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Attention-Deficit/Hyperactivity Disorder (ADHD) and Borderline Personality Disorder (BPD): Examining the overlapping features, co-occurrence, and sex differences

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ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD) AND BORDERLINE
PERSONALITY DISORDER (BPD): EXAMINING THE OVERLAPPING FEATURES, CO-
OCCURRENCE, AND SEX DIFFERENCES

An Abstract of a Thesis
Submitted
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Brittany Lewno
University of Northern Iowa
May 2014

ABSTRACT

Research connecting Attention Deficit/Hyperactivity Disorder (ADHD) and Borderline Personality Disorder (BPD) is growing. The disorders share several overlapping characteristics, neurological deficits, and similar comorbid disorders. Although these disorders are typically sex-specific, the presence of externalizing and internalizing characteristics may link these disorders. These commonalities have resulted in a developing theory suggesting that a childhood ADHD diagnosis may predict adult BPD symptoms. The current study aimed to test this developing theory. The sample included 175 emerging adults (64.6% female). A demographics measure, the Barkley Adult-ADHD Rating Scale—IV (BAARS-IV), and the Personality Assessment Inventory Borderline Personality Features Subscale (PAI-BOR) were administered in an online format. The results suggested that ADHD and BPD were significantly correlated. The theory that childhood ADHD predicted BPD symptoms was not supported. Further, results suggested that sex differences did not play a significant role in the relationship between ADHD and BPD. Implications, such as consideration of combined treatment approaches, are discussed.

Keywords: Attention Deficit Hyperactivity Disorder, Borderline Personality Disorder, precursor, sex differences, externalizing characteristics, internalizing characteristics

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Entitled: Attention Deficit/Hyperactivity Disorder and Borderline Personality Disorder:

Examining the Co-occurrence, Overlapping Features, and Sex Differences

has been approved as meeting the thesis requirement for the

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CHAPTER 1

DIAGNOSTIC CRITERIA AND CHARACTERISTICS

Attention Deficit Hyperactivity Disorder (ADHD) is a well-known disorder affecting 5% of children and 2.5% of adults (American Psychiatric Association [APA], 2013). Individuals with this diagnosis are likely to experience symptomology throughout the lifespan. For example, fifty percent of childhood ADHD symptoms may persist into adolescence, and 50% to 80% of adolescent ADHD symptoms may persist into adulthood (Murphy & Barkley, 1996). Borderline Personality Disorder (BPD) affects as many as 5.9% of individuals, who typically experience symptom onset during adolescence that persists into their adulthood (APA, 2013). Commonalities shared between these disorders include symptomology (e.g., impulsivity), co-occurring disorders (e.g., substance abuse disorders; antisocial personality disorder), and neurological deficits (e.g., working memory; frontal lobe deficits; Davids & Gastpar, 2005).

Overlap between the two disorders may also be evident when examining sex-specific internalizing and externalizing characteristics. Specifically, secondary characteristics typical in males with ADHD may be similar to the secondary characteristics of males with BPD (i.e., externalizing characteristics), and secondary characteristics typical in females with ADHD may be similar to the secondary characteristics of females with BPD (i.e., internalizing characteristics). These commonalities resulted in a developing theory suggesting that a childhood ADHD diagnosis may predict adulthood BPD symptoms (Fossati, Novella, Donati, Donini, & Maffei, 2002; Philipsen et al., 2008).

ADHD Criteria and the *DSM-5*

The most recent version of the DSM, *DSM-5* (APA, 2013) published in May 2013, identifies two primary ADHD symptom clusters: hyperactivity/impulsivity and inattention. Three subtypes of ADHD are possible for diagnosis: combined type, predominantly inattentive type, and predominately hyperactive-impulsive type. The most commonly diagnosed subtype, ADHD-combined type, occurs when at least six symptoms of inattention and six symptoms of hyperactivity-impulsivity are evident for at least six months. Similarly, ADHD-predominantly inattentive and predominately hyperactive-impulsive types may be diagnosed when six or more symptoms of that subtype are evident for at least six months (and five or fewer

of the other symptom cluster). Inattentive behavior symptoms may include avoiding homework or related tasks, losing items often, and being easily distracted. Examples of hyperactivity-impulsivity symptoms may include frequent fidgeting, excessive speaking, inability to remain calm, and preemptively responding to questions.

Although ADHD is still described in much the same way as it was in *DSM-IV-TR*, the *DSM-5* updates aimed to remedy *DSM-IV-TR* limitations (e.g., adult-specific diagnostic inclusions). Children may receive a diagnosis when they exhibit at least six symptoms of inattention and/or hyperactivity-impulsivity; however, individuals ages 17 years or older may receive a diagnosis when at least five symptoms are present. Several symptoms must have an early aged onset (i.e., 12 years) for the diagnosis. An example of the symptoms extending to adult specific situations includes the inattention symptom of being “often easily distracted by extraneous stimuli” which is visible in older adolescents or adults as “unrelated thoughts” (APA, 2013, p. 59-60). The hyperactivity symptom of “often runs or climbs in situations where it is inappropriate” may be visible in older adolescents or adults by “feeling restless” (APA, 2013, p. 59-60). These updates are not expected to effect internal consistency or reliability, but may weaken the convergent validity (Ghanizadeh, 2012).

ADHD Characteristics and Impairment

Although historically ADHD was associated with children (APA, 2000), recognizing adult ADHD in the *DSM-5* is a step toward recognizing the prevalence in adults. An estimated 2.5% of adults have ADHD (APA, 2013), which may be expected given the developmental features of ADHD. Further, 40% to 60% of childhood symptoms persist into adulthood (Xenitidis & Maltezos, 2009). Despite this statistic, many symptoms progress or develop at varying ages. Children and adolescents with ADHD may exhibit cognitive and social deficits, as evident by higher rates of delinquent behaviors, academic difficulties, and underachievement (Ramsay, 2010). Adolescents with ADHD may also have an increased likelihood for a lifetime engagement in drug-related activities (i.e., consumption, possession, distribution), and are likely to exhibit higher rates of antisocial behaviors. Drug induced behaviors among adolescents with ADHD correlate with higher rates of attempted suicide, self-injurious behaviors, and substance use compared to those without ADHD (Ramsay, 2010). Emerging adults with ADHD (i.e., ages 18-24; Arnett, 2000) often

display heightened levels of academic impairments, such as reading concerns and uncompleted assignments (Lewandowski, Lovett, Coddington, & Godron, 2008). Middle aged adults with ADHD (i.e., ages 48-52 years) are more likely to demonstrate poor cognitive performance than older aged adults ADHD (i.e., ages 68-74 years), although both sets of ages may display equal amounts inattention symptoms associated with verbal abilities (Das, Cherbuin, Eastaugh, & Anstey, 2014).

Sluggish-Cognitive Tempo

Although not noted in the *DSM-5* diagnostic criteria, a novel topic often assessed with ADHD is sluggish cognitive tempo. These symptoms refer to a subset of behavioral symptoms, including “drowsiness, daydreaming, physical hyperactivity, lethargy and apathy,” (Becker & Langberg, 2012, p. 1). Until recently these symptoms were believed to be semi-independent symptoms included in the inattention symptom cluster of ADHD (Barkley, 2013b). Growing empirical support suggests that these symptoms are a distinct construct separate from ADHD, although co-occurring cases of ADHD and sluggish-cognitive tempo are common (Barkley, 2013a; Barkley, 2013b). Evidence to suggest the distinction of sluggish cognitive tempo and ADHD has been growing (Barkley, 2012).

ADHD Comorbidity

The high statistics of ADHD comorbidity warrant acknowledgement of this topic. Approximately one-third of individuals referred for ADHD treatment also meet the criteria for another disorder (Cumyn, French, & Hechtman, 2009). Symptom severity and genetic disposition may influence the comorbid diagnosis (Steinhausen, 2009), but comorbidity may also vary depending on the age of onset. For example, children and adolescents with ADHD are frequently diagnosed comorbid with a learning disability (Ghanizadeh, 2012), oppositional defiant disorder (ODD), conduct disorder (CD; Cumyn et al., 2009; Ghanizadeh, 2012; Murphy & Barkley, 1996; Speranza et al., 2011), and tic disorders (Steinhausen, 2009; Xenitidis & Maltezos, 2009). ODD and CD may be the most frequently co-occurring diagnoses. An estimated 50% of children with the combined presentation of ADHD also have an ODD diagnosis, and approximately 25% of children and adolescents with the combined presentation of ADHD also have a CD diagnosis (APA, 2013).

Considering these statistics, it seems unsurprising that ODD- and CD-like behaviors and substance use disorders (SUD) are also frequently comorbid in adults with ADHD (Murphy & Barkley, 1996). However, as 35% of ADHD cases are diagnosed during adulthood (Ramsay, 2010), adult specific comorbid disorders also exist. These disorders often include Antisocial Personality Disorder (ASPD; Cumyn et al., 2009; Semiz et al., 2008), depression, and anxiety (Cumyn et al., 2009; Michielsen et al., 2012). As many as 65% of individuals with ASPD may also meet the criteria for ADHD (Semiz et al., 2008). Additionally, co-occurring cases of ADHD and Borderline Personality Disorder (BPD) are increasing and supported by various research (Cumyn et al., 2009; Davids & Gastpar, 2005; Dijk, Lappenschaar, Kan, Verkes, & Buitelaar, 2011).

BPD Criteria and the *DSM-5*

The *DSM-5* criteria for personality disorders lists nine total symptoms and requires the presence of at least five symptoms for a BPD diagnosis, which is the same criteria described in the *DSM-IV-TR*. The essential features of BPD are described as impairments in functioning and personality, and exhibited by unstable interpersonal relationships, self-image, impulsivity, and affects. Impulsivity was the most recent addition to the list of core BPD features (APA, 2013), and uniquely distinguishes BPD from other personality disorders.

Typically individuals with BPD will rapidly alternate from one impulsive behavior to another and engage in self-damaging impulsive behaviors (Gunderson, 2008). These core BPD features usually provoke other common BPD characteristics. For example, ongoing unstable relationships and impulsivity usually influence repeated self-injurious and/or suicidal behaviors (Baschnagel, Coffey, Hawk, Schumacher, & Hollman, 2012). The suicidality is often a byproduct of underestimating the danger of the self-injurious behaviors (Stanley, Gameroff, Michalsen, & Mann, 2001). A key distinction of BPD symptoms is the differentiation between suicidality (e.g., recurrent suicidal thoughts) and self-mutilating behaviors between impulsivity, which includes behaviors that are self-damaging (e.g., spending habits, sex, binge eating; APA, 2013).

BPD Comorbidity

With such complex symptoms, it is unsurprising that individuals with BPD are often diagnosed with a comorbid disorder. Commonly diagnosed comorbid disorders include mood disorders, and anxiety disorders (Sharp & Romero, 2007). ADHD symptoms are also common among individuals with BPD (Davids & Gastpar, 2005). Comorbid mood disorders may occur in 20% to 50% of BPD cases (Schulz et al., 1986). Other researchers' identified 90% of individuals with BPD who met the criteria for a mood disorder, primarily major depression and dysthymia (Zanarini et al., 1998). Affective disorders, anxiety disorders, and eating disorders are also typical among individuals with BPD (Gunderson, 2008; Skodol et al., 2002; Tadić et al., 2009). However, limited sampling and the potential for a sampling over-representation of individuals with certain disorders (e.g., mood disorders, anxiety disorders, substance use disorders) or females may account for the high comorbid BPD and mood disorders statistics (Gunderson, 2008).

Other frequently co-occurring disorders with BPD include substance use disorders, post-traumatic stress disorder (PTSD), Antisocial Personality Disorder (ASPD), and avoidant personality disorder (Gunderson, 2008; Sharp & Romero, 2007; Zanarini et al., 1998). Statistics for comorbid BPD and substance use disorders range from 14.7% to 57.4% (Gunderson, 2008; Sharp & Romero, 2007). Although there are fewer documented cases of these comorbid disorders, approximately 25% of individuals with BPD have a comorbid ASPD diagnosis (Gunderson, 2008). Individuals with BPD and ASPD also exhibit some overlapping symptoms (i.e., impulsivity, anger, recklessness), although typically the manifested behaviors associated with BPD and ASPD differ (Gunderson, 2008).

CHAPTER 2

ADHD AND BPD SIMILARITIES

Similar ADHD and BPD Symptoms

Affirming the connection between ADHD and BPD may be possible by noticing several common co-occurring disorders, and specific recognition of their overlapping symptoms. Impulsivity may be the most frequently cited and apparent commonality shared between ADHD and BPD (Dijk et al., 2011; Davids & Gastpar, 2005; Speranza et al., 2011). Including impulsivity as diagnostic criteria for both disorders (APA, 2013) and the number of impulsive symptoms exhibited by an individual with ADHD or BPD may explain this connection (Burke & Stepp, 2011). Evidence of this symptom overlap is available when viewing impulsivity as a form of temperament, specifically Novelty Seeking Temperament. High rates of Novelty Seeking Temperament were more susceptible to co-occurring ADHD and BPD cases than viewing the disorders separately (Dijk et al., 2012). Despite this connection, impulsivity expression may manifest differently among individuals with ADHD or BPD. For example, males with ADHD typically convey impulsivity via aggressive behaviors (Davids & Gastpar, 2005; whereas individuals with BPD usually exhibit impulsivity through self-injurious behaviors (Stanley et al., 2001). Limitations of the study examining Temperament (i.e. use of a female population; Dijk et al., 2012) and differences in symptom manifestation necessitate additional research to confirm this link.

Impulsivity is not the only overlapping symptom linking ADHD and BPD. The three core traits of ADHD, hyperactivity, inattention, *and* impulsivity, may be equally common among individuals with ADHD or BPD (Dijk et al., 2012; Speranza et al., 2011). Furthermore, several secondary characteristics (i.e., characteristics that occur as the result of core traits) are also found in individuals with ADHD or BPD. These characteristics include intolerance of frustrating situations, mood swings, and self-destructiveness (Davids & Gastpar, 2005).

Age may be an explanatory variable to accounts for overlapping symptoms. Although some ADHD symptoms decrease with age, inattention, emotional instability, disorganization, and disinhibition are more likely to manifest in adulthood (Hesslinger et al., 2002). These symptoms echo common BPD symptoms, which again are typical among adolescents and adults. Children or adolescents with ADHD may

exhibit BPD specific symptoms, such as impulsive eroticism, intense temperament, low self-esteem, moodiness, and interpersonal problems (Cumyn et al., 2009).

Similar Comorbid Disorders and Unique Connections

As previously noted, similar symptoms are one connection between ADHD and BPD. Common comorbid disorders include depression, anxiety, substance use disorders, antisocial personality disorder, and ODD (Cumyn et al., 2009; Gunderson, 2008). Certain disorders may uniquely connect ADHD and BPD. For example, antisocial personality disorder and BPD are exclusively associated with ADHD, given that other personality disorders do not co-occur with ADHD as frequently (Cumyn et al., 2009). Furthermore, empirical support connects ODD, ADHD, and BPD. For instance, the oppositional behavioral characteristics (e.g., affect dysfunction) related to ODD may predict BPD symptoms at a later onset (Burke & Stepp, 2012), and children with ADHD and high levels of ODD are more likely to develop BPD symptoms by age 14 (Speranza et al., 2011).

ADHD and BPD are uniquely connected in ways other than co-occurring disorders. A common ecological factor among individuals with ADHD and individuals with BPD is their history of maltreatment (Jovev et al., 2013; Ouyang, Fang, Mercy, Perou, & Grosse, 2008). Given that as many as half of individuals with BPD experience a history of maltreatment (Perepletchikova, Ansell, & Axelrod, 2012), such history is a suggested developmental component for individuals with BPD (Jovev et al., 2013). Specific types of maltreatment noted by individuals with BPD oftentimes include emotional abuse, social abuse, physical abuse, verbal abuse dysfunctional family environment, and sexual abuse (Stepp, Olino, Klein, Seeley, & Lewinsohn, 2013). Further, parental discord may even serve as a mediating factor for BPD development (Stepp et al., 2013).

Children with ADHD also frequently experience maltreatment, and commonly report high rates of supervision neglect, physical neglect, and physical abuse (Ouyang et al., 2008). The experienced trauma is likely to impose long-term problems and may exacerbate ADHD symptoms. These traumatic experiences may even be a developmental component of ADHD (Szymanski, Sapanski & Conway, 2011). Symptoms associated with ADHD (e.g., impulsivity, hyperactivity) are likely to also provoke unfavorable parenting styles, given the increased stress of parenting children with ADHD (Jaffee & Maikovich-Fong, 2013). This

increased stress may provoke onset an abusive relationship (i.e., maltreatment for the child with ADHD). However, additional research is warranted to examine if symptomology acts as a causal component for maltreatment (Jaffee & Maikovich-Fong, 2013).

With consideration of these overlapping commonalities, a separate subpopulation may exist of individuals with childhood ADHD who develop adulthood BPD. Such a subset may be linked by experienced maltreatment. This trajectory may be characterized by maladaptive developmental and ecological features (e.g., maltreatment, abuse) that exacerbate the onset of BPD symptoms. This ongoing history of experienced abuse and ADHD symptoms (e.g., impulsivity) may lead to the development of adulthood BPD. A better understanding of the ADHD and BPD link is warranted before this conclusion can be confirmed.

These noted commonalities may be the product of similar neurological deficits seen in individuals with ADHD and BPD. For example, frontal lobe control deficits help explain overlapping characteristics (e.g., verbal fluency, impulsivity control, attention, abilities to sustain or alter responses to cognitions; Davids & Gastpar, 2005). Also, inferior levels of white matter may heighten psychopathology symptoms among those with co-occurring ADHD and BPD (Rüsch et al., 2007). Deficits are also present in the medial orbitofrontal cortex (mOFC), a sub-region of the prefrontal cortex responsible for decision making (Rüsch et al., 2007). These abnormalities are evident by damaged mOFC regions among individuals with ADHD (Wilbertz et al., 2012), and decreased blood flow to the mOFC regions among individuals with BPD (Wolf et al., 2012). Further, the *N*-methyl-D-aspartate area, which influences the function of cognition and memory tasks, is abnormally structured in individuals with BPD (Grosjean & Tsai, 2007). Individuals with ADHD usually perform lower on working memory tasks (Allen, Grosjean-Strauss, Leany, & Donohue, 2008), which may be indicative of neurological abnormalities.

Externalizing and Internalizing Characteristics and Sex Comparison

Historically ADHD and BPD have been found to be sex specific. ADHD is more common in males than females, with a 2:1 to 9:1 ratio depending on sampling (APA, 2013). Typically BPD is considered more prominent among females, possibly up to 75% of BPD cases (APA, 2013), although some research suggests that BPD is equal among the sexes (Sansone & Sansone, 2011). Despite these

differences, a closer look at the externalizing and internalizing characteristics of both disorders might more precisely describe the overlapping characteristics and make the link between ADHD and BPD more plausible.

Sometimes described as behavioral disinhibition (Iacono, Malone, & McGue, 2008), externalizing characteristics refer to impulsive tendencies, behavioral difficulties (Sher & Trull, 1994), and other outward symptoms. Internalizing characteristics refer to negative affective characteristics, such as high levels of emotionality, fear, worry, and distress (Witkiewitz et al., 2013). Often entire disorders are categorized as either externalizing or internalizing (Cummings, Ojanen, & Hunt, 2013; Krueger & Markon, 2011). For example, ADHD is referred to as an externalizing disorder because a majority of its symptoms are outward (Witkiewitz et al., 2013); whereas a disorder with equal externalizing and internalizing characteristics may factor as both. Based on findings from a factorial analysis examining personality disorders' internalizing and externalizing symptoms, BPD is considered equally internalizing and externalizing (James & Taylor, 2008). Acknowledging these sex differences may make the link between ADHD and BPD more plausible.

ADHD and Sex Features

ADHD is more common in males than females, with a 2:1 to 9:1 ratio depending on sampling (APA, 2013). Although ADHD is considered an externalizing disorder (Cummings et al., 2013), females with ADHD usually exhibit secondary internalizing characteristics (e.g., anxiety, depression), whereas males usually display secondary externalizing characteristics (e.g., oppositionality, conduct problems; Gaub & Carlson, 1997). Males with ADHD typically display heightened levels of core ADHD symptoms compared to females with ADHD (i.e., higher levels of hyperactivity, impulsivity, inattention; Gershon 2002). Conduct disorder and ODD are also common comorbid diagnoses among males with ADHD (Gershon, 2002). On the other hand, females with ADHD are likely to exhibit more symptoms of depression and anxiety (Gaub & Carlson, 1997; Gershon, 2002). However, the following features may be equally distributed between males and females with ADHD: "... academic performance, social functioning, fine motor skills, parental education, and parental depression" (Gaub & Carlson, 1997, p. 1041).

BPD and Sex Features

Typically BPD is considered more prominent among females, and may account for 75% of BPD cases (APA, 2013). Although some research suggests that BPD is equal among the sexes (Sansone & Sansone, 2011) differences may be most visibly apparent in the manifestation of characteristics. Females with BPD commonly demonstrate secondary internalizing characteristics (e.g., difficulties with relationships; self-criticism), and males may exhibit secondary externalizing characteristics (e.g., impulsivity, and aggression; James & Taylor, 2008).

Males also exhibit that following externalizing characteristics: higher rates of explosive temperament, anger problems, impulsivity, and aggression (Bradley, Zittel, & Weston, 2005; Sansone & Sansone, 2011; Perez-Rodriquez et al., 2012). ASPD, most SUD cases, and narcissistic personality disorder are classic co-occurring disorders among males with BPD (Sansone & Sansone, 2011; Tadić et al., 2009; Zanarini et al., 1998). Male adolescents with BPD symptoms are more likely to dramatize their emotions, display more behavioral disinhibition, and are more visibly self-centered (Bradley et al., 2005).

Females with BPD usually demonstrate more harm avoidance coping strategies (Sansone & Sansone, 2011), hide their level of distress, and express patterns of instability (Tadić et al., 2009). They also have a tendency to be overly self-critical and have trouble with developing relationships (Bradley et al., 2005). Particularly females with BPD are typically diagnosed with or exhibit symptoms of PTSD, mood disorders, or anxiety disorders (Sansone & Sansone, 2011). Females are also more likely to have comorbidity with eating disorders (particularly anorexia; Zanarini et al., 1998), anxiety, and affective disorders (Sansone & Sansone, 2011; Tadić et al., 2009). Non-gender-specific BPD characteristics include self-injurious behaviors (Perez-Rodriquez et al., 2012), like cutting (Sansone & Sansone 2011), and identity disturbance (Bradley et al., 2005). Further, males and females with BPD are usually unemployed (i.e., 60% vs. 63.3%; Tadić et al., 2009).

CHAPTER 3

ADHD AS A PRECURSOR FOR BPD AND TREATMENT

The aforementioned shared characteristics and neurological commonalities may be explained through a developing theory causally connecting ADHD and BPD. This theory suggests that childhood ADHD may serve as a precursor for adulthood BPD symptoms. This theory has modest empirical support, with varying methodology and may be evident by various forms of measurement (e.g., prevalence rates, childhood maltreatment). Further, this theory may be indicative of a subset of individuals who experience ADHD symptoms during childhood and are on a trajectory for developing BPD symptoms as adults.

Empirical Support

The first evidence for this theory was a study that sought to identify BPD subcategories, and recommended ADHD symptoms as one of three subcategories of BPD (Andrulonis, Glueck, Stroebel, & Vogel, 1982). Validation is also available in more recent studies examining personality disorders. This link was also verified among a sample of individuals with and without personality disorders, where conclusions determined that individuals with BPD were likely to exhibit ADHD symptoms, even when ASPD symptoms, sex, and other co-occurring disorders were controlled (Fossati et al., 2002).

Another research team that made this connection utilized a sample of adolescents with BPD symptoms and screened participants for ADHD (Speranza et al., 2011). Approximately 46% of participants currently displayed or previously noted at least one core ADHD characteristic, and 11% fulfilled the criteria for ADHD. Controlling for impulsivity did not alter the outcomes, despite finding that over 85% of participants exhibited high rates of impulsivity, suicidality, and excessive anger (Speranza et al., 2011). Findings from these studies indicate a pattern exists: individuals with BPD are likely to have some ADHD symptoms. Additionally, women seeking BPD treatment who were evaluated for childhood and adult ADHD symptoms reported high prevalence rates of ADHD symptoms (i.e, 41.2% of childhood symptoms; 16.1% of adult symptoms; Philipsen, et al., 2008).

Similar conclusions were found in a clinical sample of boys with ODD, CD, and ADHD. These participants were administered personality disorder screenings throughout adolescence and emerging adulthood, and by age 24 years, 8.5% of participants met the criteria for BPD, and approximately half

conveyed some BPD symptoms (Burke & Stepp, 2011). Although these statistics are preliminary, individuals with ADHD were more likely to exhibit BPD symptoms than symptoms from other personality disorders suggesting that a childhood ADHD diagnosis may predict BPD adulthood symptoms (Burke & Stepp, 2011). Such findings seem extraordinary considering that only about 3% of the general population is diagnosed with BPD (APA, 2013). Other researchers support the inference that ADHD may be a precursor for BPD symptoms (e.g., Davids & Gastpar, 2005; Dijk et al., 2011; Dijk et al., 2012; Skodol et al., 2002), although noting that this theory is not universally supported by all ADHD and BPD researchers (Davids & Gastpar, 2005).

Separate Population

With consideration for the aforementioned theory and noted commonalities, a separate subpopulation of those with ADHD likely to develop BPD may exist. Specifically, a subset of children with ADHD may be on a trajectory to develop BPD symptoms. This trajectory may be characterized by maladaptive developmental and ecological features (i.e. life experiences, familial relationships), which would justify the associations between ADHD and BPD while belie the contradictions for their link. A common ecological factor among individuals with ADHD and individuals with BPD is their history of maltreatment (Jovev et al., 2013; Szymanski et al., 2011). Approximately 50% to 70% of individuals with BPD or BPD symptoms report a history of maltreatment (e.g., abuse, neglect; Martín-Blanco et al., 2014; Perepletchikova et al., 2012). Such history is a key risk factor in the development of BPD symptoms (Joyce et al., 2003). Specific types of maltreatment noted by individuals with BPD oftentimes include emotional abuse, social abuse (Stepp et al., 2013), and physical abuse; verbal abuse (Weston & Riolo, 2007), dysfunctional family environment, parental psychiatric disorders (Stepp et al., 2013), and neglect (Jovev et al., 2013). Further, emotional abuse that occurred during childhood and temperamental traits are likely to increase the severity of BPD symptoms (Martín-Blanco et al., 2014).

Children with ADHD are also likely to have experienced maltreatment. Children with ADHD are likely to report high rates of supervision neglect, physical neglect, and physical abuse (Ouyang et al., 2008). The role of trauma among this population is so great, traumatic experiences are a suggested developmental component or exacerbating feature of children with ADHD (Szymanski et al., 2011). This

ecological factor may be a developmental component to the ADHD as a precursor to BPD theory, implying that individuals with ADHD who experience such traumatic history are more likely to develop BPD.

However, a better understanding of the theory and the ADHD and BPD is warranted before this conclusion can be confirmed.

Emerging Adults

Although these studies serve as evidence for ADHD being predictive of BPD, the developmental nature of this theory warrants researching all ages of individuals with ADHD and BPD to best understand this theory. One understudied age group that may provide preliminary information about the ADHD and BPD link is emerging adulthood (i.e., ages 18 through 25). Emerging adulthood refers to a developmental life stage that includes individuals who transition into college (Arnett, 2000). Although some research is available that uses emerging adults with ADHD (e.g., Lewandowski et al., 2008) and emerging adults with BPD (e.g., Chesin, Moster, & Jeglic, 2013), limited literature exists that explicitly considers the ADHD and BPD link among emerging adults.

CHAPTER 4

CURRENT STUDY

The lack of research assessing emerging adults among the theory suggesting that ADHD may be a precursor for BPD exemplifies a literature gap that deserves addressing. Further, although ADHD and BPD are linked by multiple features (e.g., common comorbid disorders, overlapping characteristics, neurological deficits) less confirmatory research exists regarding sex differences. This area may require specific attention considering ADHD is typically associated with males, and BPD is typically associated with females (APA, 2013).

The current study's overarching objective is to enhance the growing body of literature examining the overlapping features of ADHD and BPD in a sample of emerging adults. Specifically, the current study assessed how sex-specific characteristics (e.g., externalizing characteristics, internalizing characteristics) may relate to individuals exhibiting ADHD symptoms and BPD symptoms. The current study tested the theory that an early onset of ADHD symptoms may predict adulthood BPD symptoms (Fossati et al., 2002). Using an online survey format, the current study analyzed the presence of BPD symptoms in participants exhibiting ADHD symptoms and those who do not exhibit ADHD symptoms. Based on the information reported above, the current study suspects the following hypotheses:

- a. Hypothesis 1 predicts that individuals with high levels of ADHD symptoms will have higher levels of BPD symptoms.
- b. Hypothesis 2 predicts that the younger an individual received an ADHD diagnosis, the more likely he/she would endorse BPD symptoms.
- c. Hypothesis 3 predicts that females with high levels of ADHD symptoms and high levels of BPD symptoms will indicate an internalizing disorder as a comorbid mental health problem more frequently than males; whereas males with high levels of ADHD symptoms and high levels of BPD symptoms will indicate an externalizing disorder as a comorbid mental health problem more frequently than females.
- d. Hypothesis 4 predicts that the correlation between ADHD symptoms and BPD symptoms will be higher for males than females.

e. Hypothesis 5 predicts that females with high levels of ADHD symptoms will report more self-harm behavior than males with high levels of ADHD symptoms.

f. Hypothesis 6 predicts that females with high levels of ADHD symptoms will report more affective instability.

CHAPTER 5

METHODS

The current study was a survey design administered in an online format. It should also be noted that the current study focused on symptoms of ADHD and symptoms of BPD, rather than explicit diagnoses.

Participants

Participant recruitment occurred via several approaches. First, participants were recruited from the University of Northern Iowa's Student Disability Services and Northern State University's Disability Services by email invitation. Second, participants who completed previous ADHD studies at University of Northern Iowa, Appalachian State University, and University of Wyoming were invited by email to participate. These first two recruitment methods represent an effort to over-select individuals with ADHD. The third recruitment approach was the University of Northern Iowa's Psychology Department Participant Pool. Participants from Disability Services and prior research studies received a \$10.00 Amazon.com gift card as compensation, which was sent to participants via email (see Appendix J). Participants recruited through UNI's Psychology Department Participant Pool received one research credit as required by the Introductory Psychology classes.

One-hundred ninety eight people were surveyed. Twenty-two participants were excluded from the sample for (A) being outside the emerging adult age range of 18 to 25 years old ($n = 8$), or (B) completing the study in an unrealistic amount of time of less than 10 minutes ($n = 14$). With consideration of this exclusion criteria, the total n included 176 emerging adults (64.6% female), where 158 of the participants identified themselves as Caucasian/White (89%). The sample also included individuals who reported a diverse background (i.e., 2.8% African American/Black; 2.8 % Asian/Asian American; 3.4% Latino/Latina/Hispanic, .6% Middle-Eastern). The majority of participants were reportedly in the early emerging adult ages. Eighty-seven individuals identified themselves as 18 years old (50%), and 52 individuals reported themselves as 19 years old (29.9%), $m = 18.91$. One hundred twenty-three participants were reportedly college freshman (70.3%). One individual did not specify his/her race and gender (.6%).

Thirty-one individuals (17.1%) reported having an ADHD/ADD diagnosis. Of those 31 individuals, 19 are reportedly currently taking medication for ADHD (59.4%), whereas 23 reportedly took medication for ADHD in the past (71.9%; includes some individuals currently taking medication). Two individuals stated that they are currently undergoing psychosocial treatment for ADHD (6.3%), while eight reported previously psychosocial treatment for ADHD (25%).

Seventeen individuals (53.1%) reported another diagnosis in addition to ADHD, although no individuals reported an additional externalizing disorder, 12 participants reported an additional diagnosis (or multiple diagnoses) that were classified as internalizing disorders (6.8%). Three individuals (1.7%) reported another comorbid disorder (e.g., Bipolar Disorder, Learning Disorder) that were neither externalizing nor internalizing, and two individuals did not specify (see Table 1). According to diagnostic criteria recommendations of the BAARS, twenty-nine individuals of 176 individuals met the diagnostic criteria for ADHD (18% female). Thirteen individuals met the diagnostic criteria for BPD (6% female), per the PAI-BOR diagnostic criteria recommendations.

Table 1:

Participant Characteristics

Variable	N	%
Sex		
Male	58	33%
Female	117	66.5%
Unknown	1	.6%
Age		
18	87	50%
19	52	29.9%
20	17	9.8%
21	9	5.2%
22	3	1.7%
23	3	1.7%
24	3	1.7%
Current Academic Standing		
Freshman	123	70.3%
Sophomore	23	13.1%
Junior	15	8.6%
Senior	14	8%
Race		
Caucasian/White	158	89.8%
Middle Eastern	1	.6%
Asian/Asian American	5	2.8%
African American/Black	5	2.8%
Latino/Latina/Hispanic	6	3.4%
Unknown	1	.6%
Reported ADHD Diagnosis		
Yes	31	17.1%
Diagnosis age 14 or older	20	10.3%
Additional internalizing disorder	15	7.7%
No	144	82.3%

Procedure

The University of Northern Iowa's Institutional Review Board (IRB) approved the study prior to data collection and letters of cooperation were received from individuals representing Appalachian State University, University of Wyoming, and Northern State University (see Appendix K and Appendix L). The researcher created an online survey at the website www.qualtrics.com. Potential participants from Disability Services and previous research studies received an email invitation to participate that included the survey details, compensation information, and survey link (see Appendix G).

Participants recruited through the Psychology Department Participant Pool received a study description, compensation information (i.e., research credit), and the study link through the Psychology Department Participant Pool website (see Appendix H). Informed consent procedures and additional information about the study, including benefits, risks, survey length, and the researchers' and faculty supervisor's contact information (i.e., phone number, email address) were presented to all participants.

Informed consent was confirmed by the initial [qualtrics.com](http://www.qualtrics.com) page providing the study details and informed consent information. Individuals who provided consent were directed to the remaining survey measures (see Appendix A—Appendix I). The survey explicitly stated that the participants may withdraw from the study at any time. The survey time duration varied from 10 minutes to 240 minutes to complete, but individuals who completed the survey in an unrealistically short amount of time (i.e., < 10 minutes) were removed from data analyses (i.e., 14 individuals). Participants were advised of their progress throughout the survey. As an attempt to minimize risk during the study, the National Alliance on Mental Illness (NAMI) website (i.e., <http://www.nami.org/>), and helpline (i.e., 1 (800)-950-6264) were provided at the top of each page. Students were also advised of the Counseling Center contact information from each of the four universities.

The debriefing page appeared if participants chose to discontinue the study or followed immediately after the final survey item. The debriefing form included researcher's gratitude, reiteration of the purpose of the study, study details, confidentiality agreement, and researcher/faculty advisor contact information (see Appendix I). The debriefing page was also available in a .pdf format for printing purposes

if participants wanted a personal copy. The debriefing form differed only in compensation details (gift card vs. research credit).

Materials

The current study was conducted in conjunction with another study, but only measures relevant to the current study are described here (i.e., Demographics; BAARS; PAI-BOR). The appendices are reflective of the measures associated with the current study.

Demographics

A demographics questionnaire was created by the author and collaborating researcher for the purpose of the study (see Appendix B). The 18 items included typical demographic questions and basic diagnostic inquires (i.e., referral source, age of onset, potential comorbidity). The format includes fill-in-the-blank items, yes/no items, and multiple choice items that requested the respondent marks the item that best fits. Three items allowed the respondent to write in their own response, if the given responses are not applicable.

Barkley Adult ADHD Rating Scale—IV (BAARS-IV)

The Barkley Adult ADHD Rating Scale—IV (BAARS-IV; Barkley, 2011) is a commonly used 30 item, self-report measure assessing the state of individuals' current symptoms from the previous six months (e.g., *Don't listen when spoken to directly, Forgetful in daily activities*). The BAARS distinguishes items that measure the core ADHD symptoms (i.e., inattention, hyperactivity, impulsivity) and includes eight items pertaining to sluggish-cognitive tempo symptoms (e.g., *Lethargic, more tired than others*, Barkley, 2011). Responses are answered with a Likert type scale ranging from 1 to 4 (i.e., *Never/rarely, Very Often*). Three open-ended questions included at the end of the measure relate to individuals' overall ADHD diagnosis (see Appendix C).

The BAARS-IV demonstrated high internal consistency via Cronbach's alpha as follows: ADHD inattention $\alpha = .90$, ADHD hyperactivity $\alpha = .78$, ADHD impulsivity $\alpha = .81$ for a total score of $\alpha = .90$. Test-retest reliability results indicate significance with a total score of $r = .79$, as computed by Pearson product-moment correlations between first and second scale administrations. Inter-rater validity was confirmed by positive correlations between the self-report ratings when compared to other ratings of

ADHD, which ranged from .67 to .70, and .73 to .75 when reflecting on childhood symptoms (Barkley, 2011). Inter-rater validity is also verified when comparing the BAARS to other ADHD assessment tools, such as the Parental Barkley Adult ADHD Rating Scale (P-BAARS; Magnússon et al., 2006).

Personality Assessment Inventory Borderline Personality Features Subscale (PAI-BOR)

The Personality Assessment Inventory Borderline Features Scale (PAI-BOR) is a subscale of the Personality Assessment Inventory (PAI; Morey, 2007; Slavin-Mulford et al., 2012), which is a psychometrically sound, comprehensive personality and psychopathology self-report test or semi-structured interview (see Appendix D). The current study will use the self-report version of the PAI-BOR, which includes 24 items on a 4-point Likert type scale ranging from *False* to *Very True* with six items reversed scored. The PAI-BOR is divided into four parts representative of core BPD features: affective instability (BOR-A), identity problems (BOR-I), negative relationships (BOR-N), and self-harm (BOR-S). The item, “*I have little control over my anger,*” is one item measuring affective instability (i.e., BOR-A; Morey, 2007). Scores suggest the presence of borderline pathology by an obtained raw score greater than or equal to 60 (Morey, 2007).

The psychometric properties of the scale validate its use. For example, the PAI-BOR preliminary studies illustrated strong convergent and discriminant validity (Morey, 2007). The use of the PAI was also suggested after comparing life-event correlates among a clinical inpatient population. Meaningful correlations were found for 11 of the 13 subscales, and the PAI-BOR scale produced the greatest number of correlations by demonstrating an association with eight of the 12 life event variables. These analyses provided conclusive evidence of the PAI’s strong convergent and discriminant validity in association to at least one life event (Salvin-Mulford et al., 2012).

Specifically, the use of the PAI-BOR subscale was confirmed among a sample of individuals with BPD evaluated for DBT treatment. In an attempt to confirm the relationship between the individual PAI-BOR subscales and the noted participants, the subscales accounted for a significant amount of variance, $R^2 = .645$, adjusted $R^2 = .375$ (Jacobso, Blais, Maity, & Harley, 2007). Reliability was also suggested among a sample of outpatient individuals with and without known BPD, $\alpha = .93$ (Gardner & Qualter, 2009). Further, convergent validity was determined between the PAI-BOR and the Mclean Screening Instrument for BPD

(MSI-BPD) and the Personality Diagnostic Questionnaire Fourth Edition-BPD Scale (PDQ4-BPD), two commonly used measures of BPD assessment. Specifically, the PAI-BOR converged highly with the PDQ4-BPD, $r = .86$, and the MSI-BPD, $r = .85$. However, a four-factor model confirmatory analysis and six-factor model confirmatory analysis of the PAI-BOR among this sample failed to produce a “good” model fit (Gardner & Qualter, 2009). High test-retest reliability ranges from $r = .73$ (Trull, 1995) and $r = .86$ (Morey, 2007). The PAI-BOR demonstrated high internal consistency ($r = .84$; Trull, 1995).

CHAPTER 6

RESULTS

Hypothesis testing and exploratory analyses were conducted through the computerized statistical program SPSS. Power analyses were conducted with G-Power to determine the necessary sample size (Faul, Erdfelder, Lang, & Buchner, 2007), which were based on previous studies assessing ADHD and BPD with similar statistical analyses (i.e., Burke & Stepp, 2012; Philipsen et al., 2008). It should be noted that these studies used clinical samples and diagnosed individuals with ADHD or BPD to draw conclusions. The current study assessed ADHD and BPD symptoms and individuals who reported an ADHD or ADD diagnosis. For a bivariate correlation analysis, 2-tailed, 71 participants were necessary for adequate statistical power. For an r to z -transformation analysis, 2-tailed, 152 participants were required for adequate power. According to a linear bivariate regression of two groups with the difference between slopes, 2-tailed, 1,204 participants were necessary for adequate power.

Hypothesis 1 predicted that individuals with high levels of ADHD symptoms would have higher levels of BPD symptoms. Using a bivariate correlation between total scores on the BAARS (all ADHD symptoms) and total scores of the PAI-BOR (all BPD symptoms), this hypothesis was confirmed. The results suggested that ADHD symptoms and BPD symptoms were significantly correlated, $r(129) = .526, p < .001$, 2-tailed (see Table 2).

A linear regression was performed to test hypothesis 2, which predicted that the younger an individual received an ADHD diagnosis, the more likely he/she would endorse BPD symptoms. The results suggested that age of ADHD diagnosis did not significantly predict BPD symptoms above and beyond the relationship between ADHD symptoms and BPD symptoms, $b = .273, (SE = .563), t(19) = .484, p = .634$. The overall regression was significant, but ADHD symptoms explained the variance in BPD scores, $R^2 = .468, F(2,18) = 7.924, p = .003, 95\% CI [-.911, 1.456]$ (see Table 3).

Hypothesis 3 predicted that females with high levels of ADHD symptoms and high levels of BPD symptoms will indicate an internalizing disorder as a comorbid mental health problem more frequently than males; whereas males with high levels of ADHD symptoms and high levels of BPD symptoms will indicate an externalizing disorder as a comorbid mental health problem more frequently than females.

Unfortunately, this hypothesis was not able to be fully tested. Given the limited number of individuals who reported an additional disorder or mental health problem that classified as an internalizing disorder (i.e., 12 participants, 6.8%) or an externalizing disorder (i.e., zero participants), the first half of this hypothesis should be interpreted with caution and the second half of the hypothesis was not able to be tested. The results of a multiple linear regression suggested overall significance was found as ADHD symptoms, BPD symptoms, and sex predicted the presence of an internalizing disorder, $F(3, 127) = 21.68, p < .001$. However, the presence of internalizing symptoms may be attributed to ADHD symptoms, $b = .03$ ($SE = .003$), $t(127) = -5.26, p < .001$, 95% CI [-.021, -.009], and BPD symptoms, $b = .02$ ($SE = .005$), $t(127) = 2.43, p = .016$, 95% CI [-.023, .002]. Sex did not account for a significant amount of variance in the presence of an internalizing disorder, $b = 5.85$ ($SE = .00$), $t(127) = .14, p = .89$, 95% CI [-.001, .00].

Hypothesis 4 predicted that the correlation between ADHD symptoms and BPD symptoms will be higher for males than females. To test this hypothesis, a bivariate correlation comparing males' ADHD symptoms and BPD symptoms was compared to a bivariate correlation comparing females' ADHD symptoms and BPD symptoms. Fisher r to z transformation was used to compare these correlations. First, significance was found for the correlation for females, $r(84) = .550, p = .000$, 2-tailed, as well as for males $r(84) = .550, p < .001$, 2-tailed. The results indicated that the sex of the individual did not significantly influence the correlation between ADHD symptoms and BPD symptoms, $Z = .33, p = .7414$, 2-tailed (see Table 4 and Table 5).

Hypothesis 5 predicted that females with high levels of ADHD symptoms will report more self-harm behavior as indicated by the higher scores on the PAI-BOR items measuring self-harm (i.e., BOR-S) than males with high levels of ADHD symptoms. This hypothesis was tested by a Fisher r to z transformation between males and females with high levels of ADHD symptoms and levels of self-harm, as measured by the higher scores of the BOR-S. The correlation between females with high levels of ADHD symptoms and the BOR-S was significant, $r(101) = .50, p < .001$, 2-tailed, and the correlation between males with high levels of ADHD symptoms and the BOR-S was significant, $r(53) = .393, p = .004$, 2-tailed. However, the difference between the correlation was not statistically significant, $Z = .49, p = .6241$, 2-tailed (see Table 4 and Table 5).

Hypothesis 6 predicted that females with high levels of ADHD symptoms will report more affective instability, as indicated by the higher scores on the BOR-A. Fisher r to z transformation was used to compare to the correlations between ADHD symptoms and affective instability for males and for females. The correlation between females with high levels of ADHD symptoms and the BOR-A was significant, $r(108) = .457, p < .001$, 2-tailed. On the other hand, the correlation between males with high levels of ADHD symptoms and the BOR-A was insignificant, $r(50) = .207, p = .140$. The difference between the correlations was not statically significant, $Z = 1.45, p = .1417$, 2-tailed (see Table 4 and Table 5).

Several exploratory analyses were conducted with intention of better understanding these data. First, Two Chi-square analyses were conducted to compare the sex difference among participants who met the diagnostic criteria recommendations for both ADHD and BPD. The results suggested that those who met the criteria for ADHD did not differ by sex, $\chi^2(8, N = 176) = 0.94, p = .72$. Further, those who met the criteria for BPD also did not differ by sex, $\chi^2(4, N = 176) = 0.98, p = .62$. An independent sample t-test did not produce a statistically significant difference among the mean number of males ($M = 49.4423, SD = 14.796$) and females ($M = 48.8476, SD = 16.375$), $t(155) = .221, p = .825$, 95% CI [-4.722, 5.912], when using total ADHD scores as the testing variable. When using the total BPD symptoms as the testing variable, an independent sample t-test also did not produce a statistically significant difference among the mean number of males ($M = 49.717, SD = 6.837$) and females ($M = 50.617, SD = 8.682$), $t(138) = .615, p = .539$, 95% CI [-3.791, 1.991]. An independent sample t-test failed to reveal a statistically significant difference between the mean number of males ($M = 1.087, SD = .2848$) and females ($M = 1.096, SD = .2958$), $t(138) = .167, p = .87$, 95% CI [-.113, .095] when using the BAARS-IV diagnostic criteria as the testing variable. Statistically non-significant differences was found with the testing variable being PAI-BOR diagnostic criteria between males ($M = 1.087, SD = .2848$) and females ($M = 1.096, SD = .2958$), $t(138) = .167, p = .87$, 95% CI [-.113, .095].

Next, bivariate correlations comparing BPD symptoms with the core ADHD symptom subsets (i.e., inattention, impulsivity, hyperactivity) and sluggish-cognitive tempo symptoms were conducted. Specifically, BPD symptoms significantly correlated with inattentive symptoms, $r(132) = .418, p < .001$, 2-

tailed; impulsivity symptoms, $r(133) = .423, p < .001$, 2-tailed; and hyperactivity symptoms, $r(133) = .471, p < .001$, 2-tailed. The largest correlation occurred between BPD symptoms and sluggish-cognitive tempo symptoms, $r(130) = .526, p < .001$, 2-tailed (see Table 2).

Exploratory analyses were also conducted with consideration of the sex-specific hypotheses (i.e., hypotheses 4, 5, 6). First, a Chi-square analysis was conducted to compare if there was a sex difference among participants who met the diagnostic criteria recommendations according to the PAI-BOR and BAARS-IV. The results suggested that those who met the criteria for ADHD did not differ by sex, $\chi^2(8, N = 176) = 0.94, p = .72$. Further, those who met the criteria for BPD also did not differ by sex, $\chi^2(4, N = 176) = 0.98, p = .62$.

A multiple regression model was tested to investigate if the BPD and ADHD interaction depends on the individual's sex. The total ADHD symptoms were centered (i.e., total ADHD symptoms subtracted from the mean), and another variable was created (i.e., centered ADHD symptoms by sex). These variables (i.e. sex, centered ADHD symptoms, centered ADHD symptoms by sex) were inputted into a regression model as predictor variables. When BPD symptoms were inputted as the outcome variable, the results suggested that the main effect of centered ADHD symptoms produced significance, $b = .27 (SE = .042), t(129) = 6.480, p < .001$. Although this variable approached significance, this relationship does not appear to be moderated by sex, $b = .058 (SE = .033), t(129) = 1.765, p = .08$. Similarly, sex did not have an interaction effect when assessing the individual BPD symptom clusters as outcome variables. These results were as follows: affective instability, $b = .014 (SE = .009), t(146) = .109, p < .109$; identity problems, $b = .019 (SE = .013), t(143) = 1.413, p = .160$; negative relationships, $b = .015 (SE = .010), t(147) = 1.498, p = .136$, self-harm, $b = .003 (SE = .010), t(147) = .318, p = .751$.

Given the null results from hypotheses 5 (i.e., females with high levels of ADHD symptoms would report more self-harm behavior) and 6 (i.e., females with high levels of ADHD symptoms would report more affective instability), exploratory analyses also considered the sex differences among the remaining core BPD characteristics (i.e., negative relationships, identity problems). Separate bivariate correlations were conducted for males and females, and these results were compared using a Fisher r to z

transformation. The results were not statistically significant when considering negative relationships as the dependent variable, $Z = .41$, $p = .6818$, 2-tailed. Nonsignificance was also found when considering identify problems as the dependent variable, $Z = 1.01$, $p = .3125$, 2-tailed (see Table 4 and Table 5).

Another set of exploratory analyses used a series of linear regressions, which used the core ADHD symptom clusters (i.e., inattention, hyperactivity, impulsivity) and sluggish cognitive tempo symptoms as predictors of BPD symptoms. Statistically significant results were found as follows: impulsivity symptoms significantly predicted BPD symptoms, $b = 1.336$ ($SE = .249$), $t(133) = 5.376$, $p < .001$, and explained a significant amount of variance, $R^2 = .179$, $F(1, 133) = 28.907$, $p < .001$, 95% CI [.845, 1.828]. Hyperactivity symptoms also significantly predicted BPD symptoms, $b = 1.400$ ($SE = .228$), $t(133) = 6.152$, $p < .001$, and explained a significant amount of variance, $R^2 = .222$, $F(1, 133) = 37.844$, $p < .001$, 95% CI [.950, 1.850]. Inattention symptoms significantly predicted BPD symptoms, $b = .588$ ($SE = .111$), $t(132) = 5.282$, $p < .001$, and accounted for a significant portion of the variance, $R^2 = .174$, $F(1, 132) = 27.896$, $p < .001$, 95% CI [.368, .808]. Finally, sluggish-cognitive tempo symptoms also predicted BPD symptoms, $b = .726$ ($SE = .103$), $t(130) = 7.048$, $p < .001$, and accounted for approximately 28% of the variance of BPD symptoms, $R^2 = .276$, $F(1, 130) = 49.674$, $p < .001$, 95% CI [.522, .930] (see Table 3).

Table 2:

Correlations between BPD Symptoms, ADHD Symptoms, and Sex

	1	2	3	4	5	6	7	8	9	10	11
Sex (1)	1	-.024	.000	-.073	.040	-.029	-.061	-.048	-.022	-.078	-.060
Total BPD Sx.(2)		1	.729**	.806**	.701**	.835**	.526**	.418**	.423**	.471**	.526**
Affective Instability (3)			1	.421**	.419**	.520**	.360**	.307**	.334**	.276**	.328**
Identity Problems (4)				1	.369**	.558**	.471**	.394**	.315**	.504**	.465**
Negative Relationships (5)					1	.537**	.220**	.148	.205*	.144	.234**
Self-Harm (6)						1	.441**	.371**	.263**	.393**	.427**
Total ADHD Sx. (7)							1	.940**	.740**	.856**	.933**
Inattention (8)								1	.582**	.737**	.804**
Impulsivity (9)									1	.597**	.570**
Hyperactivity (10)										1	.742**
Sluggish-Cognitive Tempo (11)											1

** . Correlation is significant at the 0.01 level (2-tailed). * . Correlation is significant at the 0.05 level (2-tailed). All *ns* range from 131—176.

Table 3:

Regression Analyses with Total BPD Symptoms as Outcome Variable

Predictor	<i>b</i> (<i>SE</i>)	β	<i>t</i>	<i>F</i>	<i>R</i>	<i>R</i> ²
ADHD* ¹	.286 (.041)	.526	7.027	49.383	.526	.277
Inattention* ³	.588 (.111)	.418	5.282	27.896	.418	.174
Impulsivity* ³	1.336 (.249)	.423	5.376	28.907	.423	.179
Hyperactivity* ³	1.400 (.228)	.471	6.152	37.844	.471	.222
SCT* ³	.726 (.103)	.526	7.048	49.674	.526	.276
Age + ADHD	-	-	-	7.945	.684	.468
Age ³	.273 (.563)	.087	.484	-	-	-
ADHD	.412 (.105)	.704	3.928	-	-	-

*p-value significant <.001; ADHD = total ADHD symptoms; SCT = Sluggish Cognitive Tempo; Age + ADHD = Age of reported diagnosis and total ADHD symptoms; ¹Small Cohen's D Effect Size (i.e., .10); ²Med. Cohen's D Effect Size (i.e., .30); ³Lrg. Cohen's D Effect Size (i.e., .50)

Table 4:

Correlations between ADHD symptoms and BPD symptoms in Females

	1	2	3	4	5	6	7	8	9	10
Total BPD Sx. (1)	1	.789**	.815**	.748**	.884**	.550**	.462**	.478**	.505**	.538**
Affective Instability (2)		1	.511**	.464**	.651**	.425**	.417**	.388**	.367**	.366**
Identity Problems (3)			1	.423**	.628**	.531**	.480**	.428**	.487**	.527**
Negative Relationships (4)				1	.629**	.250*	.218*	.168	.216*	.277**
Self-Harm (5)					1	.462**	.427**	.314**	.424**	.470**
Total ADHD Sx. (6)						1	.949**	.790**	.858**	.949**
Inattention (7)							1	.615**	.738**	.833**
Impulsivity (8)								1	.677**	.634**
Hyperactivity (9)									1	.758**
Sluggish-Cognitive Tempo (10)										1

** . Correlation is significant at the 0.01 level (2-tailed). * . Correlation is significant at the 0.05 level (2-tailed). All *ns* range from 86-109.

Table 5:

Correlations between ADHD symptoms and BPD symptoms in Males

	1	2	3	4	5	6	7	8	9	10
Total BPD Sx. (1)	1	.519**	.826**	.545**	.724**	.504**	.383**	.283	.472**	.513**
Affective Instability (2)		1	.241	.266	.169	.196	.087	.176	.088	.236
Identity Problems (3)			1	.256	.449**	.389**	.279*	.093	.570**	.350*
Negative Relationships (4)				1	.307*	.180	.022	.314*	.053	.124
Self-Harm (5)					1	.391**	.248	.147	.327*	.336*
Total ADHD Sx. (6)						1	.931**	.622**	.853**	.902**
Inattention (7)							1	.528**	.725**	.760**
Impulsivity (8)								1	.447**	.409**
Hyperactivity (9)									1	.724**
Sluggish-Cognitive Tempo (10)										1

** . Correlation is significant at the 0.01 level (2-tailed). * . Correlation is significant at the 0.05 level (2-tailed). All *ns* range from 44-56.

CHAPTER 7

DISCUSSION

The primary hypothesis of this study was confirmed: ADHD symptoms were significantly correlated with BPD symptoms. These results may indicate that individuals who exhibit ADHD symptoms may be susceptible to BPD symptoms. Further, this finding may support the growing body of literature that links ADHD and BPD on numerous factors (e.g., shared characteristics, neurological deficits, common comorbidities). Although support exists in overlapping secondary characteristics (Davids & Gastpar, 2005), this study examined specific ADHD and BPD symptoms. Therefore, these findings may particularly support research that links ADHD and BPD on core symptom clusters (Davids & Gastpar, 2005; Dijk et al., 2011, 2012). Further, the relationship between BPD symptoms and hyperactivity specifically may refute research that credits impulsivity as the primary shared characteristic (Speranza et al., 2011). These findings may also negate research suggesting that hyperactivity, inattention, and impulsivity may be equally distributed among individuals with ADHD and BPD (Dijk et al., 2012; Speranza et al., 2011).

Hypothesis 2 predicted that the younger an individual received an ADHD diagnosis, the more likely he/she would endorse BPD symptoms, which was unconfirmed. These results may refute the developing theory that ADHD symptoms may predict BPD symptoms. These findings may be inconsistent with prior research (e.g., Fossati et al., 2002), and may be due to the participant characteristics of the study. For example, this analysis was unique in the current study in that it only assessed participants with a self-reported ADHD or ADD diagnosis (i.e., 31 participants, 17.1%), and the researcher did not verify diagnoses. Further, the majority of these participants reported their age of diagnosis as older than fourteen years of age (i.e., 19 participants, 63.3%), so a restricted range might be a limitation.

Therefore, the theory that ADHD may be a precursor for BPD symptoms should be considered further. Researching this theory may provide nuanced information about these disorders as individual constructs and their relationship. For example, ADHD symptoms may serve as a developmental path to BPD symptoms. Little information is known about developmental BPD features (New et al., 2013), other than that symptom onset typically occurs in adolescence (APA, 2013). Exploratory analyses suggested that hyperactivity, impulsivity, and inattention symptoms significantly predicted BPD symptoms. However, the

varying results may imply that susceptibility for BPD symptoms may be more common among individuals with ADHD who exhibit mostly hyperactivity symptoms. Given that hyperactivity was a particularly strong predictor of BPD symptoms, it may be possible that individuals with more hyperactive symptoms are especially likely to develop BPD in the future. Further research is needed in this area. Further, the findings that sluggish-cognitive tempo symptoms also significantly predicted BPD symptoms may suggest that individuals with this symptom dimension are also likely to exhibit BPD symptoms.

Additional research of this theory may also suggest the existence of a unique population of individuals with ADHD who are more likely to develop BPD. Considering this study's results implied that sex does not serve as a moderating variable in this relationship, another possible reason for this pathway might be history of maltreatment. In other words, a subpopulation of children with ADHD symptoms who experience maltreatment may be at a heightened risk to exhibit BPD symptoms. The present study did not consider maltreatment, but future research in this area might help elucidate this possibility.

Other factors that connect ADHD and BPD should also be considered to explain the null findings and advance the research about this theory. For example, the role of temperament has some empirical support as a connecting feature among females with BPD who display ADHD symptoms (Dijk et al., 2011). The combination of impulsivity, aggression, novelty seeking, and juvenile conduct problems may also be connecting feature. This combination was reported to mediate the ADHD and BPD relationship equally among males and females (Carlotta, Borroni, Maffei, & Fossati, 2013). These topics may be directives for future studies and be especially interesting given null findings from the sex-specific hypotheses and exploratory analyses of this study.

Hypothesis 3 predicted that females with high levels of ADHD symptoms and high levels of BPD symptoms would indicate an internalizing disorder(s) as an additional mental health problem more frequently than males; whereas males with high levels of ADHD symptoms and high levels of BPD symptoms will indicate an externalizing disorder(s) as an additional mental health problem more frequently than females. These results implied that ADHD symptoms and BPD symptoms are likely to be the predictive features for the presence of an internalizing disorder, but this outcome may not be influenced by an individual's sex. Further, these results may suggest that a comorbid internalizing disorder is more likely

to occur or be reported among individuals with overlapping ADHD and BPD characteristics. However, as noted above, these findings should be interpreted with caution and further exploration of internalizing and externalizing specificities is recommended.

Hypothesis 4, that males who report high levels of ADHD symptoms will report high levels of BPD symptoms more frequently than females, was not supported. Null findings were also found for hypotheses 5 and 6. Hypothesis 5 predicted that females with high levels of ADHD symptoms would report more self-harm than males, and hypothesis 6 predicted that females with high levels of ADHD symptoms would report more affective instability than males. These findings may indicate that sex-specific characteristics may not be relevant when discussing the ADHD and BPD link. These findings may suggest that high levels of ADHD may predict BPD, but the relationship not appear to be moderated by an individual's sex. Further, results may suggest that males with ADHD who exhibit BPD symptoms are susceptible to the same BPD symptoms as females with ADHD. As previously discussed, ADHD tends to be more common in males and BPD tends to be more common in females (APA, 2013). Thus, the present study's findings may not be entirely consistent with prior research.

The exploratory findings produced surprising results. Specifically, the high correlations between sluggish cognitive tempo and BPD symptoms may suggest that a link exists between these symptoms. The high correlation between identity problems and sluggish cognitive tempo symptoms indicates that those with sluggish cognitive tempo symptoms may be especially susceptible to exhibit identity problems. Further, sluggish cognitive tempo symptoms also predicted BPD symptoms, which suggests the need for additional research on sluggish cognitive tempo being predictive of BPD symptoms. However, these conclusions should be interpreted cautiously due to the high correlation between sluggish cognitive tempo symptoms and total ADHD symptoms. This correlation may imply that ADHD and sluggish cognitive tempo symptoms tap into the same construct or very similar constructs. Therefore, the findings related to sluggish cognitive tempo and BPD may be indicative of the ADHD and BPD relationship, rather than a separate relationship between sluggish cognitive tempo and BPD.

Currently no available published research exists that considers the relationship between BPD and sluggish cognitive tempo or BPD and the behavioral symptoms typical of sluggish cognitive tempo (e.g.,

drowsiness, daydreaming, physical hyperactivity, lethargy and apathy; Becker & Langberg, 2012). Future research may benefit from focusing on these variables to assess the relationship between sluggish cognitive tempo and BPD. Examining the correlations between the core BPD symptoms, especially identity problems, with specific sluggish cognitive tempo symptoms (e.g., daydreaming, apathy) will also likely provide specific details about this relationship. Given that sluggish cognitive tempo symptoms were predictive of BPD features, additional research is warranted to assess sluggish cognitive tempo symptoms a potential developmental component of BPD. This finding may be cause for reconsideration of the theory that childhood ADHD predicts BPD. It may be especially advantageous to assess childhood ADHD and childhood sluggish cognitive tempo symptoms simultaneously as predictors for adulthood BPD to determine a) which symptom subset (i.e., sluggish cognitive tempo or ADHD) acts as the primary precursor for BPD, b) if both sluggish cognitive tempo and ADHD serve as BPD predictors, and c) whether the differences and similarities between ADHD and sluggish cognitive tempo relate to BPD.

Clinical Implications

Treatment

The current study's findings may pose clinical implications. Specifically, support of the primary hypothesis of the current study may warrant a reevaluation of current treatment approaches, and consideration for other possible treatment approaches. Clinicians may benefit from using empirically supported treatments when focusing on the shared ADHD and BPD symptoms while maintaining the overall goal of symptom reduction. Well-established treatments for ADHD (e.g., CBT, BPT; Emilsson et al., 2011, Pelham & Fabiano, 2008) and BPD (e.g., DBT; Bloom, Woodward, Susmaras, & Pantalone, 2012) are already available, and adopting a combined treatment approach may best meet the needs of clients with shared ADHD and BPD symptoms. Adults with ADHD may especially benefit from exploring other forms of adult-specific treatment, because CBT is currently the sole empirically supported treatment for those of this age group (Emilsson et al., 2011). Further, these findings may necessitate future research that considers the effectiveness and applicability of a combined treatment approach for individuals with overlapping symptoms or diagnoses.

One suggested approach may be a modified version of DBT developed by Hesslinger and colleagues (2002) that capitalizes on mindfulness and other DBT techniques to minimize core and secondary ADHD symptoms (e.g., hyperactivity/impulsivity, dysfunctional behavioral patterns; Hesslinger et al., 2002). Although this approach has some support (van de Weijer-Bergsma, Formsma, de Bruin, & Bögels, 2012), the present study's findings may suggest other forms of treatment may also be advantageous. For example, emerging adults may benefit from treatment specific to their age group. Specifically, treatment that aims to reduce on ADHD symptoms with consideration BPD symptoms (i.e., affective instability, negative relationships, self-harm, identity problems) may produce favorable outcomes. Research regarding the effects of a modified DBT treatment approach for adolescents, emerging adults, and adults are suggested.

Screening

Given that as many as 70% of suicidal individuals meet BPD diagnostic criteria (Gunderson, 2008), screening for BPD may be advantageous for practitioners. Further, ADHD symptoms and risk to self are positively correlated (Impey & Heun, 2011), suggesting that suicidal ideation and self-injurious behaviors may also be problematic individuals with ADHD. The link between these two disorders in the current study may suggest an even higher combined risk. Implementing a screening measure when assessing those with ADHD, or those who exhibit shared ADHD and BPD symptoms, may provide very important client information. Additionally, screening children and adolescents with ADHD for BPD symptoms may be helpful for detecting possible BPD symptoms as early as possible. This suggestion may be attractive considering the link found in the current study. Practitioners working with children and adolescents with ADHD are in a unique position to detect BPD symptoms before they become increasingly impairing.

Maltreatment

Although the current study did not suggest that sex played impacted the ADHD and BPD relationship, sex may have an effect on effective treatments for individuals with ADHD and BPD symptoms. Specifically, it may be helpful to recognize the sex differences in children who experience maltreatment, especially if this factor has an interaction effect on the ADHD and BPD relationship.

Although both sexes who experience maltreatment illustrate negative consequences (e.g. externalizing symptoms, internalizing symptoms, substance abuse; Godinet, Li, & Berg, 2013; Thompson, Kingree, & Desai, 2004), females generally experience greater adverse effects and experience abuse more often than males (Fisher et al., 2009; Godinet et al., 2013). Males who experience maltreatment are prone to suicidality at a faster rate than females, even though females report greater long term negative effects (Godinet et al., 2013). Additionally, males who report sexual abuse report more problems with behavior, addiction, and aggression (Garnefski & Diekstra, 1997). It may be advantageous to recognize these differences when developing the combined treatment approach and when using screening measures to assess suicidality.

Alternative Explanations

Despite the statistical significance found for Hypothesis 1 and Hypothesis 2, it is crucial to consider other possible explanations for this relationship. First, correlations between ADHD and other disorders are likely given the high rates of comorbidity and symptom overlap with a number of disorders (e.g., Oppositional Defiant Disorder, Conduct Disorder, Autism Spectrum Disorders, Obsessive-Compulsive Disorder, substance abuse, mood disorders; APA, 2013). Thus, although the comorbidity rates for ADHD and BPD are growing (Davids & Gastpar, 2005), finding high correlations between these disorders may not necessarily mean they are connected in a meaningful way.

The age of participants in the current study may also help explain the findings. Given that the mean age of participants was 18.91 years, it may be unclear whether the PAI-BOR scores were truly reflective of BPD symptoms or were simply typical developmental features. For example, identity problems are indicative of BPD in adults, but are also typical and even expected in young people and emerging adults (APA, 2013). Additionally, the stigma associated with diagnosing personality disorders may discourage clinicians from considering BPD symptoms in children or adolescents. Mental health professionals are discouraged from diagnosing personality disorders such as BPD in individuals other than adults (Chang, Sharp, & Ha, 2011). Thus, it could be that children and adolescents with clear signs of BPD are diagnosed with ADHD to reduce the stigma. Although controversial, children and adolescents who exhibit BPD symptoms may justifiably receive a diagnosis for BPD (Sharp & Romero, 2007). Lifetime

BPD prevalence rates highlight the importance of diagnosing individuals as quickly as possible (Burke & Stepp, 2011), but the lack of acknowledging such symptoms may provoke a misdiagnosis or a non-diagnosis.

Interpreting these results with caution is also warranted because of a potential negative halo effect. Unidirectional Negative halo effects occur when one symptom is exhibited, but another symptom is rated instead. For example, Hartung and colleagues (2010) found that when a symptom of ADHD was described it was frequently misinterpreted as a symptom of Oppositional Defiant Disorder, which could potentially lead to misdiagnosis and overinflated comorbidity rates. Bidirectional negative halo effects may occur when one symptom is exhibited, but is rated differently in two different individuals (Hartung et al., 2010). The relationship between ADHD and BPD may be influenced by both types of halo effects. For example, impulsivity, a symptom typical for both disorders, may be exhibited by a young person with BPD. This individual's impulsive behaviors may be mistakenly considered a symptom of ADHD when in fact this symptom is inappropriately classified, and may have been accurately classified in an older person with the same symptom. Future research regarding these symptoms is warranted before conclusive evidence of these suggestions can be drawn.

Limitations and Future Directions

Some specific limitations relate to the methodology of the study. The number of participants and participant characteristics may be one limitation and directive for future research. Given that the majority of participants were recruited from UNI's campus, the results may be exclusively related to individuals with corresponding demographics (e.g., Midwestern Caucasian students). Additionally, these findings may only be applicable within the university context from which participants were obtained. There are many individuals in the emerging adulthood range who are not enrolled in a four-year university. A larger sample size, wider age range, and more varied ethnic background are several considerations for future researchers, and may provide greater generalizability for the conclusions.

Another potential limitation of the current study involves the assessment techniques. ADHD symptoms and BPD symptoms were measured as continuous variables for the analyses rather than dichotomous individual diagnoses. Although empirical research exists that linked these disorders,

interpretations of the current study may be applicable to only symptomology of ADHD and BPD. These results may not be comparable to individuals with actual ADHD or BPD diagnoses. Although the present study determined individuals who likely meet the diagnostic criteria for BPD and ADHD, it is discouraged to diagnosis individuals from one self-report measure and therefore analyses were conducted using symptomology. Sampling participants with explicit diagnoses may provide better information about the overlap between ADHD and BPD. Results that mentioned diagnostic categories referred to self-reported diagnosis on the demographics form; information that was not independently verified.

Like the like of research regarding emerging adults, focusing on other specific samples may provide preliminary information. For example research may benefit in focusing on first-generation college students, given that these individuals are more susceptible to psychological impairments (Aspelmeirer, Love, McGill, Elliott, & Pierce, 2012). However, a research gap exists in determining if first-generation college students are more susceptible to develop ADHD, BPD, or comorbid cases of these disorders. Given that individuals with ADHD tend to suffer from academic impairments (e.g., lower grades, limited social skills; McConaughy, Volpe, Antshel, Gordon, & Eiraldi, 2011), and that first-generation college students tend to struggle with their academic performance more than others (Ramos-Sanchez & Nichols, 2007), correlations between such factors seem relevant to this discussion. Further, limited research exists that assesses this specific population compared to BPD. In fact, only one study is available that appears related to this discussion, which suggested that BPD symptoms negatively influence employment performance (Thompson, Payne, Horner, & Morey, 2012).

Focusing on certain populations will likely provide preliminary information about the individual disorders and the ADHD and BPD relationship. For example, research may benefit in focusing on first-generation college students, given that these individuals are more susceptible to psychological impairments (Aspelmeirer et al., 2012). However, a research gap exists in determining whether first-generation college students are more susceptible to develop ADHD, BPD, or comorbid cases of these disorders. Given that individuals with ADHD tend to suffer from academic impairments (e.g., lower grades, limited social skills; McConaughy et al., 2011), and that first-generation college students tend to struggle with their academic performance more than others (Ramos-Sanchez & Nichols, 2007), correlations between such factors seem

relevant to this discussion. Further, limited research exists that assesses this specific population in terms of BPD. In fact, only one study is available. This study suggested that BPD symptoms negatively influence employment performance (Thompson et al., 2012).

Consideration of socio-economic status (SES) among the sample is also likely to be advantageous for inclusion in future research regarding ADHD and BPD. Low SES was reported to have an effect on the development of ADHD symptoms (Lasky-Su et al., 2007) and BPD symptoms (Cohen et al., 2008), which warrants research regarding whether SES has an interaction effect on the ADHD and BPD relationship. Currently, no research is available that discusses first-generation college students or SES among the ADHD and BPD link.

Other notable methodological limitations are the presence of missing data within the study, as well as the administration format. Missing data may have impacted the findings by skewing the results. For example, several individuals did not answer the BAARS-IV or PAI-BOR questionnaires. These participants may have produced very high or very low scores on these measures, which may have altered the results to suggest even greater (or lesser) correlations between ADHD and BPD. Although missing data may have implemented limitations, this dilemma was corrected by recoding missing data as 999 and excluded this variable from analyses. The online format is another possible limitation of the current study. This format did not allow the researchers to monitor participants, which may have resulted in haphazard or incomplete responding. Administering in an online format allowed for recruitment methods from multiple universities and assisted with confidentiality and anonymousness. However, a face-to-face administration may have reduced the amount of missing data, and ensured that participants partaking in the study were in fact the individuals intended to take the study. The online format did allow for sampling of individuals from multiple universities, but there may have been less missing data had the study been conducted face-to-face.

Study Conclusions

The present study aimed to explore the link between ADHD and BPD with special consideration of sex differences. To assess for ADHD and BPD symptoms as well as personal characteristics, a demographics questionnaire, the BAARS-IV, and the PAI-BOR were administered in an online format to 175 emerging adults. The results suggest that ADHD and BPD symptoms are significantly correlated, and

ADHD symptoms significantly predicted BPD symptoms. The results implied that ADHD symptoms predict BPD symptoms, although age of diagnosis did not serve as a significantly predictive variable. Therefore, this study did not support the theory that childhood ADHD may serve as precursor for adulthood BPD. Despite the sex differences typical among the individual disorders, sex specific characteristics were not significant in the current study. Further, sex did not have an interaction effect on ADHD symptoms predicting BPD symptoms. These findings may have clinical implications for treating and assessing ADHD and BPD. However, conclusions should be interpreted cautiously as there were methodological and sampling limitations and a number of alternative explanations exist.

REFERENCES

- Allen, D. N., Grosjean-Strauss, G. P., Leany, B. D., & Donohue, B. (2008). Neuropsychological assessment of individuals with substance use disorders. In A. Horton, & D. Wedding (Eds.), *The Neuropsychology Handbook (3rd. ed.)* [Ebrary Subscription version]. (pp. 705-728). Retrieved from <http://site.ebrary.com/lib/rodlibrary/docDetail.action?docID=10265557>
- American Psychiatric Association (APA). (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.). Washington, DC: Author.
- American Psychiatric Association (APA). (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., text rev.). Washington, DC: Author.
- Andrulonis, P. A., Glueck, B. C., Stroebel, C. F., & Vogel, N. G. (1982). Borderline personality subcategories. *The Journal of Nervous and Mental Diseases*, *170*(11), 670-679.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*, 469-480. doi: 10.1037//0003-066X.55.5.469
- Aspelmeier, J. E., Love, M. M., McGill, L. A., Elliott, A. N., & Pierce, T. W. (2012). Self-esteem, locus of control, college adjustment, and GPA among first- and continuing-generation students: A moderator model of generational status. *Research in Higher Education*, *53*, 755-781. doi: 10.1007/s11162-011-9252-1
- Barkley, R. A. (2011). *Barkley Adult Rating Scale—IV (BAARS-IV)*. New York, NY: The Guilford Press.
- Barkley, R. A. (2012). Distinguishing Sluggish Cognitive Tempo from Attention-Deficit/Hyperactivity Disorder in Adults. *Journal of Abnormal Psychology*, *121*, 978-990. doi: 10.1037/a0023961
- Barkley, R. A. (2013a). Distinguishing sluggish cognitive tempo from ADHD in children and adolescents: Executive functioning, impairment, and comorbidity. *Journal of Clinical Child & Adolescent Psychology*, *42*, 161-173. doi: 10.1080/15374416.2012.734259
- Barkley, R. A. (2013b). Sluggish-cognitive tempo (concentration deficit disorder?): Current status, future directions, and a plea to change the name. *Journal of Abnormal Child Psychology*, *42*, 117-125. doi: 10.007/s1082-013-9824-y
- Baschnagel, J. S., Coffey, S. F., Hawk, L. R. Schumacher, J. A., & Holloman, G. (2012). Psychophysiological assessment of emotional processing in patients with borderline personality disorder with and without comorbid substance use. *Personality Disorders: Theory, Research, & Treatment*. doi: 10.1037/a0029777
- Becker, S. P. & Langberg, J. M. (2012). Sluggish cognitive tempo among young adolescents with ADHD: Relations to mental health, academic, and social functioning. *Journal of Attention Disorders*. Advance online publication. doi: 10.1177/1087054711435411
- Bloom, J. M., Woodward, E. N., Susmaras, T., & Pantalone, D. W. (2012). Use of Dialectical Behavior Therapy in inpatient treatment of borderline personality disorder: A systematic review. *Psychiatric Services*, *63*(9), 881-888.
- Bradley, R., Zittel, C., & Westen, D. (2005). The borderline personality diagnosis in adolescents: Gender differences and subtypes. *Journal of Psychology and Psychiatry*, *46*, 1006-1019. doi: 10.1111/j.469-7610.2004.00401.x

- Burke, J. D., & Stepp, S. D. (2011). Adolescent disruptive behavior and borderline personality disorder symptoms in young adult men. *Journal of Abnormal Child Psychology*, *40*, 45-44. doi: 10.1007/s10802-011-9558-7
- Carlotta, D., Borroni, S., Maffei, C., & Fossati, A. (2013). On the relationship between retrospective childhood ADHD symptoms and adult BPD features: The mediating role of action-oriented personality traits. *Comprehensive Psychiatry*, *54*, 945-952. doi: 10.1016/j.comppsy.2013.03.025
- Chang, B., Sharp, C., & Ha, C. (2011). The criterion validity of the borderline personality features scale for children in an adolescent inpatient setting. *Journal of Personality Disorders*, *25*, 492-503. doi:10.1521/pedi.2011.25.4.492
- Chesin, M. S., Moster, A. N., & Jeglic, E. L. (2013). Non-suicidal self-injury among ethnically and racially diverse emerging adults: Do factors unique to the minority experience matter? *Current Psychology*, *32*, 318-328. doi: 10.1007/s12144-013-9185-2
- Cohen, P., Chen, H., Gordon, K., Johnson, J., Brook, J., & Kasen, S. (2008). Socioeconomic background and the developmental course of schizotypal and borderline personality disorder symptoms. *Development and Psychopathology*, *20*, 633-650. doi: 10.1017/s095457940800031X
- Cummings, J. R., Ojanen, T., & Hunt, E. (2013). Time doesn't change everything: The longitudinal course of distress tolerance and its relationship with externalizing and internalizing symptoms during early adolescence. *Journal of Abnormal Child Psychology*, *41*, 735-748. doi: 10.1007/s10802-012-9704-x
- Cumyn, L., French, L., & Hechtman, L. (2009). Comorbidity in adults with attention-deficit hyperactivity disorder. *The Canadian Journal of Psychiatry*, *54*(10), 673-683. Retrieved from <http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=40dde3c3-60d5-428d-84dc-5b0163f81548%40sessionmgr13&vid=2&hid=20>
- Das, D., Cherbuin, N., Easteal, S., & Anstey, K. J. (2014). Attention Deficit/Hyperactivity Disorder Symptoms and Cognitive Abilities in the Late-Life Cohort of the PATH through Life Study. *Plos ONE*, *9*, 1-12. doi:10.1371/journal.pone.0086552
- Davids, E., & Gastpar, M. (2005). Attention deficit hyperactivity disorder and borderline personality disorder. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, *29*, 865-877. doi: 10.1016/j.pnpbp.2005.04.033
- Dijk, F., Lappenschaar, M., Kan, C., Verkes, R., & Buitelaar, J. (2011). Lifespan attention deficit/hyperactivity disorder and borderline personality disorder symptoms in female patients: A latent class approach. *Psychiatry Research*, *190*, 327-334. doi: 10.1016/j.psychres.2011.06.023
- Dijk, F., Lappenschaar, M., Kan, C., Verkes, R., & Buitelaar, J. (2012). Symptomatic overlap between attention-deficit/hyperactivity disorder and borderline personality disorder in women: The role of temperament and character traits. *Comprehensive Psychiatry*, *53*, 39-47. doi: 10.1016/j.comppsy.2011.02.007
- Emilsson, B., Gudjonsson, G., Sigurdsson, J. F., Baldursson, G., Einarsson, E., Olafsdottir, H., & Young, S. (2011). Cognitive behavioral therapy in medication-treated adults with ADHD and persistent symptoms: A randomized controlled trial. *BMC Psychiatry*, *11*, 116. doi:10.1186/1471-244X-11-116

- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.
- Fisher, H., Morgan, C., Dazzan, P., Craig, T. K., Morgan, K., Hutchinson, G., ... Fearon, P. (2009). Gender differences in the association between childhood abuse and psychosis. *The British Journal of Psychiatry*, *194*, 319-325. doi: 10.1192/bjp.bp.107.047985
- Fossati, A., Novella, L., Donati, D., Donini, M., & Maffei, C. (2002). History of childhood attention deficit/hyperactivity disorder symptoms and borderline personality disorder: A controlled study. *Comprehensive Psychiatry* *43*, 369-377. doi: 10.1053/comp.2002.34634
- Gardner, K., & Qualter, P. (2009). Reliability and validity of three screening measures of borderline personality disorder in a nonclinical population. *Personality and Individual Differences*, *46*, 636-641. doi: 10.1016/j.paid.2009.01.005
- Garnefski, N., & Diekstra, R. F. W. (1997). Child sexual abuse and emotional and behavioral problems in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*(3), 323-329.
- Gaub, M., & Carlson, C. L. (1996). Gender differences in ADHD: A meta-analysis and critical review. *Child and Adolescent Psychiatry*, *36*, 1036-1045. doi: 10.1097/00004583-199708000-00011
- Gershon, J. (2002). A meta-analytic review of gender differences in ADHD. *Journal of Attention Disorders*, *5*, 143-154. doi: 10.1177/108705470200500302
- Ghanizadeh, A. (2012). Psychometric analysis of the new ADHD derived symptoms. *BMC Psychiatry*, *12*, 2-6. doi: 1271-244X/12/21
- Godinet, M. T., Li, F., & Berg, T. (2013). Early childhood maltreatment and trajectories of behavioral problems: Exploring gender and racial differences. *Child Abuse and Neglect* (2013). Retrieved from <http://dx.doi.org/10.1016/j.chiabu.2013.07.018>.
- Grosjean, B., & Tsai, G. E. (2007). NMDA neurotransmission as a critical mediator of borderline personality disorder. *Journal of Psychiatry Neuroscience*, *32*(2), 103-115. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1810584/pdf/20070300s00004p103.pdf>
- Gunderson, J. G. with Links, P. S. (2008) *Borderline Personality Disorder: A Clinical Guide* (2nd ed.). Washington, DC: American Psychiatric Press.
- Hartung, C. M., Lefler, E. K., Tempel, A. B., Armendariz, M. L., Sigel, B. A., & Little, C. S. (2010). Halo effects in ratings of ADHD and ODD: Identification of susceptible symptoms. *Journal of Psychopathology and Behavioral Assessment*, *32*, 128-137. doi: 10.1007/x10862-009-9135-3
- Hesslinger, B., Tebartz van Elst, L., Nyberg, E., Dykieriek, P., Richter, H., Berner, M., & Ebert, D. (2002). Psychotherapy of attention deficit hyperactivity disorder in adults: A pilot study using a structured skills training program. *European Archives of Psychiatry and Clinical Neuroscience*, *252*, 177-184. doi: 10.1007/s00406-002-0379-0
- Iacono, W. G., Malone, S. M., & McGue, M. (2008). Behavioral disinhibition and the development of early-onset addiction: Common and Specific Influences. *Annual Review of Clinical Psychology*, *4*, 325-348. doi: 10.1146/annurev.clinpsy.4.022007.141157

- Impey, M., & Heun, R. (2011). Completed suicide, ideation, and attempt in attention deficit hyperactivity disorder. *Acta Psychiatrica Scandinavica*, *125*, 93-102. doi: 10.1111/j.1600-0447.2011.01798.x
- Jacobo, M. C., Blais, M. A., Baity, M. R., & Harley, R. (2007). Concurrent validity of the personality assessment inventory borderline scales in patients seeking dialectical behavior therapy. *Journal of Personality Assessment*, *88*, 74-80. doi: 10.1521/pedi.15.5.403.19202
- Jaffee, S. R., & Maikovich-Fong, A. K. (2013). Child maltreatment and risk for psychopathology. In T. P. Beauchaine & A. P. Hinshaw Editor (Eds.), *Child and Adolescent Psychopathology* (pp. 171-196). Hoboken, NJ: Wiley & Sons, Inc.
- James, L. M., & Taylor, J. (2008). Revisiting the structure of mental disorders: Borderline personality disorder and the internalizing/externalizing spectra. *British Journal of Clinical Psychology*, *47*, 361-380. doi: 10.1348/0144508X299691
- Jovev, M., McKenzie, T., Whittle, S., Simmons, J., G., Allen, N. B., & Chanen A. M. (2013). Temperament and maltreatment in the emergence of borderline and antisocial pathology during early adolescence. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *22*(3), 220-229.
- Joyce, P. R., McKenzie, J. M., Luty, S. E., Mulder, R. T., Carter, J. D., Sullivan, P. F., & Cloninger, C. R. (2003). Temperament, childhood environment, and psychopathology as risk factors for avoidant and borderline personality disorders. *Australian and New Zealand Journal of Psychiatry*, *37*, 756-764. doi: 10.1111/j.1440-1614.2003.01263.x
- Krueger, R. F., & Markon, K. E. (2011). A dimensional-spectrum model of psychopathology progress and opportunities. *Archive of General Psychiatry*, *68*, 10-11. doi: 10.1001/archgenpsychiatry.2010.188
- Lasky-Su, J., Faraone, S. V., Lange, T., Tsuang, M. T., Doyle, A. E., Smoller, J. W., Laird, N. M., & Biederman, J. (2007). A study of how socioeconomic status moderates the relationship between SNPs encompassing BDNF and ADHD symptom counts in ADHD families. *Behavior Genetics*, *37*, 487-497. doi: 10.1007/s10519-006-9136-xm
- Lewandowski, L. J., Lovett, B. J., Coddington, R. S., & Godron, M. (2008). Symptoms of ADHD and academic concerns in college students with and without ADHD diagnoses. *Journal of Attention Disorders*, *12*, 156-161.
- Magnússon, P., Smári, J., Sigurðardóttir, D., Baldursson, G., Sigmundsson, J., Kristjánsson, K., ... Guðmundsson, Ó. Ó. (2006). Validity of self-report and informant rating scales of adult ADHD symptoms in comparison with a semistructured diagnostic interview. *Journal of Attention Disorders*, *9*, 494-503. doi: 10.2288/1087054705283650
- Martín-Blanco, A., Soler, J., Villalta, L., Feliu-Soler, A., Elices, M., Pérez, V., ... Pascual, J. C. (2014). Exploring the interaction between childhood maltreatment and temperamental traits on the severity of borderline personality disorder. *Comprehensive Psychiatry*, *55*, 311-318. doi: 10.1016/j.comppsy.2013.08.026
- McConaughy, S. H., Volpe, R. J., Antshel, K. M., Gordon, M., & Eiraldi, R. B. (2011). Academic and social impairments of elementary school children with attention deficit hyperactivity disorder. *School Psychology Review*, *40*(2), 200-225. Retrieved from <http://www.nasponline.org/publications/spr/abstract.aspx?ID=2010>.

- Michielsen, M., Comijs, H. C., Semeijn, E. J., Beekman, A. T. F., Deeg, D. J. H., & Kooij, S. (2012). The comorbidity of anxiety and depressive symptoms in older adults with attention-deficit/hyperactivity disorder: A longitudinal study. *Journal of Affective Disorders, 148*, 220-227. doi: 10.1016/j.jad.2012.11.063
- Morey, L. C. (2007). *Personality Assessment Inventory: Professional Manual* (2nd. ed.). Lutz, FL: Psychological Assessment Resources.
- Murphy, K., & Barkley, R. A. (1996). Attention deficit hyperactivity disorder adults: Comorbidities and adaptive impairments. *Comprehensive Psychiatry, 37*, 393-401. doi: 10.1016/S0010-440X(96)9022-X
- New, A. S., Carpenter, D. M., Perez-Rodriguez, M. M., Ripoll, L. H., Avendon, J., Patil, U., Hazlett, E. A., & Goodman, M. (2013). Developmental differences in diffusion tensor imaging parameters in borderline personality disorder. *Journal of Psychiatric Research, 47*, 1101-1109. doi: 10.1016/j.jpsychires.2013.03.021
- Ouyang, L., Fang, X., Mercy, J., Perou, R., & Grosse, S. D. (2008). Attention-deficit/hyperactivity disorder symptoms and child maltreatment: A population-based study. *The Journal of Pediatrics, 153*, 851-856. doi: 10.1016/j.jpeds.2008.06.002
- Pelham Jr., W. E., & Fabiano, G. A. (2008). Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology, 37*, 184-214. doi: 10.1080/15374410701818681
- Perepletchikova, F., Ansell, E., & Axelrod, S. (2012). Borderline personality disorder features and history of childhood maltreatment in mothers involved with child protective services. *Child Maltreatment, 17*, 182-190. doi: 10.1177/1077559512448471
- Perez-Rodriguez, M. M., Hazlett, E. A., Rich, E. L., Ripoll, L. H., Weiner, D. M., Spence, N. ... New, A. S. (2012). Striatal activity in borderline personality disorder with comorbid intermittent explosive disorder: Sex differences. *Journal of Psychiatric Research, 43*, 797-804. doi: 10.1016/j.jpsychires.2012.02.014
- Philipsen, A., Limberger, M. F., Lieb, K., Feige, B., Kleindiest, N., Ebner-Priemer, U., ... Bohus, M. (2008). Attention-deficit hyperactivity disorder as a potentially aggravating factor in borderline personality disorder. *The British Journal of Psychiatry, 192*, 118-123. doi: 10.1192/bjp.bp.107.035782
- Ramos-Sanchez, L., & Nichols, L. (2007). Self-efficacy of first-generation and non-first generation college students: The relationship with academic performance and college adjustment. *Journal of College Counseling, 10*(1), 6-18.
- Ramsay, J. R. (2010). *Nonmedication treatments for adult ADHD: Evaluating impact on daily functioning and well-being*. Washington, DC: American Psychological Association.
- Rüsch, N., Weber, M., Il'yasov, K. A., Lieb, K., Ebert, D., Henning, J., & Tebartz van Elst, L. (2007). Inferior frontal white matter microstructure and patterns of psychopathology in women with borderline personality disorder and comorbid attention-deficit hyperactivity disorder. *NeuroImage, 35*, 738-747. doi: 10.1016/j.neuroimage.2006.12.007

- Sansone, R. A., & Sansone, L. A. (2011). Gender patterns in Borderline Personality Disorder. *Innovations in Clinical Neuroscience*, 8(5), 16-20. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3115767/pdf/icns_8_5_16.pdf
- Schulz, P. M., Schulz, S. C., Goldberg, S. C., Ettigi, P., Resnick, R. J., & Friedel, R. O. (1986). Diagnosis of the relatives of schizotypal outpatients. *Journal of Nervous and Mental Disease*, 174, 457-463. doi: 10.1097/00005053-198608000-00003
- Semiz, U. B., Basoglu, O. O., Munir, K. M., Ates, A., Algul, A., Ebrinic, S., ... Cetin, M. (2008). Effects of diagnostic comorbidity and dimensional symptoms of attention-deficit/hyperactivity disorder in men with antisocial personality disorder. *Australian and New Zealand Journal of Psychiatry*, 42, 405-413. doi: 10.1080/00048670801961099
- Skodol, A. E., Gunderson, J. G., Pfohl, B., Widiger, T. A., Livesley, J. W., & Siever, L. J. (2002). The borderline diagnosis I: Psychopathology, comorbidity and personality structure. *Biological Psychiatry*, 51, 936-950. doi: 10.1016/s0006-3223(02)01324-0
- Sharp, C., & Romero, C. (2007). Borderline personality disorder: A comparison between children and adults. *Bulletin of the Menninger Clinic*, 71, 185-206. doi: 10.1521/bumc.2007.71.2.85
- Sher, K. J. & Trull, T. J. (1994). Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. *Journal of Abnormal Psychology*, 103, 92-102. doi: 10.1037/0021-843X.103.1.92
- Slavin-Mulford, J., Sinclair, S. J., Stein, M., Malone, J., Bello, I., & Blais, M. A. (2012). External validity of the personality assessment inventory (PAI) in a clinical sample. *Journal of Personality Assessment*, 94, 593-600. doi: 10.1080/00223891.2012.681817
- Speranza, M., Revah-Levy, A., Cortese, S., Falissard, B., Pham-Scottez, A., & Corcos, M. (2011). ADHD in adolescents with borderline personality disorder. *BMC Psychiatry*, 11. doi: 10.1186/1471-244X-11-158
- Stanley, B., Gameroff, M., Michalsen, V., & Mann, J. (2001). Are suicide attempters who self-mutilate a unique population? *American Journal of Psychiatry*, 158, 427-435. doi: 10.1176/appi.ajp.158.3.427
- Steinhausen, H. C. (2009). The heterogeneity of causes and courses of attention-deficit hyperactivity disorder. *ACTA Psychiatrica Scandinavica*, 120, 392-399. doi: 10.1111/j.1600-0447.2009.01446.x
- Stepp, S. D., Olino, T. M., Klein, D. N., Seeley, J. R., & Lewinsohn, P. M. (2013). Unique influences of adolescent antecedents on adult borderline personality disorder features. *Personality Disorders: Theory, Research, and Treatment*, 4, 223-229. doi: 10.1037/per0000015
- Szymanski, K., Sapanski, L., & Conway, F. (2011). Trauma and ADHD—Association or Diagnostic Confusion? A Clinical Perspective. *Journal of Infant, Child, and Adolescent Psychotherapy*, 10, 51-59. doi: 10.1080/15289168.2011.575704
- Tadić, A., Wagner, S., Hoch, J., Baškaya, Ö., von Cube, R., Skaletz, C., ... Dahmen, N. (2009). Gender differences in axis I and axis II comorbidity with borderline personality disorder. *Psychopathology*, 42, 257-263. doi: 10.1159/000224149

- Thompson, M. P., Kingree, J. B., & Desai, S. (2004). Gender differences in long-term health consequences of physical abuse of children: Data from a nationally representative study. *American Journal of Public Health, 94*(4), 599-603.
- Thompson, R. J., Payne, S. C., Horner, M. T., & Morey, L. C. (2012). Why borderline personality features adversely affect job performance: The role of task strategies. *Personality and Individual Differences, 52*, 32-36. doi: 10.1016/j.paid.2011.08.026
- Trull, T. J. (1995). Borderline personality disorder features in nonclinical young adults: 1. Identification and validation. *Psychological Assessment, 7*, 33-41. doi: 10.1521/pedi.15.6.536.19187
- van de Weijer-Bergsma, E., Formsa, A. R., de Bruin, E. I., & Bögels, S. M. (2012). The effectiveness of mindfulness training on behavioral problems and attentional functioning in adolescents with ADHD. *Journal of Child and Family Studies, 21*, 775-787. doi: 10.1007/s10826-011-9531.7
- Weston, C. G., & Riolo, S. (2007). Childhood and adolescent precursors to adult personality disorders. *Psychiatric Annals, 37*(2), 114-120
- Wilbertz, G., van Elst Tebartz, L., Delgado, M. R., Maier, S., Feige, B., Philipsen, A., & Blechert, J. (2012). Orbitofrontal reward sensitivity and impulsivity in adult attention deficit hyperactivity disorder. *Neuroimage, 60*, 353-361. doi: 10.1016/j.neuroimage.2011.12.011
- Witkiewitz, K., King, K., McMahon, R., Wu, J., Luk, J., Bierman, K., ... Pinderhughes, E. (2013). Evidence for a multi-dimensional latent structural model of externalizing disorders. *Journal of Abnormal Psychology, 41*(2), 223-237.
- Wolf, R., Thompson, P., Sambataro, F., Vasic, N., Schmid, M., & Wolf, N. (2012). Orbitofrontal cortex and impulsivity in borderline personality disorder: an MRI study of baseline brain perfusion. *European Archives of Psychiatry & Clinical Neuroscience, 262*, 677-685. doi: 10.1007/s00406-012-0303-1
- Xenitidis, K., & Maltezos. (2009). Attention deficit hyperactivity disorder in adults with learning disabilities. *Psychiatry 8*(10), 402-404. Retrieved from http://ac.els-cdn.com/S1476179309001451/1-s2.0-S1476179309001451-main.pdf?_tid=5a27b516-4084-11e2-99e7-00000aacb35e&acdnat=1354894976_673a3f980f246c9a12253f1acff300ac.
- Zanarini, M. C., Frankenburg, F. R., Dubo, E. D., Sickel, A. E., Trikha, A., Levin, A., & Reynolds, V. (1998). Axis I comorbidity of borderline personality disorder. *American Journal of Psychiatry, 155*(12), 1733-1799. Retrieved from <http://ajp.psychiatryonline.org/data/Journals/AJP/3695/1733.pdf>.

APPENDIX A

SURVEY INSTRUCTIONS

Please answer all the questions in the study based on how you feel when you are NOT taking medication.

Daily vitamins, allergy medication, occasional pain relievers (e.g. Tylenol; Ibuprofen, etc), fever reducers, or over the counter drugs are not applicable.

APPENDIX B

DEMOGRAPHICS

Instructions: The following 13 items refer to your demographic information, and other information about your diagnosis (if applicable). Please answer accordingly.

1. Age: _____ years _____ months

2. Race, check all that apply:

African American/Black

Caucasian/White

Asian/Asian American

Latino/Latina/Hispanic

Native American/American Indian

Other: _____

3. Gender: _____

4. Current academic standing, Choose one:

Freshman

Sophomore

Junior

Senior

Other: _____

5. Have ever been officially diagnosed with ADHD/ADD?

Yes

No

If yes to question 5, please answer the following:

6. If yes, what age did you receive this diagnosis?

4 years old/Preschool

5 years old/Kindergarten

6 years old/1st grade

7 years old/2nd grade

8 years old/3rd grade

9 years old/4th grade

10 years old/5th grade

11 years old/6th grade

12 years old/7th grade

13 years old/8th grade

14 years old

If older than 14 years of age, please specify: _____

7. Are you currently taking any medication for ADHD?

Yes: _____ No

8. Have you ever taken medication for ADHD?

Yes

No

9. Are you currently receiving psychosocial treatment (therapy) for ADHD?

Yes

No

10. Have you ever received psychosocial treatment (therapy) for ADHD?

Yes

No

11. Have you ever been officially diagnosed with another mental health/psychological problems?

Yes: _____

No

If yes to question 11, please answer the following:

12. Are you currently taking any medication for your additional mental health/psychological problem(s)?

Yes: _____

No

13. Are you currently receiving psychosocial treatment (therapy) for your additional mental health/psychological problem(s)?

Yes

No

APPENDIX C

BARKLEY ADULT ADHD RATING SCALE (BAARS-IV) SELF-REPORT

Instructions: For the first 27 items, please circle the number next to each item below that best describes your behavior DURING THE PAST 6 MONTHS. Then answer the remaining three questions.

Never/rarely	Sometimes	Often	Very
often			
1. (IN) Fail to give close attention to details or make careless mistakes in my work or other activities			
2. (IN) Difficulty sustaining my attention in tasks or fun activities			
3. (IN) Don't listen when spoken to directly			
4. (IN) Don't follow through on instructions and fail to finish work or chores			
5. (IN) Have difficulty organizing tasks and activities			
6. (IN) Avoid, dislike, or am reluctant to engage in tasks that require sustained mental effort			
7. (IN) Lose things necessary for tasks or activities			
8. (IN) Easily distracted by extraneous stimuli or irrelevant thoughts			
9. (IN) Forgetful in daily activities			
10. (H) Fidget with hands or feet or squirm in seat			
11. (H) Leave my seat in classrooms or in other situations in which remaining seated is expected			
12. (H) Shift around excessively or feel restless or hemmed in			
13. (H) Have difficulty engaging in leisure activities quietly (feel uncomfortable, or am loud or noisy)			
14. (H) I am "on the go" or act as if "driven by a motor" (or I feel like I have to be busy or always doing something)			
15. (IM) Talk excessively (in social situations)			
16. (IM) Blurt out answers before questions have been completed, complete others' sentences, or jump the gun			
17. (IM) Have difficulty awaiting my turn			
18. (IM) Interrupt or intrude on others (butt into conversations or activities without permission or take over what others are doing)			

19. (S) Prone to daydreaming when I should be concentrating on something or working
20. (S) Have trouble staying alert or awake in boring situations
21. (S) Easily confused
22. (S) Easily bored
23. (S) Spacey or “in a fog”
24. (S) Lethargic, more tired than others
25. (S) Underactive or have less energy than others
26. (S) Slow moving

1. I don't seem to process information as quickly or as accurately as others.

No Yes

2. Did you experience *any* of these 27 symptoms at least “Often” or more frequently (Did you circle a 3 or a 4 above)?

No Yes

If so, how old were you when those symptoms began?

I was _____ years old.

If so, in which of these settings did those symptoms impair your functioning? Place a check mark next to all of the areas that apply to you.

_____ School

_____ Home

_____ Work

_____ Social Relationships

(IN) Indicates an item referring to inattention

(H) Indicates an item referring to hyperactivity

(IM) Indicates an item referring to impulsivity

(S) Indicates an item referring to sluggish-cognitive tempo

APPENDIX D

PERSONALITY ASSESSMENT INVENTORY BORDERLINE FEATURES SCALE (PAI-BOR)

Instructions: Read each statement and decide if it is an accurate statement about you. Give your own opinion of yourself. Be sure to answer every statement.

False Not true at all Slightly true Mainly true Very

true

1. (A) My mood can shift quite suddenly.
2. (I) My attitude about myself changes a lot.
3. (N) My relationships have been stormy.
4. (A) My mood gets quite intense.
5. (I) Sometimes I feel terribly empty inside.
6. (N) I want to let certain people know how much they've hurt me.
7. (A) My mood is very steady.**
8. (I) I worry a lot about other people leaving me.
9. (N) People once close to me have let me down.
10. (A) I have little control over my anger.
11. (I) I often wonder what I should do with my life.
12. (N) I rarely feel very lonely.**
13. (S) I sometimes do things so impulsively that I get into trouble.
14. (A) I have always been a pretty happy person.**
15. (I) I can't handle separation from those close to me very well.
16. (N) I've made some real mistakes in the people I've picked as friends.
17. (S) *When I'm upset, I typically do something to hurt myself.
18. (A) I've had times when I was so mad I couldn't do enough to express all my anger.
19. (I) I don't get bored very easily.**
20. (N) Once someone is my friend, we stay friends.**
21. (S) I'm too impulsive for my own good.

22. (S) I spend money too easily.

23. (S) I am a reckless person.

24. (S) I am careful about how I spend my money.**

(A) Indicates a measure of the PAI-BOR-A, affective instability

(I) Indicates a measure of the PAI-BOR-I, identity problems

(N) Indicates a measure of the PAI-BOR-N, negative relationships

(S) Indicates a measure of the PAI-BOR-S, self-harm

* Indicates critical items ** Indicates reverse scored items

APPENDIX E

ELECTRONIC DISPLAY CONSENT FORM FOR UNI PSYCHOLOGY DEPARTMENT
PARTICIPANT POOL RECRUITED PARTICIPANTSUNIVERSITY OF NORTHERN IOWA
HUMAN PARTICIPANTS REVIEW

INFORMED CONSENT

Project Title: Correlations Between Personality Factors, Mood, and Life Outcomes

Name of Investigator(s): Brittany Lewno, Gina Sacchetti, & Dr. Elizabeth Lefler

Invitation to Participate: You are invited to participate in this research project conducted through the University of Northern Iowa, which requires that you provide your agreement to participate in this project. The following information is given to help you make an informed decision about whether or not to participate.

Nature and Purpose: The purpose of the study is to gain information about ADHD and life outcomes. Specifically, previous research suggests that ADHD is related to certain personality characteristics and emotional experiences (i.e. impulsivity and anger). Because of this, it is possible that symptoms of ADHD may be related to life factors such as relationship satisfaction and relational conflict. The current study will examine ADHD in respect to other features past studies suggest a relationship. The current study considers how these relationships and features, specifically Borderline Personality Disorder and Antisocial Personality Disorder, anger, relationship satisfaction and conflict, and gender, influence ADHD symptoms.

Explanation of Procedures: This study will consist of a 187-question survey and will take 45-60 minutes to complete. After you review this form, you will enter into the online survey, where you will be asked to respond to questions about your demographic factors, emotional experience, social and romantic relationships, and ADHD. Other questions relate to Antisocial Personality Disorder and Borderline Personality Disorder symptoms. Identifying information (i.e. name, email) will be linked to your responses solely for compensation (i.e. granting research credit) and safety purposes. The link will be destroyed after your compensation is awarded and appropriate safety measures have been taken, if necessary. It is important to note that you do not have to answer any questions you do not want to, and you may withdraw from the research study without penalty at any time. If it is determined that there is a potential risk for you to harm yourself or others or others to hurt you, a licensed clinical psychologist will contact you via email.

Discomfort and Risks: There is a risk that participants will experience psychological discomfort associated with sharing their thoughts and feelings for the purposes of this study.

Benefits and Compensation: There are no direct benefits for participating in this study, although you may experience greater self awareness or sense of camaraderie for participating. Everyone who helps with this work will be contributing directly to our knowledge of the relationship between ADHD and life factors. For participating in this study, you will receive 1 research credit on the SONA system to fulfill your psychology research requirement. As previously stated, your participation is voluntary; you may skip any question and you may withdraw at any time without affecting your compensation. However, if you do not want to provide your name, you will not be compensated as research credit can only be given to known participants.

Confidentiality: Your confidentiality will be maintained to the degree permitted by the technology used. Specifically, no guarantees can be made regarding the interception of data sent via the Internet by any third parties. Any identifying information obtained during the study will be kept confidential. Only aggregate data with no identifying information will be published in an academic journal or presented at a scholarly conference. The data from this study may be used in future studies on Borderline Personality Disorder features and life outcomes.

Right to Refuse or Withdraw: Your participation is completely voluntary. You are free to withdraw from participation at any time or to choose not to participate at all. If you choose to withdraw you will not be penalized, or lose benefits discussed above. Furthermore, your information and responses will remain confidential.

Questions: If you have questions or are interested in more information about your participation or the study in general, you may contact Brittany Lewno at lewnob@uni.edu or Gina Sacchetti at sacchetg@uni.edu. You may also contact the faculty advisor, Dr. Elizabeth Lefler, at the Department of Psychology, University of Northern Iowa at elizabeth.lefler@uni.edu or 319-273-7637, or the office of the IRB Administrator, University of Northern Iowa, at 319-273-6148, for answers to questions about rights of research participants and the participant review process.

Agreement:

I am fully aware of the nature and extent of my participation in this project as stated above and the possible risks arising from it. I hereby agree to participate in this project. I acknowledge that I have received a copy of this consent statement. I am 18 years of age or older.

I reviewed and understand the components of this study. I voluntarily give my consent to proceed.

I reviewed and understand the components of this study. I do not give my consent to proceed.

(Electronic signature of investigator) _____ (Date)

(Electronic signature of instructor/advisor) _____ (Date)

APPENDIX F

ELECTRONIC DISPLAY CONSENT FORM FOR UNI PREVIOUS STUDY PARTICIPANTS AND
NON-UNI RECRUITED PARTICIPANTSUNIVERSITY OF NORTHERN IOWA
HUMAN PARTICIPANTS REVIEW

INFORMED CONSENT

Project Title: Correlations Between Personality Factors, Mood, and Life Outcomes

Name of Investigator(s): Brittany Lewno, Gina Sacchetti, & Dr. Elizabeth Lefler

Invitation to Participate: You are invited to participate in this research project conducted through the University of Northern Iowa, which requires that you provide your agreement to participate in this project. The following information is given to help you make an informed decision about whether or not to participate.

Nature and Purpose: The purpose of the study is to gain information about ADHD and life outcomes. Specifically, previous research suggests that ADHD is related to certain personality characteristics and emotional experiences (i.e. impulsivity and anger). Because of this, it is possible that symptoms of ADHD may be related to life factors such as relationship satisfaction and relational conflict. The current study will examine ADHD in respect to other features past studies suggest a relationship. The current study considers how these relationships and features, specifically Borderline Personality Disorder and Antisocial Personality Disorder, anger, relationship satisfaction and conflict, and gender, influence ADHD symptoms.

Explanation of Procedures: This study will consist of a 187-question survey and will take 45-60 minutes to complete. After you review this form, you will enter into the online survey, where you will be asked to respond to questions about your demographic factors, emotional experience, social and romantic relationships, and ADHD. Other questions relate to Antisocial Personality Disorder and Borderline Personality Disorder symptoms. Identifying information (i.e. email, student number) will be linked to your responses solely for compensation and safety purposes. The link will be destroyed after your compensation is awarded and appropriate safety measures have been taken, if necessary. It is important to note that you do not have to answer any questions you do not want to, and you may withdraw from the research study without penalty at any time. Please note: If it is determined that there is a potential risk for you to harm yourself or others or others to hurt you, a licensed clinical psychologist will contact you via email.

Discomfort and Risks: There is a risk that participants will experience psychological discomfort associated with sharing their thoughts and feelings for the purposes of this study.

Benefits and Compensation: There are no direct benefits for participating in this study, although you may experience greater self awareness or sense of camaraderie for participating. Everyone who helps with this work will be contributing directly to our knowledge of the relationship between ADHD and life factors. For participating in this study, you will receive a \$10.00 Amazon.com gift card that will be emailed to you by the researchers. Your student number will be turned into the Office of Business Operations and your compensation may be subject to being taxed. As previously stated, your participation is voluntary; you may skip any question and you may withdraw at any time without affecting your compensation. However, if you

do not want your student number and/or email reported to the Office of Business Operations, you will not receive your compensation.

Confidentiality: Your confidentiality will be maintained to the degree permitted by the technology used. Specifically, no guarantees can be made regarding the interception of data sent via the Internet by any third parties. Any identifying information obtained during the study will be kept confidential. Only aggregate data with no identifying information will be published in an academic journal or presented at a scholarly conference. The data from this study may be used in future studies on Borderline Personality Disorder features and life outcomes.

Right to Refuse or Withdraw: Your participation is completely voluntary. You are free to withdraw from participation at any time or to choose not to participate at all. If you choose to withdraw you will not be penalized, or lose benefits discussed above. Furthermore, your information and responses will remain confidential.

Questions: If you have questions or are interested in more information about your participation or the study in general, you may contact Brittany Lewno at lewnob@uni.edu or Gina Sacchetti at sacchetg@uni.edu. You may also contact the faculty advisor, Dr. Elizabeth Lefler, at the Department of Psychology, University of Northern Iowa at elizabeth.lefler@uni.edu or 319-273-7637, or the office of the IRB Administrator, University of Northern Iowa, at 319-273-6148, for answers to questions about rights of research participants and the participant review process.

Agreement:

I am fully aware of the nature and extent of my participation in this project as stated above and the possible risks arising from it. I hereby agree to participate in this project. I acknowledge that I have received a copy of this consent statement. I am 18 years of age or older.

I reviewed and understand the components of this study. I voluntarily give my consent to proceed.

I reviewed and understand the components of this study. I do not give my consent to proceed.

(Electronic signature of investigator) _____ (Date)

(Electronic signature of instructor/advisor) _____ (Date)

APPENDIX G

RECRUITMENT EMAIL FOR ADDITIONAL PARTICIPANTS

Subject: Invitation to Participate in a Research Study

Hello,

This is an invitation to participate in a study titled Correlations Between Personality Factors, Mood, and Life Outcomes, comparing some life factors associated with ADHD symptoms. Such factors include personality characteristics associated with Borderline Personality Disorder and Antisocial Personality Disorder, anger, social and romantic relationship satisfaction, relational conflict, and sex-specific characteristics. You have been invited to participate because: in a previous ADHD study you gave permission for the researchers to contact you for future studies (for previous study participants)/you received an ADHD diagnosis from Student Disability Services (for those recruited from UNI SDS).

Identifying information (i.e. email address & student number) for UNI SDS participants/ (i.e. email address) for previous study participants will be collected and linked to your responses for compensation (\$10 Amazon.com gift card) and possible follow up.

The link between your responses and any identifying information will be destroyed after compensation is awarded and a follow up email is sent if appropriate. Data analysis will only be conducted after the link between identifying information and responses is destroyed. You are under no obligation to participate.

If you choose to participate please complete the study in private and allow between 45 minutes to 60 minutes for completion; however, you may terminate the study at any time. As compensation for your participation, the researchers will email you a \$10.00 Amazon.com gift card redeemable at their website or affiliated sites.

Here is the link to participate: _____

Thank you,

Researchers:

Brittany Lewno

Email: lewnob@uni.edu

Phone: (605) 216-5752

Gina Sacchetti

Email: sacchetg@uni.edu

Phone: (847) 274-8052

Faculty Advisor:

Dr. Elizabeth Lefler

Email: elizabeth.lefler@uni.edu

Phone: (319) 273-7637

APPENDIX H

UNI PSYCHOLOGY DEPART. PARTICIPANT POOL STUDY DESCRIPTION

Project Title: Correlations Between Personality Factors, Mood, and Life Outcomes

Description: The current study explores the relationship of Attention Deficit Hyperactivity Disorder (ADHD) symptoms and other factors associated with ADHD, per previous literature. Some factors include borderline personality disorder symptoms (e.g. heightened sensitivity, impulsivity) and characteristics typically associated with a specific gender. The remaining factors consider personal social and romantic relationship satisfaction, and an individual's level of anger. Individuals ranging between ages 18 through 25 are invited to participate. Your responses will be linked with identifying information (i.e. name, address, email) for the purpose of compensation and safety measures. This link will be destroyed after compensation and appropriate safety measures are taken. The information provided will remain confidential. The study takes approximately 45 minutes to 60 minutes to complete, and participants earn 1 psychology research credit for participation. Given that these topics explore personal experiences, the researchers encourage participants to complete the survey at a secured, private location.

APPENDIX I

DEBRIEFING

Correlations Between Personality Factors, Mood, and Life Outcomes

Thank you for your participation with this study.

Information about the study:

The purpose of this research is to compare the potential relationship between ADHD symptoms to specific factors that may be influential to the onset of ADHD symptoms or the degree of symptomology. Such factors include Borderline Personality Disorder (BPD) symptoms (e.g. emotionality, impulsivity), Antisocial Personality Disorder (ASPD) symptoms (e.g. disregard for right and wrong), and degree of personal anger. Additional factors consider level of satisfaction in relationship(s), intimate partner violence, and gender differences commonly exhibited by a specific gender.

Support Services:

You may have experienced distress during the course of the study. Below are several support services both state specific and nationwide.

University of Northern Iowa Counseling Center
Monday – Friday 8 a.m. to 5 p.m.
(319) 273-2676
<http://uni.edu/counseling/>

Appalachian State University Counseling Center
Monday – Friday 8 a.m. to 5 p.m.
(828) 262-3180
<http://counseling.appstate.edu/>

University of Wyoming Counseling Center
Monday – Friday 8 a.m. to 5 p.m.
(307) 766-2187
<http://www.uwyo.edu/ucc/>

Northern State University
Monday – Friday 8 a.m. to 5 p.m.
(605) 626-2371
<http://www3.northern.edu/sacounseling/>

National Domestic Violence Hotline
24 hours/7 days a week
(800) 799-7233
<http://www.thehotline.org/>

National Suicide Prevention Hotline
24 hours/7 days a week
(800) 273-8255

<http://www.suicidepreventionlifeline.org/>

Assurance of privacy:

We received approval from the universities (UNI, ASU, UW, NSU) prior to inviting you to participate and we would like to assure you that your information is confidential and responses are only used for the purpose of the study as indicated above. Although we will be collecting identifying information linked to your responses, the link will be destroyed once you receive compensation and after appropriate safety measures have been taken. Only the researchers and faculty advisor will have access to the response data. This information will be visible in a secured Qualtrics account, which is an online survey website, only accessible by the researchers and faculty advisor.

Compensation details:

To thank you for your participation, we'd like to offer you compensation. You will receive \$10.00 Amazon.com gift card as your compensation shortly after completion of the study.

Contact information:

If you have any questions, comments, or concerns please feel free to contact the researchers or faculty advisor for further inquiries. Thank you very much for your assistance with participating.

Researchers:

Brittany Lewno

Email: lewnob@uni.edu

Phone: (605) 216-5752

Gina Sacchetti

Email: sacchetg@uni.edu

Phone: (847) 274-8052

Faculty Advisor:

Dr. Elizabeth Lefler

Email: elizabeth.lefler@uni.edu

Phone: (319) 273-7637

APPENDIX J
COMPENSATION EMAIL

Subject: Compensation for Participation in a Research Study

Hello,

As previously mentioned, we are emailing you a \$10.00 Amazon.com gift to thank you for your participation with the study Correlations Between Personality Factors, Mood, and Life Outcome. Please contact us if you experience any troubles with redeeming your gift card, which may be redeemed at Amazon.com or affiliated websites. Please visit Amazon.com for additional inquiries or to view the terms and conditions.

Thank you for your time and participation with this study.



Sincerely,

Brittany Lewno
UNI Graduate Student, Clinical Psychology
lewnob@uni.edu

Gina Sacchetti
UNI Graduate Student, Clinical Psychology
sacchetg@uni.edu

APPENDIX K

UNIVERSITY OF NORTHERN IOWA INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL LETTER

Office of Research and Sponsored Programs	
<p align="center">Human Participants Review Committee UNI Institutional Review Board (IRB) 213 East Bartlett</p>	
<p>Gina Sacchetti Department of Psychology 0505</p>	<p>NOTE: This is a correction to previous letter sent earlier on 9/20/13. The red highlights are the corrected items.</p>
<p>Re: IRB 12-0265</p>	
<p>Dear Ms. Sacchetti:</p>	
<p>Your study, ADHD and Life Outcomes, has been approved following a Full Board review on 7/11/13. The effective date of your approval is 9/17/13. You may begin recruiting participants when ready.</p>	
<p>Modifications: If you need to make changes to your study procedures, samples, or sites, you must request approval of the change before continuing with the research. Changes requiring approval are those that may increase the social, emotional, physical, legal, or privacy risks to participants. Your request may be sent to me by mail or email.</p>	
<p>Problems and Adverse Events: If during the study you observe any problems or events pertaining to participation in your study that are <i>serious</i> and <i>unexpected</i> (e.g., you did not include them in your IRB materials as a potential risk), you must report this to the IRB within 10 days. Examples include unexpected injury or emotional stress, missteps in the consent documentation, or breaches of confidentiality. You may send this information to me by mail or email.</p>	
<p>Expiration Date: Your study approval will expire on 7/11/14. Beyond that, you may not recruit participants or collect data without continuing approval. We will email you an Annual Renewal/Update form about 4-6 weeks before your expiration date, or you can download it from our website. You are responsible for seeking continuing approval before your expiration date <i>whether you receive a reminder or not</i>. If your approval lapses, you will need to submit a new application for review.</p>	
<p>Closure: If you complete your project before the expiration date, or it ends for other reasons, please download the IRB Project Renewal/Closure form and submit in order to close out your protocol. It is especially important to do this if you are a student and planning to leave campus at the end of the academic year. Advisors are encouraged to monitor that this occurs.</p>	
<p>Forms: Information and all IRB forms are available online at: http://www.uni.edu/rsp/protection-human-research-participants.</p>	
<p>If you have any questions about Human Participants Review policies or procedures, please contact me at 319.273.6148 or anita.gordon@uni.edu. Best wishes for your project success.</p>	
<p align="right">Sincerely,  Anita M. Gordon, Ph.D. IRB Administrator</p>	
<p>Cc Elizabeth Lefler, Faculty Advisor; Brittany Lewno, Co-Investigator</p>	
<p align="center"><small>213 East Bartlett Hall • Cedar Falls, Iowa 50614-0391 • Phone: 319-273-3117 • Fax: 319-273-2634 • E-mail: rsp@uni.edu • Web: www.uni.edu/rsp</small></p>	

APPENDIX L

LETTERS OF COOPERATION FROM AFFILIATED UNIVERSITIES



College of Arts and Sciences
Dr. Wiley F. Smith
Department of Psychology
ASU Box 32109
Boone, NC 28608-2109
(828) 262-2272
Fax: (828) 262-2974

July 10, 2013

LETTER OF COOPERATION FROM APPALACHIAN STATE UNIVERSITY
FOR UNI STUDY ENTITLED: "ADHD AND LIFE OUTCOMES"

University of Northern Iowa Student Researchers: Brittany Lewno & Gina Sacchetti, Psychology
University of Northern Iowa Faculty Supervisor: Elizabeth Lefler, Ph.D., Psychology
Address: 334 Baker Hall, UNI Psychology Department, Cedar Falls, IA 50614

Dear Ms. Lewno and Ms. Sacchetti,

Appalachian State University is pleased to collaborate with you on your project "ADHD and Life Outcomes."

We understand that participating in this research will include inviting participants from previous studies to complete the current study. The current study will take place online and will include self-report measures on Attention Deficit Hyperactivity Disorder, Borderline Personality Disorder, relationship satisfaction, anger, intimate partner violence, and Antisocial Personality Disorder. We have had ample opportunities to discuss the research with you and ask for clarifications. Furthermore, we understand that the PI and key personnel for this project will maintain confidentiality of all research participants in all phases of this project.

According to our agreement, project activities will be carried out as described in the research plan reviewed and approved by the University of Northern Iowa Institutional Review Board.

We look forward to working with you; please consider this communication our Letter of Cooperation.

Sincerely,

A handwritten signature in cursive script that reads "Will Canu".

Will Canu, Ph.D.
Associate Professor
Psychology Department
Appalachian State University

June 25, 2013

LETTER OF COOPERATION FROM UNIVERSITY OF WYOMING
FOR UNI STUDY ENTITLED: "ADHD AND LIFE OUTCOMES"

University of Northern Iowa Student Researchers: Brittany Lewno & Gina Sacchetti, Psychology
University of Northern Iowa Faculty Supervisor: Dr. Elizabeth Lefler, Psychology
Address: 334 Baker Hall, UNI Psychology Department, Cedar Falls, IA 50614

Dear Ms. Lewno and Ms. Sacchetti,

The University of Wyoming is pleased to collaborate with you on your project "ADHD and Life Outcomes."

We understand that participating in this research will include inviting participants from previous studies to complete the current study. The current study will take place online and will include self-report measures on Attention Deficit Hyperactivity Disorder, Borderline Personality Disorder, relationship satisfaction, anger, intimate partner violence, and Antisocial Personality Disorder. We have had ample opportunities to discuss the research with you and ask for clarifications. Furthermore, we understand that the PI and key personnel for this project will maintain confidentiality of all research participants in all phases of this project.

According to our agreement, project activities will be carried out as described in the research plan reviewed and approved by the University of Northern Iowa Institutional Review Board.

We look forward to working with you; please consider this communication our Letter of Cooperation.

Sincerely,



Cynthia Hartung, Ph.D.
Associate Professor
Psychology Department
University of Wyoming



northern *State* university

Institutional Review Board Approval Letter

DATE: 12/27/2013

NAME: Brittany Lewno; Gina Sachetti

ADDRESS: Department of Psychology, University of Northern Iowa, Baker 334, Cedar Falls, IA 50614
Phone: (605) 216-5752; (847)274-8052

TITLE OF PROPOSAL: "The Correlations between Personality Factors, Mood, and Life Outcomes"

IRB PROTOCOL#: 2013-12-10A

This letter is to inform you officially of the approval of your proposed project by the Institutional Review Board (IRB) at NSU. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study. This project must be conducted in full accordance with IRB policies.

You are authorized to implement this study as of 12/27/2013 (date of approval); this approval is valid for 365 days. Should your project continue beyond this period, you are required to apply to the IRB for continuing review before 11/27/2014 (30 days prior to expiration date). You should notify the IRB immediately if any unanticipated or adverse effects occur during the research period. All modifications to the research protocol, including changes to materials and recruitment methods, must be reported to the IRB before the research project can continue.

Special Conditions for Approval:

*Informed consent form as provided with application materials is required. Study is approved by Northern State University IRB via acceptance of IRB approval as rendered by the University of Northern Iowa.

Jeffrey N. Howard, PhD

Chair

12/27/2013

Member IRB, Print

Signature

Position

Date