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Examining well-being among college students with Attention-Deficit/Hyperactivity Disorder (ADHD) and co-morbid diagnoses: An integrative approach to understanding mental health

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Examining Well-being Among College Students with Attention-Deficit/Hyperactivity
Disorder (ADHD) and Co-Morbid Diagnoses: An Integrative Approach to Understanding

Mental Health

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A dissertation submitted to the Graduate Faculty of

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ABSTRACT

Deficit and dysfunction in college students with ADHD diagnoses are now well studied and known to be commonplace in clinical psychology research literature (see Green & Rabiner, 2014, for review). However, areas of positive functioning and psychological well-being have not been well examined. This dissertation aims to investigate the extent to aspects of well-being may be more or less developed among college students carrying a diagnosis of ADHD, in comparison to their college peers. This examination utilized a subset of data collected from annual national “Healthy Minds” survey of college student mental health in the United States (Eisenberg, D., Hunt, J.B., Speer, N., 2013). In total, well-being profiles were examined across 4 distinct groups: 1) students reporting ADHD diagnosis with no co-morbid psychiatric diagnoses, 2) students reporting ADHD diagnosis in addition to co-morbid diagnoses of an anxiety and/or depressive disorder, 3) students reporting an anxiety and/or depressive disorder without ADHD diagnosis, and 4) a comparison group of peers who indicate no history of psychiatric diagnosis. Overall, results suggest ADHD diagnosis alone was not associated with any significant reduction in well-being, and observed deficits may be best accounted for by co-morbid emotional disorder diagnosis. Students indicating diagnoses of anxiety and/or depression were more likely to experience reduced well-being in comparison to their peers across a variety of domains. Implications of these results are discussed further, particularly in regard to understanding well-being among individuals with mental health disorder diagnoses.

Chapter I

INTRODUCTION AND OVERVIEW

Attention-Deficit/Hyperactivity disorder (ADHD) is characterized as a chronic neurodevelopmental disorder, which becomes first apparent in childhood and often pervades well into adulthood (APA, 2013). For both children and adults, the diagnosis is associated with various functional impairments, including problems in academics, work, and personal relationships (Barkley, 2006). In addition, individuals with ADHD are at higher risk for the development of other mental and physical health concerns (e.g., substance abuse, depression, anxiety, physical injury, etc.; Barkley et al., 2006, Barkley, Murphy, & Fischer, 2008).

The purpose of this investigation is to deepen our understanding of individuals diagnosed with ADHD, but from a new angle. Approximately two decades ago, researchers and clinicians lamented clinical psychology's focus on psychopathology and functional impairment and, to remedy this, suggested the field of "positive psychology," which emphasizes understanding human potential for resilience, character strength, and happiness (Seligman, 2002). One central concept in positive psychology is the construct of well-being, and over the past two decades much work has been done on mapping out the key elements of human well-being (Henriques, Kleinman, & Asselin, 2014). The central focus of this dissertation is to apply the lens of well-being to understanding ADHD. Specifically, the most basic question, which has yet to be explored empirically to our knowledge, is whether there are various aspects of the positive dimensions of psychological well-being that are less (or more) well-developed in individuals who carry a diagnosis of ADHD as

compared with the general population? Although extant literature clearly points to several areas of functional impairment associated with ADHD, it remains unclear how ADHD symptoms may relate to key domains of positive functioning and well-being, which includes domains such as having purpose in life, life satisfaction, and positive relationships.

Through the traditional lens of psychopathology, ADHD is often characterized as a disabling syndrome, one that is generally associated with chronic and significant dysfunction and distress. Research in the fields of clinical psychology and psychiatry provides a large body of evidence to support this characterization, ranging from higher rates of school drop-out and divorce, to increased risk of involvement in fatal motor vehicle accidents and criminal arrests (Barkley, 2006; Barkley, Murphy, & Fischer, 2008; Weiss & Hechtman, 1993). However, extant research has been oriented toward elucidating domains of deficit on a continuum of functioning. Much less empirical scrutiny has been directed toward understanding the opposite end of the continuum – areas of strength, resiliency, competence, life satisfaction, and flourishing. These themes are common to research in the areas of “positive psychology” and well-being. Unfortunately, the fields of positive and clinical psychology remain quite separate from one another, despite the complementary nature of the two areas. While clinical research has provided a rich understanding of dysfunction and distress associated with psychopathology, insights from positive psychology on the nature of well-being can elucidate co-occurring strengths and areas of positive functioning associated with psychiatric diagnosis. Integration of a well-being framework would thus provide a

more comprehensive and integrated conceptualization of diagnoses such as ADHD. Furthermore, this integration is critical for the advancement of professional psychology, as goals of clinical intervention often expand beyond reduction of symptoms and impairment toward fostering the enhancement of mental health and well-being.

To date, there have been two prominent approaches to the psychological study of well-being. One approach, termed *hedonic* well-being research, examines well-being in relation to one's subjective sense of life satisfaction and happiness. In contrast, *eudemonic* perspectives consider indices of personal growth; need fulfillment, and achievement as defining well-being components. Few extant models have attempted to integrate these approaches (see Chapter 2 for comprehensive review). However, a recent model by Henriques and colleagues (2014) offers an integrated and multi-tiered conceptualization. Called the Nested Model, it offers an integrative framework of positive human functioning to compliment the assessment and conceptualization of psychopathology.

The Nested Model of well-being (Henriques, Kleinman, & Asselin, 2014) identifies four nested layers that together make up the variables that go into the construct of human well-being, described as follows: 1) the *Subjective Domain*, consisting of one's own account of their phenomenological experience of happiness and satisfaction, 2) the *Health and Functioning Domain*, comprised of sub-domains of biological and psychological functioning, 3) the *Environmental Domain*, which addresses the presence of material and social resources in one's environment, and

4) the *Values and Ideology Domain*, which acknowledges human functioning as being subjectively defined within a broader context of ethics, morals, and cultural norms. Taken together, the Nested Model defines well-being based on the extent to which an individual experiences happiness and satisfaction, physical and mental health, and effective utilization of environmental resources in accordance with a recognized set of beliefs and values of the evaluator.

Current research suggests that an ADHD diagnosis is associated with varying degrees of dysfunction within each of the above domains across the life-span (Barkley, 2006; Barkley, Murphy, & Fischer, 2008; Weiss & Hechtman, 1993). Evidence of this impairment is generally derived from group-level analyses demonstrating that individuals with ADHD, on average, experience greater impairments than their peers. However, it is also widely recognized that considerable inter-individual differences exist in the presentation of ADHD symptoms and associated impairment (Levy, Hay, McStephen, Wood, & Waldman, 1997; Willcutt, Pennington, & DeFries, 2000). Furthermore, comparisons of functioning across psychiatric diagnoses are less common (Rutter & Sroufe, 2000), and the extent to which observed impairments are specific to ADHD diagnosis remains unclear. Finally, relatively little empirical attention has been given to understanding the trajectory of ADHD beyond childhood and adolescence. Many individuals diagnosed with ADHD in childhood demonstrate a reduction of symptoms in adulthood, with approximately one-third to two-thirds of those individuals no longer meeting diagnostic criteria (Barkley et al., 2002; Weiss & Hechtman, 1993). This trajectory suggests individual differences in positive

adaptation and resiliency, and further research is needed to clarify the extent to which college students with ADHD experience aspects of positive functioning and well-being in comparison to their peers. In order to elucidate domains of positive adaptation among college students carrying an ADHD diagnosis, this dissertation will explore well-being profiles among students with and without self-reports of a previous ADHD diagnosis. We expect that well-being is likely to be reduced among individuals with additional mental health concerns beyond ADHD diagnosis.

Therefore, group comparisons will be made that distinguish between students reporting co-morbid mood and anxiety disorder diagnoses. In total, well-being profiles will be examined across 4 distinct groups: 1) students who report a history of ADHD diagnosis with no co-morbid psychiatric diagnoses, 2) students who report a history of ADHD diagnosis in addition to co-morbid diagnoses of an anxiety and/or depressive disorder, and 3) a comparison group of peers with no significant mental health concerns. This goal will be accomplished through utilization of a subset of recent data collected from the “Healthy Minds Study” (HMS) annual national survey of college students across the United States (for review, see Eisenberg, D., Hunt, J.B., Speer, N., 2013).

Chapter II

LITERATURE REVIEW

This project attempts to examine Attention Deficit Hyperactivity Disorder in adults via a new lens. Specifically, the goal is to examine archival self-report data collected from local college students regarding their mental health (i.e., the “Healthy Minds Study”; Eisenberg, D., Hunt, J.B., Speer, N., 2013) framed with a novel, holistic perspective on human well-being, and then proceed to compare and contrast young adults who indicate a history of diagnosis for ADHD with those who do not. The value will be in both determining the feasibility of this new comprehensive approach to assessing human well-being, and in offering a potentially important angle in understanding ADHD. Because this project is the result of the intersection of two broad streams of thought, the literature review will be divided up into two parts. First, a review of the concepts of well-being via the lens of Henriques’ unified approach to psychology will lay the groundwork for the domains to assess. Second, a comprehensive review of the literature on ADHD will survey the current picture and state of knowledge and will set the stage for predictions of the pattern of results we would expect to see emerge when such individuals would be compared with those without this condition on measures of well-being and related areas of functioning.

Part I: A Unified Approach to Well-being

To date, there have been two prominent approaches to the psychological study of well-being. One approach, termed *hedonic* well-being research, examines well-being in relation to one’s subjective sense of life satisfaction and happiness. In

contrast, *eudemonic* perspectives consider indices of personal growth; need fulfillment, and achievement as defining well-being components. Few extant models have attempted to integrate these approaches. However, a recent nested model by Henriques and colleagues (2014) offers an integrated and multi-tiered conceptualization. This model is proposed to resolve fragmentation of well-being perspectives, and offers an integrative framework of positive human functioning to compliment the assessment and conceptualization of psychopathology.

The Construct of Well-being

The study of well-being within psychology has a long history stemming from two distinct philosophical perspectives: one emphasizing the pursuit of pleasure and being satisfied with one's life (i.e., hedonic well-being), and one emphasizing the pursuit of a meaningful life and optimal functioning (i.e., eudemonic well-being). The philosophical roots of this division can traced as far back as ancient Greece and the writings of Aristotle (e.g., Deci & Ryan, 2002; Kashdan Diswas-Diener, & King, 2008; Henriques, Kleinman, & Asselin, 2014), who wrote extensively on the pursuit of happiness, and often distinguished between seeking happiness through pleasure, and happiness resulting from living a virtuous and meaningful life. To Aristotle, well-being was determined by the pursuit of meaningful achievements consistent with one's values. This view is consistent with eudemonic approaches to conceptualizing well-being (e.g., Ryan & Deci, 2000; Ryff, 1989).

In contrast the eudemonic perspective, the hedonic perspective conceptualizes well-being based on one's subjective experience of pleasure and life

satisfaction. The philosophical rationale for the hedonic perspective also has a long history. For example, as Kashdan, Diswas-Diener and King (2008) point out, Thomas Hobbes and John Locke both recognized in the 17th century that pleasure is a motivator and indicator of accomplishment in life. This notion has been extensively studied and supported across decades of psychological research, and is central to several prominent and influential psychological theories (e.g., Eysenck & Eysenck, 1985; Gray, 2004). It is now very well understood that we tend to act in ways that maximize “pleasure” (i.e., move toward desired outcomes) and minimize “pain” (i.e., avoid undesired outcomes). This adaptive capacity allows us to capitalize on opportunities for success while preventing failure in areas we deem to be important to us.

Hedonic and eudemonic perspectives emphasize two quite distinct domains of well-being. However, experiences of pleasure and meaningful life achievement are not entirely distinct or unrelated. Human beings experience pleasure in response to meaningful achievement, and the subjective experience of satisfaction and happiness can lead us to pursue meaningful and fulfilling opportunities in the future.

In the first section of this chapter, we will review prominent theories within each of these approaches, as well as theoretical and data-driven attempts to integrate these hedonic and eudemonic perspectives. Finally, an integrative, nested model of well-being will be proposed as a conceptual framework for the assessment of well-being among college students with ADHD.

Hedonic Well-being

Currently, the most prominent theoretical framework for the empirical study of hedonic well-being comes from Ed Diener's proposed model of Subjective Well-Being (SWB; Diener, 1984). According to this model, SWB is defined based on 4 components: 1) the presence of positive affect, 2) the absence of negative affect, and 3) one's own general appraisal of life satisfaction, 4) one's appraisal of satisfaction in regard to specific life domains and time constraints. The SWB model recognizes that appraisals of life satisfaction and affect may vary across specific domains and time constraints. For example, life satisfaction may be assessed at the global level (i.e., overall, across time and circumstances), or in consideration of particular time periods (e.g., over the past days or months, following a marriage or divorce, etc.).

Research suggests that these contextual variations in the assessment of SWB may bias or alter self-reports of affect and satisfaction (for full review, see Diener, Napa-Scollon, Oishi, Dzokoto, Suh, 2000). However, Diener's SWB model makes no a priori predictions about SWB in response to specific contextual variables. Instead, the model acknowledges contextual correlates of well-being as empirical questions warranting further research. Indeed, one strength of the SWB model is that it has encouraged a burgeoning area of empirical research. Empirically validated measures of SWB utilize clear operational definitions of measured constructs, and subsequently provide reliable assessment of happiness and life satisfaction (e.g., Kahneman & Krueger, 2006). The ability to reliably assess correlates of affect and

life satisfaction has been fruitful, and we now have a wealth of data that informs us about predictors of human happiness.

Based on extant literature examining correlates of subjective well-being, Seligman (2002) previously suggested a causal “formula” implicating the components of human happiness. In his formula, he identified enduring happiness as being multiply determined by 1) a personal “set point,” 2) circumstances of one’s environment, and 3) other factors under an individual’s own personal control. A set point for human happiness is supported by evidence from behavior-genetic research, which suggests up to 80% of the variance in stable self-reports of SWB appear to be accounted for by factors associated with heritability (Lykken & Tellegan, 1996). However, this high estimate is associated with only the stable, aggregate portion of self-reports of SWB over a 10 year period. Self-reports of happiness evaluated at a single period in one’s life appear to be much less influenced by heritability, with estimates suggesting that 40 -55% of variance in SWB during a specific period of life can be accounted for by genetics influence.

However, Diener and colleagues (Diener, Lucas & Smith, 1999) caution against interpretation of this data to suggest that subjective well-being is largely fixed and unchangeable. The authors note that heritability estimates from twin studies may be inflated due to some restriction in the range of environmental influences in those samples. That is, samples are not likely to include more extreme circumstances (e.g., “solitary confinement,” “social revolution,” etc.). Diener and colleagues therefore argue that heritability studies only tell us about the influence of

heritability among contemporary Western samples living with relatively minimal variability in their environment.

Further research by Diener and others suggests that SWB is, indeed, largely influenced by contextual factors (see Diener, Lucas & Smith, 1999 for full review). For example, it may come as little surprise that research demonstrates that individuals with a high income are more likely to be happy than those in poverty. Those with multiple severe disabilities and physical illnesses report less life satisfaction than individuals in good health. Individuals who identify with religious beliefs that are widely accepted in their culture report more satisfaction than those who report a divergent set of beliefs. In sum, a broader context of health, availability of resources, and an alignment of individual and cultural values are quite significant in determining one's subjective sense of happiness and satisfaction.

Through the lens of the SWB model, it is tempting to infer ratings of happiness and life satisfaction as the dependent variable, reliant on contextual factors such as the examples provided above. However, assuming causation based on this correlational data would be spurious and premature. Several well-being researchers have recognized that reciprocal interactions among variables are also worthy of empirical consideration. For example, it is also entirely plausible that increased life satisfaction and happiness may motivate an individual to progress towards their goals. An ecological model of reciprocal influence is therefore required.

Eudemonic Well-being

While the construct of hedonic well-being is largely data-driven and informed by a single predominant model (i.e., SWB), the construct of eudemonic well-being is largely theory-driven and broadly represented by a range of theoretical models and constructs. A commonality across these perspectives is that well-being is derived from fulfillment of some fundamental and intrinsic psychological needs. However, eudemonic approaches vary considerably in their identification and emphases of these core needs.

Several theoretical models relate to the eudemonic perspective, offering a range of insights into various human needs and intrinsic motivations associated with well-being. For example, a Self-Determination Theory (SDT) proposed by Deci & Ryan (2000) suggests that well-being is derived from fundamental needs of autonomy, competence, and belonging. Similarly, a model of human flourishing proposed by Seligman suggests that well-being is determined by the presence of positive emotion, engagement, meaning, positive relationships, and significant accomplishment (referred to by the acronym “PERMA”; Seligman, 2012).

Although a variety of eudemonic well-being models exist, Carol Ryff’s seminal model of Psychological Well-being (PWB) is arguably one of the most prominent and influential, and strongly associated with the eudemonic well-being “camp” (Ryff, 1989). Ryff’s model of PWB has been historically aligned against hedonic notions of well-being, asserting that human well-being is best defined by aspects of personal growth and achievement, rather than one’s subjective sense of satisfaction or prevalence of positive vs. negative affect (i.e., SWB). A fundamental assertion of the

PWB model is that well-being is determined by living a “virtuous” life which involves capitalizing on one’s human potential. Furthermore, the model proposes that pursuit of excellence and engagement in purposeful goal-oriented activity will result in secondary enhancement of SWB (i.e., increased positive affect, decreased negative affect, endorsement of higher levels of life satisfaction). Like Seligman’s “PERMA” model (2012), PWB theory also acknowledges human needs of autonomy and relationships with others, and adds dimensions of self-acceptance, environmental mastery, life purpose, and personal growth to the list (Ryff, 1989; Ryff & Singer, 2008).

Like other eudemonic models, PWB is a theoretically derived model. However, Carol Ryff and colleagues have subsequently attempted to empirically validate the model through construction and factor analysis of a PWB self-report measure (Ryff & Singer, 2008). Over the past two decades, several published studies have provided evidence of factorial validity in support of PWB’s six eudemonic dimensions (i.e., autonomy, relationships with others, self-acceptance, environmental mastery, life purpose, and personal growth; Chen & Chan, 2005; Ryff & Keyes, 1995; van Dierendonck, 2004). In addition, research demonstrates that many of these dimensions correlate highly with various socio-demographic domains, varying predictably across age, gender, level of education, biological functioning, etc.

Still, critics of the eudemonic approach to well-being point out several limitations of models, such as PWB. First, eudemonic definitions of well-being are

inherently value laden, and eudemonic perspectives offer little insight regarding the extent to which an individual's functioning may or may not be adaptive and in accord with a broader context of cultural beliefs and values. Relatedly, although eudemonic approaches are implied to be more "objective" than "subjective" in their assessment of well-being, constructs such as "autonomy," "personal growth," etc. are difficult to operationally define, and measurement of these domains is typically dependent on an individual's subjective, self-reported appraisal of functioning in these areas. Finally, eudemonic models imply that domains of personal growth and achievement play a central role in determining one's overall positive functioning, state of happiness, and life satisfaction. In this regard, eudemonic approaches are prone to the same faulty causal assumption implied by hedonic models. Although commonly inferred, causal relationships between domains of well-being cannot be extrapolated from extant correlational data.

Integrative Approaches to Well-being

In recent years, many well-being researchers have challenged the merits of distinguishing between hedonic and eudemonic perspectives, suggesting that these models may simply represent two sides of the same coin. This assertion is supported by empirical research demonstrating high correlations between measures of SWB and eudemonic measures (Keyes et al., 2003). Factor analyses of these correlations indicate that while SWB and eudemonic measures represent separate factors, these factors share up to ~49% of their variance. A variety of

integrative well-being models have subsequently attempted to clarify the association between these factors.

One integrative model, proposed by Corey Keyes (2002), conceptualizes well-being as overall human “flourishing” which is comprised of both hedonic and eudemonic indices of functioning. According to this model, mental health is determined, not only by the absence of mental illness, but also the presence of positive characteristics. In line with this assertion, Keyes (2002) offers that human flourishing may be defined as the inverse of a “depressive episode,” as it is characterized by symptoms of both hedonia (inversely related to anhedonia) and positive functioning (an inverse of behavioral impairments). Keyes further suggests “diagnosis” of flourishing using discrete classification modeled after the DSM system (i.e., APA, 2013). More specifically, Keyes (2002) recommends criteria for flourishing may be met based on the presence of “at least 1 characteristic of hedonic well-being” (e.g., positive affect, life satisfaction), “6 total characteristics present across domains of psychological well-being” (noted above), and evidence of positive social functioning (including social acceptance, actualization, contribution, coherence, and integration; see Keyes, 2005 for full description of these domains). Conversely, Keyes suggests that individuals who demonstrate impairment in at least 1 area of hedonic well-being, and at least 6 areas of psychological and social well-being may be considered “languishing.” Individuals who do not meet criteria for languishing or flourishing may be considered “moderately healthy.”

Keyes' notion of flourishing highlights the relevance of both hedonic and eudemonic variables in determining one's overall sense of well-being, and attempts to operationally define well-being according to these variables. However, the model does not offer insights regarding how these factors may relate to one another, nor does it acknowledge and address the varying epistemological frames from which these two perspectives have been derived.

In contrast, John Tomer (2011) more explicitly acknowledges the relative contributions of hedonic and eudemonic epistemologies in his "formula" approach to conceptualizing well-being. He recognizes that hedonic approaches to well-being have evolved from an economist research orientation, where value is placed on assessments that tend to be utilitarian and easily measurable. Conversely, eudemonic perspectives emphasize philosophical concerns over issues of measurement, placing higher value on understanding of human virtue. Tomer acknowledges that measures of hedonic and eudemonic well-being are often highly correlated, and resonates with the hedonic argument for the empirical benefits of measuring. He also resonates with the eudemonic notion that focusing solely on the pursuit of pleasure and satisfaction as an end goal is an ineffective means of pursuing well-being. In support of this assertion, Tomer cites research demonstrating that intrinsically motivated individuals report more enduring happiness than individuals in pursuit of subjective pleasure (e.g., Kasser & Ryan, 2001).

In an attempt to clarify the nature of well-being, Tomer offers a revised model of human happiness based on an earlier model proposed by Seligman (2002). In Seligman's initial formula for understanding happiness, he suggested that happiness may be visually represented by the equation " $H = S + C + V$," whereby happiness ("H") is multiply determined by: 1) genetically inherited capacity ("S"), 2) environmental context ("C"), and 3) an individual's voluntary exertion of abilities to influence their own happiness ("V"). In Tomer's revised model, he suggests instead, that our aggregate capacity for happiness is determined by a sum of hedonic and eudemonic factors (Represented by the formula $E = E_U + E_R$). He suggests that the Hedonic contribution to happiness is associated with attainment of material goods, status, and wealth, and a repertoire of useful skills. In addition, happiness is additively determined by eudemonic influences, such as an individual's capacity to exert control over regulating their emotions, and move toward achieving their goals and maximizing their potential. In sum, Tomer argues that both eudemonic capacities, cultivation of both hedonically-oriented external resources and eudemonically-oriented intrinsic capacities will contribute to one's potential for experiencing of happiness.

Since Tomer's proposed revision to Seligman's original "happiness formula," Seligman and colleagues have proposed a more comprehensive model for understanding well-being, referred to as the "engine model" (Jayawickreme, Forgeard, & Seligman, 2012). This engine approach attempts to unite hedonic and eudemonic emphases by placing them in a context of "input", "process" and "outcome" variables associated with well-being. "Input" variables refer to a range

of specific predictors of well-being, including “exogenous” variables (i.e., environmental variables; includes incomes, genetics, etc.) and “endogenous” variables (i.e., personality variables; includes traits, values, talents, etc.). “Process” variables refer to a range of mental states and processes that influence an individual’s choices and actions (e.g., beliefs, cognitions, emotions). Finally, “outcome” variables refer to any voluntary overt behaviors associated with well-being (e.g., relationships with others, achievements at work, meaningful activity, etc.).

The engine model (Jayawickreme, Forgearg, & Seligman, 2012) helps to clarify and organize the theoretical problems of hedonic and eudemonic approaches by proposing functional relationship between variables emphasized in those approaches. However, a significant limitation of the engine model is that it implies a one-directional causal relationship between “input,” “process,” and “outcome” variables. That is, input variables determine process variables, and process variables result in outcome variables. Of course, it makes sense that our environments and personalities will influence how we think and feel, and those thoughts and feelings will influence our overt behaviors. However, a comprehensive psychological model must recognize that possibilities of reciprocal influence across each of these variables. Surely one’s overt behavior can also exert influence internal processes of thinking and feeling, and environmental context. In other words, many variables have the potential to be inputs, processes, and outcomes.

The Nested Model of Well-being

An alternative Nested Model has subsequently been proposed in order to clarify the functional relationships between multiple domains associated with the construct of well-being (Henriques, Kleinman, & Asselin, 2014). Previous models have emphasized some of these domains with the exclusion of others, or have offered more holistic well-being conceptualizations without clear delineation of the component parts. The Nested Model attempts to provide a holistic and comprehensive framework to beginning conceptualizing well-being based on functioning across clearly defined domains. These domains include: 1) The Subjective Domain (characterized by the conscious, first person experience of happiness and satisfaction), 2) the Health and Functioning Domain (encapsulating functioning in subdomains of physical and mental health), 3) Environmental domain (defined by the quality and availability of resources in subdomains of material and social environment), and 4) the Values and Ideologies domain (which acknowledges that well-being is ultimately determined by the extent to which one's functioning in across other domains aligns with a subsuming context of an evaluator's beliefs and values; see Figure 1).

Subjective Domain

The Subjective domain of well-being refers to an individual's first person conscious experience of happiness. This domain acknowledges, first and foremost, that conscious experience is a necessary prerequisite for well-being. Furthermore, the experience of consciousness is a fundamental requirement for well-being, such that

any conscious organism, experiences some degree of well-being, whether it be a human or a chinchilla.

The Subjective Domain of the nested model encapsulates the perspective of SWB (e.g., Diener, 1984), defines the subjective phenomenological experience of well-being based on two general components: experiential consciousness and reflective self-consciousness. Experiential consciousness refers to the combined sensory, perceptual, and affective experience of living. The experience of positive and negative emotions serves as the basic foundation for an organism's adaptive functioning. Neurologically mediated signals of pleasure and pain provide crucial information to direct behavior, telling us when and what to approach and avoid. Generally speaking, increased positive emotion with decreased negative emotion typically serves as a neuro-biological indicator of an organism's positive adaptation. Therefore, one's conscious experience of positive vs. negative emotional states is a foundational component of well-being. In addition to the basic experiential consciousness, human beings are unique in their capacity to use language and thereby narrate every moment of their conscious experience (Henriques, 2003). This capacity for language sets the stage for an additional component of the Subjective domain – reflective self-consciousness.

Reflective self-consciousness refers to our capacity to verbally interpret, understand and develop greater meaning and insight regarding ourselves and the world we live in. As we narrate our experience, we have the ability to more carefully consider ourselves and environment and reach narrative conclusions regarding the

extent to which we are satisfied with our circumstances. Therefore, our subjective appraisal of our own well-being can be assessed by affective indices (e.g., positive vs. negative affect) and cognitive appraisal (e.g., level of self-reflective satisfaction). These two consciousness streams align with domains of emotion and cognition outlined by hedonic psychology and the SWB model (e.g., Diener, 1984). However, the Nested Model regards these subjective components as “one piece of the puzzle” of well-being and also considers a broader context of adaptive functioning as critical for the overall assessment of the construct. The nested domains outlined below are intended to clarify eudemonic concepts of adaptive living often associated with one’s overall well-being.

Health and Functioning Domain

This domain of the NM acknowledges health as a critical element of overall well-being. The Health and Functioning domain distinguishes between sub-components of biological and psychological functioning. These two domains are regarded in the model as highly inter-related, though theoretically distinct aspects of overall health. The biological sub-domain refers to aspects of organismic functioning across various levels of biology, including genetic, cellular, organ, and larger biological system operations (e.g., endocrine, nervous system, etc.). Of course, biological functioning across these levels may influence psychological functioning in a multitude of ways, and ultimately, all psychological processes must be mediated by neuro-biological processes.

The psychological sub-domain of Health and Functioning considers broader patterns of mental behavior (i.e., personality) not fully accounted for in the subjective domain of the Nested Model. Of course, stable patterns of personality are defined and shaped by states of experiential and reflective self-consciousness, and mediated by neuro-biological processes – all acknowledged above. However, clarifying specific patterns in mental behavior allows for functional assessment of an individual's capacity to adapt and thrive. For example, an individual experiencing a manic episode may report strong feelings of euphoria, but express delusional thinking and impulsive decision making likely to result in significant functional impairment. Similarly, individuals with ADHD may experience functional impairments associated with symptoms of inattention and impulsivity, but still indicate feeling happy and satisfied with themselves (e.g., positive illusory bias; Owens et al., 2007; Proctor et al., 20011) despite this apparent dysfunction. Psychological health is thus considered an essential component in determining one's overall well-being. Patterns of mental behavior considered in this sub-domain include: 1) temperament and traits (i.e., stable dispositional tendencies), 2) characteristic adaptations and identity (i.e., an individual's beliefs, motives, etc. regarding self and others), and 3) adaptive potentials (i.e., one's intelligence, skills, and abilities which contribute to adaptive functioning).

Environmental Domain

This domain recognizes the relationship between person and environment as paramount to understanding an individual's adaptive functioning and well-being.

According to the nested model, environmental context is crucial for understanding both the opportunity for cultivating personal well-being, as well as well-being outcomes. An individual raised in a war-torn country surrounded by violence and death and little positive support will likely have poorer health, less pleasurable experience, and lower satisfaction with their life and circumstances. Furthermore, an otherwise healthy and flourishing individual placed in a context of poverty and trauma will be less likely to realize their full potential; without resources, humans inevitably struggle much more to accomplish their goals and reach success. As human beings, we each have basic physical needs, including oxygen, nutrition, water, and physical safety. In addition, we have psycho-social needs, such as a fundamental need to belong (Baumeister & Leary, 1995), as well as the development of competence and autonomy (Deci & Ryan, 2000). An environment that allows opportunity for those needs to be met is therefore a necessary component of well-being.

The Nested Model of well-being clarifies two broad sub-domains of environment – material and social. Both aspects of the environment are regarded as essential for the development of well-being. The material environment refers to physical resources that benefit an individual's adaptive functioning. This includes natural ecological resources such as food, shelter, etc., and habitability of one's environment (e.g., absence of pathogens, etc.). In addition, the availability of man-made technological resources is also relevant to well-being. Access to manufactured goods and services, and technological innovations can help conserve energy, reduce

stress and frustration, and provide greater ease as we work toward accomplishing our goals.

Of course, economic context and access to money will largely determine the availability of these resources, and so financial standing is also an important consideration in understanding well-being. The relationship between money and happiness is a topic of extensive study in positive psychology, and extant research suggests a somewhat complicated picture. Evidence suggests that access to money is associated with greater subjective well-being to the extent that it allows individuals opportunity to pursue their basic needs (Diener, 2000; Diener & Oishi, 2000). However, the influence of money on well-being appears to generally plateau once money allows sufficient access to available resources.

The social environment sub-domain is defined by the context of social networks and inter-personal relationships a person is connected to. This level of the nested model aligns well with Bronfenbrenner's socio-ecological systems model, which also visualizes individual functioning within a broader context of nested systems (Bronfenbrenner, 2009). According to the socio-ecological model, individuals function in a context of: 1) a microsystem, defined by close relationships with family, peers and local institutions, 2) a "mesosystem," characterized by the inter-relationships between individuals and systems in the microsystem, 3) an "exosystem," which accounts for the indirect effects of third parties engaging individuals and systems in the microsystem, and 3) a "macrosystem" of broader cultural context, including political, religious, and socio-economic systems, etc.

Finally, patterns of influence from each of the above systems may change over time, resulting in various degrees of influence over the course of an individual's lifespan (i.e., the "chronosystem").

Taken together, the above three domains reflect a holistic view of well-being, as it accounts for an individual's subjective experience of happiness and satisfaction within a context of adaptive functioning across various domains. Each of these domains is frequently discussed in well-being literature. However, less attention has been given to considering the underlying values and ideologies that guide our determinations of what *is* "adaptive functioning." The final domain of the nested model highlights a broader context of beliefs and values that shape our individual appraisals of well-being.

Values and Ideology Domain

According to Henriques, Kleinman and Asselin (2014), well-being is an inherently evaluative notion that is inextricably linked to underlying values and ideologies. Eudemonic notions of well-being can be traced back thousands of years to teaching of Aristotle, and an age-old belief in living "a good life" filled with "virtue." Of course, there can be no universal consensus on an operational definition of these terms. They are intentionally ideological and evaluative. Furthermore, many epistemological frames exist to guide one's assessment of an ethical or "virtuous" life – religious, political, etc., and the Nested Model does not attempt to dispute the legitimacy of various worldviews. Rather, the model aims to acknowledge that any assessment of well-being will be inevitably influenced by the

evaluator's underlying ideology. Therefore, self-reflective awareness is a crucial component of any well-being evaluation. We the authors, therefore view the construct of well-being through the lens of professional psychology, and evaluate well-being in accordance with the ethics and values of our profession (e.g., APA Ethics Code; APA, 2003). For example, it is our view that evaluation of well-being must consider principles of beneficence, non-maleficence, integrity, and dignity. Ultimately, regardless of an individual's sense of happiness, satisfaction, or successes in life, psychological assessment of well-being must also consider the extent to which an individual is living in harmony with these values.

Notably, this positive and holistic view of mental health and well-being is not the standard conception used in psychiatry and psychology for understanding diagnoses such as ADHD. However, this perspective may be readily integrated with the standard psychiatric conceptualization of ADHD and extant literature examining symptoms and functional impairments associated with the diagnosis. The following section provides an integrative overview of research literature examining ADHD among college students through the lens of the Nested Model.

Part 2: ADHD and College Functioning Contextualized in the Nested Model:

The standard psychiatric conception of ADHD comes from a medical model in which apparent symptoms of inattention and hyperactivity/impulsivity are considered characteristics of a neuro-developmental disorder (APA, 2013). Indeed, research has demonstrated that the diagnosis is frequently associated with neurocognitive deficits such as problems with working memory, response

inhibition, vigilance, and temporal processing (Nigg, 2006). However, while these deficits are common, they are not universal, as many individuals with ADHD do not demonstrate these deficits (Wilcutt, Doyle, Nigg, Faraone, & Pennington, 2005). In order to develop a more comprehensive and holistic understanding of the diagnosis, a broader understanding of well-being and functioning associated with ADHD is required.

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most commonly diagnosed neuro-developmental disorder, affecting approximately 5-12% of children (DSM-5, American Psychiatric Association, 2013; Perou et al., 2013), and it is predictive of many negative outcomes later in life (Barkley, 2006). The disorder is characterized by persistent and clinically significant symptoms of inattention, hyperactivity, and impulsivity, which cause chronic impairment across multiple settings (APA, 2013). Diagnosis requires the presence of at least 6 symptoms in at least one of two criterion domains – inattention or hyperactivity/impulsivity in children, and a threshold of at least 5 symptoms among adults (i.e., ages 17 and over; APA, 2013). Furthermore, the DSM-5 further stipulates that several of these symptoms must first be present in childhood (i.e., prior to age 12).

Initially, symptoms of ADHD were thought to persist into adulthood in only a small minority of childhood cases (McGouch & Barkley, 2002). However, prevalence estimates now suggest that approximately 60-70% of childhood diagnoses of ADHD display persistent symptoms and associated impairment into adulthood (APA, 2013; Barkley, Fischer, Smallish, & Fletcher, 2006; Mannuzza, Gittelman-Klein, Bessler,

Malloy, & LaPadula, 1993; McGough & Barkley, 2004; Weiss & Hechtman, 1993).

This impairment appears across multiple domains, as adults with ADHD demonstrate reduced functioning across academic, social, psychological, and occupational functioning in comparison to peers without the disorder (Barkley, Murphy & Fisher, 2008).

Evidence of impairments associated with ADHD is suggestive of potential deficits associated with each of the four well-being domains proposed by the Nested Model. However, no research has carefully examined well-being among individuals with ADHD as it is described above. Careful review and integration of this literature may help to clarify an overall clinical profile of well-being among individuals with ADHD. In this section, extant clinical research will be reviewed in order to clearly define and contextualize ADHD within the Nested Model of well-being (Henriques, Kleinman, & Asselin, 2014). Particular consideration will be given to college student populations with ADHD, arguably an understudied demographic. In college settings, young adults with ADHD may be particularly vulnerable to impairment, as they are likely to have less behavioral and educational support, and greater cognitive demand than they would have experienced throughout their time in grades K through 12.

Within universities, the rate of students with ADHD seeking academic disabilities services appears to be growing, with current prevalence estimates

ranging from 3% up to 13%¹ (Green & Rabiner, 2013). Furthermore, approximately 25% of college students receiving disability services carry an ADHD diagnosis (Dupaul et al., 2001). In an effort to increase understanding and promote positive outcomes for college students with ADHD, a burgeoning scientific literature has begun to examine the extent to which ADHD impacts general functioning in higher education. It is now clear that college students with ADHD tend to demonstrate functional impairments similar to those observed in younger children and adolescents, including academic, social, and psychological, and neuro-cognitive problems (Barkley, 2006; Green & Rabiner, 2012; Dupaul et al., 2009; Weyandt et al., 2013). Some data suggest that college students with ADHD may fare better than non-college attending peers with ADHD, as a certain level of academic achievement is required to receive college admission (see Green & Rabiner, 2014). Still, it is evident that a large percentage of students with ADHD struggle in the college setting, and the extent to which ADHD symptoms may impact overall functioning and well-being among college students remains largely unknown.

ADHD and Well-being

Only one study was located that directly assessed the construct of well-being among an ADHD sample (i.e., Wilmschurst, Peele, & Wilmschurst, 2011). In this recent

¹ A recent study by Green & Rabiner (2013) indicates that diagnostic method may account for large discrepancies in reported prevalence rates among college students with ADHD. In their sample of students, Green and Rabiner found the highest prevalence estimate yielded through a normative method of ADHD assessment (i.e., identifying ADHD as defined by self-reported symptoms at least 1.5 SDs above the sample mean); the lowest prevalence estimate was observed when full DSM-IV diagnostic criteria were required.

study, Wilmshurst and colleagues assessed resilience and psychological well-being (PWB) among a small sample of college students with and without ADHD (ADHD, $n = 17$; controls, $n = 19$). Undergraduates completed survey measures of psychological well-being (i.e., Scales of Psychological Well-being; Ryff & Keyes, 1995), self-concept (i.e., Tennessee Self-Concept Scale, 2nd Ed., TSCS:2; Fitts & Warren, 2003), and ADHD symptoms (i.e., Conners Adult ADHD Rating Scale, CAARS-S:L; Conners, Erhardt, & Sparrow, 1999), as well as a laboratory measure of sustained attention (i.e., Conners' Continuous Performance Test, CPT-II; Conners, 2000).

Notably, Wilmshurst and colleagues (2011) found no significant group differences in self-reports of psychological well-being, self-concept, or overall GPA. Furthermore, the average GPA of the ADHD group was actually superior to the average college student at their institution (3.23 vs. 3.12 GPA, respectively)! The authors hypothesized that the lack of observed impairment in their ADHD sample may be an indicator of resilience among college students with ADHD. However, the authors also acknowledged that their small sample may have precluded detection of significant group differences. The demographics of the sample were also not representative of college students with ADHD, as female participants comprised nearly 50% of the ADHD group (ADHD diagnosis is more prevalent among males, at a ratio of approximately 2:1; APA, 2013). These findings are also inconsistent with extant research literature indicating significant academic impairment among college students with ADHD (e.g., Advokat, Lane, & Luo, 2011; Green & Rabiner, 2012;

Heiligenstein et al., 1999; Weyandt et al., 2013); this suggests that sample may not be not representative.

Although Wilmshurst and colleagues (2011) did not observe overall group differences on measures of self-concept and psychological well-being, the authors did find significant correlations between ratings of self-concept and specific domains of psychological well-being differed between groups, such that self-concept was predicted by “environmental mastery” among the ADHD group, and “positive relations with others” among controls. The authors hypothesized that these differing predictors of self-concept may reflect a unique pattern of utilizing social supports to aid in this resiliency among college students with ADHD. However, due to their limited sample, it remains unclear if this truly indicates a characteristic profile of resiliency among college students with ADHD.

No other published research that explicitly examined profiles of well-being and resiliency among college students with ADHD was able to be located. However, a burgeoning literature provides evidence that diagnosis of ADHD comes with considerable risk of impairment in higher education. This evidence is considered in relation to each the nested domains of well-being below.

ADHD and the Subjective Well-being Domain

Positive v. Negative Emotions

Decades of clinical research indicate that diagnosis of ADHD is commonly associated with difficulties in managing one’s emotions (Barkley, 2006). In

comparison to their peers, children with ADHD more likely to become excitable and hyper-aroused in response to immediate rewards, and express greater negative affect in response to negative feedback (Douglas & Parry, 1994; Rosenbaum & Baker, 1984). Fewer studies have examined emotion regulation among adult populations with ADHD. However, there is good reason to believe that many adults with ADHD continue to exhibit difficulties in emotional self-regulation into adulthood, and these co-morbid regulation deficits predict higher risk of functional impairments (Barkley & Murphy, 2010; Surman et al., 2010).

Very little empirical research to date has examined emotional functioning among college students with ADHD. These studies have not explicitly examined the construct of emotional dysregulation; however, findings provide growing evidence that college students with ADHD exhibit co-occurring emotional concerns (Fleming & McMahon, 2012). For example, Heiligenstein and colleagues (1999) found no difference in self-reported emotional distress among college students with ADHD in comparison to peers also seeking services at a university counseling center. These results suggest that emotional distress may be associated with myriad of factors beyond ADHD among college students. However, increased emotional distress among individuals with ADHD becomes apparent when compared to non-clinical control groups of college peers (e.g., Richards et al., 1999; Richards et al., 2002). In addition, college students with ADHD symptoms are more likely than their peers to exhibit comorbid symptoms of anxiety and depression (Dupaul et al., 2009; Green & Rabiner, 2012).

Satisfaction with Life

Given that college students with ADHD are more likely to experience symptoms of emotional distress, it is reasonable to expect that college students with ADHD may also report lower ratings of satisfaction in regard to their overall quality of life. Findings from Grenwald-Mayes (2001) suggest this is the case. More specifically, in comparison to peers, undergraduates with ADHD indicated lower satisfaction regarding their personal growth, social relationships, physical health, among other areas. In fact, college students with ADHD reported lower ratings across all assessed domains of quality of life with the exception of one area – *active-recreational-orientation*. Higher average ratings in this domain appear to suggest that college students with ADHD may gain particular satisfaction from engagement in recreational activities, relative to other areas of functioning.

ADHD and the Health and Functioning Domain

There is currently well-established evidence that ADHD diagnosis frequently co-occurs with a range of behavioral health problems, including increased prevalence of obesity and substance use disorders (Biederman et al., 1995; Cortese et al., 2008; Davis, 2010). Addictive behaviors, including binge eating and substance use, correlate with symptoms of impulsivity in ADHD, and underlying self-regulatory deficits are suspected to be a mediating factor accounting for the association between ADHD diagnosis and addiction (Davis 2010; Wilens, 2004). Increased prevalence of alcohol and drug use is, to some degree, normative among college students (O'Malley & Johnston, 2002). However, students with ADHD are

significantly more likely than their peers to meet criteria for substance abuse or dependence, and suffer from greater impairment due to use while attending college (Blasé et al., 2009; Rabiner et al., 2008; Smith et al., 2002).

Disturbed sleep and poor sleep hygiene are also common physical health concerns among adults with ADHD (Shredl, Alm, & Sobanski, 2006). Adults with ADHD are more likely to report poor quality of sleep, such as indicating feeling “less rested” upon waking in the morning. However, evidence suggests observable measures of sleep disturbance and poor sleep quality may be best accounted for by co-morbid sleep disorders and other psychiatric conditions (Phillipsen et al., 2005; Shredl, Alm & Sobanski). For example, in one recent study, symptoms of insomnia in a sample of adults with ADHD were best predicted by the presence of co-morbid depressive symptoms (Shredly, Alm, & Sobanski, 2006). Less research has examined sleep among college students with ADHD; however, one recent study revealed higher self-reported ratings of sleep disturbance were associated with impulsive symptoms among a sample of 183 undergraduates (Kass, Wallace, and Vodanovich, 2003).

Psychological Functioning

An ADHD diagnosis is defined via the presence of behavioral symptoms indicative of underlying neuro-cognitive deficits, including impairment in executive functions (e.g., working memory, planning, decision making), and neurologically mediated self-regulatory and motivational processes (Nigg, 2006). In adulthood, these basic deficits associated with ADHD appear to manifest into predictable

patterns of personality dysfunction, and often co-occur with a range of comorbid depressive and anxiety disorders (Nigg et al., 2002; APA, 2013).

Emotion regulation is a common deficit observed in individuals with ADHD across the lifespan (Barkley, 2006). In adults, emotion regulation deficits often appear to manifest in difficulty regulating anger; adults with ADHD are also more likely than peers to demonstrate stable, trait-like patterns of angry behavior (Ramirez et al., 1997). College students with ADHD are also more likely to demonstrate “aggressive” or “confrontive” traits, and be less responsive to rules and corrective feedback (Kern et al., 1999). The presence of these hostile traits may also be diagnostic of antisocial personality disorder, a pervasive pattern of disregard for others which appears more frequently among adults with ADHD than the general population (Mannuzza et al., 2004).

In addition to specific traits associated with aggression and hostility, evidence suggests adults with ADHD may confer a predictable personality profile according to Costa & McCrae’s “Big Five” personality dimensions (McCrae & Costa, 1999). A recent meta-analytic review by Nigg and colleagues (2002) demonstrated that symptoms of inattention-disorganization predicted low “conscientiousness” and high “neuroticism” among young adults with ADHD (primarily college samples), while hyperactivity-impulsivity and adult oppositional behaviors predicted low “agreeableness.”

Evidence suggests that college students with ADHD are also far more likely than their peers to exhibit clinically significant depressive and anxiety symptoms

(Blasé et al, 2009; Heiligenstein and Keeling, 1995), and report higher levels of general distress (Weyandt et al., 2013). Symptoms of depression and anxiety may be particularly more prevalent among young adults with ADHD who are entering college, as they transition and adjust to increased autonomy, responsibility, and cognitive demands of higher education in a setting with fewer supports and resources than may have been available through childhood and adolescence (Fleming & McMahon, 2012).

ADHD and the Environmental Domain

Academic Functioning

Notably, even among normative college student samples, inattentive symptoms predict significant impairment (Fleming & McMahon, 2012). Hyperactive/impulsive symptoms are typically uncorrelated with academic impairment; however, self-reported inattentive symptoms appear to be associated with poor adjustment to college, and reduced sense of self-efficacy in decision making, and lower GPAs among college students (Norwalk et al., 2009). Causal explanations for this difference must be tentative. However, a plausible explanation may be that many aspects of the college environment frequently require sustained attention and persistence of cognitively demanding tasks (e.g., attending to class lectures, completing homework assignments, correct responding on academic tests, etc.). These increased demands may result in greater impairment, particularly among students with attentional difficulties.

Studies have found that college students with ADHD often demonstrate impaired academic performance in comparison to their peers (e.g., Green & Rabiner, 2012; Dupaul et al., 2009; Blasé et al. 2009; Weyndt et al., 2013). For example, students with ADHD were more likely than their peers to have lower GPAs, to have academic probationary status, and to self-report less confidence in their academic abilities (Frazier, 2007; Rabiner et al., 2008; Heiligenstein et al., 1999). These findings are reflected across a variety of university settings, and include university clinic referred and non-clinic referred samples (e.g., Advokat, Lane, & Luo, 2010; Frazier, Youngstrom, Glutting, & Watkins, 2007; Weyand et al., 2013).

These academic deficits may not be fully remediated by treatment with stimulant medication, a common pharmacological treatment for adults with ADHD (Dodson, 2005; Faraone et al., 2004). In a recent study conducted by Advokat, Lane, and Luo (2010), a sample of college students previously diagnosed with ADHD and treated with stimulant medication reported continued difficulties in academic planning, poor study skills, and significantly lower GPAs and standardized test scores than a control group of their college peers. As previously observed in studies of children and adolescents with ADHD, observable symptom reduction associated with medication use often does not yield reduction in functional impairment (Pelham & Fabiano, 2008).

Notably, even among normative college student samples, inattentive symptoms predict significant impairment across several studies (Fleming & McMahon, 2012). Hyperactive/impulsive symptoms are typically uncorrelated with

impairment; however, self-reported inattentive symptoms appear to be associated with poor adjustment to college, and reduced sense of self-efficacy in decision making, and lower GPAs among college students (Norwalk et al., 2009). Causal explanations for this profile difference must be tentative. However, a plausible explanation may be that many aspects of the college environment frequently require sustained attention and persistence of cognitively demanding tasks (e.g., attending to class lectures, completing homework assignments, correct responding on academic tests, etc.).

Occupational Functioning

As adults with ADHD enter the workforce, difficulties in sustaining attention, regulating behavior, maintaining organization and engagement in cognitively demanding tasks are likely to impair functioning on the job. Outcome studies suggest that adults with ADHD tend to perform significantly worse on the job than their co-workers according to employer ratings (Barkely, 2006; Mannuzza et al., 1993; Weiss & Hectman, 1993). Subsequently, adults with ADHD are also more likely to be laid off, fired, or unemployed (Barkley et al., 2006). Less is known about occupational functioning among young adults with ADHD while they are enrolled in college. However, a recent study by Shifren, Proctor, and Prevatt (2010) suggests that college student with ADHD exhibit far more impairment in job-related functioning than their peers, including poorer on-the-job performance and greater frequency of being fired from previous jobs.

Social Functioning

To date, few studies have directly examined social functioning specifically among college students with ADHD, with some mixed findings among the extant scientific literature, with some studies finding significant social impairment among college students with ADHD (e.g., Greenwald-Mayes, 2002, Shaw-Zirt et al., 2005), and other investigations demonstrating no difference between students with and without ADHD (e.g., Heiligenstein et al., 1999; Weyandt et al., 2013). For example, preliminary research by Heiligenstein and colleagues (1999) examined self-reports from college students receiving services at a university counseling center with and without ADHD diagnoses. Their results indicated no difference in self-reported social functioning between the ADHD and non-ADHD groups receiving counseling services. However, with only this comparison group, it remains unclear how social functioning among college students with ADHD compare to a general sample of college peers. In addition, the study excluded students with comorbid diagnoses from the ADHD sample, making it even more likely that these results may not generalize to general college populations of students with and without ADHD.

In contrast to these null findings, more recent research using samples of non-clinic referred samples of college students found that students with ADHD were more likely than their peers to report difficulties with social skills, adjustment, and self-esteem (Blase, Gilbert, & Anastopoulos, 2009; Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005).

In addition, college students with ADHD may also experience greater difficulty in romantic relationships, particularly among students diagnosed with ADHD, Inattentive subtype (Canu & Carlson, 2003; Meaux et al., 2009). In one study by Canu and Carlson (2003), students with ADHD, Inattentive type were delayed in experiencing dating milestones, and were rated as more negatively following interactions with confederates in comparison to their peers with an ADHD, Combined type diagnosis and a matched control group. In particular, symptoms of inattention were associated with reduced observer ratings of assertiveness, comfort, and attractiveness during heterosexual interactions with a female confederate. When asked to describe social behavior of male college student peers with ADHD, female research participants frequently used terms such as “hurtful,” or blunt” to describe their colleagues (Meaux et al., 2009).

In an effort to better understand protective factors associated with college success among students with ADHD, Meaux, Green & Broussard (2009) interviewed college students with ADHD to assess their own perceptions of supportive resources that aided their adjustment to college. In response, students identified their ability to establish support from peers as a specifically beneficial protective factor. An additional study conducted by Greenwald-Mayes (2001) found that self-report of supportive family functioning was predictive of greater quality of life among students with ADHD; furthermore, family relationships appeared to be more important to quality of life among students with ADHD than peers without the diagnosis. This suggests that understanding family dynamics among students with ADHD may be particularly useful to conceptualizing their overall well-being and

resiliency in college. Unfortunately, college students with ADHD are also more likely than other students to self-report relational problems with parents and family members (Grenwald-Mayes, 2001).

Mixed findings in the extant literature examining social functioning in college students with ADHD suggest that context may be particularly important for understanding impairment. Therefore, additional research considering broader context of social functioning and well-being is needed to better understand relative impairment for these students.

ADHD and the Values and Ideology Domain

In any evaluation of mental health, determination of functioning is inextricably linked to the evaluator's underlying values and ideologies. The psychiatric conception of ADHD as a mental disorder is no exception. Although the Diagnostic and Statistical Manual of Mental Disorders 5 is intended by its authors to provide an "atheoretical" account of clinical syndromes (APA, 2013), the classification system inherently implies a medical "disease" model for understanding mental health. In keeping with this perspective, much of the field of clinical psychology has focused on pathology associated with syndromes such as ADHD, with less consideration given to a broader context for understanding inattentive or hyperactive/impulsive symptoms. Furthermore, human potential for resilience, character strength, or happiness among individuals with ADHD has not been well examining in the empirical literature. Moreover, one must consider the potentially problematic implication is found in the sociological impact regarding the

way in which individuals, families and social systems might use the concept “ADHD” as an attribution for explaining certain kinds of problems and distress. As an alternative to the traditional approach of understanding ADHD through a lens of psychopathology, the current study aims to evaluate the disorder from a broader and more holistic perspective that captures aspects of well-being among young adults with and without a history of ADHD diagnosis.

Current Aims

Based on review of extant research literature, college students appear to be at much greater risk than their peers to experience impairments on a continuum of functioning across each of the well-being domains outlined above. However, little consideration has been given in empirical literature to understanding aspects of resiliency and positive adaptation among college students with ADHD. To date, only one published study has explicitly assessed psychological well-being in this population (i.e. Wilmshurst, Peele, & Wilmshurst, 2011), although the generalizability of the study results remains unclear. Findings from Wilmshurst and colleagues indicated no group differences in subjective reports of well-being or other measures of impairment; however, the study was significantly limited by a small sample that was likely not representative of typical university student populations.

In order to clarify the extent to which psychological well-being and associated functioning may be impaired among college students with ADHD, the current study aims to analyze survey responses from a large, nationally representative sample of college students using measures of both pathology and

well-being. This is made possible through analysis of archival data collected as part of a large nation-wide study of college student mental health in the United States, known as “The Healthy Minds Study” (Eisenberg, D., Hunt, J.B., Speer, N.,2013). Although the survey was not developed explicitly to evaluate well-being via the Nested Model, it included key elements that allow us to begin to address the question in an effective way and thus became the focus of the present investigation

Chapter III

METHODS

Design Overview

The current study aims to examine the relationship between ADHD diagnosis in college students, and functioning across various domains of well-being according to the nested model (Henriques, Kleinman, & Asselin, 2014). History of diagnoses and associated well-being will be assessed through analyses of archival self-report survey data collected as part of a national research initiative to understand mental health and associated academic functioning among college students (i.e., the “Healthy Minds Study”; Eisenberg, D., Hunt, J.B., Speer, N., 2013).

In order to explore the association between psychiatric diagnosis and well-being profiles, three groups will be compared: 1) college students who report a history of ADHD diagnosis without a history of comorbid psychopathology (referred to hereafter as “ADHD Only”; $n = 141$), 2) college students who report a history of ADHD diagnosis in addition to an anxiety and/or mood disorder diagnosis (referred to hereafter as “ADHD + Anxiety/Depression” group; $n = 134$), 3) students who report a previous diagnosis of an anxiety and/or mood disorder without previous diagnosis of ADHD (referred to hereafter as “Anxiety/Depression Only” group; $n = 708$), and 4) a control group of typically developing college students who report no history of psychiatric diagnosis ($n = 2,950$).

The primary outcome measure used was a recently piloted brief (6-item) version of The Ryff Scales of Psychological Well-Being (i.e., the “Ryff 6” scale). Each

item on this brief measure represents one of six domains of Psychological Well-being (Ryff, 1989; Ryff & Singer, 2008), including: 1) autonomy, 2) relationships with others, 3) self-acceptance, 4) environmental mastery, 5) life purpose, and 6) personal growth. Between-subjects ANOVAs were conducted to determine group level differences in overall well-being scores as well as item level responses corresponding to each well-being domain. As a supplementary measure of well-being, responses to the (Diener, et al., 2009) were also analyzed using between-subjects ANOVA (measure described in more detail below).

In addition to direct assessment of participant's self-report of well-being, additional analyses were conducted to explore other aspects of functioning associated with mental health and well-being. These areas included: 1) current symptoms of depression and anxiety, 2) self-report of academic impairment due to mental health concerns (i.e., participants were asked to indicate the number of days in the past month during which they experienced academic impairment due to mental health concerns), 3) self-reported GPA, 4) history of recreational drug use, 5) recent use of psycho-stimulant medications, 6) recent use of anti-anxiety medications, 7) recent use of anti-depressant medications, 8) recent engagement in counseling or psychotherapy.

Subjects

As noted above, all survey data included in this study is be archival; as such, all data has been previously de-identified. However, subjects include a random sample of college students at JMU and other universities and colleges within the

state of Virginia who were enrolled during the 2012-2013 school year and voluntarily completed the online “Healthy Minds” survey. The complete Virginia sample includes 4,398 respondents (54% female; 80% between ages 18 – 22).

Procedures

All procedures were approved by the Institutional Review Board at James Madison University and other participating institutions. All students were recruited for the study via e-mail invitation from their institution, and compensated by being entered into a cash sweepstakes drawing. To protect confidentiality, surveys were administered via a secure website, and no identifying information was transmitted via email; in addition, all identifying information used for recruitment was kept separate from subjects’ survey response data. Finally, at the conclusion of the survey, all participants were provided with referral information for local and/or campus mental health agencies, as well as the phone number for a national suicide prevention hotline.

Assessment measures used for survey construction

The Healthy Minds Study survey is a comprehensive self-report measure designed to assess various aspects of mental health, well-being, academic functioning, and attitudes regarding mental health services among college students. The survey is comprised of novel items developed to assess those domains, as well as additional items adapted from other published public-domain self-assessment measures. These measures include: the *Psychological Well-Being Scale* (Diener et al., 2009), the *Patient Health Questionnaire* (Spitzer et al., 1999), and the *Patient Health*

Questionnaire-9 (Kroenke Spitzer, & Williams, 2001). A brief description of each of those measures is provided below.

Psychological Well-being Scale (Diener et al., 2009). The Psychological Well-being scale is a brief, 8-item self-administered rating scale intended to measure the presence of psychological resources and strengths, and the extent to which respondents are currently experiencing optimal human functioning. Items reflect statements associated with positive functioning across domains central to the concept of psychological well-being (e.g. "I lead a purposeful and meaningful life," "my social relationships are supportive and rewarding), and informants are instructed to endorse the extent to which they agree with each statement. Item responses are endorsed on a 1-7 Likert scale ranging from "Strongly disagree" to "Strongly agree."

Generalized Anxiety Disorder 7-Item Scale (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006). The GAD-7 is a self-administered assessment tool designed to assess the presence of generalized anxiety disorder symptoms according to DSM-IV criteria. The measure was developed as a brief and accurate screening measure to determine probable cases of generalized anxiety disorder. It is frequently used in primary care practice and health care research, and is considered a reliable and valid measure of mental health symptoms (Spitzer et al., 2006; Swinson, 2006). The Healthy Minds survey includes items from this measure as an assessment of current generalized anxiety symptoms.

Patient Health Questionnaire-9 (PHQ-9; Kroenke Spitzer, & Williams, 2001). The PHQ-9 is a module addition to the Patient Health Questionnaire designed to assess symptoms of depression based on DSM-IV criteria. Each item reflects a face valid criterion for a major depressive episode, and is rated on a 3-point likert scale indicating the respondent's experience of the symptoms (ranging from 0 "not at all" to 3 "nearly every day"). The PHQ-9 is considered to be a reliable and valid measure of depression symptoms and severity (Kroenke, Spitzer, & Williams, 2001).

Chapter IV

Results

Sample Characteristics. Students from six Virginia colleges and universities volunteered to participate in the study ($n = 4398$, 56% female; 48% non-white). Students reported a median age of 20 years old (range = 19 –“41+” years old; 69% were less than or equal to 21 years old).² Eighty two percent were undergraduate students (18% graduate students).

In order to explore well-being functioning associated specifically with ADHD diagnosis, this overall sample was classified into four distinct groups based on their self-report of the presence of prior diagnoses: 1) “ADHD Only” ($n = 141$); 2) “ADHD + Anxiety/Depression” ($n = 134$); “Anxiety/Depression Only” ($n = 708$); and 4) a “Controls” ($n = 2950$) (see *Table 1* for sample characteristics). Notably, students in the Control group were slightly younger (*median age* = 20 y/o) in comparison to their peers in the three diagnosis groups (*median age* = 21 y/o in each group). In addition, the two groups with histories of anxiety and/or depression were comprised of a smaller proportion of non-white students (i.e., “ADHD + Anxiety/Depression” = 11.1% non-white; “Anxiety/Depression Only” = 12.3% non-white) in comparison to the Control and “ADHD Only” groups (19% and 18.4%, respectively). The groups differed moderately in regard to gender, such that Controls were reported to be 54.7% female, “ADHD Only” reported “47.5% female,

² Median age is provided instead of mean in order to mitigate the effects of outliers, as age was not normally distributed.

“ADHD + Anxiety/Depression” reported 56% female, and “Anxiety/Depression Only” reported 63% female ($p < .01$).

“*Ryff 6 Well-being Rating Scale*. Students read descriptions of each of the six domains of psychological well-being, and then rated their own functioning on each of those domains using a 7-point likert scale (ranging from “very low” to “very high” for each domain). Self-report ratings of psychological well-being on the R6WB varied significantly between groups, $F(3,3930) = 25.115, p < .001$. Specifically, overall well-being was lower among students in the “ADHD + Anxiety/Depression” Group (mean = 28.74) and the “Anxiety/Depression Only” (mean = 29.52) than among their peers in the Control group (mean = 33.12) and “ADHD Only” Group (mean = 32.37; p 's $< .001$; see *Figure 2*). However, overall well-being ratings did not differ between students in the “ADHD Only” group and the Control group ($p = .807$). Similarly, overall ratings did not differ between students in the “ADHD+Anxiety/Depression” group and the “Anxiety/Depression Only” group ($p = .149$). Thus, all of the differences were located between the groups that carried the Anxiety/Depression diagnosis versus those that did not.

Subsequent ANOVAs were conducted to investigate group differences across each of the specific domains of psychological well-being measured by the six items of the *Ryff 6* rating scale. Notably, significant between group differences in responses emerged for each of the 6 items: 1) “autonomy,” $F(3,3814) = 94.48, p < .001$; 2) “relationships with others,” $F(3,3803) = 94.48, p < .001$; 3) “self-acceptance,” $F(3,3798) = 20.52, p < .001$; 4) “environmental mastery,” $F(3,3794) = 124.04, p < .001$.

.001; 5) "personal growth," $F(3,3795) = 29.01, p < .001$; and 6) "life purpose" $F(3,3800) = 36.97, p < .001$.

Ryff 6, "Autonomy" domain. Post Hoc Tukey HSD analyses revealed that ratings of autonomy were lower among students in each of the three diagnosis groups in comparison to controls (Control *mean* rating = 5.7; p 's $\leq .01$). However, ratings of autonomy across each of the three diagnosis groups did not differ ("ADHD Only" *mean* = 5.36; "ADHD + Anxiety/Depression" = 5.33; "Anxiety/Depression Only" = 5.32; p 's $\geq .995$).

Ryff 6, "Relationships with Others" domain. Post Hoc Tukey HSD analyses revealed that the lowest ratings of "Relationships with Others" were observed among students in the "ADHD+Anxiety/Depression" group (mean = 4.96), which differed significantly from the other three groups ($p < .001$). In addition, students in the "Anxiety/Depression Only group" reported lower ratings of "Relationships with Others" (mean = 5.25) than their peers in the "ADHD Only" and Control groups. Ratings of "Relationships with Others" did not differ between students in the "ADHD Only" and Control groups (means = 5.75 and 5.76, respectively).

Ryff 6, "Self-Acceptance" domain. Post Hoc Tukey HSD analyses revealed a pattern that parallels group differences observed in overall ratings of well-being. That is, self-acceptance was lower among students in the "ADHD + Anxiety/Depression" group (mean = 4.01) and the "Anxiety/Depression Only" group (mean = 4.12) than among their peers in the Control group (mean = 5.10) and "ADHD Only" Group (mean = 4.96; p 's $< .001$). However, ratings of self-acceptance

did not differ between students in the “ADHD Only” group and the Control group ($p = .703$). Similarly, self-acceptance did not differ between students in the “ADHD+Anxiety/Depression” group and the “Anxiety/Depression Only” group ($p = .859$).

Ryff 6, “Environmental Mastery” domain. Post Hoc Tukey HSD analyses indicated that ratings of environmental mastery followed a pattern similar to that observed for overall ratings of well-being. Specifically, environmental mastery was lower among students in the “ADHD + Anxiety/Depression” Group (mean = 4.63) and the “Anxiety/Depression Only” (mean = 4.58) than among their peers in the Control group (mean = 5.18) and “ADHD Only” Group (mean = 5.36; p 's < .001). However, ratings of environmental mastery did not differ between students in the “ADHD Only” group (mean = 5.18) and the Control group (mean = 5.36; $p = .375$). Similarly, environmental mastery did not differ between students in the “ADHD+Anxiety/Depression” group and the “Anxiety/Depression Only” group ($p = .985$).

Ryff 6, “Personal Growth” domain. Post Hoc Tukey HSD analyses similarly indicated that personal growth was lower among students in the “ADHD + Anxiety/Depression” group (mean = 5.23) and the “Anxiety/Depression Only” (mean = 5.26) than among their peers in the “ADHD Only” group (mean = 5.65) and Control Group (mean = 5.70; p 's < .05). However, ratings of personal growth did not differ between students in the “ADHD Only” group and the Control group ($p = .969$). And again personal growth did not differ between students in the

“ADHD+Anxiety/Depression” group and the “Anxiety/Depression Only” group ($p = .993$).

Ryff 6, “Purpose in Life” domain. Post Hoc Tukey HSD analyses revealed that the lowest ratings of “purpose in life” were observed among students in the “ADHD + Anxiety/Depression” group (mean = 4.63), which differed significantly from the other three groups (p 's < .05). In addition, Students in the “Anxiety/Depression Only” group reported lower ratings of “purpose in life” (mean = 4.99) than their peers in the “ADHD Only” and Control groups (p 's < .01). However, ratings of “purpose in life” did not differ between students in the “ADHD Only” and Control groups (means = 5.46 and 5.50, respectively, $p = .988$).

Flourishing scale. (Diener, 2009). Overall ratings of well-being on the *Flourishing* scale followed the same basic pattern observed for overall ratings of well-being on the *Ryff 6* rating scale, such that overall self-report ratings of well-being varied significantly between groups, $F(3, 3890) = 52.77$, $p < .001$. More specifically, overall well-being ratings were lower among students in the “ADHD + Anxiety/Depression” Group (mean = 44.11, SD = 8.98) and the “Anxiety/Depression Only” (mean = 45.25, SD = 7.62) than among their peers in the “ADHD Only” group (mean = 47.87, SD = 5.95) and Control group (mean = 48.31, SD = 6.26; p 's < .001; see *Figure 3*). However, overall well-being ratings did not differ between students in the “ADHD Only” group and the control group ($p = .869$). Similarly, overall ratings did not differ between students in the “ADHD + Anxiety/Depression” group and the “Anxiety/Depression Only” group ($p = .271$).

Supplemental Analyses (additional indices of mental health and well-being).

Current Depression Symptom Ratings (PHQ-9). Ratings of current depression symptoms varied between groups, $F(3, 3871) = 126.8, p < .001$. Students in the control group indicated lower overall depression ratings (mean = 4.80) than their peers in the three diagnostic groups, $p \leq .002$ (see *Figure 4*). Furthermore, students in the “ADHD Only” group reported fewer depression symptoms (mean = 6.22, SD = 4.07) than their peers in the “ADHD + Anxiety/Depression” group (mean = 9.18, SD = 5.90) and the “Anxiety/Depression Only” group (mean = 8.15, SD = 5.87). Depression symptom ratings did not differ between students in the “ADHD + Anxiety/Depression” group and the “Anxiety/Depression Only” group ($p = .09$).

Current anxiety symptom ratings (GAD-7). Overall current ratings of anxiety symptoms varied between groups, $F(3, 3893) = 148.913, p < .001$. Anxiety symptom ratings were significantly higher among students in the “ADHD + Anxiety/Depression” Group (mean = 7.78, SD = 5.12) and the “Anxiety/Depression Only” (mean = 7.30, SD = 5.44) than among their peers in the Control group (mean = 3.81, SD = 3.94) and “ADHD Only” Group (mean = 4.61; p 's < .001; see *Figure 5*). However, ratings of anxiety symptoms did not differ between students in the “ADHD Only” group and the Control group ($p = .145$). Similarly, anxiety symptom ratings did not differ between students in the “ADHD + Anxiety/Depression” group and the “Anxiety/Depression Only” group ($p = .652$).

Academic impairment due to mental health concerns. Participants were asked to indicate the number of days in the past month during which they experienced

academic impairment due to mental health concerns. The number of days, in the past four weeks, during which students reported that emotional or mental health difficulties impaired their academic performance varied significantly between groups, $F(3, 3927) = 115.963, p < .001$. Students in the Control group indicated fewer days of academic impairment due to mental health concerns (44% report 1 or more days of academic impairment) than their peers in the three diagnostic groups, p 's $< .001$ (see *Figure 6*). Students in the "ADHD Only" and "Anxiety/Depression Only groups" did not differ in their reported frequency of academic impairment due to mental health concerns (63.8% and 67.5% report 1 or more days of impairment, respectively). However, students in the "ADHD + Anxiety/Depression" group indicated more days of academic impairment due to mental health concerns than their peers in the other three groups (78.4% report 1 or more days of impairment; p 's $\leq .002$).

GPA. Marginal group differences emerged in regard to self-reported GPA, $F(3, 2673) = 3.816, p = .01$, such that students in the "ADHD + Anxiety/Depression" group reported slightly lower GPA's (mean GPA = 2.86, SD = .90) in comparison to their peers in the control group (mean GPA = 3.11, SD = .92, $p = .066$) and the "Anxiety/Depression Only" group (mean GPA = 3.17, $p = .021$; see *Figure 7*). No other significant group differences in GPA were observed ("ADHD Only" group, mean GPA = 2.94, SD = .70).

Frequency of recreational drug use. Reported frequency of recreational substance use varied significantly between groups, $F(3, 3903) = 30.156, p < .001$.

Notably, students in the control group indicated less frequent recreational drug use in the past year than their peers in the three diagnostic groups, $p \leq .001$ (see *Figure 8*). Students in the “ADHD + Anxiety/Depression” group indicated more frequent recreational drug use than their peers who indicated histories of “ADHD Only” ($p = .08^3$) and “Anxiety/Depression Only” ($p = .001$). Notably, the “ADHD Only” and “Anxiety/Depression Only” groups did not differ in regards to their reported frequency of recreational drug use ($p = .815$).

Frequency of psycho-stimulant medication use. Not surprisingly, reported use of stimulants within the past year varied significantly between groups, $F(3, 3825) = 657.955$, $p < .001$. Students in Control group and “Anxiety/Depression Only group” reported less use of stimulant medication than their peers in the “ADHD Only” and “ADHD + Anxiety/Depression groups,” p 's $< .001$. Furthermore, students in the “ADHD + Anxiety/Depression group reported more stimulant use than their peers in the “ADHD Only” group. More specifically, only 2.1% of students in the control group endorsed stimulant medication use in the past year, 4.5% of students in the “Anxiety/Depression group” indicated use, 53.6% of students in the “ADHD Only group” reported use, and “63.8% of students in the “ADHD + Anxiety/Depression” group indicated use (see *Figure 9*).

Frequency of prescribed anti-anxiety medication use. Reported use of anti-anxiety medications within the past year varied significantly between groups, $F(3,$

³ Although Tukey HSD post-hoc analysis indicated $p < .08$, a more robust analysis using adjusted harmonic mean sample size to adjust for unequal group sizes indicated group means for the “ADHD + Anxiety/Depression” and “ADHD Only” differed significantly.

3825) = 249.034, $p < .001$. As expected, students in Control group and “ADHD Only” group reported less use of anti-anxiety medication than their peers in the “ADHD + Anxiety/Depression group” and “Anxiety/Depression Only” groups, p 's $< .001$. Furthermore, students in the “ADHD + Anxiety/Depression” group reported more anti-anxiety medication use than their peers in the “Anxiety/Depression Only” group, $p = .001$. More specifically, only 0.8% of students in the control group endorsed anti-anxiety medication use in the past year, 0.7% of students in the “ADHD Only” group indicated use, 22.1% of students in the “Anxiety/Depression Only” group reported use, and 30% of students in the “ADHD + Anxiety/Depression” group indicated use (see *Figure 10*).

Frequency of prescribed anti-depressant medication use. Reported use of anti-depressant medications within the past year varied significantly between groups, $F(3, 3825) = 755.494$, $p < .001$. As expected, students in Control group and “ADHD Only” group reported less use of anti-depressant medication than their peers in the “ADHD + Anxiety/Depression group” and “Anxiety/Depression Only” groups, p 's $< .001$. Furthermore, students in the “ADHD + Anxiety/Depression” group reported more anti-depressant medication use than their peers in the “Anxiety/Depression Only” group, $p < .05$. More specifically, only 0.3% of students in the control group endorsed anti-depressant medication use in the past year, 0.0% of students in the “ADHD Only” group indicated use, 43.3% of students in the “Anxiety/Depression Only” group reported use, and 49.2% of students in the “ADHD + Anxiety/Depression” group indicated use (see *Figure 11*).

Frequency of receiving counseling/psychotherapy in the past 12 months.

Reported engagement in counseling or psychotherapy within the past year varied significantly between groups, $F(3, 3840) = 357.968, p < .001$. Students in control group indicated less engagement in counseling or psychotherapy than their peers in the three diagnostic groups, p 's $< .001$. In addition, students in the "ADHD Only" group reported significantly less engagement in counseling or therapy than their peers indicating histories of anxiety and/or depression, p 's $< .001$. Finally, students in the "Anxiety/Depression Only" group reported less engagement in counseling or therapy than their peers in the "ADHD + Anxiety/Depression" group. More specifically, 8.4% of students in the control group endorsed receiving counseling or psychotherapy in the past year, 32.9% of students in the "ADHD Only" group endorsed receiving counseling/psychotherapy, 51.1% of students in the "Anxiety/Depression Only" group endorsed receiving counseling/psychotherapy, and 59.7% of students in the "ADHD + Anxiety/Depression" group endorsed receiving counseling/psychotherapy (see *Figure 12*).

Chapter V

Discussion

The purpose of the current study was to better understand the psychological functioning of college students with a prior diagnosis of ADHD through a comprehensive view mental health, which employed an aggregate survey incorporating an evaluation of psychological well-being in conjunction with other domains of functioning that are traditionally examined. This goal was accomplished through comparison of a large sample students based on multiple diagnostic classifications, including students with ADHD with and without co-morbid psychiatric diagnosis (i.e., depression and/or anxiety disorders), and students with no history of diagnosed psychopathology. A related goal of the study was to more carefully examine to role of co-morbid emotional disorders (which commonly co-occur with ADHD) on well-being and functioning. This was accomplished through the inclusion of an additional comparison group of college students reporting histories of anxiety or depression diagnoses. Overall, our results suggest a more complex picture than may be gleaned from a more “traditional” mental health assessment of ADHD (i.e., focus on psychiatric symptoms and areas of impairment without evaluation of psychological well-being or areas of adaptive functioning).

Consistent with a large body of current research on college students with ADHD, college students with ADHD (with and without co-morbid diagnoses) in the current study were significant more likely than their peers to indicate higher rates of academic impairment due to mental health concerns, and higher rates of recreational drug use. In addition, co-morbid emotional disorder diagnosis was associated with higher rates of recreational drug use among students reporting a history of ADHD diagnosis. Extant

research indicates that these are common areas of impairment among college students with ADHD (Green & Rabiner, 2012). However, our results also diverge from the current literature in some notable ways in regards to understanding aspects of well-being among college students with ADHD.

The current study is novel in that we also chose to examine aspects of psychological well-being in order to assess functioning on the *positive* end of the mental health continuum among college students with ADHD (i.e., domains of “autonomy,” “relationships with others,” “self-acceptance,” “environmental mastery,” “purpose in life”, and “personal growth”; Ryff & Singer, 2008). The current research literature and the concept of ADHD itself suggests that some of these areas of functioning would likely be impaired in college students with ADHD – particularly “relationships with others” and “environmental mastery.”

In regards to “relationships with others,” research indicates that students with ADHD are more likely than their peers to demonstrate difficulties with social skills, adjustment, and self-esteem (Blase, Gilbert, & Anastopoulos, 2009; Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005), as well as possible problems in their romantic relationships (e.g., delayed dating milestones, poorer communication strategies in romantic interactions; Canu & Carlson, 2003; Meaux et al., 2009) and impaired relationships with family members (Grenwald-Mayes, 2001). Positive relationships with family members appear to be particularly critical for students with ADHD, as it has been found to be a predictor of overall quality of life among these students (Meaux et al., 2009).

In regards to “environmental mastery,” current research suggests students with ADHD experience poorer academic performance (Frazier, 2007; Rabiner et al., 2008), poorer performance and impairment at work (Shifren, Proctor, and Prevatt, 2010), and increased risk of behavioral health problems such as poor nutrition and substance abuse (Biederman et al., 1995; Cortese et al., 2008; Davis, 2010). Thus, one might presume their sense of environmental mastery would be lesser than controls.

Surprisingly, in the current study, self-reports of psychological well-being among students with ADHD (and no co-morbid psychopathology) remained quite high and did not significantly differ from their peers with no reported psychiatric concerns. This pattern was consistent across both the “Ryff 6” item responses, as well as the “Psychological Wellbeing Scale” items (Diener, 2006). These results are consistent with the findings of Wilmhurst and colleagues (Wilmshurst, Peele, & Wilmshurst, 2011), which also indicated no significant difference in self-reports of psychological well-being among a small sample of college students with and with ADHD diagnosis. The current study replicates these findings with a larger, and more representative college sample than the previous investigation. The current study also expands on the work of Wilmhurst and colleagues by including additional measures of functioning (described above) and inclusion of additional diagnostic groups which allowed us to assess the extent to which psychological well-being may be impacted by other mental health disorder diagnoses that commonly co-occur with ADHD (i.e., anxiety and depression).

Results of the current study indicate that psychological well-being is associated with diagnoses of anxiety and/or depressive disorder among college students. However, psychological well-being did not appear to be particularly associated with ADHD diagnosis. These findings suggest that psychological well-being may be specifically related to emotional disorder diagnoses, and the presence of reduced psychological well-being in college students may be a marker of co-occurring of emotional distress.

It is critical to highlight that the current study begins to “bridge the gap” between clinical research examining areas of impairment among college students with ADHD, and positive psychology research which emphasizes aspects of resiliency and well-being. By doing so, our study found an apparent contradiction in findings – although ADHD diagnosis was associated with some expected impairments in assessed areas of academic functioning and substance use, self-reports of psychological well-being seemed unaffected by ADHD diagnosis. There are several possible explanations for this apparent contradiction in findings, which we will consider here.

One explanation for the findings could be that our sample of college students is higher functioning than student samples in other studies reporting a higher degree of impairment associated with college student ADHD. Unlike some studies of ADHD in college students, our investigation utilized a large, non-clinical sample, comprised of students from several colleges and universities across the state of Virginia. It is possible that the students in our sample were not as impaired as students recruited from clinical settings; however, we believe that our sample is likely to be more representative of college student populations as a whole.

Another possible explanation for our disparate findings may be that they represent the phenomenon of “positive illusory bias” – an overly positive unrealistic self-perception commonly associated with diagnosis of ADHD. The phenomenon has been well-documented in studies of ADHD in childhood (e.g., Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007). More recent research suggests that positive-illusory bias continues to inflate self-perceptions of performance among college students with ADHD (Prevatt, Proctor, Best, Baker, Van Walker, & Taylor, 2011). Therefore, it may be the case that our ADHD sample of students has inflated their self-reporting of psychological well-being. However, if that is true, it is still unclear why self-reports of substance use and academic impairment are not similarly inflated. One hypothesis may be that college students with ADHD are more likely to engage in positive-illusory bias when reporting on more abstract and subjective phenomena (e.g., “self-acceptance,” “personal growth,” etc.), in comparison to more concrete and objective assessment of functioning (e.g., “number of alcoholic beverages consumed”). Further research will be necessary to clarify the impact of positive illusory bias on self-reports of functioning among college students with ADHD.

Critically, the discrepancy in our findings may also be understood from a “positive psychology” perspective that parallels the hypothesis presented above. That is, it may be the case that our college students are demonstrating resiliency by maintaining a positive self-concept (i.e., “positive illusory bias”) despite their functional difficulties. Rather than considering this phenomenon as a “bias” or an error in thinking, we may consider this inflated self-evaluation as a positive adaptation that may serve to protect students with ADHD from experiencing high levels of emotional distress. Data from the

present study are consistent with this explanation, as college students with ADHD only (i.e., no co-occurring emotional disorder diagnoses) indicate higher ratings of psychological well-being than those students who report diagnosis of both ADHD and co-morbid emotional disorders. Of course, this data is correlational in nature, and therefore further research is necessary to determine the extent to which inflations in self-concept (or “positive illusory bias”) may protect against the development of emotional distress in college students with ADHD.

Well-being and Emotional Disorders

In addition to examining the association between ADHD, well-being, and adaptive functioning, data from the current study also provided insight into understanding functioning associated with emotional disorder diagnosis (i.e., anxiety and depression). Specifically, the findings suggest that co-morbid emotional disorders with ADHD was associated with significantly lower overall well-being scores than diagnosis of ADHD alone. Furthermore, well-being among students indicating diagnosis of both ADHD and an emotional disorder did not differ from students who indicated diagnosis of an emotional disorder without ADHD. Taken together, these findings strongly suggest that self-ratings of psychological well-being are likely to be more strongly impacted by experiences of anxiety and depression, rather than ADHD diagnosis. Given that anxiety and depression diagnoses are often associated with the experience of cognitive distortions relating to the negative appraisals of one’s self and functioning, this well-being profile is not surprising. However, it is unclear whether or not well-being would appear as impaired if it were to be assessed by a third party such as a parent or significant other, as the current data set was limited to self reporting only.

Treatment Utilization

The current study also provides insight into the extent to which students with ADHD and co-morbid diagnoses are utilizing treatment. In our samples, well over half of students reporting ADHD diagnosis also indicate use of psycho-stimulant medication in the previous year (i.e., 58.5% of students reporting ADHD diagnosis). In contrast, use rates of students reporting an emotional disorder diagnosis were significantly less likely to report use of anxiolytics (i.e., 23%) or anti-depressant medication (i.e., 44.2%) were relatively lower among students reporting an emotional disorder diagnosis. To date, no known studies have examined the impact of psychotropic medication on psychological well-being, and no published randomized controlled trials have examined the efficacy of psychotropic medications among college students, specifically. However, preliminary research suggests that stimulant medications may be beneficial in reducing symptoms and related impairments among college students with ADHD (Stauffer & Graeydaus, 2005). In addition, anti-depressant and anxiolytic medications have demonstrated efficacy among adults with depression (e.g., Borges et al, 2014; Gibbons, Hur, Brown, Davis, & Mann), and anxiety disorders (e.g., Koen & Stein, 2011). Further research is necessary to examine the efficacy of psychotropic medication in improving college students' mental health and psychological well-being.

Although preliminary research literature suggests psychotherapy (particularly, cognitive-behavioral therapy) may be useful in reducing impairments among college students with ADHD (Green & Rabiner, 2012), college students did not appear to frequently utilize psychotherapy to address ADHD related concerns (i.e., 32.9% of students with ADHD indicated participation in psychotherapy). Surprisingly, students

who indicated a diagnosis of an emotional disorder without ADHD were actually far more likely to utilize psychotherapy than students who reported both diagnoses. These findings therefore suggest that ADHD diagnosis may predict a reduced likelihood of psychotherapy utilization for students with co-morbid psychopathology.

Limitations

The current study is intended to be preliminary and exploratory in nature, and several methodological limitations should be noted. Most critically, psychiatric diagnosis was in no way directly assessed nor confirmed in any way in the current study – rather, diagnostic status was based solely on students' own reports of prior diagnoses. Therefore, findings relating to diagnoses must be interpreted with some caution. It is unclear how our findings may have differed if diagnostic status was confirmed among students in our sample.

A related methodological consideration is that participation in the study was completely voluntary. Therefore, it is possible that this subset of the college student population may not be truly representative. However, demographic data from the sample is generally consistent with larger population of college students (Eisenberg, D., Hunt, J.B., Speer, N., 2013).

Future Directions

To date, there is a paucity of scientific literature examining psychopathology with consideration of “positive psychology” constructs such as well-being. Therefore, systemic research is required to determine the extent to which well-being is likely to be impaired (or not) among individuals with diagnosable mental health disorders. Results of

the current study suggest that levels of well-being may vary in unique ways across mental health diagnoses. Further understanding of well-being in psychopathology may help to identify areas of strength and resiliency; subsequently, these areas may be better utilized and leveraged to reduce negative sequelae associated with mental health disorder diagnosis.

Future studies that examine well-being in relation to psychopathology should also consider the multitude of ways that well-being may be assessed. In the current study, well-being was determined solely based on short self-report survey, and it remains unclear what the clinical picture may have looked like if well-being were examined based on the data such as additional observer reports, clinical interviewing, etc. This line of research would clarify the ways in which well-being may be reliably measured, and ultimately, could yield standards for valid assessment of well-being in clinical settings.

Such well-being evaluation could also be a critical tool for early detection of individuals “at risk” of further mental health problems before symptoms cross the threshold for psychiatric diagnosis. This approach would be akin to a “psychological check-up,” providing an opportunity to promote wellness in mental health and prevent further psychological decline. The integration of well-being assessment into psychodiagnostic evaluation signifies a shift away from a more traditional psychiatric model of understanding mental health. However, this more “holistic” approach recognizes that mental health exists on a continuum of functioning, providing a more comprehensive and accurate appraisal.

As medicine and mental health care continue to become more integrated, in settings such as primary care and behavioral health, target populations will include those who are more likely to be “at risk” of decline in mental health without necessarily having a mental health disorder (e.g., patients with chronic illnesses, injuries, etc.). In this developing landscape of integrated health care, the ability to capture mental health across a full spectrum of functioning will be critical. Now more than ever, mental health clinicians are called on to reduce patient suffering and enhance well-being, regardless of psychiatric diagnosis.

Appendix

Table 1 *Sample characteristics for each group*

	Control (n = 2,950)	ADHD Only (n = 141)	ADHD + Anxiety/ Depression (n = 134)	Anxiety/ Depression Only (n = 708)
Age in years, median	20	21	21	21
Gender, % female	54.7%	47.5%	56%	63%
Race, % non-white	19%	18.4%	11.1%	12.3%

FIGURE 1

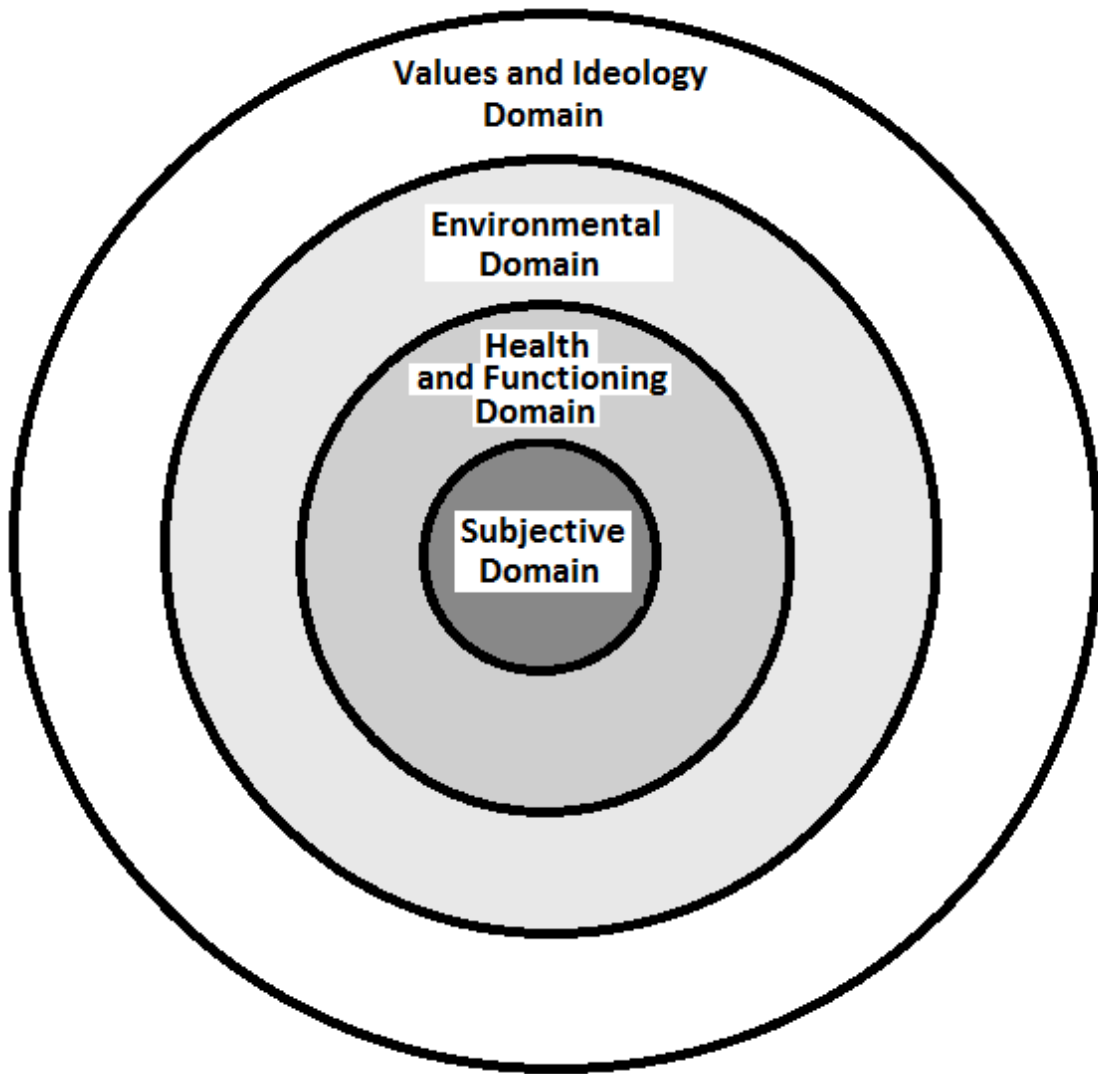


Figure 1. The Nested Model of Well-Being.

FIGURE 2

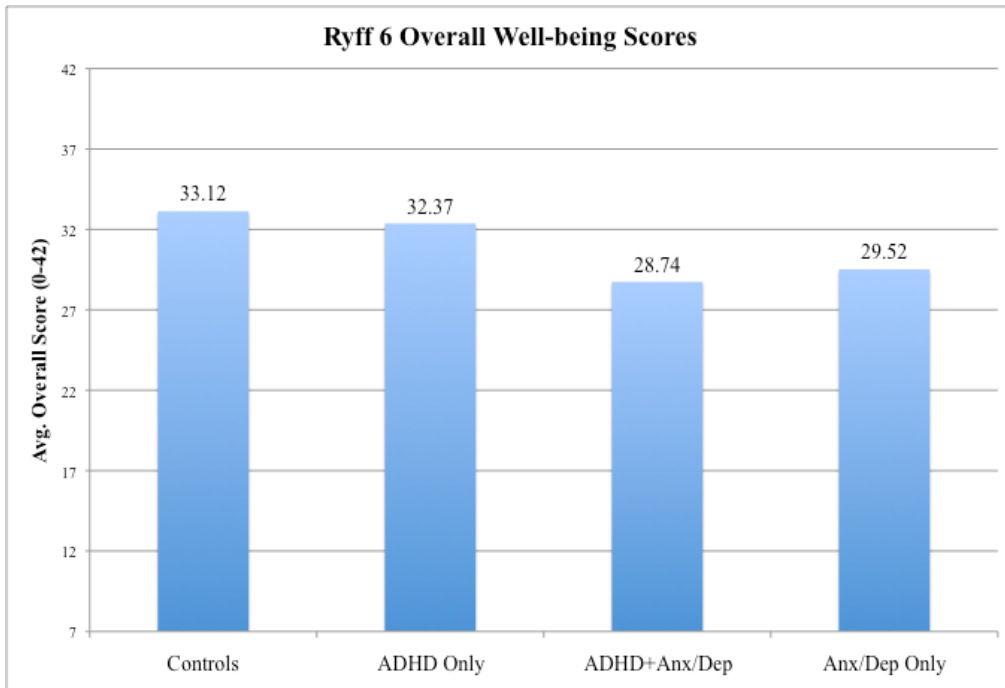


Figure 2. Group means for raw overall scores of well-being based on sum of Ryff 6 item responses

FIGURE 3

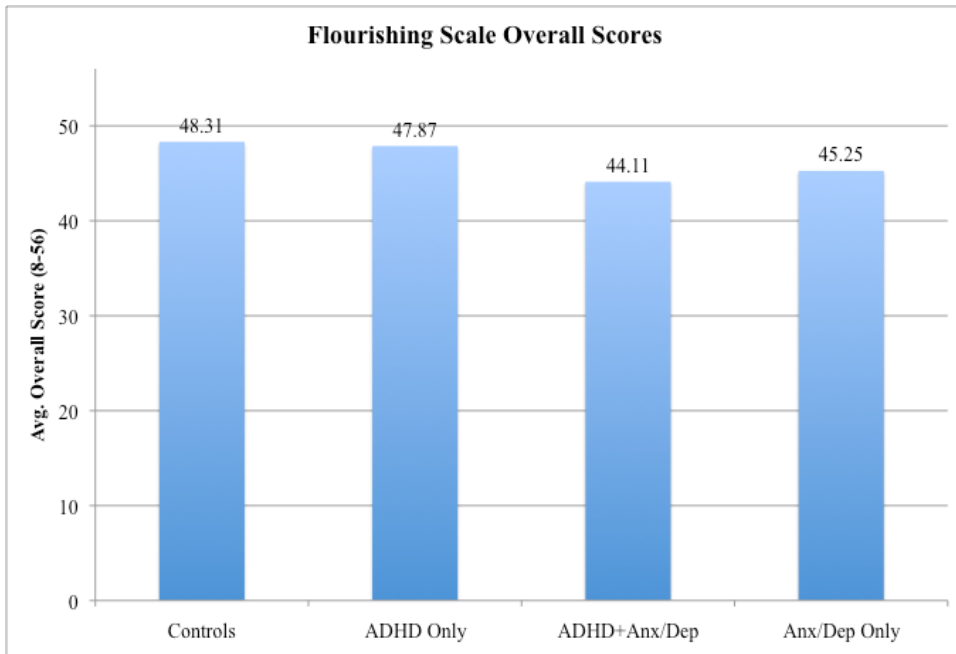


Figure 4. Group means for raw overall scores of well-being based on sum of *Flourishing Scale* (Diener, 2009) item responses.

FIGURE 4

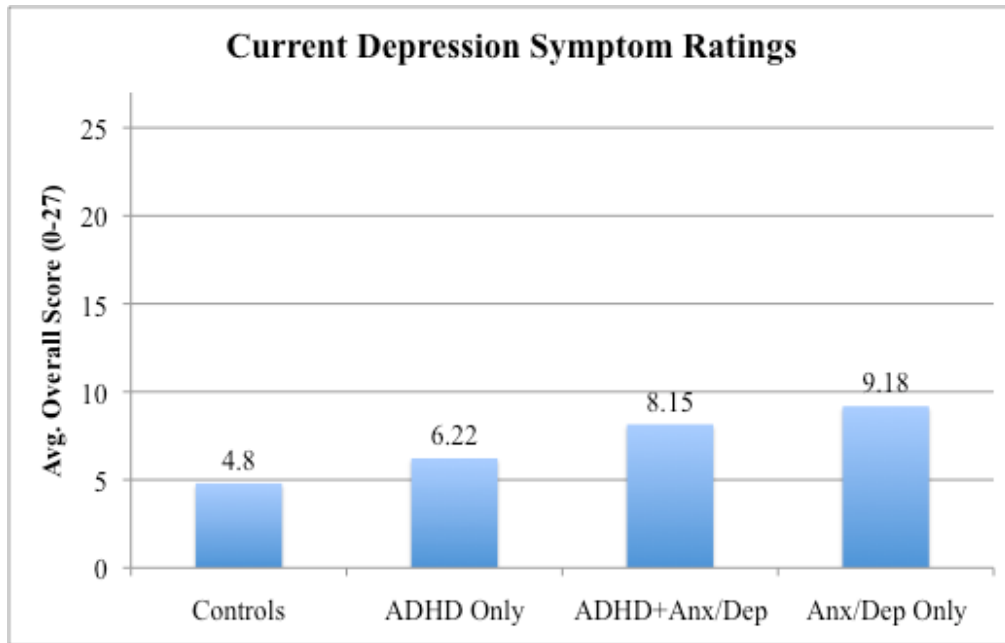


Figure 4. Group means for depression symptom raw scores based on select items from the PHQ-9 (Kroenke Spitzer, & Williams, 2001),

FIGURE 5

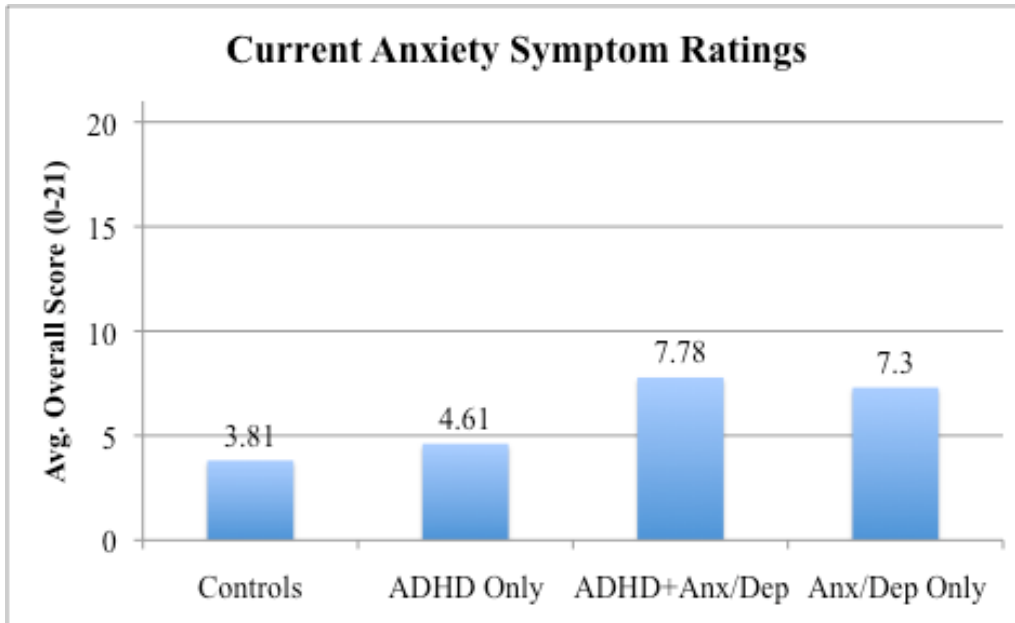


Figure 5. Group means for anxiety symptom raw scores based on select items from the GAD-7 (Spitzer et al., 2006).

FIGURE 6

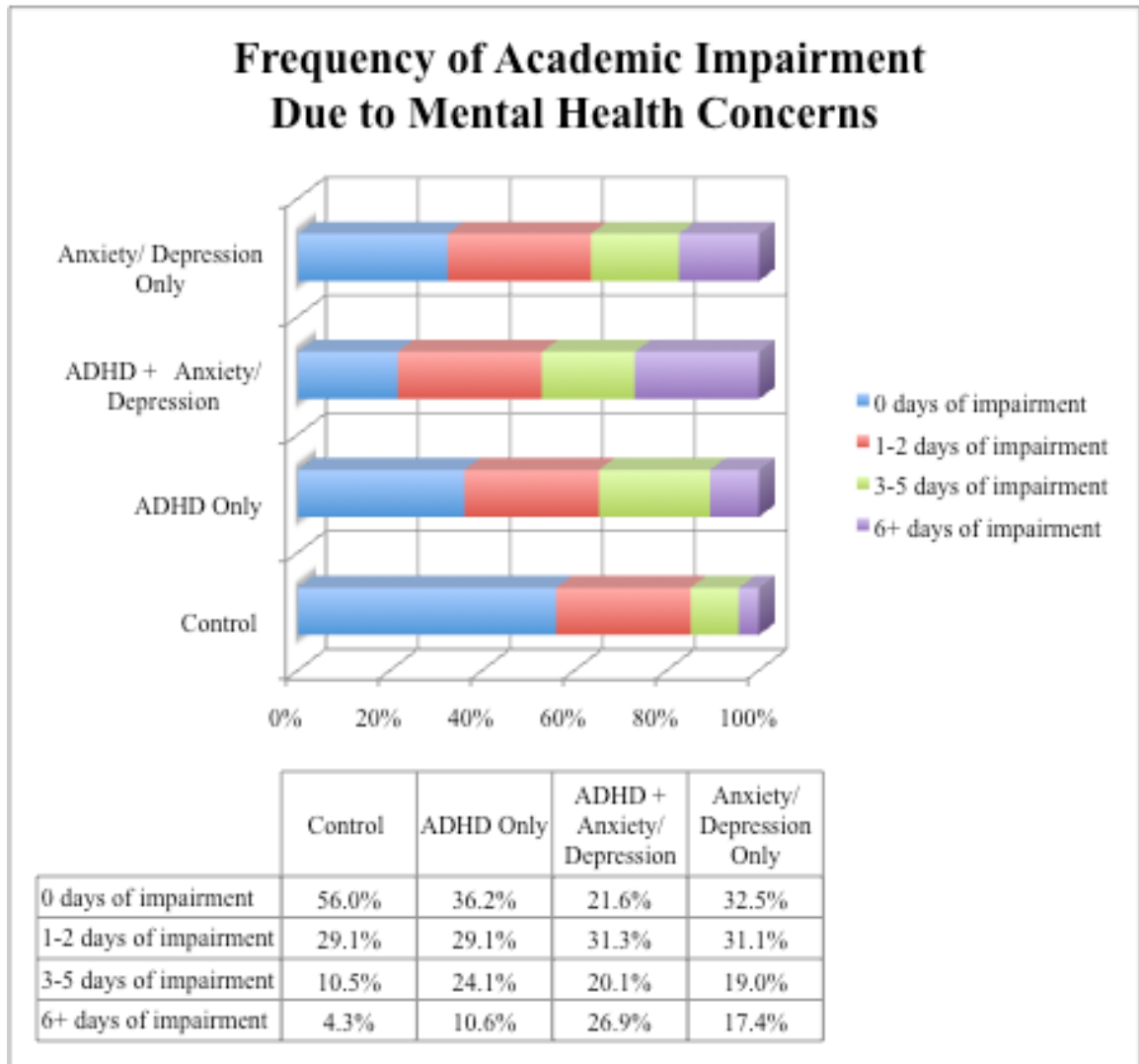


Figure 6. Frequency of academic impairment (i.e., number of days impaired) due to mental health concerns.

FIGURE 7

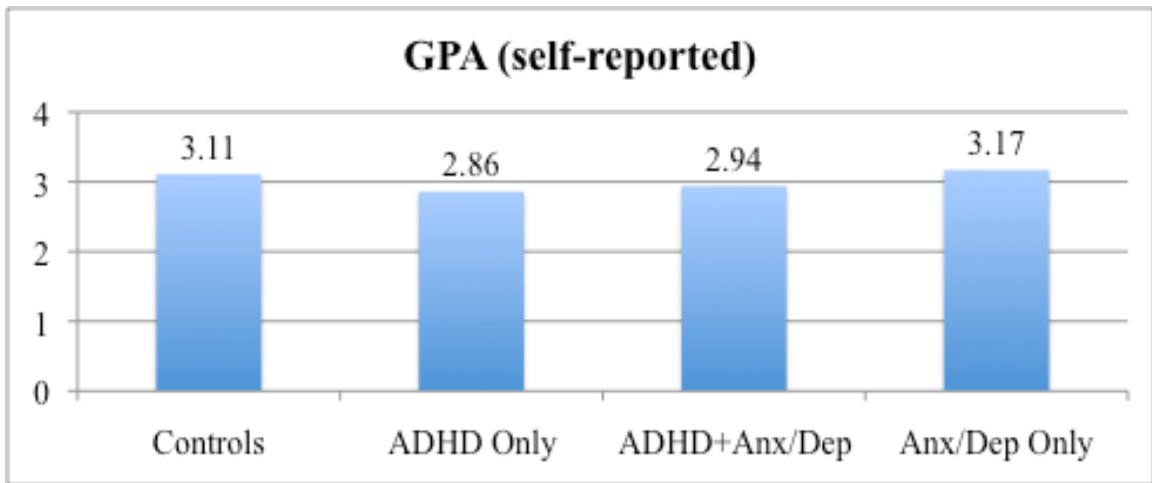


Figure 7. Group means for self-reported cumulative GPA.

FIGURE 8

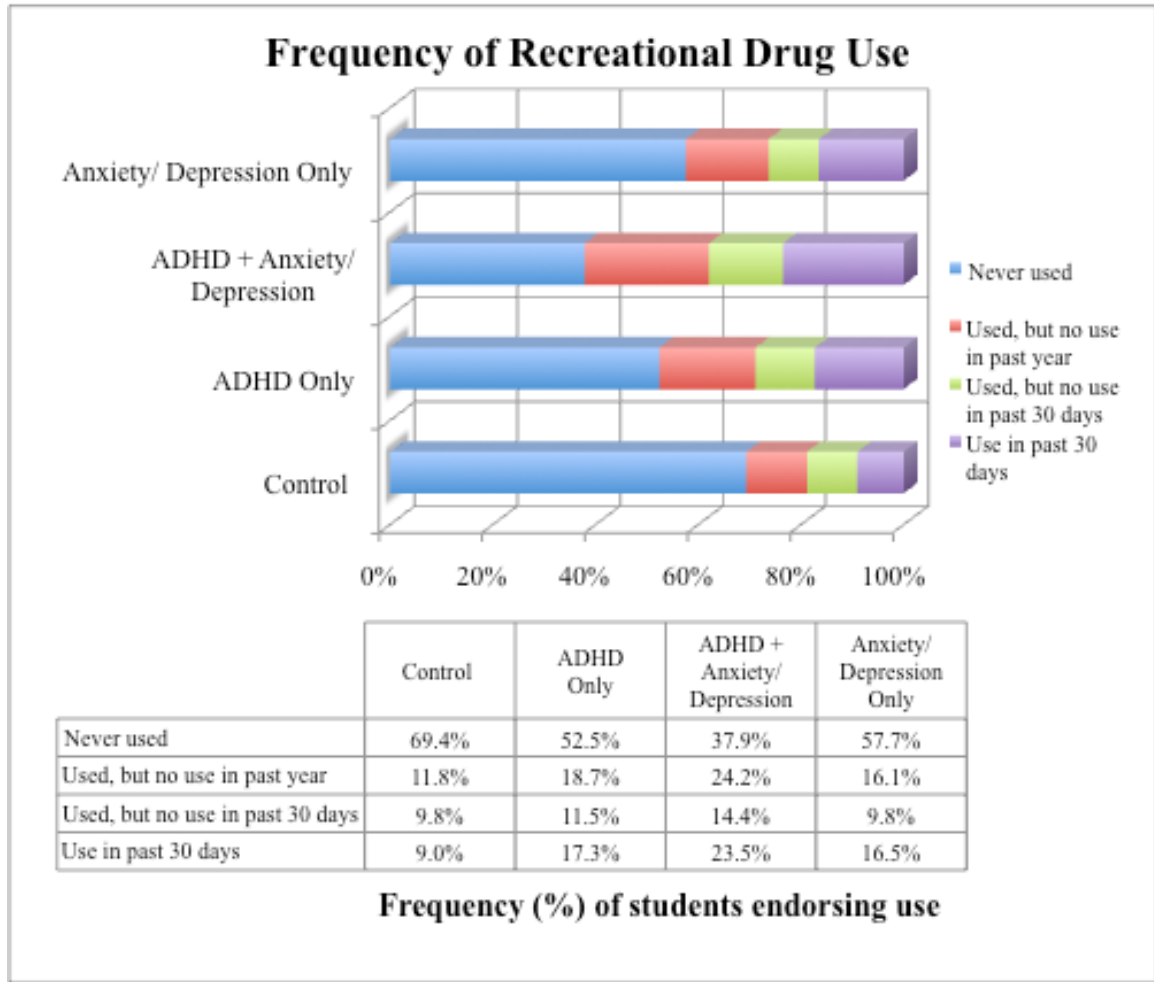


Figure 8. Frequency of reported recreational drug use.

FIGURE 9

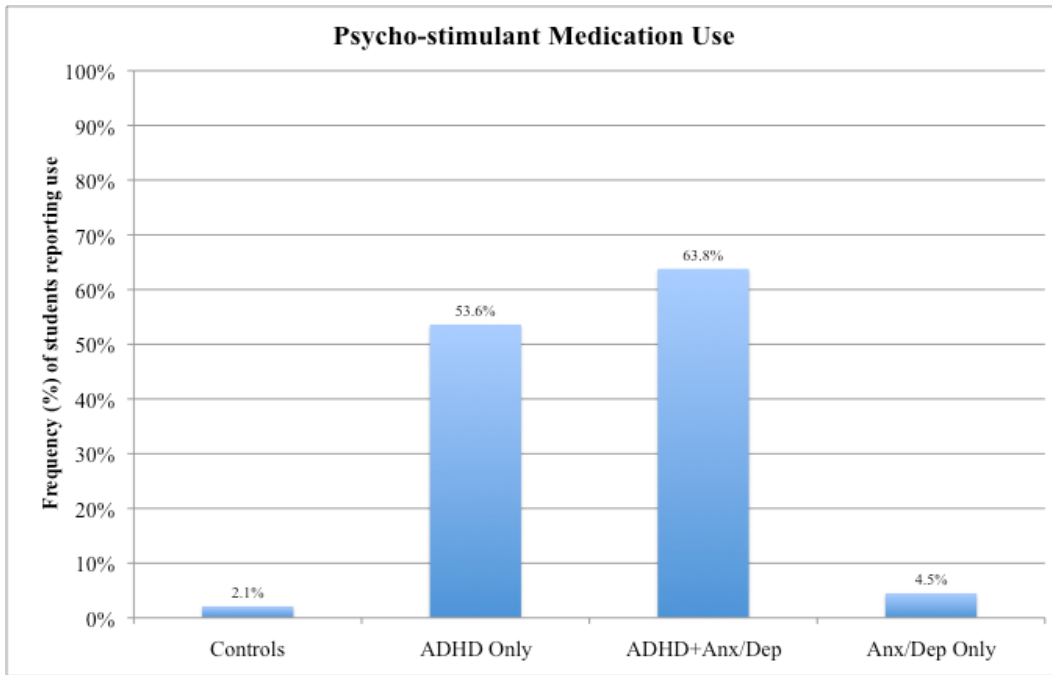


Figure 9. Percentage of students within each group who indicated use of psycho-stimulant medication in the past 12 months.

FIGURE 10

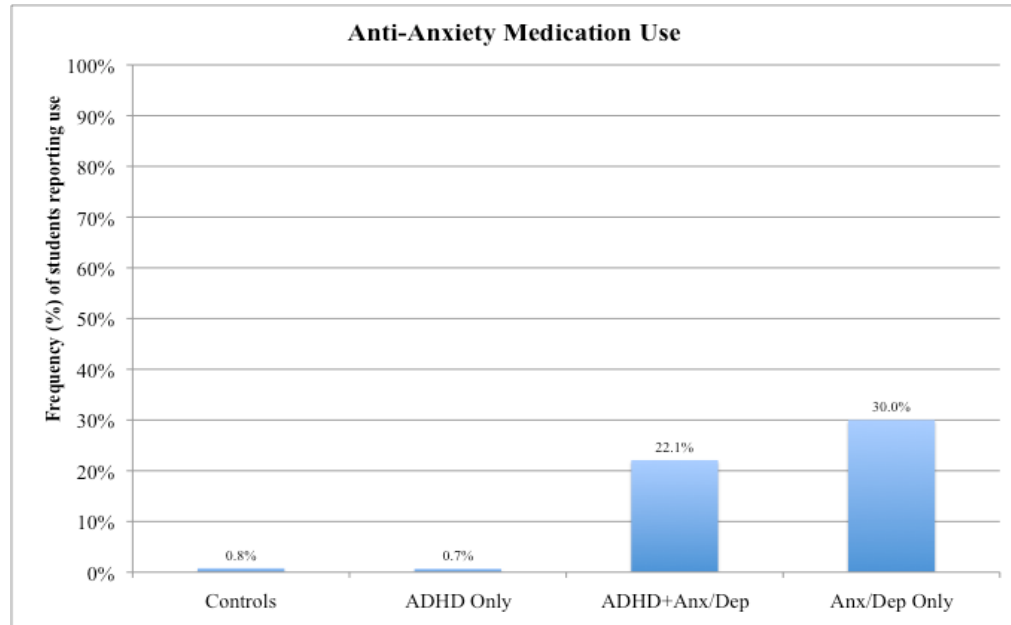


Figure 10. Percentage of students within each group who indicated use of anti-anxiety medication in the past 12 months.

FIGURE 11

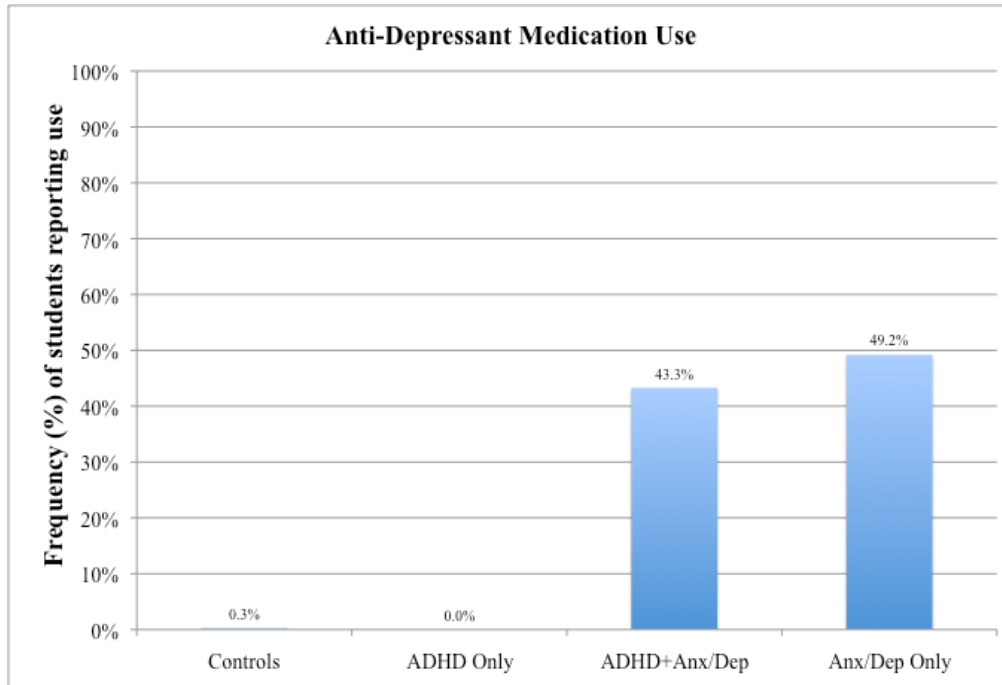


Figure 11. Percentage of students within each group who indicated use of anti-depressant medication in the past 12 months.

FIGURE 12

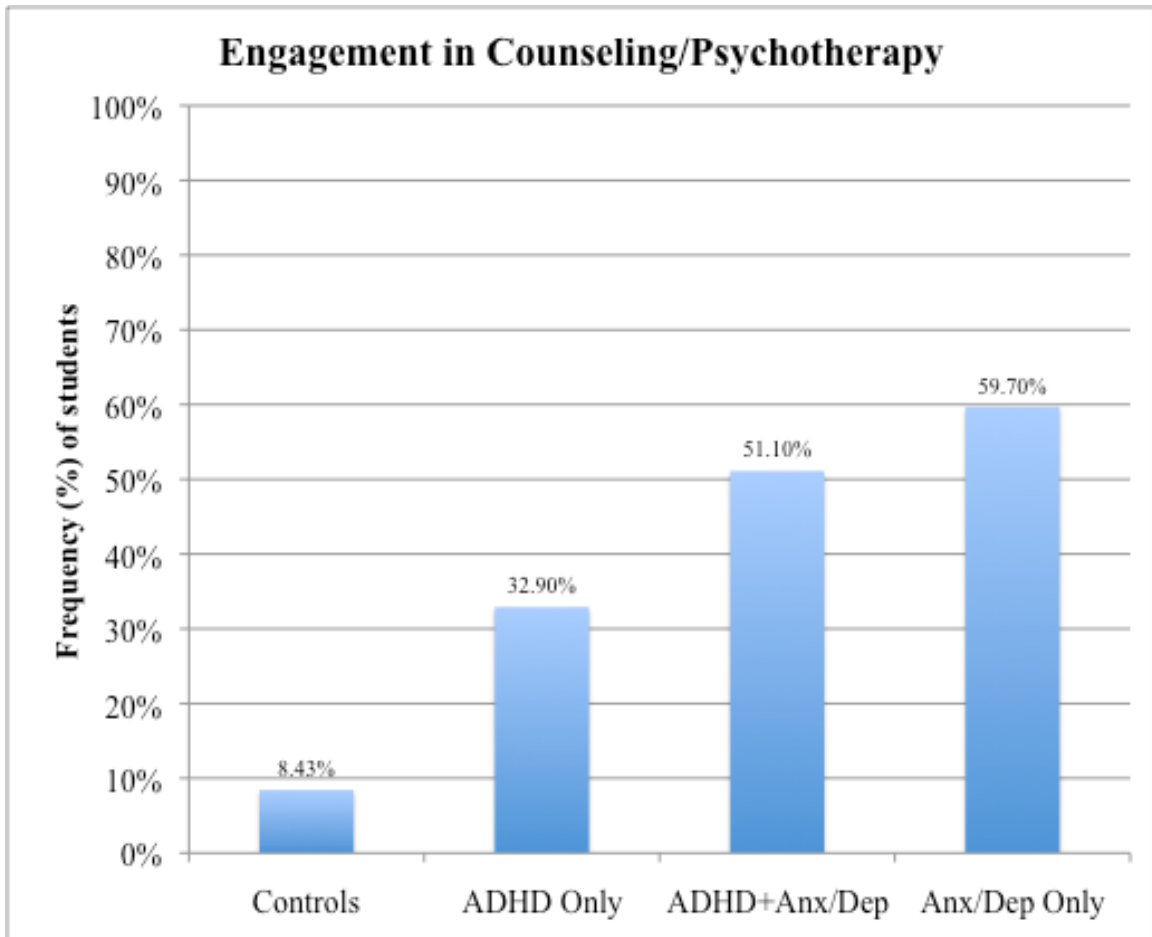


Figure 12. Percentage of students within each group who indicated that they received counseling or psychotherapy in the past 12 months.

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