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Relationships between Life Satisfaction, Symptoms of Inattention and Hyperactivity/Impulsivity, and Depressive Symptoms in High School Students

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Relationships between Life Satisfaction, Symptoms of Inattention and Hyperactivity/Impulsivity, and Depressive Symptoms in High School Students

by

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Abstract

Given increased evidence related to the importance of fostering life satisfaction in the overall population (Diener & Diener, 1996), as well as recent suggestions regarding the importance of increasing positive academic and social outcomes for children with ADHD (DuPaul, 2007), it is important to gain a clearer understanding of how life satisfaction may be related to symptoms of inattention and hyperactivity/impulsivity. Research on the relationship between life satisfaction and symptoms of inattention, hyperactivity, and impulsivity is currently limited to two studies (Gudjonsson et al., 2009; Ogg et al., 2014). The current study investigated the relationship between symptoms of inattention and hyperactivity/impulsivity and reports of global life satisfaction in 399 high school students. This study used the bifactor model to conceptualize ADHD given that this model provided the best fit when compared to other models of ADHD in the current study and given that there is substantial evidence in the current literature to support the use of this model (Martel, von Eye, & Nigg, 2010). Structural equation modeling results demonstrated that the general factor of ADHD was a significant predictor of life satisfaction when students rated ADHD symptoms, and the inattention factor of ADHD was a significant predictor of life satisfaction when teachers rated ADHD symptoms. In addition, because depressive symptoms have been associated with life satisfaction and inattention, hyperactivity, and impulsivity, the current study examined if life satisfaction moderated or mediated the relationship between inattention, hyperactivity, and impulsivity and depressive symptoms. Results of the present study suggested that life satisfaction serves as a potential but weak moderator in the relationship between general ADHD and depression when symptoms of

ADHD were rated by teachers. Results also demonstrated that life satisfaction mediated the relationship between general ADHD symptoms and depressive symptoms when ADHD symptoms were rated by students, and life satisfaction mediated the relationship between inattentive symptoms and depressive symptoms when ADHD symptoms were rated by teachers.

The current study contributes to existing literature on life satisfaction given that there are currently only two studies, one which was conducted with an adult population and one of which was conducted with a middle school population, specifically examining levels of life satisfaction in individuals with symptoms of ADHD. The results of this study provide additional confirmation of the negative relationship between ADHD symptoms and life satisfaction. Moreover, this study was the first to examine how life satisfaction may play a role in the relationship between symptoms of ADHD and depressive symptoms. This study supports that life satisfaction primarily plays a mediating role in the relationship between ADHD symptoms and depressive symptoms and provides support for further examination of this role in future studies.

CHAPTER I: Introduction

Statement of the Problem

A notable shift in psychological research and practice from focusing on identifying and reducing symptomology to also embracing and promoting overall well-being has occurred in recent decades (Pavot & Diener, 1993). Psychological researchers have discovered that in order to understand one's full mental health, it is important to view mental health as existing on a continuum (Keyes, 2007), in which the absence of symptoms does not necessarily indicate complete well-being. Research conducted with children and adolescents has demonstrated that youth may report low levels of well-being despite also reporting low levels of psychopathology (Greenspoon & Saklofske, 2001; Suldo & Shaffer, 2008).

One widely used construct to measure well-being is subjective well-being, which is comprised of three components: positive affect, negative affect, and life satisfaction (Diener, Suh, Lucas, & Smith, 1999). Life satisfaction has been defined as a "cognitive judgmental process in which individuals assess the quality of their lives on the basis of their own unique set of criteria" (Pavot & Diener, 1993, p. 164). Life satisfaction is considered to be more stable than the other two components of subjective well-being (Diener et al., 1999).

It is important to obtain a deeper understanding of life satisfaction and the factors that are associated with life satisfaction given that research has clearly determined that high levels of life satisfaction are associated with increased benefits in multiple domains. In the academic domain, high levels of life satisfaction are associated with increased academic self-efficacy (Suldo & Huebner, 2006), higher grade-point averages (GPAs), and better attitudes towards school

(Gilman & Huebner, 2006). In the social domain, high levels of life satisfaction are associated with better relationships with one's parents (Gilman & Huebner, 2006) and increased emotional and social self-efficacy (Suldo & Huebner, 2006) in comparison to lower levels of life satisfaction. In terms of psychological functioning, high levels of life satisfaction are associated with higher self-esteem and levels of hope (Gilman & Huebner, 2006), fewer internalizing and externalizing behavior problems (Suldo & Huebner, 2006), a reduced risk for developing psychopathological symptoms (Diener & Diener, 1996; Lewinsohn, Redner, & Seeley, 1991), and a reduced risk for suicidal ideation or behavior (Valois, Zullig, Huebner, & Drane, 2004).

Researchers have examined the relationship between life satisfaction and both internalizing and externalizing psychopathology; however, more research has focused on the relationship between life satisfaction and internalizing psychopathology, and this research has clearly and consistently established an inverse relationship between life satisfaction and internalizing psychopathology. For example, research with adults has demonstrated that depression is strongly associated with low levels of life satisfaction and that low life satisfaction most often precedes the onset of depression; thus, life satisfaction is believed to be an important factor to consider when studying the etiology of depression and identifying individuals who are at risk of developing depression (Lewinsohn, Redner, & Seeley, 1991). Low levels of life satisfaction are also associated with increased rates of anxiety (Diener & Diener, 1996). In addition, Suldo and Huebner (2006) demonstrated that the opposite of this relationship is also true, with high school students who reported very high levels of life satisfaction also reporting very low levels of internalizing symptomology. Researchers have also examined, to a lesser extent, the relationship between life satisfaction and externalizing psychopathology. Suldo and Huebner (2004a) found in a longitudinal study conducted with adolescents that life satisfaction

was predictive of later externalizing behavior, even when controlling for the presence of initial externalizing behavior and thus concluded that lower levels of life satisfaction could precede the development of externalizing behavior problems. Moreover, when adolescents were faced with stressful life events, increased life satisfaction served as a protective factor against the development of externalizing behaviors (Suldo & Huebner, 2004a). Huebner and Alderman (1993) also conducted a study with at-risk students in 3rd-6th grade and found significant correlations between lower levels of life satisfaction and the presence of teacher-reported externalizing behavior.

Although research has examined the relationship between life satisfaction and the broad construct of externalizing behavior (Suldo & Huebner, 2004a; Zullig, Valois, Huebner, Oeltmann, & Drane, 2001), research on the relationship between life satisfaction and Attention-deficit/Hyperactivity Disorder (ADHD), one specific type of externalizing behavior, is currently limited. ADHD is characterized by chronic inattentive and/or hyperactive/impulsive symptoms that occur more often and are more disruptive than the behavior of peers without ADHD (American Psychiatric Association [APA], 2013). Inattentive symptoms include failing to pay close attention to details or making careless mistakes, difficulty sustaining attention, not listening, not following through on instructions, organizational difficulties, avoidance of tasks that require sustained mental effort, losing things often, being easily distracted, and forgetfulness (APA, 2013). Hyperactive symptoms include fidgeting, getting out of one's seat, running or climbing excessively, difficulty engaging in leisure activities quietly, being on the go, and talking excessively (APA, 2013). Impulsive symptoms include blurting out answers, difficulty awaiting turn, and interrupting or intruding on others (APA, 2013). Only two studies have examined the relationship between inattentive and hyperactive/impulsive symptoms and life

satisfaction (Gudjonsson, Sigurdsson, Eyjolfsdottir, Smari, & Young, 2009; Ogg, Bateman, Dedrick, & Suldo, 2014).

Bifactor Model of ADHD

When researching ADHD, it is important to note that multiple conceptualizations of the dimensionality of ADHD, including a one-factor model, a two-factor model of inattention and hyperactivity/impulsivity, a three-factor model of inattention, hyperactivity, and impulsivity, a second-order model, and a bifactor model, have been presented to account for the heterogeneity in the disorder. Recent research on the bifactor model has suggested that it may be the most accurate model for conceptualizing ADHD (Martel, von Eye, & Nigg, 2010). In the bifactor model, each symptom has a non-zero loading on the primary dimension of ADHD (i.e., the general or 'g' factor) and a secondary loading on a specific component ('s' factor; e.g., inattention, hyperactivity/impulsivity). One key advantage of utilizing the bifactor model in measuring ADHD is the fact that the bifactor model affords simultaneous examination of both general *and* specific dimensions of ADHD in relation to external variables. Thus, the bifactor model provides information on whether these dimensions of ADHD relate to other theoretically meaningful constructs (e.g., life satisfaction), as well as important academic and social outcomes, in similar or different ways. Given research demonstrating that outcomes differ for youth with different subtypes of ADHD (Bussing et al., 2010; Gaub & Carlson, 1997; McBurnett, Pfiffner, & Frick, 2001), recent support for the superior fit of the bifactor model (Dumenci, McConaghy, & Achenbach, 2004; Gibbins, Toplak, Flora, Weiss, & Tannock, 2011; Martel, Roberts, Gremillion, von Eye, & Nigg, 2011; Martel, von Eye, & Nigg, 2010; Normand, Flora, Toplak, & Tannock, 2012; Toplak, Pitch, Flora, Iwenofa, Ghelani, Jain et al., 2009; Toplak, Sorge, Flora, Chen, Banaschewski, Buitelaar et al., 2012), and research demonstrating

the usefulness of conceptualizing ADHD symptoms through the bifactor model when exploring external variables (Martel et al., 2011; Ogg, Bateman, Dedrick, & Suldo, 2014), the bifactor model may provide the best conceptualization of ADHD symptoms to utilize when examining external variables, such as life satisfaction, related to these symptoms.

Rationale for Further Research on Life Satisfaction and ADHD Symptoms

There are numerous reasons as to why it is important to examine levels of life satisfaction in children and adolescents with symptoms of inattentive and hyperactivity/impulsivity. First, ADHD is one of the most commonly diagnosed disorders affecting school-age children, with approximately 5% of school age children diagnosed (APA, 2013). Moreover, research has suggested that the prevalence of youth with high but not clinically significant levels of inattentive and hyperactivity/impulsivity is even higher, with one study revealing prevalence rates for high levels of symptoms of 18.2% among preschool children, 15.9% for elementary age students, and 14.8% for secondary (i.e., middle and high school) students based on teacher ratings of DSM-IV symptoms (Nolan, Gadow, & Sprafkin, 2001). Despite the prevalence of ADHD, as well as the prevalence of elevated symptoms of ADHD that do not meet full diagnostic criteria, only two studies have examined the relationship between symptoms of ADHD and life satisfaction (Gudjonsson, Sigurdsson, Eyjolfsdottir, Smari, & Young, 2009; Ogg, Bateman, Dedrick, & Suldo, 2014). The first study, conducted by Gudjonsson and colleagues (2009), examined the relationship between life satisfaction, ADHD symptoms, and other social and emotional concerns among university students. Even though the levels of ADHD symptoms in this study were mild, they were still found to be significantly related to lower levels of life satisfaction. Therefore, this study provided preliminary support for a relationship between life satisfaction and ADHD. The second study examining this relationship, conducted by Ogg and

colleagues (2014), examined the relationship between ADHD as conceptualized by the bifactor model and life satisfaction, as well as if this relationship differed depending on if teachers versus students reported ADHD symptoms. In this study, ADHD symptoms were measured by teacher report on the Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS; Wolraich, Feurer, Hannah, Baumgaertel, & Pinnock, 1998) and student report on a rating scale designed by the researchers to be comparable to the Vanderbilt. Life satisfaction was measured by the Students' Life Satisfaction Scale (SLSS; Huebner, 1991). Results of this study demonstrated that the bifactor model provided the best fit when ADHD symptoms were rated by students and by teachers as compared to alternative models (e.g., one-factor model, two-factor model, three-factor model). In addition, results of this study demonstrated that ADHD symptoms as conceptualized by the bifactor model were differentially related to life satisfaction. For student self-ratings of ADHD symptoms, both the general ADHD factor and the inattention factor were significantly, negatively related to life satisfaction. On the other hand, for teacher ratings of ADHD symptoms, only the inattention factor was significantly, negatively related to life satisfaction. The hyperactivity/impulsivity factor was not determined to be significantly related to life satisfaction whether it was rated by students or teachers. These findings in conjunction with those obtained by Gudjonsson and colleagues (2009) provide support for a link between ADHD symptoms and life satisfaction. In addition, the fact that inattention was a more consistent predictor of life satisfaction than hyperactivity/impulsivity and the general ADHD factor was consistent across these two previous studies. Thus, it may be particularly important to consider the relationship between inattention and life satisfaction.

To better understand the relationship between ADHD symptoms and well-being, research examining the link between ADHD symptoms and another positive psychology construct, quality

of life, can also be considered. Quality of life is different from life satisfaction because it includes not only subjective beliefs about the quality of one's life but also objective indicators of physical, psychological, and social functioning. This research has produced primarily inconclusive findings. A recent review of the literature examining quality of life in children with ADHD (Danckaerts, Sonuga-Barke, Banaschewski, Buitelaar, Döpfner, Hollis et al., 2010) indicates that parents of children with ADHD report significantly lower levels of quality of life for their children than do parents of children without ADHD (Escobar, Soutullo, Hervas, Gastaminza, Polavieja, & Gilaberte, 2005; Graetz, Sawyer, Hazell, Arney, & Baghurst; Klassen, Miller, & Fine, 2004; Sawyer, Whaites, Rey, Hazell, Graetz, & Baghurst, 2002). On the other hand, this review demonstrated that children with ADHD often rate their own quality of life less negatively than their parents do (Klassen, Miller, & Fine, 2006) or report levels of quality of life similar to that of peers without ADHD (Klassen, Miller, & Fine, 2006; Landgraf & Abetz, 1997). However, other studies reviewed by Danckaerts et al. (2010) found that children and adolescents with ADHD report lower levels of quality of life than their peers without ADHD (Bussing, Mason, Bell, Porter, & Garvan, 2010; Hampel & Desman, 2006). Thus, current research on reports of quality of life among children and adolescents with ADHD is mixed, particularly regarding the self-reports of children with ADHD. Given that subjective indicators may be more malleable to psychological interventions than objective indicators, such as socioeconomic status, on which it may not be possible to intervene, coupled with the fact that current research on the relationship between quality of life and ADHD has been inconclusive, it is important to consider not only quality of life but also life satisfaction in relation to ADHD symptoms. In addition, research using the quality of life construct has primarily grouped children into ADHD and non-ADHD groups. One possibility for the inconclusive findings is the fact that ADHD is known to

be a heterogeneous disorder; therefore, examining ADHD as a more homogenous disorder rather than examining symptoms on a continuum could plausibly contribute to the mixed findings in this research. By considering the ADHD symptoms separately, researchers may be able to better understand the well-being of this population.

In conclusion, the limited research to date suggests the presence of a link between ADHD symptoms, particularly inattentive symptoms, and life satisfaction. However, these two studies only represent certain age groups (e.g., middle school and college-age populations). Given increased evidence related to the importance of fostering life satisfaction in the overall population (Diener & Diener, 1996), as well as recent suggestions regarding the importance of increasing positive academic and social outcomes for children with ADHD rather than focusing on problem behaviors (DuPaul, 2007), it is important to gain a clearer understanding of how life satisfaction may be related to the presence or degree of ADHD symptoms. In particular, understanding the relationship between life satisfaction and inattention, hyperactivity, and impulsivity could be valuable in the prevention of comorbid concerns often experienced by youth with ADHD (e.g., depression). Given recent research suggesting that risk status for low levels of life satisfaction may differ based on the specific ADHD symptoms (Gudjonsson et al., 2009; Ogg et al., 2014), it is particularly important to examine how general and specific ADHD symptoms are associated with life satisfaction. The bifactor model of ADHD may provide more nuanced insights than other models of ADHD would into the relationship between ADHD symptoms and life satisfaction. Given that past research that has examined this relationship in young adolescents (i.e., middle school students) and young adults (i.e., university students) has identified a relationship between these two constructs, it is also important to explore this relationship in older adolescents (i.e., high school students).

Moreover, given past research, it is important to consider multiple raters of ADHD symptoms in exploring this relationship. A review of the literature on quality of life and ADHD demonstrated that parents and children themselves often provided different ratings related to how the presence of ADHD symptoms affects quality of life (Danckaerts et al., 2010). Ogg and colleagues (2014) found differences in the relationship between ADHD symptoms and life satisfaction when symptoms were reported by teachers versus by students. This is important given that teachers are often considered to be better reporters of externalizing behavior than students themselves, and thus teacher ratings of ADHD are utilized more often than student self-report ratings (Phares, 1997). Moreover, teacher reports are often utilized in the diagnosis of ADHD; thus, it is important to understand how teacher ratings of ADHD symptoms relate to students' reports of life satisfaction. However, given research demonstrating differences in the strength of the relationship depending on who rates ADHD symptoms, it is also important to gain a clear understanding of how student self-report ratings of ADHD relate to life satisfaction.

Rationale for Examining Depressive Symptoms

In addition to examining the relationship between symptoms of inattention and hyperactivity/impulsivity and life satisfaction, it is also important to consider depressive symptoms, as they are typically positively associated with symptoms of inattention and hyperactivity/impulsivity (Jensen et al., 1988; Szatmari et al., 1989), and low levels of life satisfaction have been found to precede the onset of depression in adult populations (Lewinsohn et al., 1991). Given these associations, it seems plausible that higher levels of life satisfaction could provide a buffer against the development of depressive symptoms among youth with symptoms of ADHD or could partially or fully explain the relationship between symptoms of ADHD and life satisfaction. DuPaul (2007) highlighted the importance of increasing positive

outcomes for children with ADHD, as opposed to focusing solely on problem behaviors, which has traditionally been the focus of treatment. Thus, it is also important to examine how factors related to life satisfaction and ADHD independently, as identified by prior research, may specifically relate to the relationship between life satisfaction and ADHD symptoms. In particular, it is important to consider if higher levels of life satisfaction could serve as a moderator or a mediator in the relationship between symptoms of inattention and hyperactivity/impulsivity and depressive symptoms.

Purpose of the Current Study

The purpose of the current study was to gain insight into the association between levels of ADHD symptoms and reports of life satisfaction within a high school population. This study had two aims. First, it examined the extent to which inattention, hyperactivity, and impulsivity, as conceptualized by the bifactor model, predicted levels of life satisfaction in high school students. Second, it explored the relationship between ADHD symptoms, life satisfaction, and depressive symptoms to determine if life satisfaction served as a moderator or a mediator in the relationship between ADHD symptoms and life satisfaction.

Given that research has established a tentative connection between ADHD symptoms and life satisfaction in young adolescence and adulthood and the fact that research has demonstrated that ADHD often persists from childhood and adolescence to adulthood (Bussing et al., 2010), it is important to examine the relationship between ADHD symptoms and life satisfaction in older adolescents. It is important to gain a clearer understanding of how life satisfaction may be related to the presence or degree of ADHD symptoms, as an understanding of this relationship may be especially valuable in preventing difficulties often experienced by youth with ADHD. Given that increased levels of life satisfaction are associated with positive outcomes in various

domains of functioning and that individuals with ADHD experience impairments in the academic domain, as well as psychological functioning, it seems plausible that children with ADHD may experience decreased life satisfaction when compared to peers without ADHD. This hypothesis has tentative support, as the two studies that have examined this relationship (Gudjonsson et al., 2009; Ogg et al., 2014) found a negative relationship between ADHD symptoms, particularly inattentive symptoms, and life satisfaction. Additional research is needed with children and adolescents to gain a better understanding of the link between ADHD symptoms and life satisfaction.

Definition of Key Terms

Subjective well-being. Subjective well-being refers to one's cognitive and affective assessment of his or her life (Diener, Oishi, & Lucas, 2009). It is comprised of three components: positive affect, negative affect, and life satisfaction (Diener, Suh, Lucas, & Smith, 1999).

Life satisfaction. Life satisfaction is one of the three major indicators of subjective well-being and is considered to be the most stable component (Diener, Suh, Lucas, & Smith, 1999). It has been defined as a "cognitive judgmental process in which individuals assess the quality of their lives on the basis of their own unique set of criteria" (Pavot & Diener, 1993, p. 164).

Quality of life. The term quality of life refers to one's overall well-being and includes both objective and subjective indicators of wellness (Felce & Perry, 1995). It is different from life satisfaction in that life satisfaction is a completely subjective construct, whereas quality of life also includes more concrete, observable aspects of one's life, such as wealth, employment, physical and mental health, and social standing.

Attention-Deficit/Hyperactivity Disorder (ADHD). ADHD is one of the most commonly diagnosed disorders affecting school-age children, with approximately 5% of school age children diagnosed (American Psychiatric Association, 2013). ADHD is defined by the core symptoms of inattention and/or hyperactivity/impulsivity. A clinical diagnosis of ADHD requires that a child, adolescent, or adult exhibits six or more symptoms in either the area of inattention or hyperactivity/impulsivity (American Psychiatric Association [APA], 2013, that these symptoms were present before age 7, that the symptoms are maladaptive and inconsistent with the behavior of others at a child's respective developmental level, that the symptoms have been present for at least six months, and that some degree of impairment is present in two or more settings (e.g., at home and at school).

Inattention. Inattention is characterized by a lack of attention to details and information in the environment, distractibility, forgetfulness, and carelessness.

Hyperactivity/Impulsivity. Hyperactivity is characterized by abnormally high levels of physical and verbal activity. Impulsivity is characterized by acting quickly without thinking.

High school students. This term will be used to refer to students in ninth through twelfth grade.

Moderator. A moderator is a qualitative or quantitative variable that affects the strength and/or the direction of the relationship between an independent variable and a dependent variable (Baron & Kenny, 1986).

Mediator. A mediator is a qualitative or quantitative variable that is analyzed to identify and explain the mechanism or process that underlies a relationship between an independent variable and a dependent variable (Baron & Kenny, 1986).

Research Questions

To investigate the association between life satisfaction and severity of ADHD symptoms and depressive symptoms, the following research questions were examined:

1. *To what extent, if any, does each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) predict life satisfaction in high school students?*
    a. *When ADHD symptoms are rated by students?*
    b. *When ADHD symptoms are rated by teachers?*
2. *To what extent, if any, does life satisfaction moderate the relationship between each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) and depressive symptoms in high school students?*
    a. *When ADHD symptoms are rated by students?*
    b. *When ADHD symptoms are rated by teachers?*
3. *To what extent, if any, does life satisfaction mediate the relationship between each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) and depressive symptoms in high school students?*
    a. *When ADHD symptoms are rated by students?*
    b. *When ADHD symptoms are rated by teachers?*

Importance of the Current Study to School Psychology

In recent decades, the establishment of the positive psychology framework has led to an increased focus on promoting overall well-being as opposed to simply decreasing psychopathology (Pavot & Diener, 1993). Research has clearly demonstrated that it is not enough to solely focus on symptomology, as the absence of symptomology is not synonymous with complete well-being (Suldo & Shaffer, 2008). Moreover, research has consistently

demonstrated that increased levels of well-being, specifically life satisfaction, are associated with positive outcomes in various domains of functioning; thus, it is critical for school psychologists to gain a better understanding of factors relating to wellness in students.

Given the high prevalence of ADHD in school-age youth, it is particularly important for school psychologists to better understand the experiences of students with ADHD. In particular, research examining how ADHD symptoms predict life satisfaction in adolescence would have important implications for school psychologists. Preliminary research has demonstrated that ADHD symptoms are associated with lower levels of life satisfaction, especially with regards to inattentive symptoms (Gudjonsson et al., 2009; Ogg et al., 2014). However, additional research is needed to better understand the extent of this relationship. Given that adolescents with ADHD often experience academic and social difficulties, as well as comorbid psychopathology, it is particularly important for school psychologists to have an understanding of how these associated impairments could be prevented. One plausible buffer between ADHD symptoms and associated impairment is life satisfaction, as higher levels of life satisfaction are associated with improved positive outcomes in various domains. Thus, understanding the relationship between ADHD symptoms and life satisfaction could be valuable in the prevention of comorbid concerns often experienced by youth with ADHD (i.e., depression).

Contributions to the Literature

The current study contributes to the existing, limited literature on the relationship between ADHD symptoms and life satisfaction given that there are currently only two studies that have examined levels of life satisfaction in individuals with ADHD. The first study was conducted with a sample of university students and demonstrated that even mild symptoms of ADHD were associated with lower levels of life satisfaction (Gudjonsson et al., 2009). The

second study was conducted with a sample of middle school students and demonstrated that student-reported inattentive and general ADHD symptoms, as conceptualized by the bifactor model, were significantly related to life satisfaction (Ogg et al., 2014). This study also demonstrated that teacher-reported inattentive symptoms were significantly related to life satisfaction. Thus, there is preliminary support for a relationship between ADHD symptoms, especially inattentive symptoms, and life satisfaction in studies conducted with middle school and young adult samples. Given that research has demonstrated that there is a relationship between the two constructs in adulthood and early adolescence, coupled with the fact that research has demonstrated that ADHD persists throughout the developmental course, it is important to examine this relationship in later adolescence as well. The current study is consistent with recent recommendations in the literature to highlight the importance of focusing on positive constructs, versus solely negative outcomes, for youth with ADHD (DuPaul, 2007).

The current study also contributes to the literature on the bifactor model. Recent research has suggested that this model may provide the most accurate conceptualization of ADHD. The current study examined the fit of the bifactor model with a high school sample and provided additional evidence for the use of the bifactor model in conceptualizing ADHD. In addition, because the current study utilized this model in conceptualizing ADHD, the results of this study also provide more nuanced insights into the relationships between symptoms of inattention and hyperactivity/impulsivity and life satisfaction.

Moreover, from a preventative standpoint, the current study has important implications for better understanding factors that may affect (i.e., moderate) or partially or fully (i.e., mediate) explain the relationship between ADHD symptoms and depressive symptoms. Given that individuals with ADHD are at higher risk of negative outcomes in multiple domains, it is

important to identify any possible strengths that students might possess, such as high levels of life satisfaction, which could serve as a protective factor against the development of typically related negative outcomes.

CHAPTER II: Review of the Literature

This chapter outlines the current knowledge base on life satisfaction in individuals with symptoms of inattention and hyperactivity/impulsivity. First, life satisfaction and other related positive psychology constructs, such as quality of life, are defined, and the outcomes associated with life satisfaction are identified. Second, inattentive and hyperactive/impulsive symptoms, as well as theoretical and empirical models for conceptualizing these symptoms, are defined and explained, and outcomes typically associated with these symptoms are identified. Third, past research on the relationship between positive psychology constructs, including life satisfaction and quality of life, and symptoms of inattention and hyperactivity/impulsivity is reviewed. Relevant literature related to each of these topics is reviewed to build support for the current study.

Positive Psychology

Overview. The present study is rooted in the positive psychology framework. In recent decades, researchers have shifted their focus from not only identifying and reducing symptomology to also emphasizing and promoting the importance of overall well-being (Pavot & Diener, 1993). According to Keyes (2007), mental health can be thought of as existing on a continuum, such that the absence of psychological symptoms does not necessarily indicate full mental health. Thus, in order to determine one's overall mental health, it is important to not solely examine symptoms, but also to examine wellness, or the extent to which an individual is thriving. For example, research has demonstrated that children may report low subjective well-being despite also reporting low levels of psychopathology (Greenspoon & Saklofske, 2001). In

a psychological model in which mental health was solely determined by symptomology, these children would be labeled as healthy, but by examining their levels of subjective well-being, the researchers determined that their reports of well-being suggested a different level of functioning than what would be expected based solely on their levels of psychopathology. Further research has confirmed the existence of a dual factor model of mental health, in which individuals fall into one of four categories: complete mental health (i.e., the absence of mental health problems and average to high levels of life satisfaction), vulnerable (i.e., the absence of mental health problems and low levels of life satisfaction), symptomatic but content (i.e., the presence of mental health problems and average to high levels of life satisfaction), and troubled (i.e., the presence of mental health problems and low levels of life satisfaction; Suldo & Shaffer, 2008). Given these findings, researchers have clearly recognized the need to focus on well-being in addition to symptomology in order to obtain a clear picture of an individual's functioning.

It is important to understand key constructs within the framework of positive psychology. Numerous indicators have been utilized to measure well-being (Lent, 2004; Sirgy, Michalos, Ferriss, Easterlin, Patrick, & Pavot, 2006). Three key constructs that are often used to measure well-being (i.e., quality of life, subjective well-being, and life satisfaction) will be discussed and clearly differentiated in the following section.

Quality of life. Quality of life has been defined as "the complex interaction of the various elements present in a person's life" (Higgs, Hyde, Wiggins, & Blane, 2003, p. 243). It is a multidimensional construct that includes both objective and subjective indicators of wellness (Felce & Perry, 1995). Thus, quality of life refers to overall well-being, but it also includes more concrete, observable aspects of one's life (e.g., wealth, employment, physical health, mental health, and social standing). Quality of life is often used interchangeably with other constructs

utilized to measure well-being, despite the fact that it is distinctly different conceptually in its inclusion of both subjective and objective indicators (Lent, 2004). It is important to note that quality of life has most often been utilized in reference to the well-being of populations with clinical symptoms (e.g., children with ADHD, children with chronic health conditions, etc.).

Subjective well-being. An additional important construct within the framework of positive psychology is subjective well-being. Unlike quality of life, subjective well-being has been utilized in reference to more general populations, and it does not include objective indicators of wellness. Instead, subjective well-being has been conceptualized as an individual's subjective appraisal of his or her life in conjunction with his or her affect (Diener, Suh, Lucas, & Smith, 1999). Thus, subjective well-being has been proposed to be comprised of three separate components: global life satisfaction, positive affect, and negative affect (Diener et al., 1999). An individual's affect, whether positive or negative, refers to one's moods and emotions surrounding life events (Diener, Suh, Lucas, & Smith, 1999). Specifically, positive affect is the extent to which one experiences positive emotions, such as joy or affection, and negative affect is the frequency in which one experiences negative emotions, such as sadness or anxiety (McKnight, Huebner, & Suldo, 2002, p. 677).

Life satisfaction. Life satisfaction is a purely subjective construct (Pavot & Diener, 1993). It is considered to be the most stable component of subjective well-being given that the positive and negative affective domains are often unstable and change rapidly (Diener et al., 1999). Life satisfaction has been defined as a "cognitive judgmental process in which individuals assess the quality of their lives on the basis of their own unique set of criteria" (Pavot & Diener, 1993, p. 164). Life satisfaction has been found to be a stable characteristic in both adolescents (Suldo & Huebner, 2004a) and adults (Diener et al., 1999). For example, Suldo and

Huebner (2004a) examined life satisfaction in adolescents and found a strong association between life satisfaction as measured initially and one year later.

Although there are several constructs that can be utilized to examine wellness, it is particularly important to consider life satisfaction for two key reasons. First, life satisfaction is, in theory, a more malleable construct than quality of life given that it is purely comprise of subjective indicators on which intervention may be more plausible than objective indicators. Second, life satisfaction is often examined instead of overall subjective well-being because it is a more stable construct. Research has also determined that high levels of life satisfaction are associated with increased benefits in multiple domains. For example, Diener and Diener (1996) reported in a review of cross-national data that adults with more positive subjective well-being have increased coping skills, curiosity, exploratory behavior, and sociability. Additionally, individuals who report higher levels of life satisfaction are at a reduced risk of developing psychopathological symptoms (Diener & Diener, 1996; Lewinsohn, Redner, & Seeley, 1991) and at a reduced risk of suicidal ideation and behavior (Valois, Zullig, Huebner, & Drane, 2004). Moreover, middle and high school students with high levels of life satisfaction have been found to demonstrate increased academic, emotional, and social self-efficacy in comparison to peers with low or moderate life satisfaction (Suldo & Huebner, 2006). Additionally, adolescents with higher levels of life satisfaction also have higher GPAs, self-esteem, and levels of hope, report better relationships with their parents, and are less likely to experience depression, anxiety, and negative school attitudes (Gilman & Huebner, 2006).

Developmental Course for Life Satisfaction

It is important to consider the development course of life satisfaction. Conceptually, life satisfaction is believed to be a stable construct across time (Diener et al., 1999). Researchers

have examined the stability of life satisfaction across 17 years with an adult sample (Fujita & Diener, 2005). Results demonstrated that 24% of participants had significant changes in life satisfaction from the first five years of the study to the last five years of the study. In addition, Fujita and Diener (2005) found that stability in life satisfaction declined as the time between measurements increased. Researchers concluded that life satisfaction has modest stability and that levels do appear to fluctuate around a "set point" (Fujita and Diener, 2005, p. 162).

Although life satisfaction has been examined with adult populations for many decades, research using child and adolescent samples is more recent. However, preliminary, limited research has examined the stability of life satisfaction from childhood to adulthood and has demonstrated that life satisfaction decreases during adolescence (Goldbeck, Schmitz, Besier, Herschbach, & Henrich, 2007). Goldbeck and colleagues (2007) examined life satisfaction in a sample of adolescents ages 11-16 in Germany and found that life satisfaction decreased linearly with age; however, the use of a cross-sectional design in this study precludes the assumption that the negative correlation between life satisfaction and age is due to developmental rather than other associated factors. Similarly, Park (2005) examined the relationship between life satisfaction and age among children and adolescents in South Korea and found that as age increases, global and domain-specific life satisfaction decreases. Thus, correlational research demonstrates that life satisfaction may decline with age in the global population; however, additional, longitudinal research is needed to confirm these findings.

Life Satisfaction and Psychopathology

Researchers have examined the relationship between life satisfaction and psychopathology. Adults with lower levels of life satisfaction are more likely to develop psychopathology symptoms, with a particular risk of developing internalizing problems such as

depression and anxiety (Diener & Diener, 1996; Lewinsohn, Redner, & Seeley, 1991). Among youth, initial levels of life satisfaction have also been found to be related to later externalizing behavior (Suldo & Huebner, 2004a), and levels of life satisfaction have also been found to be concurrently related to risk taking behavior (Zullig, Valois, Huebner, Oeltmann, & Drane, 2001). This section will outline findings related to the relationship between life satisfaction and internalizing and externalizing behaviors.

Life satisfaction and internalizing behavior. Life satisfaction appears to be inversely associated with levels of psychopathology, specifically mood disorders. Lewinsohn, Redner, and Seeley (1991) examined life satisfaction in adults and found that depression was associated with lower levels of life satisfaction. Specifically, low life satisfaction most often preceded the onset of depression, suggesting that life satisfaction is an important factor to consider when studying the etiology of depression and identifying individuals who are at risk of developing depression. Low levels of life satisfaction are also associated with increased rates of anxiety among college age students (Diener & Diener, 1996). In addition to research demonstrating that low levels of life satisfaction are associated with the presence of internalizing psychopathology, Suldo and Huebner (2006) also found the inverse relationship to be true, with high school students who reported very high levels of life satisfaction reporting significantly lower levels of internalizing symptoms than their peers with lower levels of life satisfaction. Life satisfaction has also been determined to partially mediate the relationship between stressful life events and internalizing behavior for adolescents, thus suggesting that low levels of life satisfaction could serve as a pathway to the development of internalizing psychopathology for adolescents exposed to negative life events (McKnight, Suldo, & Huebner, 2002).

Life satisfaction and externalizing behavior. Researchers have also examined, to a lesser extent, the relationship between life satisfaction and externalizing behaviors. Suldo and Huebner (2004a) examined 816 middle and high school students and found that initial life satisfaction was predictive of later externalizing behavior, even when controlling for the presence of initial externalizing behavior. Thus, the researchers concluded that reduced life satisfaction alone could precede the development of externalizing behavior problems, and adolescents who have higher levels of life satisfaction may be less likely to develop aversive externalizing behaviors. The same results were not found for internalizing behaviors, perhaps because levels of life satisfaction are more concurrently related to internalizing disorders, whereas they may have a greater longitudinal influence on the development of externalizing behavior. Nevertheless, the results of the study conducted by Suldo and Huebner (2004a) with specific regard to externalizing behavior demonstrate that life satisfaction is not solely a result of life experiences; it can also affect the development of behavior and impact future outcomes. Huebner and Alderman (1993) also conducted a study with at-risk students in 3rd-6th grade and found significant correlations between lower levels of life satisfaction and the presence of teacher-reported externalizing behavior.

Life satisfaction has also been found to be inversely related to several risky behaviors that are often conceptualized as specific forms of externalizing behavior. For example, lower levels of life satisfaction have been found to be significantly associated with cigarette smoking, regular alcohol use, binge drinking, and using tobacco, marijuana, cocaine, injection drugs, or steroids (Zullig, Valois, Huebner, Oeltmann, & Drane, 2001). Furthermore, lower global life satisfaction has also been found to be associated with higher rates of weapon carrying, driving while under

the influence of alcohol, being threatened or injured by a weapon, and physical fighting (Valois, Zullig, Huebner, & Drane, 2001).

Summary

In summary, research has demonstrated that individuals with lower levels of life satisfaction are more likely to manifest and develop psychopathology symptoms, especially internalizing disorders such as depression and anxiety (Diener & Diener, 1996; Lewinsohn, Redner, & Seeley, 1991). Research has also demonstrated that youth life satisfaction predicts later broad externalizing behavior (Huebner & Alderman, 1993; Suldo & Huebner, 2004a). In addition, lower levels of life satisfaction are also related to a specific type of externalizing behavior, risk-taking behavior, such as substance abuse (Zullig et al., 2001) and aggressive or violent behavior (Valois et al., 2001). Thus, given that research has established a clear, inverse relationship between life satisfaction and both internalizing and externalizing psychopathology, life satisfaction is an important factor to examine in relation to psychopathology.

Attention-Deficit/Hyperactivity Disorder and Associated Problems

Although researchers have examined links between the broad construct of externalizing behavior and life satisfaction (Suldo & Huebner, 2004a), research on the relationship between life satisfaction and Attention-deficit/Hyperactivity Disorder (ADHD), one specific type of externalizing behavior, is currently limited. ADHD is one of the most commonly diagnosed disorders affecting children, with approximately 5% of school age children meeting diagnostic criteria for ADHD (American Psychiatric Association [APA], 2013). In addition, the prevalence rate of youth who experience high levels of ADHD symptoms but do not meet full criteria for diagnosis is even higher, with one study revealing prevalence rates for high levels of ADHD symptoms of 18.2% among preschool children, 15.9% for elementary age students, and 14.8%

for secondary (i.e., middle and high school) students based on teacher ratings of DSM-IV symptoms (Nolan, Gadow, & Sprafkin, 2001). Given that prevalence rates for high levels of symptoms versus prevalence rates for diagnosis differ greatly, Barkley (2006) has suggested not only considering diagnosis but rather viewing symptoms of ADHD on a continuum, with diagnosable levels existing on the extreme end of the continuum. Only two studies, which will be discussed further in this chapter, have examined the relationship between symptoms of inattention and hyperactivity/impulsivity and life satisfaction (Gudjonsson, Sigurdsson, Eyjolfsdottir, Smari, & Young, 2009; Ogg et al., 2014). It is important to note that these studies solely examined symptoms of ADHD and not associated impairment required for a diagnosis of ADHD. However, research has demonstrated that adolescents with sub-threshold ADHD symptoms experience similar and even worse impairments and outcomes when compared to students who meet criteria for an ADHD diagnosis (Bussing et al., 2010). Thus, there is clear support for considering ADHD symptoms on a continuum, as has been done in previous research.

In addition to experiencing symptoms of inattention, hyperactivity, and impulsivity, youth with ADHD are at an increased risk for negative outcomes in the academic (Loe & Feldman, 2007), social (Gaub & Carlson, 1997), and familial domains (Danforth, Barkley, & Stokes, 1991), as well as at increased risk for comorbid psychopathology (Jensen, Burke, & Garfinkel, 1988; Kadesjö, & Gillberg, 2001; Miranda, Soriano, Fernández, & Meliá, 2008; Szatmari, Offord, and Boyle, 1989). Given that these outcomes are also associated with lower levels of life satisfaction, it seems plausible that children and adolescents with symptoms ADHD could be more vulnerable to lower levels of life satisfaction. This is important because high levels of life satisfaction could provide a buffer against the development of negative outcomes

associated with symptoms of ADHD. On the other hand, high levels of life satisfaction among students with symptoms of ADHD may contribute to more positive outcomes in the academic and social domains than is typical for students with symptoms of ADHD, given research indicating that higher levels of life satisfaction are associated with increased competence in the academic and social domains (Gilman & Huebner, 2006; Suldo & Huebner, 2006).

Considering the fact that ADHD affects such a significant portion of the population (APA, 2013), coupled with the recent shift in focus to promoting positive life satisfaction in addition to attempting to decrease the presence of psychopathology (Pavot & Diener, 1993), it is important to examine reports of life satisfaction in children and adolescents demonstrating symptoms of ADHD in order to best be able to serve this population. DuPaul (2007) highlighted the importance of increasing positive academic and social outcomes for children with ADHD, as opposed to focusing solely on reducing problem behaviors. Although DuPaul (2007) was not specifically referring to life satisfaction, this focus on increasing positive outcomes is consistent with the positive psychology approach, as previous research has suggested that higher levels of life satisfaction are associated with increased coping skills and sociability (Diener & Diener, 1996), a reduced risk for developing psychopathological symptoms (Diener & Diener, 1996; Lewinsohn, Redner, & Seeley, 1991) and suicidal ideation or behavior (Valois, Zullig, Huebner, & Drane, 2004), and increased academic, emotional, and social self-efficacy (Suldo & Huebner, 2006).

One of the key reasons why it is important to consider life satisfaction in children with ADHD is the relatively high rate of this disorder. Specifically, ADHD is one of the most commonly diagnosed disorders affecting children, with approximately 5% of school age children meeting diagnostic criteria for an ADHD diagnosis (APA, 2013). According to the *Diagnostic*

and Statistical Manual of Mental Health Disorders-5th Edition (DSM-V; APA, 2013), ADHD is characterized by chronic inattentive and/or hyperactive/impulsive symptoms that occur more often and are more disruptive than the behavior of peers without ADHD. In order to reach the diagnostic threshold, symptoms must have been present before age seven, there must be clear indication of impairment related to symptoms of ADHD in at least two settings (e.g., at home and at school), and there must be clear evidence that the symptoms are causing clinically significant impairment in academic, social, or occupational functioning. There are three subtypes of ADHD, including ADHD-Predominantly Inattentive Type (ADHD-PI), ADHD-Predominantly Hyperactive/Impulsive Type (ADHD-HI), and ADHD-Combined Type (ADHD-C). In order for an individual to be diagnosed with ADHD-PI, the individual must display six or more symptoms of inattention for the past six months (such as being easily distracted or forgetful in daily activities). Regarding prevalence, Froehlich and colleagues (2007) reported that the ADHD-PI subtype occurs in 4.4% of children age 8-15. In order for an individual to be diagnosed with ADHD-HI, the criteria are the same except that the individual must demonstrate six or more symptoms of hyperactivity/impulsivity for the past six months (such as being fidgety or blurting out answers) rather than symptoms of inattention. Regarding prevalence, Froehlich and colleagues (2007) reported that the ADHD-HI subtype occurs in 2.2% of children age 8-15. In order for an individual to be diagnosed with ADHD-C, the individual must meet criteria for both ADHD-PI and ADHD-HI. Regarding prevalence, Froehlich and colleagues (2007) reported that the ADHD-C subtype occurs in 2.2% of children age 8-15. The ADHD-PI subtype has been found to be most common among adolescents with ADHD, and researchers have suggested that this may be due to the fact that other symptoms may change or become less visible as students

reach adolescence, with some children meeting criteria for the ADHD-C subtype shifting to the ADHD-PI subtype as they approach adolescence (Lahey, 2001; Wolraich et al., 2005).

Conceptualizations of ADHD

Multiple conceptualizations of the dimensionality of ADHD, including a one-factor model, a two-factor model of inattention and hyperactivity/impulsivity, and a three-factor model of inattention, hyperactivity, and impulsivity, a second-order model, and a bifactor model, have been presented to account for the heterogeneity in the disorder. These models of ADHD have been represented over time in the changing conceptualization of ADHD symptoms in the DSM (Barkley, 2006). It is important to understand the factor structure of ADHD in research and link this structure to the current conceptualization of ADHD in the DSM.

Model structures. A one-factor model of ADHD includes all 18 symptoms of inattention, hyperactivity, and impulsivity on one factor, which is consistent with the DSM-III Diagnostic Criteria for Attention Deficit Disorder with Hyperactivity, which required that children display at least three symptoms of inattention and impulsivity and at least two symptoms of hyperactivity (American Psychiatric Association [APA], 1980). A two-factor model of ADHD includes one inattentive factor (comprised of the nine inattentive symptoms) and one hyperactive/impulsive factor (comprised of the nine hyperactive/impulsive symptoms), which is similar to the current conceptualization of ADHD in the DSM-IV-TR in its recognition of inattention and hyperactivity/impulsivity of distinct subtypes of ADHD; however, it does not recognize the presence of a third, combined subtype. Researchers have found support for the two-factor model in comparison to other models, excluding the bifactor model, with a sample of elementary school students in America, Spain, and Germany (Wolraich et al., 2003). A third conceptualization of ADHD, a three-factor model, differentiates between hyperactivity and

impulsivity to create three distinct factors, with the nine inattentive symptoms loading onto one factor, the six hyperactive symptoms loading onto a second factor, and the three impulsive symptoms loading onto a third factor. Wolraich and colleagues (2003) found that inclusion of a third-factor in the model of ADHD did not provide an adequate fit, with the third-factor (i.e., impulsivity) being too insignificant to stand alone in this model. Although the two-factor model has more empirical support than the one-factor or three-factor models (Burns, Boe, Walsh, Sommers-Flanagan, & Teegarden, 2001), none of the aforementioned models are believed to be consistent with the way ADHD is conceptualized in the DSM-IV-TR (Wolraich et al., 2003). A second-order model could include the one, two, or three factors described above at one level, as well as a more general ADHD factor at a second level. It differs from the bifactor model in that it allows inattentive and hyperactive/impulsive symptoms to be modeled separately, as well as including all symptoms within a higher-order ADHD diagnostic category (Wolraich et al., 2003). This model has been proposed to better account for the general and specific factors of ADHD and to be more consistent with the DSM-IV conceptualization of ADHD as a single diagnostic category (Wolraich et al., 2003). Moreover, it has been argued that the second-order model suggests that clinical intervention would be equally effective for all children with ADHD despite their unique symptom profiles (Wolraich et al., 2003).

Bifactor model. Recently, an alternative to the aforementioned models, the bifactor model, has been proposed as a more accurate model for conceptualizing ADHD, given that it is believed to be "more consistent with the way ADHD is thought of by clinicians or portrayed in the DSM-IV" (Martel, von Eye, & Nigg, 2010, p. 906). In this model, inattentive and hyperactive/impulsive symptoms are understood as distinct pathways to the disorder, rather than symptoms that are subsumed under a general ADHD category, which is consistent with recent

research on the existence of multiple pathways to ADHD (Nigg, Goldsmith, & Sachek, 2004). In the bifactor model, each symptom has a non-zero loading on the primary dimension of ADHD (i.e., the general or 'g' factor) and a secondary loading on a specific component ('s' factor; e.g., inattention, hyperactivity/impulsivity). Bifactor models have been recommended for "substantively complex constructs" (Reise, Morizot, & Hays, 2007, p. 22), such as ADHD, that contain a heterogeneous set of symptom indicators. Moreover, it has been suggested that the bifactor model might help to explain contradictory findings of general and specific influences on ADHD symptom domains, as the bifactor model suggests that distinct etiological influences that converge on the same syndrome (Wolraich et al., 2003). Unlike a second-order factor model in which a construct that is conceptualized at a higher level of abstraction is used to explain lower-order constructs, the bifactor model represents the general and specific constructs at the same conceptual level (Reise et al., 2007). This model provides an opportunity to explore both general and specific risk factors associated with ADHD, depending on the specific constellation of symptoms youth experience and is thus consistent with a multiple-pathway conceptualization of ADHD (Nigg, Goldsmith, & Sachek, 2004). Several studies provide support for the superior fit of the bifactor model for ADHD symptoms for both clinical and community samples of school-age children and adults compared to the aforementioned conceptualizations of ADHD (Dumenci, McConaghy & Achenbach, 2004; Gibbins, Toplak, Flora, Weiss & Tannock, 2011; Martel, Robers, Gremillion, von Eye & Nigg, 2011; Martel, von Eye & Nigg, 2010; Normand, Flora, Toplak & Tannock, 2012; Ogg et al., 2014; Toplak, Pitch, Flora, Iwenofa, Ghelani, Jain et al., 2009; Toplak, Sorge, Flora, Chen, Banaschewski, Buitelaar et al., 2012). Figure 1 demonstrates a visual conceptualization of the bifactor model of ADHD.

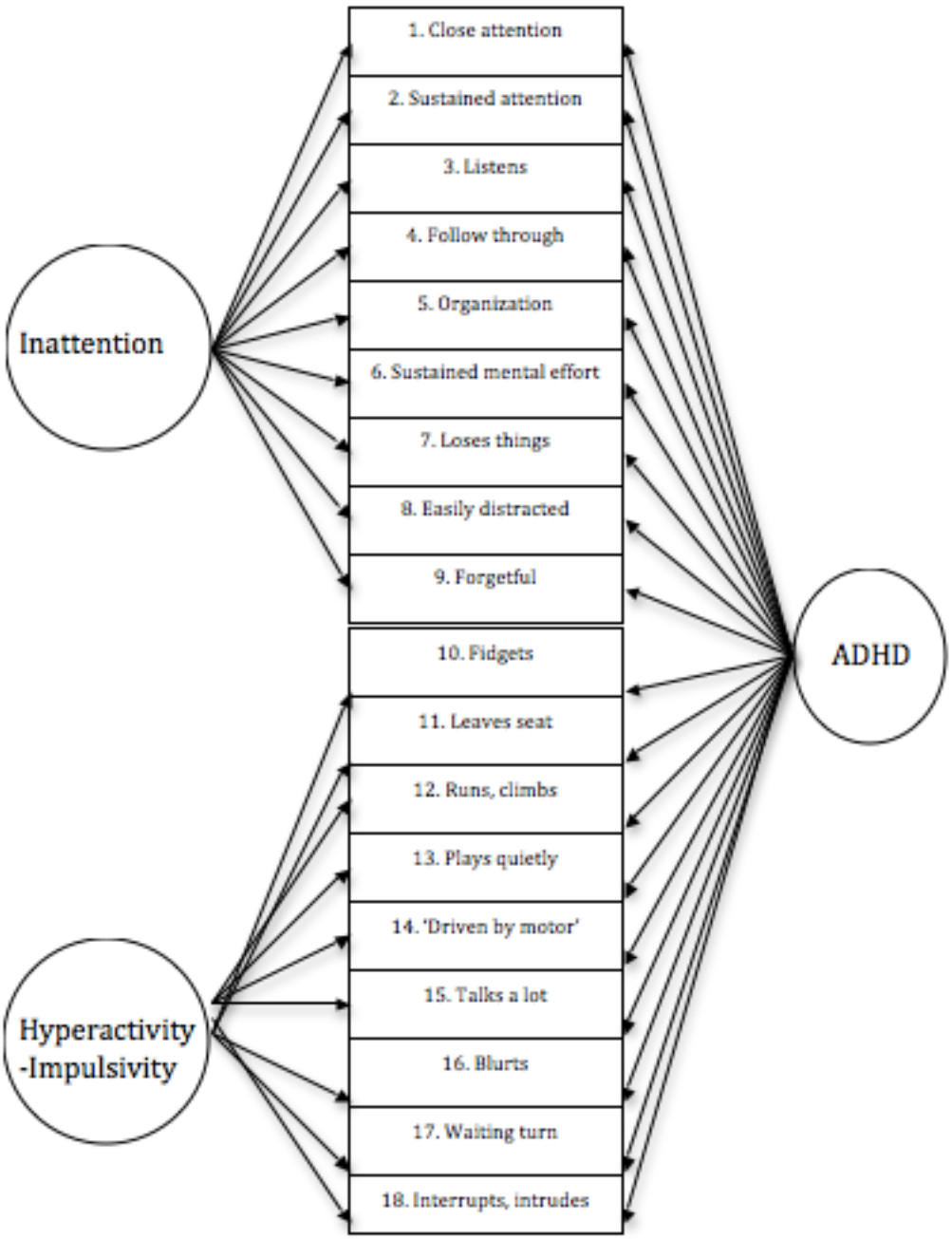


Figure 1

Bifactor Model of ADHD

One key advantage of utilizing the bifactor model in measuring ADHD is the fact that the bifactor model affords simultaneous examination of both general *and* specific dimensions of ADHD in relation to external variables, thus providing information on whether these dimensions

of ADHD relate to other theoretically meaningful constructs (e.g., conduct disorder, anxiety), as well as important academic and social outcomes, in similar or different ways. Martel and colleagues (2011) demonstrated the relationship to external outcomes when they explored the links between ADHD general and specific latent factors ('g' and 's'), measured using parent and teacher reports, and problem behaviors, cognitive control, and personality factors. Inattention was associated with outcomes such as withdrawal/depression, slower cognitive performance, introversion, and agreeableness, while hyperactivity/impulsivity and the general ADHD factor were associated with anxiety/depression, rule-breaking behavior, aggression, social problems, extraversion, low effortful control, high negative emotionality, and disagreeableness (Martin et al., 2011). Similarly, Ogg and colleagues (2014) used the bifactor model to examine how both general and specific factors of ADHD symptoms, as rated by teachers and by the students themselves, related to the life satisfaction of middle school students. Results of this study demonstrated good fit for the bifactor model, and the ADHD symptoms as conceptualized through this model were found to be differentially related to life satisfaction (Ogg et al., 2014). Specifically, when students rated ADHD symptoms, both the general ADHD factor and the specific factor of inattention were significantly negatively related to LS; however, when teachers rated ADHD symptoms, only inattention was significantly negatively related to LS.

In summary, given research demonstrating that outcomes differ for youth with different subtypes of ADHD, recent support for the superior fit of the bifactor model, and research demonstrating the usefulness of conceptualizing ADHD symptoms through the bifactor model when exploring external variables, the bifactor model may provide the best conceptualization of ADHD symptoms to utilize when examining external variables, such as life satisfaction, related to these symptoms.

Associated Outcomes of ADHD

In addition to understanding the structure of ADHD, it is also important to consider the outcomes typically associated with this disorder. In addition to the primary problems associated with ADHD, such as inattention, impulsivity, and hyperactivity, children with ADHD often also experience negative outcomes in the academic domain and are often also at increased risk of experiencing comorbid psychological disorders. It is important to note that outcomes differ based on the type of ADHD (i.e., ADHD-PI, ADHD-HI, or ADHD-C). The specific deficits that children and adolescents with ADHD experience in the academic domain, information about the prevalence of and most common comorbid diagnoses for children and adolescents with ADHD, and the developmental course of ADHD and associated outcomes will be discussed below. Differences in outcomes based on the subtype of ADHD will also be enumerated in this section.

Academic domain. Children and adolescents with ADHD often struggle academically. First, children with ADHD are more likely to have lower grades than their peers without ADHD (Loe & Feldman, 2007). Second, children with ADHD also tend to score more poorly on standardized test scores in reading and mathematics (Loe & Feldman, 2007), as well as on tests of intelligence (Frazier, Demaree, & Youngstrom, 2004). Children with ADHD are also more likely to be retained or to receive serious disciplinary consequences, such as detention and expulsion (Loe & Feldman, 2007). Furthermore, these academic difficulties eventually result in lower rates of high school graduation and postsecondary education among individuals with ADHD (Loe & Feldman, 2007). Longitudinal research has confirmed that students with ADHD consistently underachieved in academics when compared with predicted levels of achievement based on intellectual ability (Massetti, Lahey, Pelham, Loney, Ehrhardt, Lee et al., 2008).

Research has demonstrated that it is not only adolescents who meet criteria for an ADHD diagnosis who experience academic difficulties, but adolescents who experience subthreshold symptoms of ADHD also have increased academic difficulty compared to peers without ADHD in both reading and mathematics (Bussing, Mason, Bell, Porter, & Garvan, 2010). Moreover, adolescents with subthreshold symptoms were found to have even lower graduation rates than adolescents with ADHD, which the researchers suggest may result from a lack of additional educational supports for these students since they lack an ADHD diagnosis (Bussing et al., 2010). Additionally, children who met modified criteria (children met symptom criteria but only displayed impairment in one setting) for ADHD-PI struggled more in the areas of reading, spelling, and mathematics over time than peers without ADHD as well as those who met modified criteria for ADHD-HI (Bussing et al., 2010). This is consistent with past research indicating the children with the predominantly inattentive subtype of ADHD often experience greater academic impairments and are more likely to have a comorbid learning disability than students with other ADHD subtypes (Gaub & Carlson, 1997).

In summary, regardless of subtype, children and adolescents with significant levels of ADHD symptoms experience difficulties in the academic domain. However, children who experience inattentive symptoms tend to experience greater academic impairments than children with the hyperactive/impulsive subtypes of ADHD.

Comorbid psychopathology. Research has also indicated that ADHD is often associated with comorbid psychiatric disorders, with one study determining that as many as 44% of children with ADHD in a community sample had at least one additional psychiatric disorder, 32% had two other psychiatric disorders, and 11% had three or more comorbid disorders (Szatmari, Offord, & Boyle, 1989). Rates of comorbidity have been found to be even higher in a clinical

sample, with 87% of children with ADHD demonstrating at least one comorbid disorder (Kadesjö & Gillberg, 2001). In a study conducted with 72 children with ADHD between the ages of six and 14, children with ADHD-C were found to have the highest rate of comorbid disorders (Miranda, Soriano, Fernández, & Meliá, 2008). Research has also determined that children with the ADHD-PI subtype are more likely to experience comorbid internalizing disorders, such as anxiety and depression (Carlson & Mann, 2000) and less likely to experience comorbid externalizing disorders, such as Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) in comparison to the other ADHD subtypes (Crystal, Ostrander, Chen, & August, 2001). Children with the ADHD-HI subtype, on the other hand, have been found to be similar to control group peers in terms of both learning and internalizing problems (Gaub & Carlson, 1997).

Anxiety and mood disorders are some of the most common comorbid diagnoses associated with ADHD, with as many as 17% of girls and 21% of boys between the ages of 4 and 11 in a community sample meeting diagnostic criteria for both ADHD and an anxiety or mood disorder (Szatmari, Offord, & Boyle, 1989). Moreover, once children with ADHD reach adolescence, their chances of having an accompanying mood or anxiety disorder increase, with 24% of boys and 50% of girls meeting criteria during the adolescent years (Szatmari, Offord, & Boyle, 1989). Children with ADHD often have elevated symptoms of depression, and researchers have found that the diagnosis of ADHD often precedes the diagnosis of depression (Jensen, Burke, & Garfinkel, 1988). ADHD also frequently co-occurs with diagnoses of Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD), with anywhere between 45% to 84% of children and adolescents who have been diagnosed with ADHD meeting the criteria for ODD or for both ODD and CD (Barkley, DuPaul, & McMurray, 1990).

It is particularly important to consider the comorbid diagnoses associated with ADHD given that researchers have determined that the clinical course of ADHD is typically worsened by the presence of comorbid disorders (Jensen, Martin, & Cantwell, 1997). Specifically, researchers found that children with ADHD and a comorbid diagnosis were at greater risk for difficult parent-child interactions, poor school performance, and risk behaviors (Jensen, Martin, & Cantwell, 1997). Similarly, children who were rated as having more cognitive and inattention problems, emotional lability, and conduct problems also demonstrate more severe ADHD symptoms (Miranda, Soriano, Fernández, & Meliá, 2008). In this study, researchers suggested that the presence of these additional emotional and behavioral difficulties may have intensified the degree to which ADHD symptoms were displayed in these children.

In summary, children and adolescents with ADHD are at higher risk for experiencing psychopathology than their peers without an ADHD diagnosis. Children and adolescents who meet criteria for the ADHD-C subtype have been found to be at the highest risk for experiencing comorbid psychopathology. Additionally, children and adolescents who meet the criteria for an ADHD-PI diagnosis are more likely to experience comorbid internalizing symptoms, whereas children and adolescents who meet the criteria for an ADHD-HI diagnosis are more likely to experience comorbid externalizing symptoms.

Developmental course. Research has demonstrated that ADHD and the negative outcomes associated with the disorder often persist into adolescence. Bussing and colleagues (2010) found that 44% of children with childhood ADHD still met criteria for an ADHD diagnosis at age 16. Similarly, researchers have determined through longitudinal research that 35 to 80% of cases of ADHD diagnosed in childhood will persist into adolescence (Barkley, Fischer, Edelbrock, & Smallish, 1990; Gittelman, Mannuzza, Shenker, & Bonagura, 1985).

Lara, Fayyad, de Graaf, Kessler, Aguilar-Gaxiola, Angermeyer, and colleagues (2009) examined childhood history of ADHD and its persistence into adulthood in ten countries through World Health Organization World Mental Health Surveys and found that approximately half of childhood ADHD cases persisted into adulthood and that persistence of ADHD is more likely in individuals with combined-type ADHD, greater general symptom severity, and presence of a comorbid disorder. Similarly, 66% of children with ADHD have been found to demonstrate full or at least partial persistence of ADHD into young adulthood (Weiss, Hechtman, Milroy, & Perlman, 1985). Biederman, Faraone, Milberger, and colleagues (1996) conducted a four-year follow-up study with 6- to 17-year-old children to examine the persistence of ADHD and the specific predictors associated with cases in which persistence occurred. They found that ADHD persisted in 85% of the children and adolescents participating in the study. In addition, results of this study demonstrated that a familial history of ADHD, psychosocial adversity (i.e., parental psychopathology and parental conflict), and psychiatric comorbidity (i.e., disruptive behavior, mood, and anxiety disorders) may be accurate predictors of children at-risk for persistence of ADHD into adolescence.

Researchers have also found that it is not only the symptoms of ADHD that persist into adolescence and adulthood, but that the negative outcomes often associated with ADHD also persist. In the academic domain, hyperactive children continue to experience significant educational impairments when they reach young adulthood (Barkley, Fischer, Smallish, & Fletcher, 2006). Specifically, of the young adults included in this study, those diagnosed with hyperactivity in childhood were more likely to have been retained, suspended from high school, to have received special education services, to complete fewer years of formal education, and to have a lower GPA and class ranking than non-ADHD counterparts (Barkley, Fischer, Smallish,

& Fletcher, 2006). In addition, 32% of young adults who had been diagnosed with hyperactivity in childhood failed to complete high school. Similarly, Bussing et al. (2010) also found that adolescents with childhood ADHD and subthreshold ADHD were at an increased risk of failing to graduate than were their peers. Interestingly, subthreshold ADHD, rather than full ADHD, led to an increased risk of grade retention, which points to the importance of recognizing even subthreshold symptoms and intervening early to prevent the development of future academic difficulties (Bussing et al., 2010).

Regarding psychopathology, Bussing et al. (2010) found that adolescents with childhood ADHD were more likely to develop ODD, anxiety, and depression than their peers without ADHD. Moreover, the persistence of ADHD from childhood to adolescence was found to be associated with increased risk for being involved in the juvenile justice system (Bussing et al., 2010). Additionally, researchers have found that behavioral deficits in children with ADHD that go untreated can contribute to the development of later conduct problems (Fleming, Harachi, Cortes, Abbot, & Catalano, 2004).

Thus, research consistently demonstrates that ADHD symptoms and related problems persist into adolescence and adulthood and can predict the development of additional associated problems. Children with persistent ADHD are likely to experience academic difficulties throughout their education (Barkley, Fischer, Smallish, & Fletcher, 2006) and comorbid diagnoses (Bussing et al., 2010; Fleming et al., 2004). Therefore, it is equally important to focus research and intervention efforts on adolescents with ADHD as it is to focus efforts on children with ADHD.

Research on Quality of Life in Adolescents with ADHD

Given the long-term negative outcomes typically associated with an ADHD diagnosis as well as symptoms of ADHD, additional research examining how life satisfaction could protect youth with ADHD from experiencing negative outcomes is warranted. Currently, research on life satisfaction in adolescents with ADHD is very limited, although researchers have examined reports of quality of life, particularly health-related quality of life, in children and adolescents. Quality of life is different than life satisfaction in that life satisfaction is a subjective construct, while quality of life typically refers to both objective and subjective indicators of wellness (Felce & Perry, 1995). Thus, quality of life measures general well-being and includes more concrete, observable aspects of one's life, such as wealth, employment, physical and mental health, and social standing, whereas life satisfaction refers specifically to one's cognitive appraisal of his or her life that is not dependent on the specific context of the individual's life when he or she provides the rating. Quality of life has been defined as "the complex interaction of the various elements present in a person's life" (Higgs, Hyde, Wiggins, & Blane, 2003, p. 243). Given that quality of life does include subjective appraisals of one's life, the two constructs have enough overlap that a review of literature on quality of life in children and adolescents with ADHD is warranted.

Danckaerts, Sonuga-Barke, Banaschewski, Buitelaar, Döpfner, Hollis and colleagues (2010) conducted a recent review of 36 studies examining quality of life in children with ADHD. Although they reported that it was difficult to compare studies due to researchers' differing definitions of quality of life and use of measures that address different aspects of quality of life, the researchers concluded that parents were overall very negative in their reports of levels of quality of life in their children with ADHD, but children with ADHD often rated their own

quality of life less negatively than their parents did, and their reports were often very similar to those of children without ADHD. Specific findings in this research will be discussed in the following sections.

Children's reports of quality of life associated with ADHD. Interestingly, Klassen, Miller, and Fine (2006) found that children and adolescents with ADHD reported overall levels of quality of life that were very similar to norms for children without ADHD. Thus, they also did not perceive themselves as functioning particularly worse than other children their age. This is consistent with research conducted by Landgraf and Abetz (1997) examining reports on the Child Health Questionnaire (CHQ) by children with ADHD, healthy controls (i.e., children without a physical or mental health diagnosis), and patients receiving hemodialysis treatment. The CHQ is a measure commonly used for identifying levels of quality of life in children, and there are child and parent report forms that are comparable across eight domains and a single item, including physical health and functioning, limitations in physical or social activities due to physical health or emotional-behavior problems, bodily pain or discomfort, emotional-behavioral problems, mental health, self-esteem, perceptions of general health, family activities, and family cohesion. In this study, children with ADHD rated similar levels of quality of life across all domains of the CHQ when compared to the healthy control group.

Interestingly, not all of the studies reviewed by Danckaerts et al. (2007) found that children and adolescents with ADHD rated their quality of life as similar to youth without ADHD. For example, Hampel and Desman (2006) examined coping and quality of life, as measured by the Kid-KINDL-R, in children ages 8-12. The Kid-KINDL-R is a self-report measure of overall health-related quality of life for children and adolescents that includes six specific subscales (i.e., physical well-being, psychological well-being, self-esteem, family,

friends, and functioning in school). All students with ADHD (n = 48) reported lower levels of quality of life across all domains than normative data for children their age. Topolski, Edwards, Patrick, Varley, Way, and Buesching (2004) found similar results in a study conducted with 55 adolescent males. The researchers examined levels of quality of life in adolescents with ADHD (n = 55), adolescents with impaired mobility (n = 52), and healthy controls (n = 107) using the Youth Quality of Life-Research Version (YQOL-R), which measures global quality of life and specific domains pertaining to self (e.g., mental health, physical health, belief in self, being oneself, and spirituality), relationships (e.g., adult support, caring for others, family relationships, freedom, friendships), and environment (e.g., activities, education, resources, neighborhood). The researchers found that the adolescents with ADHD reported significantly lower levels of quality of life in the sense of self (e.g., belief in self, being oneself, mental health, physical health, and spirituality) and social relationships (e.g., adult support, caring for others, family relations, freedom, friendships, participation, and peer relations) domains than their peers in the healthy control group and that the levels of quality of life reported by adolescents with ADHD were similar to those reported by the adolescents with impaired mobility. Bussing et al. (2010) also examined the quality of life, as measured by the CHQ, with a sample of 169 students meeting full or subthreshold DSM-IV criteria for ADHD. Bussing and colleagues found that parents of adolescents with ADHD and adolescents with ADHD reported lower levels of quality of life than peers with subthreshold or no ADHD.

Parent reports of quality of life for children with ADHD versus peers without ADHD. Research has indicated that parents of children with ADHD report significantly lower levels of quality of life for their children than do parents of children without ADHD (Escobar, Soutullo, Hervas, Gastaminza, Polavieja, & Gilaberte, 2005; Graetz, Sawyer, Hazell, Arney, &

Baghurst, 2001; Klassen, Miller, & Fine, 2004; Sawyer, Whaites, Rey, Hazell, Graetz, & Baghurst, 2002). There are four studies available that utilized parents' reports of their child's quality of life on the CHQ.

Klassen and colleagues (2004) found that children with ADHD were rated by their parents as having significantly more deficits in psychosocial quality of life (i.e., impairments in the domains of behavior, mental health, and self-esteem) than their peers, although their physical health was rated as similar to their peers without ADHD. Additionally, children who had at least two diagnoses in addition to ADHD were rated as having a lower psychosocial quality of life than children with only ADHD or children with only one comorbid diagnosis in addition to ADHD (Klassen et al., 2004). Sawyer and colleagues (2002) also found that parents of children with ADHD rated their children as having a significantly lower quality of life in the domains of self-esteem, emotional-behavioral problems, pain/discomfort, general health, and limitations in other activities than children with no disorder. Graetz and colleagues (2001) found that parents' quality of life ratings for their children on the CHQ were the lowest for children diagnosed with ADHD-C. Escobar et al. (2005) also found that not only did parents of children with ADHD report lower levels of quality of life for their children than parents of healthy children, but parents of children with ADHD also reported lower levels of quality of life for their children than did parents of children with asthma on the CHQ. Unfortunately, in each of these studies, data on quality of life was only collected from the parent perspective, not from the child perspective, so it is unknown if the parent perspective was consistent with the child's perspective.

Parent versus child reports of quality of life associated with ADHD. Two studies included ratings from both parents and students, which allowed for direct comparison between parent and child perceptions. Klassen, Miller, and Fine (2006) examined both parent and child

reports of quality of life using the CHQ for 58 children and adolescents between the ages of 10-17. Children and adolescents with ADHD reported higher levels of health-related quality of life in the behavior, self-esteem, mental health, and family cohesion domains in comparison to parent ratings of child functioning. However, children and adolescents with ADHD also reported lower levels of health-related quality of life in the physical function domain in comparison to parent reports. One additional study examined parent versus child reports of quality of life for children with ADHD and found conflicting results, as both parents and children in this study rated the quality of life of children with ADHD as lower than the quality of life of their peers (Pongwilairat, Louthrenoo, Charnsil, & Witoonchart, 2005). This highlights the importance of considering who the rater is when examining previous literature on quality of life in children diagnosed with ADHD.

Thus, current research on reports of quality of life among children and adolescents with ADHD has provided inconclusive results. Although research has consistently reported that parents of children with ADHD indicate worse perceptions in regard to their child's quality of life when compared to peers without ADHD, the self-reports of children with ADHD are more variable. However, these discrepancies could be due to inconsistencies in the definitions of the quality of life construct across studies (Danckaerts et al., 2010). Danckaerts and colleagues (2010) also suggest that these discrepancies could results from methodological limitations within the studies, such as the fact that the majority of the samples included in the studies were clinic-referred populations or the fact that the majority of the studies relied on parent reports of both symptoms and quality of life, thus allowing for shared-rater bias in that parents may inaccurately report both elevated symptoms and quality of life, thereby complicating the association between the two variables. Given that the literature on quality of life and ADHD has produced

inconclusive findings, it is important to further explore links between ADHD and wellness. In particular, it may be beneficial to consider a wellness construct that only utilizes subjective indicators (i.e., life satisfaction), rather than both subjective and objective indicators (i.e., quality of life), in order to obtain a clearer picture of how the symptoms of ADHD alone, versus ADHD in conjunction with other indicators (e.g., socioeconomic status, physical health, family relationships, etc.) relate to wellness. Moreover, these studies examined youth who met full diagnostic criteria for ADHD and did not separately examine inattentive and hyperactive/impulsive symptoms. This may be important because the current research examining quality of life and the diagnosis of ADHD may be limited, as it groups a heterogeneous population of youth into one diagnostic category and thus could miss the unique relationships that may differ by subtype or specific symptoms experienced.

Research on Life Satisfaction in Adolescents with ADHD

Currently, there is little research relating specifically to life satisfaction, as opposed to quality of life, in children or adolescents with ADHD. Given that subjective indicators may be more malleable to psychological interventions than objective indicators, such as socioeconomic status, on which it may not be possible to intervene, it is important to consider not only quality of life but also life satisfaction in relation to ADHD symptoms. Given that it is likely that the core symptoms of ADHD and the associated problems may predict lower levels of life satisfaction, more research is need to specifically examine the relationship between ADHD and life satisfaction. There have only been two studies to date that have examined the relationship between life satisfaction and ADHD among any age group. The first study, conducted by Gudjonsson, Sigurdsson, Eyjolfsdottir, Smari, and Young (2009), examined the relationship between life satisfaction, ADHD symptoms, and other social and emotional concerns among

university students. Participants in this study were 369 students, 107 males (29%; average age of 22.5 years) and 259 females (70%; average age of 23.7 years) from the University of Iceland. Participants completed the RATE-S self-report questionnaire, which consists of four subscales: ADHD Symptoms, Emotional Control, Antisocial Behavior, and Social Functioning (Young & Ross, 2007). In order to establish reliability of the RATE-S scale, participants were also given the DSM-IV Checklist of Symptoms, a self-report measure that directly links to ADHD symptoms as outlined in the DSM-IV. Life satisfaction was determined through the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), a self-report measure of global life satisfaction. In this study, ADHD symptoms were considered on a continuum, rather using categorical distinctions based on criteria for diagnosis. Gudjonsson and colleagues (2009) found that symptoms of attention and hyperactivity individually, as well as a total score of attention and hyperactivity combined, were negatively related to lower levels of global life satisfaction. Specifically, participants' scores on the SWLS were significantly negatively correlated with the RATE ADHD subscale (r = -.41 for females, r = -.34 for males). Similarly, students' scores on the SWLS were also significantly negatively correlated with DSM-IV criteria, with the strongest relationship demonstrated for attentional criteria for females (r = -.40) and hyperactivity criteria for males (r = -.34). A summary of the correlation matrix from this study between ADHD measures and SWLS scores is provided in Table 1.

Additionally, multiple regression analyses indicated that ADHD symptoms were less predictive of life satisfaction than social functioning (in males) and emotional control (in females; Gudjonsson et al., 2009). Unfortunately, the researchers did not examine if ADHD symptoms were still related to life satisfaction when controlling for the associated problems of depression, anxiety, and stress, so it is not clear if it is the ADHD symptoms or the associated

factors (or both) that predict levels of life satisfaction. Even though the levels of ADHD symptoms in this study were mild, they were still found to be significantly related to lower levels of life satisfaction as indicated by significant bivariate correlations. Thus, the researchers hypothesized that individuals with more severe symptoms might experience even greater deficits in life satisfaction. Given these findings and the fact that research has demonstrated that ADHD persists throughout the course of life, it is important to examine life satisfaction in a younger population of individuals with ADHD.

Table 1. *Correlations between ADHD Symptoms and SWLS Scores for Males (Above the Diagonal) and Females (Below the Diagonal) from Gudjonsson et al. (2009)*

	1	2	3	4	5	6	7	8	9
1. RATE total	--	.87***	.88***	.68***	.51***	.57***	.60***	.40***	-.46***
2. RATE ADHD	.85***	--	.71***	.58***	.21*	.64***	.71***	.41***	-.34***
3. RATE Emotional	.91***	.70***	--	.55***	.30***	.53***	.51***	.42***	-.40***
4. RATE Antisocial	.64***	.48***	.54***	--	.01	.33***	.26**	.31**	-.21*
5. RATE Social	.54***	.23***	.34***	.10	--	.13	.22*	.02	-.39***
6. DSM-IV Overall	.54***	.53***	.44***	.35***	.26***	--	.88***	.88***	-.19*
7. DSM-IV Attentional	.62***	.63***	.52***	.34***	.31***	.91***	--	.56***	-.26**
8. DSM-IV Hyperactivity	.35***	.33***	.29***	.29***	.16*	.91***	.65***	--	-.34***
9. SWLS	-.50***	-.41***	-.49***	-.27***	-.27***	-.34***	-.40**	-.22***	--

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

The second study examining this relationship, conducted by Ogg, Bateman, Dedrick, and Suldo (2014), examined the relationship between ADHD, measured by teacher report on the Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS; Wolraich, Feurer, Hannah, Baumgaertel, & Pinnock, 1998) and student report on a rating scale designed by the researchers to be comparable to the Vanderbilt and life satisfaction, measured by the Students' Life

Satisfaction Scale (SLSS; Huebner, 1991), utilizing the bifactor model, as well as if this relationship differed depending on if teachers versus students reported ADHD symptoms. Participants were sixth through eighth grade students at two public middle schools (N = 183; 63.9% female). Results of this study demonstrated that the bifactor model provided the best fit when ADHD symptoms were rated by students and by teachers as compared to alternative models (e.g., one-factor model, two-factor model, three-factor model). In addition, results of this study demonstrated that ADHD symptoms as conceptualized by the bifactor model were differentially related to life satisfaction. For student self-ratings of ADHD symptoms, both the general ADHD factor and the inattention factor were significantly, negatively related to life satisfaction. On the other hand, for teacher ratings of ADHD symptoms, only the inattention factor was significantly, negatively related to life satisfaction. Hyperactive/impulsive symptoms rated by teachers and students were not determined to be significantly related to life satisfaction. These findings in conjunction with those obtained by Gudjonsson and colleagues (2009) provide support for a link between ADHD symptoms and life satisfaction. In addition, the fact that inattention was a more consistent predictor of life satisfaction than hyperactivity/impulsivity and the general ADHD factor was consistent across these two previous studies. It is possible that inattention may be a stronger predictor of life satisfaction given that inattention is more often linked to higher levels of depression than other subtypes of ADHD (Carlson & Mann, 2000), and depression has an inverse relationship with life satisfaction, with some research demonstrating that low levels of life satisfaction may predict the onset of depression (Lewinsohn, Redner, & Seeley, 1991). Thus, it may be particularly important to consider the relationship between inattention and life satisfaction, and life satisfaction may be an important factor to consider when

studying the etiology of depression and identifying individuals with ADHD who are particularly at-risk for developing depression.

In addition, Ogg and colleagues (2014) found differences in the relationship between ADHD symptoms and life satisfaction depending on if ADHD symptoms were rated by teachers versus by students. Specifically, students' self-reported ADHD symptoms were more strongly related to life satisfaction than teachers' reports of their ADHD symptoms. This difference seems intuitive given that life satisfaction is a self-report rating, and thus it seems logical that if students rate themselves high for problematic behaviors, they would also be less satisfied with their lives. However, Ogg and colleagues (2014) found that even teacher ratings of ADHD symptoms were still inversely related to life satisfaction, but the strength of the relationship was not as strong. One limitation of the study by Ogg and colleagues (2014) is the fact that depression was not explored in relation to life satisfaction and symptoms of ADHD.

In conclusion, the limited research to date suggests the presence of a link between ADHD symptoms, particularly inattentive symptoms, and life satisfaction. Because individuals with ADHD are at higher risk of negative outcomes in multiple domains, it is important to consider if ADHD symptoms in adolescents are associated with lower levels of life satisfaction. Given increased evidence related to the importance of fostering life satisfaction in the overall population (Diener & Diener, 1996), as well as recent suggestions regarding the importance of increasing positive academic and social outcomes for children with ADHD rather than focusing on problem behaviors (DuPaul, 2007), it is important to gain a clearer understanding of how life satisfaction may be related to the presence or degree of ADHD symptoms. In particular, understanding the relationship between life satisfaction and ADHD symptoms could be valuable in the prevention of comorbid concerns often experienced by youth with ADHD (e.g.,

depression). Given past research suggesting that risk status for low levels of LS may differ based on the specific ADHD symptoms (Gudjonsson et al., 2009; Ogg, Bateman, Dedrick, & Suldo, 2014), it is particularly important to examine how general and specific ADHD symptoms as are associated with life satisfaction. The bifactor model of ADHD may provide more nuanced insights into the relationship between ADHD symptoms and life satisfaction. Given that past research that has examined this relationship in young adolescents (i.e., middle school students) and young adults (i.e., university students) has identified a relationship between these two constructs, it is also important to explore this relationship in older adolescents (i.e., high school students).

Moreover, given past research, it is important to consider multiple raters of ADHD symptoms in exploring this relationship. A review of the literature on quality of life and ADHD demonstrated that parents and children themselves often provided different ratings related to how the presence of ADHD symptoms affects quality of life (Danckaerts et al., 2010). Ogg and colleagues (2014) found differences in the relationship between ADHD symptoms and life satisfaction when symptoms were reported by teachers versus by students. This is important given that teachers are often considered to be more accurate of externalizing behavior than students themselves, and thus teacher ratings of ADHD are utilized more often than student self-report ratings (Phares, 1997). Moreover, teacher reports are often utilized in the diagnosis of ADHD; thus, it is important to understand how teacher ratings of ADHD symptoms related to students' reports of life satisfaction. However, given research demonstrating differences in the strength of the relationship depending on who rates ADHD symptoms, it is also important to gain a clear understanding of how student self-report ratings of ADHD relate to life satisfaction.

ADHD, Depression, and Life Satisfaction

It is important to examine how factors related to life satisfaction and ADHD independently may specifically relate to the relationship between life satisfaction and ADHD. Several variables have been demonstrated to significantly and independently relate to both life satisfaction as well as ADHD, and each variable could thus potentially play an important role in the relationship between these two constructs. In particular, it is important to consider how depression may relate to life satisfaction in students with ADHD.

It is important to examine the specific role of life satisfaction in the relationship between symptoms of ADHD and symptoms of depression. As was previously discussed in this chapter, one study has demonstrated that low levels of life satisfaction often precede the development of depression; however, this study was conducted with an adult population (Lewinsohn et al., 1991), and this directional relationship has not been demonstrated with adolescent populations in current research. On the other hand, research has demonstrated that high levels of life satisfaction can serve as a buffer against the development of psychopathology for adolescents who experience stressful life events (Suldo & Huebner, 2004a). Research has also determined that anxiety and mood disorders are some of the most common comorbid diagnoses associated with ADHD (Szatmari et al., 1989) and that a diagnosis of ADHD often precedes a diagnosis of depression (Jensen et al., 1988). Given this relationship, it is important to consider if higher levels of life satisfaction could serve as a protective factor against the development of comorbid depressive symptoms for adolescents with symptoms of ADHD. It is unclear based on the available research if life satisfaction would be better conceptualized as a moderator or a mediator in the relationship between ADHD symptoms and depressive symptoms. It seems plausible that life satisfaction could serve as a moderator in the relationship between symptoms of ADHD and

depressive symptoms, in which the strength of the relationship between these two types of symptoms would be impacted by the presence of life satisfaction. However, it also seems plausible that life satisfaction may mediate the relationship between symptoms of ADHD and depressive symptoms, with life satisfaction serving as a pathway between the two types of symptoms. It is understood that conceptually life satisfaction would not serve as both a moderator and a mediator simultaneously; however, both possibilities in this study are being examined in an exploratory fashion.

Conclusions

Further research is needed to explore the relationship between life satisfaction and ADHD in high school students. Given the fact that that research has demonstrated that increased levels of life satisfaction are associated with positive outcomes in various domains of functioning and that individuals with ADHD frequently experience impairments in the academic domain, as well as psychological functioning, it seems likely that children with high levels of symptoms ADHD may experience decreased life satisfaction when compared to peers without symptoms of ADHD. This hypothesis has tentative support, as the two studies that have examined this relationship (Gudjonsson et al., 2009; Ogg et al., 2014) found a negative relationship between ADHD symptoms, particularly inattentive symptoms, and life satisfaction. The first was conducted with an adult population, and the researchers found a relationship between life satisfaction and even mild ADHD symptoms (Gudjonsson et al., 2009). Gudjonsson and colleauges (2009) concluded that, "It is likely that ADHD and associated symptoms, even if mild as in the present study, interfere with the ability of the person to achieve satisfaction with life as a whole" (pp. 513). The second was conducted with middle school students, and the researchers found a similar inverse relationship between ADHD symptoms and life satisfaction, specifically with inattentive symptoms that were rated by the students themselves (Ogg et al., 2014).

Given that research has established a tentative connection between ADHD and life satisfaction in young adolescence adulthood and research demonstrating that ADHD often persists from childhood and adolescence to adulthood (Bussing et al., 2010), it is important to examine the relationship between ADHD symptoms and life satisfaction in older adolescents (i.e., high school students). It is important to gain a clearer understanding of how life satisfaction may be related to the presence or degree of ADHD symptoms, as an understanding of this relationship may be especially valuable in preventing difficulties often experienced by youth with ADHD. Given that life satisfaction may also serve as a buffer against the development of negative outcomes (Lewinsohn et al., 1991; Suldo & Huebner, 2004a), it is also important to consider whether life satisfaction moderates or mediates the relationship between symptoms of ADHD and depressive symptoms.

CHAPTER III: Method

The primary purpose of the current study was to gain insight into the relationship between symptoms of ADHD and life satisfaction in high school students. First, the current study examined to what extent the severity of ADHD symptoms predicted life satisfaction in high school students. The second aim of the present study was to examine the role of life satisfaction in the relationship between ADHD symptoms and depressive symptoms. Because this was the first study to examine the role of life satisfaction in this relationship, it was determined that examining the role of life satisfaction in the relationship would be exploratory. Thus, the current study first examined if life satisfaction moderated the relationship between ADHD symptoms and depressive symptoms. Additionally, this study examined if life satisfaction mediated the relationship between ADHD symptoms and depressive symptoms. The following chapter provides an explanation of the methods for the current study, including a description of participant selection, participant characteristics, measures, and procedures. In addition, an overview of the analyses conducted to examine each research question is provided.

Participants

This study is part of a larger study. Data for the current study were collected during the 2012-2013 school year. Participants in the current study were students in grades nine through twelve who were recruited from two public high schools in a large, urban school district in the southeastern United States. Additional information on the demographics of these two schools can be found in Table 2.

Table 2

Total School Demographic Information

	School A *N* (%)	School B *N* (%)	Total *N* (%)
Gender			
Male	1,000 (51.4%)	1,068 (48.5%)	2,068 (49.9%)
Female	944 (48.6%)	1,134 (51.5%)	2,078 (50.1%)
Race/Ethnicity			
American Indian or Alaskan Native	4 (0.2%)	4 (0.2%)	8 (0.2%)
Asian or Pacific Islander	89 (4.6%)	53 (2.4%)	142 (3.5%)
Black, Non-Hispanic	205 (10.5%)	163 (7.4%)	368 (8.9%)
Hispanic	641 (33%)	341 (15.5%)	982 (24.25%)
Multiracial	103 (5.3%)	11 (0.5%)	114 (2.9%)
White, Non-Hispanic	932 (47.9%)	1,530 (69.5%)	2,462 (58.7%)
Eligible for Free & Reduced Lunch	634 (32.6%)	427 (19.4%)	1061 (26%)
Receiving ESL Services	99 (5.1%)	33 (1.5%)	132 (3.3%)
Students with an IEP	247 (12.7%)	203 (9.2%)	450 (10.9%)
Grade Level[a]			
Nine	510 (26.2%)	573 (26%)	1,083 (26.1%)
Ten	494 (25.4%)	577 (26.2%)	1,071 (25.8%)
Eleven	512 (26.3%)	482 (21.9%)	994 (24.1%)
Twelve	428 (22%)	545 (24.8%)	973 (23.4%)
Total Enrollment	1,944	2,202	4,146

Note. [a]School B has 25 students in a Special Education classroom who are not figured into grade level numbers.

The two schools from which the data were collected were selected for the current study based on (a) the principals' and school psychologists' interest in the research and willingness to recruit

teacher and student participants and (b) having a student population of approximately 2,000 students enrolled at the school. Both schools were public schools that offered a general high school curriculum. School A opened in 1984, and School B opened in 2011. Both schools earned a school grade of A in 2012 and a school grade of B in 2011.

Within this district, 53.7% of students received free and reduced lunch (FRL), and 53.8% were of an ethnic minority during the 2010-2011 school year (New America Foundation, 2011). It is important to note that these data are for all school levels (rather than just high schools) in the district in which that data were collected. As evidenced by the information provided in Table 2 in comparison to these statistics, the two schools from which data were collected for the present study have lower percentages of students who received FRL and who are of ethnic minority status in comparison to the district as the whole. Thus, it is important to note that the two schools may not be entirely representative of the district as a whole.

Total enrollment across both schools was 4,146 students (school A n = 1,994; school B n = 2,202). Parental consent forms for the present study were obtained for a total of 617 students, which represents 14.88% of the total enrollment across both schools. Of the 617 returned parental consent forms, 519 forms were affirmative, and 98 forms indicated that parents declined to allow their children to participate. The majority of the returned forms in which parent consent was declined were returned in a class in which a teacher gave extra credit for returning a consent form, regardless of the parent's response (i.e., a "yes" or "no" for participation). Of the 519 students who did obtain parental consent to participate, 99 students did not participate in the present study (i.e., they verbally did not assent to participate during data collection, or they failed to assent to participate by default by not showing up for any of the data collection times). Thus, 420 were present and provided verbal assent to participate in the current study (10% of the

student body across both schools). Descriptive statistics of the demographics of study participants are provided in Table 3.

Table 3

Demographic Characteristics of Student Participants

Variable	School A Sample (n = 190)		School B Sample (n = 230)		Total Sample (N = 420)	
	n	%	*n*	%	N	%
Gender						
Male	80	42.1	93	40.4	173	41.2
Female	110	57.9	137	59.8	247	58.8
Grade						
9	69	36.3	33	14.4	101	24.4
10	48	25.3	78	34.1	126	30.4
11	39	20.5	79	34.5	117	28.3
12	34	17.9	39	17.0	70	16.9
Ethnicity						
African-American	22	11.6	19	8.3	41	9.8
Asian/Pacific Islander	13	6.8	5	2.2	18	4.3
White	88	46.6	155	67.7	243	57.9
Hispanic	59	31.1	51	22.3	110	26.2
Native American/ Alaska Native	1	0.5	2	.9	3	0.7
Other	16	8.4	7	3.0	23	5.5
Free/Reduced Price Lunch[a]	75	39.5	40	17.5	115	27.4
Limited English Proficiency	4	0.9	1	0.2	5	1.2

Note. [a]Free and reduced price lunch status was obtained from student records

A comparison between the overall sample for the present study (Table 3) and both schools' demographic data (Table 2) demonstrates that females were overrepresented in the current study sample in comparison to schools overall, with 50.1% females within the total student body across both schools compared to 58.8% females in the current study sample. Regarding ethnicity and free/reduced lunch status, the sample appears to be representative of the student body across both schools. At school A, there was an overrepresentation of students in ninth grade (36.3% of study participants compared to 26.2% of 9th grade students enrolled at

school A) and an underrepresentation of students in eleventh grade (20.5% of study participants compared to 26.3% of students enrolled). On the other hand, ninth grade students were underrepresented at school B (14.4% of study participants compared to 26% of students enrolled), and tenth and eleventh grade students were overrepresented at this school (with 34.1% and 34.5% of study participants, in comparison to 26.2% and 21.9% of students enrolled, respectively). Twelfth grade students were underrepresented at both schools (17.9% and 17.0% of student participants compared to 22.0% and 24.8% of students enrolled). Chi-square tests for independence were run to detect significant differences across schools for all of the demographic variables. These analyses indicated significant associations between school and: (a) free/reduced lunch status, χ^2 (2, N = 420) = 27.93, p = .00, with a greater percentage of students eligible at School A, (b) Asian/Pacific Islander ethnicity, χ^2 (2, N = 420) = 4.46, p = .04, with a greater percentage of students at School A, (c) White ethnicity, χ^2 (2, N = 420) = 18.13, p = .00, with a greater percentage of students at school B, (d) Other ethnicity, χ^2 (2, N = 420) = 4.83, p = .03, with a greater percentage of students at school A, and (e) grade, χ^2 (3, N = 420) = 30.36, p = .00, with a greater percentage of ninth grade students at School A, and a greater percentage of tenth and eleventh grade students at school B.

In addition to student participants, teacher participants were also recruited for the current study. One English and one mathematics teacher (or another academic teacher in the case that the student's mathematics teacher elected not to participate in the study) were recruited to complete rating scales for each student participant (for a total of two teacher ratings for each student). English and mathematics teachers were specifically selected because high school students across all grade levels are enrolled in these core subjects. The following sections

describe the procedures that were used to recruit and collect data from student and teacher participants for the current study.

Recruitment

Recruitment of student participants. In order to be eligible to participate in the current study, students were required to be enrolled in an English class at one of the high schools included in the study in the Spring 2013 semester. Students served exclusively in self-contained special education classrooms, as well as students whose primary language was not English, were excluded from the current study due to potential cognitive or language impairments that may have made it difficult for these students to accurately complete the survey packet. All other general education students (i.e., regular diploma, advanced placement, honors) were included in the current study. Student participants were also required to obtain informed consent from a parent or guardian (see Appendix A) prior to participation in the study. Two copies of the consent form (one to sign and return, and another for family records) were provided to all eligible students at the two participating high schools in early January 2013. Students were recruited through their English teachers, who were first recruited into the study. English teachers who agreed to participate in the current study recruited all of the students in each class section that they taught. English teachers were provided with a standardized script explaining the purpose of the study, details of participation in the study, and incentives for participating in the study. Teachers were instructed to read this script to each of their classes before providing students with two copies of the parent consent forms. In addition, English teachers were encouraged to remind students in their classes on a regular basis to return their consent forms. Incentives were provided to teachers and students to encourage students to return consent forms. Teachers who assisted with recruiting students received a $10 gift card. In order to ensure an

adequate response rate, a lottery was also utilized in which each student who returned a consent form was entered to win a $25 gift card (four per school, one per grade level for students). Teachers also received $2 cash for each student packet they completed, and participating teachers were also entered into a raffle to win one of four $25 gift cards.

Immediately prior to administration of the survey packet, an assent form (see Appendix B) was read aloud to all student participants, and they were required to sign the form if they chose to participate. Only participants providing written assent completed the survey packet. When completing the survey packet, students were asked to complete rating scales about (1) their life satisfaction, (2) the presence of ADHD symptoms, and (3) symptoms of depression, as well as demographic information and other measures that were utilized as part of a larger study.

Recruitment of teacher participants. In collaboration with school administrators, English teachers were first recruited to participate in the present study through meetings with research personnel. A member of the research team met with all English teachers at each school in separate meetings to explain the purpose and procedures of the present study and answer any questions. English teachers were specifically targeted to help with student recruitment because all students were enrolled in at least one English class each year in high school. English teachers who agreed to participate in the present study at one of the meetings signed a letter of informed consent (see Appendix C). English teachers were informed that they would receive $10 for participating in recruitment of student participants (as described in the section above), as well as $2 cash for each student survey completed. Research personnel also collaborated with English teachers to determine the best method for recruiting a second teacher rater for each student. English teachers were asked to have each student who returned a parent consent form to participate in the present study write down his or her mathematics teacher on a standardized

form. Then, research personnel recruited each of the teachers listed on the form to participate in the present study. In the event that a teacher declined to participate, members of the research team obtained access to class schedules for each student participant who had this teacher listed as a second rater in order to determine another teacher to recruit. Research personnel attempted to recruit science teachers if a mathematics teacher declined to participate; however, some students were not presently enrolled in a science class. Moreover, in some instances, science teachers declined to participate, and teachers of other subject areas were then recruited. Once a second teacher agreed to participate, he or she signed a letter of informed consent (see Appendix C), which explained confidentiality, the voluntary nature of the study, and the available incentives. Teachers across all subject areas who completed the informed consent were asked to complete rating scales for each student in their class who returned an affirmative parent consent form and assented to participate in the current study. Teacher participants were asked how long they knew each student for whom they completed a packet. Teachers were provided with brief instructions (either verbal or written) on how to complete the survey packet. Teachers completed measures of student ADHD symptoms for each student participant in their class, as well as other measures that were utilized for the larger study. As noted above, teachers received $2 cash for each student questionnaire completed. All participating teachers were also entered into a drawing to win one of four $25 gift cards.

Measures and Achievement Indicators

As part of the larger study, students and teachers completed several measures that were analyzed in the current study. Data were gathered from student records, including information about students' Free/Reduced Lunch (FRL) status as an indicator of socioeconomic status (SES),

grade level, and English Language Learner (ELL) status (in order to determine if students met language criteria for participation in the current study).

Student Measures and Achievement Indicators

Demographic form. The demographic form used in this study (see Appendix D) contained questions regarding age, grade, gender, and race/ethnicity. All demographic questions were structured in a multiple-choice format. When relevant, these data were used as covariates in regression analyses.

Students' Life Satisfaction Scale (SLSS). The SLSS (see Appendix E) is a measure that was designed to examine global life satisfaction in children and adolescents (Huebner, 1991). The SLSS is a 7-item measure in which students are asked to respond to items designed to assess global life satisfaction, such as "My life is going well." Two of the items in this measure are reverse-scored (e.g., "I would like to change many things in my life" and "I wish I had a different kind of life"). Students' responses range from a low score of 1, which indicates that the student strongly disagrees with the aforementioned statement, to a high score of 6, which indicates that the student strongly agrees with the aforementioned statement. To obtain a total score for the measure, reverse-scored items are recoded, and then the average is calculated across all seven items.

The SLSS was piloted by Huebner (1991) on a sample of 254 children ages 7-14 and a second sample of 329 children ages 8-14, all of whom were from the midwestern United States (Huebner, 1991). This initial study and subsequent studies have reported internal consistency reliability scores above .80 for this measure (Dew & Huebner, 1994; Gilman & Huebner, 1997; Huebner, 1991). In the pilot study, researchers also found that the measure had a test-retest reliability of .74 across one to two weeks (Huebner, 1991). Moreover, the measure has been

found to have concurrent validity through comparisons of child and parent reports of children's life satisfaction (Dew & Huebner, 1994; Gilman & Huebner, 1997) and comparisons to other measures of global life satisfaction (Dew & Huebner, 1994; Huebner, 1991). Research concludes that the SLSS is not subject to racial bias (Huebner, 1994).

Internal consistency of the SLSS with the sample from the present study was investigated via Cronbach's alpha coefficients. Cronbach's alpha for the SLSS for the present study was determined to be .86, which is considered to represent adequate internal consistency for research purposes (Nunnally, 1978).

Behavioral Assessment System of Children-2, Self-Report of Personality, Adolescent Version. The Behavioral Assessment System for Children-2, Self-Report of Personality, Adolescent Version (BASC-2-SRP-A; Reynolds & Kamphaus, 2004; not included in appendices due to copyright restrictions) is a measure of emotional/behavioral functioning for youth age 12-21 years. This 176-item measure consists of 16 subscales and five composite scores. With the permission of the publishers of this measure, only portions of this scale were used for the current study. The BASC-2-SRP-A was used as the primary measure of depressive symptoms (Depression subscale consists of 12 items), as well as a secondary indicator of students' perception of Attention Problems and Hyperactivity (consisting of 9 and 7 items, respectively). Response items are on a scale ranging from 0 (*never*) to 3 (*almost always*) in regards to the presence of symptoms. Reliability of the BASC-2 SRP is supported by moderate to high internal consistency for all three subscales used within the current study. The Cronbach's alpha reported in the manual for this measure (i.e., Depression [α =.88 for ages 12-14 and α =.86 for ages 15-18], Attention Problems [α =.78 for ages 12-14 and α =.79 for ages 15-18], and Hyperactivity [α =.76 for ages 12-14 and α =.74 for ages 15-18] are all adequate.

Three types of validity evidence are provided for the BASC-2 SRP-A, including scale intercorrelations in the expected directions for all scales of interest, factor analyses suggesting a good model fit, and correlations among the BASC-2 and other measures of adolescent behavior. Studies determining the construct validity of the BASC-2-SRP-A suggest that this measure has moderate to strong relationships with other measures of similar constructs, including the Youth Self-Report (YSR) Form from the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2001) for the full scale, as well as for the subscales used in the current study. Specifically, the Depression subscale of the BASC-2-SRP-A has a .69 correlation with the total depression score on the Children's Depression Inventory (CDI), which indicates strong validity. The Attention Problems subscale has a .59 correlation with the Conners-Wells' Adolescent Self-Report Inattentive subscale, indicating a moderately strong relationship. The Hyperactivity subscale has a .64 correlation with the Conners-Wells' Adolescent Self-Report Hyperactive/Impulsive subscale, indicating strong validity as well. The BASC-2 SRP-A was selected due to its high psychometric properties within a large school-based general population sample, which was representative of U.S. demographics, as well as within a large clinical sample (age 8-18).

Internal consistency of the BASC-2-SRP-A with the sample from the present study was investigated via Cronbach's alpha coefficients. Cronbach's alpha for the BASC Depression, Inattention, and Hyperactivity subscales for the present study were determined to be .84, .82, and .76, respectively, all of which are considered to represent adequate internal consistency for research purposes (Nunnally, 1978).

In addition, the fit of the Depression subscale using the data from the present study was examined via confirmatory factor analysis (CFA) in Mplus. Fit of the model was evaluated

using the χ^2 test, the comparative fix index (CFI), and the root mean square error of approximation (RMSEA). Hu and Bentler's (1999) cutoff values of greater than or equal to .95 for the CFI, and Kline's (2005) value of the RMSEA < .05 suggesting close fit (with .05-.08 indicating adequate fit) were used as general indicators of acceptable fit of the models; however, substantive issues such as the interpretability of the parameter estimates were also considered. The results of the CFA indicated that based on the chi-square statistic, there was a statistically significant lack of fit for the depression model, χ^2 (54, N = 399) = 158.958, p < .001. However, limitations of the chi-square fit statistic have been well documented with minor misfit achieving statistical significance as a function of sample size. When alternative measures of fit less sensitive to sample size were used, the results indicated an adequate fit for the BASC depression scale (CFI = .961; RMSEA = .070).

ADHD Student Self-Rating Scale (ASSRS). Students also completed a 25-item rating scale (see Appendix F) that was created by the authors of the present study and designed to parallel the VADTRS with permission from the VADTRS author. The Inattention and Hyperactivity/Impulsivity subscales, each with nine items, were analyzed. Students' responses range from 0 (*never present*) to 3 (*very often present*). This measure was utilized in the Ogg and colleagues (2014) study. In that study, the reliability was high, with Cronbach's alphas of .92 for the Total subscale, .88 for the Inattention subscale, and .85 for Hyperactivity/Impulsivity subscale. In addition, Ogg and colleagues (2014) evaluated the validity of the ASSRS through confirmatory factor analyses (CFAs) of the 18 items on the scale and found strong fit (CFI = .995; RMSEA = .028) for the bifactor model. Because this scale has limited available reliability and validity data, correlations between this measure and the BASC Attention and Hyperactivity subscales were examined and will be reported later in this document. The strength of the

correlations between these measures was utilized to support the use of the ASSRS in the present study as a way to conceptualize student-rated symptoms of ADHD.

Internal consistency of the ASSRS with the sample from the present study was investigated via Cronbach's alpha coefficients. Cronbach's alpha for the ASSRS Inattention and Hyperactivity/Impulsivity subscales for the present study were .82 and .81, respectively, both of which are considered to represent adequate internal consistency for research purposes (Nunnally, 1978).

Teacher Measures

Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS). To determine the severity of ADHD symptoms for the student participants, inattentive and/or hyperactive symptoms endorsed on the VADTRS (Wolraich, Feurer, Hannah, Baumgaertel, & Pinnock, 1998; see Appendix G**)** were counted**.** Symptoms of ADHD were examined along a continuum, allowing all study participants to be included in the analyses. The VADTRS is a 43-item rating scale in which teachers are asked to report the presence and severity of inattention, hyperactivity, and impulsivity displayed by a student in their homeroom classroom. The VADTRS items directly correspond to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; APA, 2000) ADHD diagnostic criteria. It is important to note that although this measure was developed to correspond to the DSM-IV, the symptoms listed in the DSM-IV and DSM-V are identical with only minor changes in wording (that do not affect the meaning of the symptoms) and examples provided for how the symptoms might manifest differently in children and adults in the DSM-V. Thus, it is believed that this measure corresponds with the new DSM-V diagnoses for the three subtypes of ADHD as well. When completing this measure, the teacher is to keep in mind the developmentally appropriate behaviors that would be expected

for the student based on his or her age. The measure includes nine items that assess symptoms of Inattention (e.g., "Is forgetful in daily activities") and nine items that assess Hyperactive/Impulsive symptoms (e.g., "Fidgets with hands or feet and squirms in seat"). The VADTRS also includes items that are intended to screen for comorbid symptoms (e.g., "Is sad, unhappy, or depressed). All items on the measure are rated on a four-point scale from 0 (*never*) to 3 (*very often)*.

Given that past research has suggested that children are less accurate reporters of externalizing behavior than their parents and teachers (Phares, 1997), teachers' ratings of ADHD were utilized in this study in addition to student ratings of ADHD. Both inattentive and hyperactive/impulsive symptoms were considered for each student participant. Ratings from two teachers were averaged so that one representative score could be used for the purpose of analyses. However, the robustness of the results was explored when analyses were repeated using single teacher ratings of ADHD symptoms as well.

The VADTRS has high internal consistency for both the Inattention (α = .92) and the Hyperactivity/Impulsivity subscales (α = .90; Wolraich et al., 1998). The high internal consistency of the measure was also evident in a study including teachers' ratings of ADHD symptoms for children in elementary school in Spain, Germany, and the United States (Wolraich, Lambert, Baumgaertel, Garcia-Tornel, Fuerer, Bickman, et al., 2003). In this study, internal consistencies ranged from .95 to 96 for items measuring Inattention and from .87 to .93 for items measuring Hyperactivity/Impulsivity. Test-retest data have not yet been reported for this instrument. Wolraich and colleagues (1998) also conducted a confirmatory factory analysis and found that data supported a two-factor solution, in which Inattention and

Hyperactivity/Impulsivity are viewed separately, rather than considering all the symptoms together or as three separate symptoms (e.g., Inattention, Hyperactivity, and Impulsivity).

Internal consistency of the VADTRS with the sample from the present study was investigated via Cronbach's alpha coefficients. Cronbach's alpha for the VADTRS Inattention subscale as rated by Teacher A (i.e., English teachers), Hyperactivity/Impulsivity subscale as rated by Teacher A, Inattention subscale as rated by Teacher B (i.e., alternative teachers), and Hyperactivity/Impulsivity subscale as rated by Teacher B for the present study were .96 .91, .94, and .93, respectively, all of which are considered to represent adequate internal consistency for research purposes (Nunnally, 1978).

Procedures

The current study is part of a larger study, which was approved by the Institutional Review Board (IRB) at the University of South Florida (USF) and the participating school district, that examined the experiences of adolescents displaying symptoms of inattention, hyperactivity, and impulsivity in order to better understand how these behaviors relate to adolescents' academic, social, emotional, and psychological functioning. The principal investigators (PIs) for this larger study were the author of the current study and University of South Florida student colleague Sarah Fefer, with supervision from Dr. Julia Ogg. Data were collected in the spring semester of 2013 by a research team of graduate students, including the author of the current study. All data collection assistants received training from the PI and faculty supervisor in order to ensure standardization across data collection.

Student survey packet. The aforementioned student questionnaires, as well as additional measures that were part of the larger study but were not relevant to the current study, were compiled into a comprehensive packet. Measures included in the survey packet were counterbalanced to control for order effects. Specifically, four versions of the survey packet, in

which measures were arranged systematically in differing orders, were administered in order to control for possible order effects.

A list of students with affirmative parental consent for participation was compiled prior to data collection. Students whose names were included on this list were asked to report to a predetermined location at their respective school in order to complete the survey packet one day during the 2013 Spring semester. Student data collection occurred from the end of January through the end of February. Students completed the survey packets during their lunch period during the school day, and completion of the survey packet took approximately 20 minutes. Once students reported to the predetermined location for survey administration, they were asked to sit at least one seat apart from each other to ensure privacy during survey packet completion. One of the PIs and/or a team of graduate students who were trained in administering the survey packets were present throughout adminsitration in order to read the student assent form aloud prior to survey completion (including to explain confidentiality and to inform students that their participation was voluntary and that they could withdraw their participation at any time during completion of the survey packet).

Once assent was obtained, a member of the research team guided all student participants through examples of the types of questions they would see within the survey packet and allowed students to ask any relevant question. After students exhausted their additional questions, participants independently completed all measures included in the survey packet. Researchers monitored the room throughout survey packet administration to ensure accurate completion of the study materials and to answer any questions. Additionally, when a student finished his or her survey packet, the PI or a trained graduate student checked through each survey packet to (1) ensure that no pages were unintentionally missed, (2) ensure that the student answered every

question he or she wanted to answer, and (3) check that only one response was selected per item on each measure. This was done privately to ensure that other students were not watching while the researcher reviewed the student's survey packet. If a student scored above the clinical cutoff score for the Depression subscale of the BASC, his or her name was provided to a mental health provider at his or her school within approximately one month so that the need for additional follow-up could be ascertained. These procedures were outlined in the parent consent and student assent documents.

Teacher survey packet. Informed consent was also gathered from teacher participants prior to administration of the teacher survey packet. Teachers who gave consent were provided with a packet containing the VADTRS and an additional measure that was part of the larger study for each student participant in their class. Throughout February, March, and April of 2013, members of the research team provided packets of rating scales to each student participant's English teacher. Secondary teachers (across various subject areas including mathematics, science, social studies) were also identified and provided with survey packets for students in their classes. Teachers were required to indicate if they knew the student for at least two months at the time of completing the rating scale; if not, another teacher was recruited for the given student to ensure accuracy of teacher ratings. The number of rating scales administered to each teacher was dependent on the number of student participants in each teacher's classes (range from 1 to 79 surveys per teacher; *M* surveys completed by teachers = 14). A total of 58 teachers participated in the present study. Teachers were asked to complete the rating scales within one week and were provided with an envelope to hold completed survey packets (to protect privacy). Completion of the scales was estimated to take approximately 5 minutes per student. Teachers who had fewer surveys to complete were able to return them within the one week time frame, but

other teachers (e.g., teachers who had 10+ surveys to complete) required longer to return their surveys. Overall, teachers took anywhere between one week to two months to complete their surveys. The teacher who completed the most surveys (i.e., 79 surveys) submitted surveys to one of the PIs in waves, and it is believed that this teacher took time to accurately answer the survey for each individual student despite the large number of surveys completed. Teachers were provided with contact information for one of the PIs if they had questions related to completion of the rating scales. A member of the research team collected the completed packets from each school. Each teacher participant received two dollars cash per survey packet completed (therefore, incentives ranged from $2-158 depending on the number of packets completed). This process resulted in two sources of teacher data for 67.8% of the sample, and one source of teacher data for 32.3% of student participants.

Analyses

A series of statistical analyses were performed to answer the research questions for this study. Prior to performing data analysis, data were entered into Excel 2010 and then imported into SPSS 20.0 statistical software for the descriptive analyses and Mplus 7.0 statistical software (Muthén & Muthén, 1998-2010), which was utilized for the preliminary analyses, as well as all analyses conducted to answer each research question.

Descriptive Analysis

First, a procedure to account for missing data was determined. Next, all data were screened to detect the presence of outliers (i.e., scores $\geq$ 2.5 standard deviations from the mean). Means, standard deviations, and additional descriptive data (e.g., skew, kurtosis, etc.) were obtained for the entire sample for all variables of interest, including: demographic variables (gender, grade, ethnicity, free/reduced lunch status), students' reports of life satisfaction, student-rated ADHD symptoms, teacher-rated ADHD symptoms, and students' total depression scores.

These continuous variables were examined for multivariate normality. Cronbach's alpha was also calculated for each construct in order to determine the internal consistency of these measures when utilized with this particular sample.

Preliminary Analyses

To evaluate the various conceptualizations of ADHD in the literature, separate confirmatory factor analyses (CFAs) were conducted for the 18 items from the ASSRS and the 18 items from the VADTRS. Responses to items from both instruments were scaled from 0 (*never present*) to 3 (*very often present*) and were treated as ordinal data. Analyses of the polychoric correlations of the 18 items were conducted in Mplus 7.0 (Muthén & Muthén, 1998-2010) using robust weighted least squares estimation with mean- and variance-adjusted chi-square test statistic (WLSMV). When conducting these preliminary analyses, the amount of missing data was considered and reported. Mplus uses pairwise deletion of missing data when computing the polychoric correlations if covariates are not present in the model. Results of these analyses were evaluated by examining the fit indices for the model. First, Chi-Square tests of the fit of the model and standard errors were determined using Mplus's complex sampling analysis approach (i.e., Type = Complex) in order to account for the lack of independence that existed in the data set because students were nested within teachers. The Chi-Square goodness-of-fit statistic was used to determine the extent of the difference between the sample and fitted polychoric correlation matrices (Hu & Bentler, 1999)

However, limitations of the Chi-Square fit statistic have been well documented with trivial misfit achieving statistical significance as a function of sample size. Thus, alternative measures of fit were also used, including the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA). In examining fit using these statistics, the standard

for very good fit was determined by CFI ≥ .95 and RMSEA < .05 (with .05 to .08 indicating adequate fit; Kline, 2012). Assuming the bifactor model provided the best fit, standardized parameter estimates were provided for each item on the general ADHD factor and the specific factors (inattention, hyperactivity/impulsivity) of the model.

Research Question 1

The following analyses were conducted to address the research questions, which examined the relationship between life satisfaction and varying degrees of specific symptoms of ADHD. Assuming the bifactor model was identified as the model with the best fit, this model was utilized in the analyses for the following research questions.

1. *To what extent, if any, does each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) predict life satisfaction in high school students?*
    a. *When ADHD symptoms are rated by students?*
    b. *When ADHD symptoms are rated by teachers?*

To address the first research question, structural equation modeling was used. Specifically, following an examination of the measurement model underlying the 18 ADHD items (described above), life satisfaction was added to the bifactor model as an endogenous latent variable (measured by all items from the SLSS scale). If demographic items (e.g., gender, SES, and grade level) were identified to be significantly related to the variables of interest via the preliminary analysis, these variables were included as covariates to the full structural equation model (SEM). The fit of these models was evaluated using the chi-square, CFI, and RMSEA statistics to determine the viability of the proposed model (using criteria described above). If the models provided an adequate fit, the significance and amount of variance in life satisfaction

accounted for by the three bifactor model components (e.g., general ADHD, inattention, and hyperactivity/impulsivity) were examined.

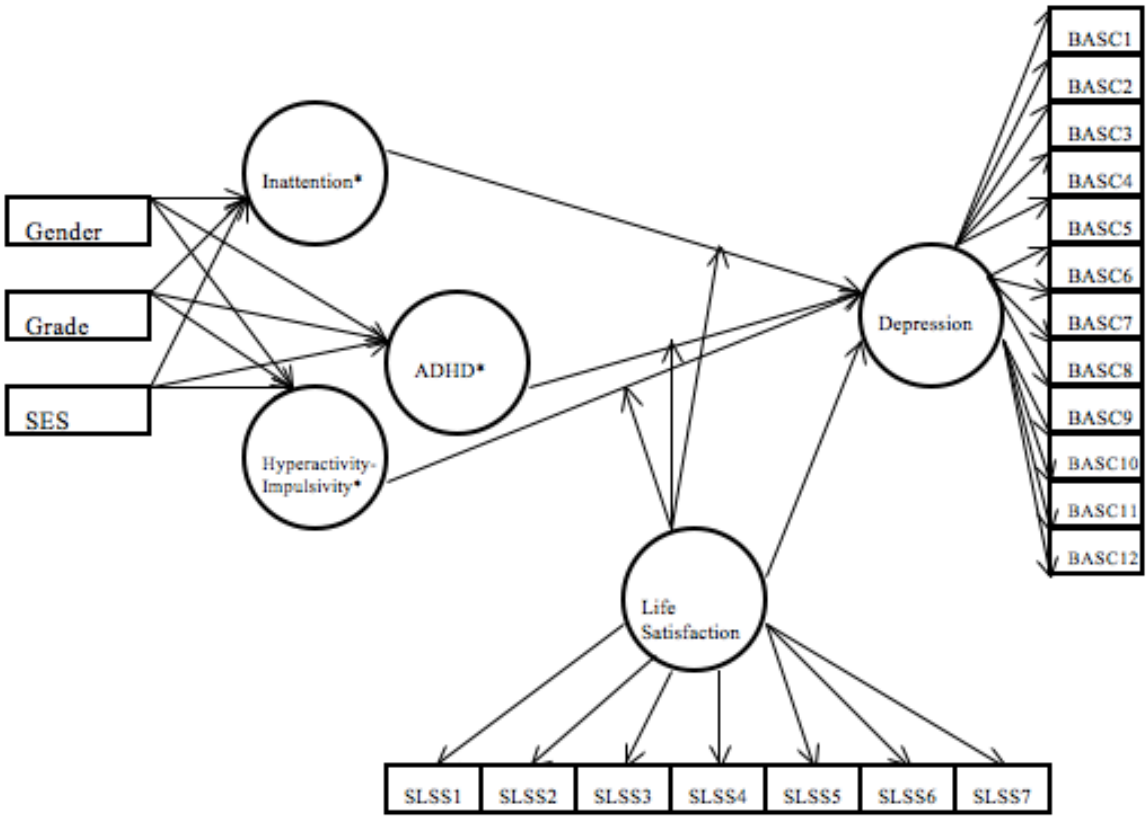
Research Question 2

2. *To what extent, if any, does life satisfaction moderate the relationship between each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) and depressive symptoms in high school students?*
    a. *When ADHD symptoms are rated by students?*
    b. *When ADHD symptoms are rated by teachers?*

To address the second research question, SEM was used. Specifically, life satisfaction and depressive symptoms were added to the model as endogenous latent variables (with life satisfaction measured by all items from the SLSS scale and depressive symptoms measured by all items from the BASC Depression subscale). The moderator variable (i.e., life satisfaction) and the predictor variable (i.e., inattentive symptoms, hyperactive/impulsive symptoms, or general ADHD symptoms) were endogenous variables, and the outcome variable (i.e., depressive symptoms) was an endogenous variable. The interaction effect was conducted using both latent exogenous variables to create product terms that represent the interaction effects. If demographic items (e.g., gender, SES, and grade level) were identified to be significantly related to the variables of interest via the preliminary analysis, these variables were included as covariates to the full SEM. The fit of these models was evaluated using the chi-square, CFI, and RMSEA statistics to determine the viability of the proposed model (using criteria described above). If the models provided an adequate fit, the significance and amount of variance in the outcome variable (i.e., depressive symptoms) accounted for by the three bifactor model components (e.g., general ADHD, inattention, or hyperactivity/impulsivity) and the interaction

term (i.e., life satisfaction) were examined. Specifically, path coefficients for the effects of the product terms were estimated to determine the interaction effects.

Figure 2 provides a visual analysis of the moderation analyses in the present study.



Note. *The bifactor model has been simplified in the above diagram for clarity. See Figure 1 for the complete bifactor model.

Figure 2

Moderation Analysis Model

Research Question 3

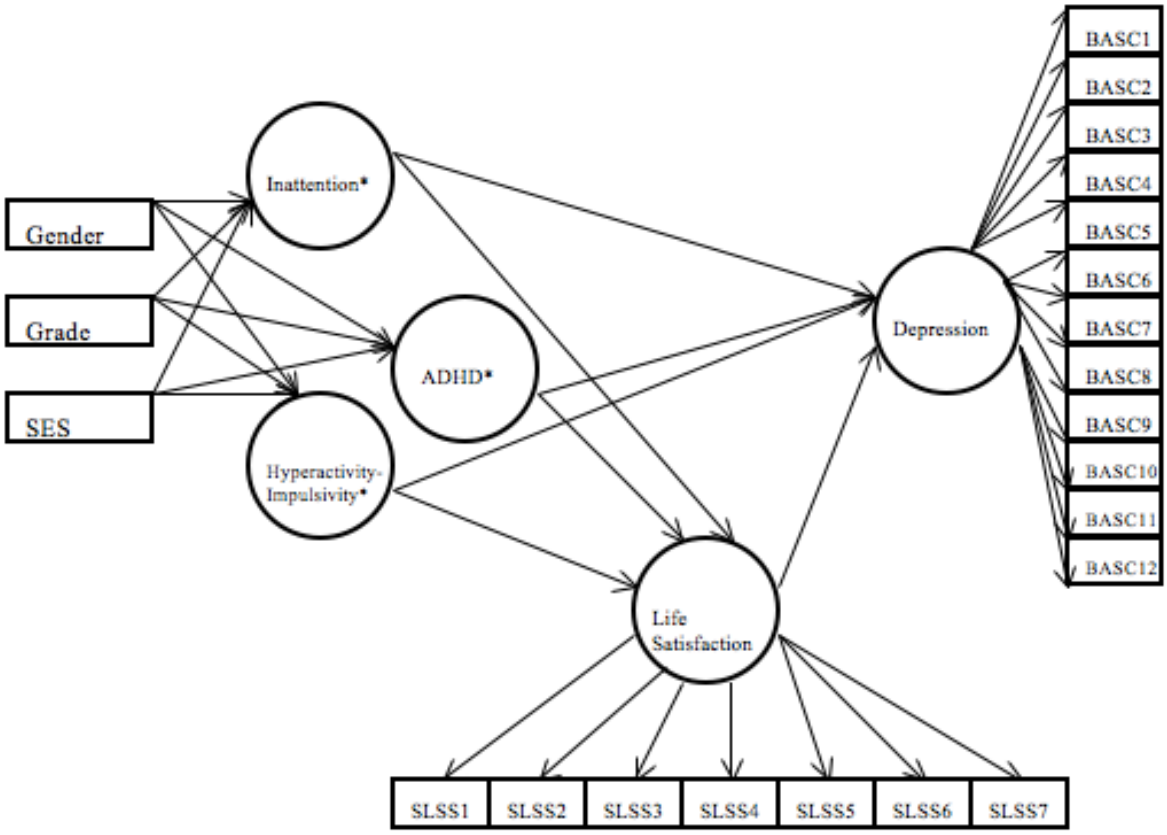
3. *To what extent, if any, does life satisfaction mediate the relationship between each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) and depressive symptoms in high school students?*

a. *When ADHD symptoms are rated by students?*

b. *When ADHD symptoms are rated by teachers?*

The third research question explored the possibility that life satisfaction may serve as a mediator variable that specifies the conditions under which students' ADHD symptoms relate to depressive symptoms. This research question was examined given research suggesting that lower levels of life satisfaction often precede the development of depression (Lewinsohn et al., 1991). To address this research question, SEM was used. Specifically, life satisfaction and depressive symptoms were added to the model as endogenous latent variables (with life satisfaction measured by all items from the SLSS scale and depressive symptoms measured by all items from the BASC Depression subscale). If demographic items (e.g., gender, SES, and grade level) were identified to be significantly related to the variables of interest via the preliminary analysis, these variables were then included as covariates to the full SEM. Mediator analyses were conducted in Mplus using the bootstrapping confidence interval method to examine the significance of the mediation effects in path analysis (Lau & Cheung, 2014; MacKinnon, Lockwood, & Williams, 2004; Williams & MacKinnon, 2008). This procedure allows for the testing of direct and indirect mediation effects in a complex model with bootstrap confidence intervals. Direct effects between the predictors (i.e., inattention, hyperactivity-impulsivity, and general ADHD) and the potential mediator (i.e., life satisfaction) and the potential mediator and the outcome variables (i.e., depressive symptoms) were analyzed to determine their significance. The indirect effects (i.e., the multiplication of the direct effects through the meditational pattern) between the predictors and the outcome variable were also examined.

Figure 3 demonstrates the meditational model for the current study.



Note. *The bifactor model has been simplified in the above diagram for clarity. See Figure 1 for the complete bifactor model.

Figure 3

Mediation Analysis Model

Ethical Considerations

Precautions were taken throughout the current study in order to protect all participants. Approval was obtained from the University of South Florida Institutional Review Board (IRB) and the Department of Assessment and Accountability within the collaborating local school district in order to ensure that the appropriate precautions were taken in order to protect human research participants. Approval was obtained in January 2013 prior to data collection, which began during the Spring 2013 semester.

A parental consent form, which outlined the goals and procedures for the project, was distributed to ensure that parents were aware of all aspects of the study, including potential risks and benefits associated with their child's participation in the study. The letter also included contact information for one of the PIs to ensure that parents would be able to discuss questions or concerns related to the current study with one of the PIs. Each family was provided with two copies of the form: one to sign and return, and one for their records.

For all students who returned a signed parent consent form, a student assent form was also administered immediately prior to survey completion. The student assent form outlined the risks and benefits of the study and allowed students to decide whether or not they wanted to participate, even though parental consent was already obtained. One of the PIs or a trained member of the research team read the letter aloud to students immediately prior to data collection to ensure student understanding. Additionally, students were provided with time to ask questions about the study or to inform the researchers if they did not want to participate in the study. Teacher consent was sought from all teachers with student participants in their homeroom, and teachers were provided with a copy of the consent letter, which described the purpose of the study and provided information regarding the timeframe of survey completion. This letter also indicated that their participation was voluntary and included contact information for one of the PIs in order to address any questions that teachers had.

Participant confidentiality was ensured in part by examining aggregate data, such that individual students were not identifiable in any published documents. All students were assigned a code number when data were entered into the database, and their data were identified by this code number but not their names. The file linking the code numbers to student names was kept in a locked and separate location from the data. All completed survey packets were kept in a

locked filing cabinet that could only be accessed by the supervising university faculty. It is important to note that there were two instances in which confidential data were shared, and the nature of these instances was previously outlined in the parental consent and student assent forms. Specifically, students and parents were informed that the investigators would inform school mental health professionals and threat assessments would be conducted if a student indicated on the survey packet that he or she had thoughts of harming himself/herself or others based on the responses made by the student on one of the survey packet measures, or if he or she had depression scores in the clinical range (greater than 70) on the BASC in order to determine if additional follow-up was needed. A total of nine names across both schools were shared with the school psychologist at the corresponding school due to depression scores in the clinical range. No students indicated intent to harm themselves or others.

In order to ensure that valid results were obtained, precautions were taken in the design and administration of this study. First, several (i.e., four) counterbalanced versions of the survey packet were utilized in order to control for order effects. Before administering the survey packets, all of the graduate students assisting with data collection were trained to ensure that they were able to clearly provide the standardized instructions and were able to provide uniform responses to student questions. Each of these procedures helped to control for errors in survey administration and data collection. The researcher also took appropriate precautions (i.e., consider limitations to the current study and the generalizabilty of the sample to the overall population) when interpreting the results of this study.

CHAPTER IV: Results

The results of the statistical analyses utilized to answer the research questions for the present study are enumerated in this chapter. First, data preparation, including procedures used to check accuracy of data entry and screen data as well as information regarding variable construction, is discussed. Second, preliminary analyses (e.g., descriptive statistics, scale reliabilities, and correlations between variables of interest) are presented. Finally, results of structural equation modeling (SEM) analysis techniques used to answer the research questions are presented.

Data Preparation

Accuracy of data entry. Student and teacher survey data were hand-entered into three excel databases (i.e., one student excel database, one English teacher excel database, and one alternative teacher excel database) by graduate student members of the USF ADHD research team. Each of the data entry files were designed with cell restrictions to ensure that a cell would be flagged if a value outside of the allowable range was entered. After all data were entered, every 10th survey packet was selected to be checked for data entry errors by a member of the research team who did not enter the specific survey the first time. When an error was found in one or more cells for a survey, the error was corrected, and then the entire surveys directly preceding and following the survey with the error were reviewed for accuracy. This process resulted in a total of 11.4% of surveys being reviewed (127 of 1114 surveys across students and teachers). A total of 15 cell errors (out of 10,567 total cells) were detected across these 127 packets, with an average accuracy rate of 99.86% for student and teacher data entry.

Validity of data. Student scores on the BASC-2-SRP-A V index were examined in order to determine the validity of student survey data. The V index is a validity indicator that contains five items that are highly unlikely to be true for students and are therefore used to indicate careless responding or failure to understand the measure (Reynolds & Kamphaus, 2004). The BASC manual indicates that students with scores ranging from 4-12 are in the "extreme caution" range. Five students had V index scores between 4 and 8. A member of the research team visually inspected the raw protocols for these five students for endorsement of impossible items (e.g., answering *True* to the item, "I take a plane trip from New York to Chicago at least twice a week."). Each of these students endorsed one or more of the impossible items included on this scale and were therefore excluded from the dataset due to the questionable validity of their responses.

Exclusion criteria. Students' English Language Learner (ELL) status was determined through examination of school records, which are updated every year to reflect students' ELL status. Five students were identified as having Limited English Proficiency (LEP). These five students were excluded from further analyses, as they may have had difficulty understanding and responding accurately to survey measures.

Missing data. Any participant with missing data on an entire measure included in the present study was excluded from the dataset; only one participant was excluded due to missing all items on the ASSRS (i.e., student participated in the study and completed the survey packet but skipped all items on the ASSRS). Ten participants were excluded due to missing teacher data (i.e., no teachers completed surveys about those ten participants). There were eight instances in which a student participant had two sources of English teacher data (e.g., the student was enrolled in both an English and a reading class, each with a different teacher, at the same

time). If the student also had data from an alternative teacher (i.e., the student had three sources of data: two packets completed by English teachers and one packet completed by an alternative teacher), only one source of English teacher data (the first source of data entered in the spreadsheet) was retained. If the student did not have data from an alternative teacher (four of the eight cases), both of the data sources from English teachers were utilized. There were three instances in which a student had two sources of alternative teacher data. In two of the three instances, the student did not have English teacher data, and thus both sources of alternative teacher data were retained. In the one instance in which the student did have English teacher data, the mathematics teacher data were chosen to be used as the second source of data, given that mathematics teachers were originally recruited as alternative teachers.

Reverse-scored items. Prior to variable construction, reverse-scored items were re-coded. There were two reverse-scored items on the SLSS and two reverse-scored items on the BASC inattention scale.

Final student sample. The remaining sample to be used in subsequent analyses included 399 student participants (see Table 4 for demographic information for the student sample). This sample is similar to the total sample previously presented ($N = 420$; see Table 4).

Variable construction. In order to retain students with only a few items missing, it was determined that mean scores for each variable would be calculated based on the availability of at least two-thirds of the data on that measure (i.e., at least six out of nine items on the VADTRS and ASSRS; at least five out of seven items on the BASC Hyperactivity subscale; at least five out of seven items on the SLSS).

Missing data on the BASC Depression and Inattention subscales were handled in a different manner, given that these subscales contained items with two different scoring metrics

(i.e., true/false and Likert scale items with scoring from 0-3). Thus, sums of all items for each measure were calculated according to the procedures specified in the BASC technical manual (Reynolds & Kamphaus, 2004). Consistent with the BASC manual, if a student missed more than two items in scale, the student was removed from the dataset. Only one student was removed in creating the depression variable due to missing five items. No students were missing more than two items on the Inattention subscale. In situations in which one or two items were missing from a particular subscale, the constant score for that specific subscale, as enumerated in the BASC technical manual, was inserted in the place of the missing data point.

Table 4

Demographic Information for Student Sample

	School A Sample (n =179)		School B Sample (n =220)		Total Sample (N = 399)	
Variable	*n*	%	*n*	%	*N*	%
Gender						
Male	79	44.4	87	39.5	166	41.4
Female	99	55.6	133	60.5	232	57.9
Grade						
9	65	36.3	30	13.6	95	23.7
10	45	25.1	72	32.7	117	29.2
11	38	21.2	77	35.0	115	28.7
12	28	15.6	38	17.3	66	16.5
Ethnicity						
African-American	20	11.8	17	7.7	37	9.2
Asian/Pacific Islander	12	6.7	4	1.8	16	4.0
White	86	48.0	149	67.7	235	58.6
Hispanic	53	29.6	50	22.7	103	25.7
Native American/ Alaska Native	1	0.6	2	0.9	3	0.7
Other	14	7.8	6	2.7	20	5.0
Free/Reduced Price Lunch[a]	70	39.1	36	16.4	106	26.6

Note. [a]Free and reduced price lunch status was obtained from student records

Data screening. Data were also screened using SPSS 22 to detect the presence of univariate outliers. First, the minimum and maximum values for all variables of interest were

examined to determine that they did not fall outside of the permissible values. No scores outside of the permissible value ranges were identified for any of the variables. Second, z-scores were created for each of the variables of interest to detect the presence of univariate outliers. Univariate outliers were considered to be z-scores greater than positive or negative 3.3 on any variable of interest, as recommended by Tabachnick and Fidel (2007). Two univariate outliers were detected for the BASC depression scale (with the highest outlier having a z-score of 4.39). Five univariate outliers were detected for the BASC hyperactivity/impulsivity scale (with the highest outlier having a z-score of 3.46). Five univariate outliers were detected for the student-rated inattention scale (ASSRS: with the highest outlier having a z-score of 3.59). Three univariate outliers were detected for the student-rated hyperactivity/impulsivity scale (ASSRS; with the highest outlier having a z-score of 3.55). Six univariate outliers were detected for the Teacher A Vanderbilt inattention scale (with the highest outlier having a z-score of 3.45), and three were detected for the Teacher B Vanderbilt inattention scale (with the highest of the three having a z-score of 3.68). Eleven univariate outliers were detected for the Teacher A Vanderbilt hyperactivity/impulsivity scale (with the highest outlier having a z-score of 6.60), and nine were detected for the Teacher B Vanderbilt hyperactivity/impulsivity scale (with the highest outlier having a z-score of 6.84). All of the cases identified were screened to insure that data fell within expected ranges for the scale, and it was determined that the cases identified as outliers had scores in the clinically significant range (for the BASC) or high levels of symptoms (for the ASSRS and Vanderbilt scales). Thus, these participants emerged as univariate outliers due to high levels of symptoms of interest and were retained for analyses in the current study because students with higher levels of symptoms were of particular interest in the current study.

Descriptive statistics. Descriptive statistics for all variables of interest for the present study are presented in Table 5. It is important to note that the sample sizes for the different variables vary due to missing data. In particular, the sample sizes for the variables of teacher-rated behaviors are slightly smaller than those for student-rated behaviors, as some students were missing data from either an English teacher or an alternative teacher. Means, standard deviations, ranges, skew, and kurtosis for each variable of interest were calculated using SPSS 22 software. Overall, students reported moderately high levels of life satisfaction and relatively low levels of symptomology. Skew and kurtosis were calculated to assess for univariate normality. The majority of the variables were approximately normally distributed (i.e., skew and kurtosis between -1.0 and +1.0); however, ratings from both sets of teachers of hyperactive/impulsive symptoms on the VADTRS were outside normal limits. Due to this finding, the data were inspected to ensure that all levels of symptoms in the dataset were within the permissible range for the scales used within this study. Given that all levels of symptoms in the dataset were within the permissible range for the scales used within the study, as well as the fact that plus or minus one is thought to be a stringent criterion and thus plus or minus three is considered acceptable for studies with larger sample sizes, these variables were retained for the present study (Tabachnick & Fidell, 2007). Moreover, given the small percentage of the population for which teachers would actually endorse these symptoms, it is not surprising that the distribution of the data for these two variables would be non-normal. Lastly, normality is not assumed when using WLSMV with categorical variables in Mplus, and further analyses in the present study used this method. Thus, the normality of the data is not a necessary assumption to consider.

Table 5

Means, Standard Deviations, Ranges, Skew, and Kurtosis of Variables of Interest

Variable	*N*	*M*	*SD*	Range	Skew	Kurtosis
Life Satisfaction (SLSS)	399	4.53	0.91	1.43-6	-0.81	0.36
Student-Rated IA (ASSRS)	399	0.82	0.51	0-2.67	0.88	0.76
Student-Rated HI (ASSRS)	399	0.81	0.55	0-2.78	0.84	0.38
Depression (BASC)	398	4.71	4.84	0-26.0	1.52	2.43
BASC IA	399	7.32	4.82	0-20.0	0.52	-0.73
BASC HI	399	0.85	0.54	0-2.71	0.89	0.72
Teacher A-Rated IA (VAND)	391	0.49	0.73	0-3.00	1.66	2.01
Teacher A-Rated HI (VAND)	388	0.17	0.43	0-3.00	3.74	16.08
Teacher B-Rated IA (VAND)	281	0.59	0.66	0-3.00	1.17	0.83
Teacher B-Rated HI (VAND)	281	0.16	0.38	0-2.78	3.41	13.52

Note. IA = inattention; HI = hyperactivity/impulsivity.

Measure reliability. All variables of interest for the current study were analyzed using Cronbach's alpha coefficients to determine their internal consistency. Cronbach's alpha coefficients of .70 or above are considered to represent adequate internal consistency for research purposes (Nunnally, 1978). Cronbach's alpha coefficients for the present study are presented in Table 6. Coefficients ranged from .76 to .96. Thus, all scales had acceptable estimates of reliability.

Table 6

Cronbach's Alpha (α) for all Measures

Scale Name	Number of Items	Cronbach's Alpha (α)
Life Satisfaction (SLSS)	7	.86
Student-Rated IA (ASSRS)	9	.82
Student-Rated HI (ASSRS)	7	.81
Depression (BASC)	12	.84
BASC IA	9	.82
BASC HI	7	.76
Teacher A-Rated IA (VAND)	9	.96
Teacher A-Rated HI (VAND)	9	.91
Teacher B-Rated IA (VAND)	9	.94
Teacher B-Rated HI (VAND)	9	.93

Note. Higher scores reflect increased levels of the construct indicated by the variable name. IA = inattention; HI = hyperactivity/impulsivity.

Correlational analyses. Pearson product-moment correlation coefficients were calculated among all variables of interest, as well covariates (i.e., gender, grade level, SES). Correlation coefficients among variables of interest are presented in Table 7. Gender (male = 0, female = 1) was significantly negatively correlated with life satisfaction ($r = -.18$, $p < .01$), English teacher rated inattention ($r = -.18$, $p < .01$), English teacher rated hyperactivity/impulsivity ($r = -.19$, $p < .01$), alternative teacher rated inattention ($r = -.12$, $p < .05$), and alternative teacher rated hyperactivity/impulsivity

(r = -.12, p < .05). Although each of the aforementioned correlations was significant, they are all considered to be weak correlations. Gender was significantly positively correlated with depression (r = .22, p < .01) and inattention as measured by the BASC (r = .10, p < .05). Grade level was not significantly correlated with any of the variables of interest. These positive correlations were weak as well. Socioeconomic status (0 = no FRL, 1 = FRL) was significantly negatively correlated with life satisfaction (r = -.11, p < .05) and positively correlated with English teacher rated inattention (r = .11, p < .05), and both of these correlations were considered to be relatively weak correlations.

Life satisfaction was strongly associated with depression (r = -.68, p < .01), moderately associated with inattention as measured by the BASC (r = -.43, p < .01), weakly associated with hyperactivity/impulsivity as measured by the BASC (r = -.25, p < .01), moderately associated with student rated inattention on the ASSRS (r = -.40, p < .01), and weakly associated with student rated hyperactivity/impulsivity on the ASSRS (r = -.23, p < .01). The significant negative correlations between life satisfaction and student-rated depression, inattention, and hyperactivity/impulsivity were anticipated given previous available literature.

The correlation between the BASC Inattention subscale and the Inattention subscale on the ASSRS was significant, strong, and positive (r = .76, p < .01), as was the correlation between the BASC Hyperactivity/Impulsivity subscale and the Hyperactivity/Impulsivity subscale on the ASSRS (r = .76, p < .01). It was proposed that the ASSRS would be used for all analyses to address research questions given that this measure is directly aligned with the symptom criteria for ADHD and thus consistent with the bifactor model of ADHD, as long as the correlations between the ASSRS and the

BASC were strong. Given that this was found to be true, the ASSRS was used for all of the following analyses to address research questions as the student-rated measure of ADHD symptoms.

The correlations between the two different teacher raters on the Vanderbilt ADHD scale were also examined to determine if teachers' scores could be averaged for proceeding analyses or if they should be examined separately. The correlation between the Teacher A (i.e., English teachers) ratings of inattention and Teacher B (i.e., alternative teachers) ratings of inattention on the Vanderbilt ADHD scale was significant ($r = .31$, $p < .01$). The correlation between the Teacher A (i.e., English teachers) ratings of hyperactivity/impulsivity and Teacher B (i.e., alternative teachers) ratings of hyperactivity/impulsivity on the Vanderbilt ADHD scale was also significant ($r = .44$, $p < .01$). Although both correlations were significant, they were only moderate in strength. Given this, as well as the fact that many students in the sample were missing at least one source of teacher data, it was determined that teacher A and teacher B scores should not be averaged together to form one teacher data score. Thus, it was determined that teacher A data would be used for the subsequent analyses, given that more teacher data were available from English teachers than from alternative teachers. Moreover, it is plausible that English teachers may have more information to accurately complete ratings of student behavior than alternative teachers, given that English teachers have students in their class for the entire school year, while alternative teachers may only have a student for a semester at a time if the class is considered to be an elective.

Table 7

Correlations between All Variables of Interest

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Gender[a]	1												
2. Grade	-.00	1											
3. SES[b]	-.00	.02	1										
4. Life Satisfaction	-.18**	-.01	-.11*	1									
5. Depression	.22**	-.01	.07	-.68**	1								
6. BASC IA	.10*	.00	.06	-.43**	.46**	1							
7. BASC HI	.03	.02	-.01	-25**	.28**	.60**	1						
8. Student IA (ASSRS)	.05	-.04	.08	-.40**	.41**	.76**	.58**	1					
9. Student HI (ASSRS)	.03	.02	.07	-.23**	.28**	.56**	.76**	.58**	1				
10. Teacher A IA (VAND)	-.18**	.02	.11*	-.06	.05	.20**	.19**	.14**	.15**	1			
11. Teacher A HI (VAND)	-.19**	.06	.05	-.03	-.04	.14**	.20**	.10*	.20**	.55**	1		
12. Teacher B IA (VAND)	-.12*	-.01	.08	-.10	.14*	.09	.09	.16	.09	.31**	.19**	1	
13. Teacher B HI (VAND)	-.12*	-.02	.00	-.04	.00	.11	.22**	.10	.20**	.22**	.44**	.57**	1

Note. IA = inattention; HI = hyperactivity/impulsivity. Sample sizes ranged from 281 to 399. [a]Gender: male = 0, female = 1. [b]SES: no FRL = 0, FRL = 1. **Correlation is significant at the .01 level. *Correlation is significant at the .05 level.

Fit of the bifactor model. Before beginning the analyses to address the three research questions, the fit of the bifactor model was examined to determine that it was an appropriate model to use for all analyses. Separate confirmatory factor analyses (CFAs) were conducted for the 18 items from the ADHD Student Self-Rating Scale and the 18 items from the Vanderbilt ADHD Teacher Rating Scale. Responses to items from both instruments were treated as ordinal data. Analyses of the polychoric correlations of the 18 items were conducted in Mplus 7.0 (Muthén & Muthén, 1998-2010) using robust weighted least squares estimation with mean- and variance-adjusted chi-square test statistic (WLSMV). When covariates are not present in the model, Mplus uses pairwise deletion of missing data in order to compute the polychoric correlations. Chi-square tests of model fit and standard errors were computed using Mplus's complex sampling analysis approach (i.e., Type = Complex) to take into account the lack of independence in the data (i.e., students nested within teachers).

Analyses began with an examination of the bifactor model underlying the ADHD items (see Figure 1). The variances of the general, inattentive, and hyperactive/impulsive latent variables of ADHD were fixed to one in order to identify the model. Consistent with previous formulations of the bifactor model, the correlation between the specific factors (inattentive and hyperactive/impulsive) was constrained to zero, as were the correlations between the general factor and each of the specific factors. Fit of the models was evaluated using the χ^2 test, the comparative fix index (CFI), and the root mean square error of approximation (RMSEA). The significance of the χ^2 test, determined based on the degrees of freedom, was first examined, in which a significant ($p < .05$) result indicates a statistically significant lack of fit of the model. Hu and Bentler's (1999) cutoff values of greater than or equal to .95 for the CFI, and Kline's (2005) value of the RMSEA < .05 suggesting close fit (with .05-.08 indicating adequate fit),

were used as general indicators of acceptable fit of the models; however, substantive issues such as the interpretability of the parameter estimates were also considered.

Comparison of bifactor model to other models of ADHD. The student and teacher bifactor models were compared with alternative models of ADHD (one-factor model, two-factor model of hyperactivity/impulsivity and inattention, and the three-factor model of hyperactivity and impulsivity as separate factors and inattention). These models were selected for comparison given that they are models that have typically been used to conceptualize ADHD in past research. The fit for these models was consistently poorer than those from the bifactor model. See Table 9 for a summary of the fit statistics for these models. Given the poorer fit of these models, they are not discussed further.

Confirmatory factor analyses. Two CFA models using robust least weighted squares were run to evaluate the bifactor model, one with student ratings of inattention and hyperactivity/impulsivity and one with teacher ratings of inattention and hyperactivity/impulsivity. For student self-ratings, the results of the CFA indicated that based on the chi-square statistic, there was a statistically significant lack of fit for the bifactor model, χ^2 (117, N = 399) = 185.627, $p < .001$. However, limitations of the chi-square fit statistic have been well documented with minor misfit achieving statistic significance as a function of sample size (Martin-Löf, 1974). When alternative measures of fit less sensitive to sample size were used, the results indicated a very good fit for the bifactor model (CFI = .980; RMSEA = .038).

Table 8

Confirmatory Factor Analysis Model Comparisons Using Robust Weighted Least Squares Estimation for Non-independent Data

	Student (n = 399)				Teacher (n =391)			
Model	Chi-Square	*df*	CFI	RMSEA	Chi-Square	*df*	CFI	RMSEA
One-factor	494.567	135	.897	.082	627.923	135	.975	.097
Two-factor[a]	297.123	134	.953	.055	335.779	134	.990	.062
Three-factor[b]	291.876	132	.954	.055	330.049	132	.990	.062
Bifactor[c]	185.627	117	.980	.038	159.559	117	.998	.031

Note. Analyses were based on the 18 items contained in Table X. CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation

[a] The two factors consisted of inattention (items 1 to 9) and hyperactivity/impulsivity (items 10 to 18).

[b]The three factors consisted of inattention (items 1 to 9), hyperactivity (items 10 to 15), and impulsivity (items 16 to 18).

[c] The bifactor model included a general ADHD factor, as well as specific factors for inattention (items 1 to 9) and hyperactivity/impulsivity (items 10 to 18). See Figure 1.

Similarly for the teacher-rated symptoms of ADHD, the results of the CFA indicated that based on the chi-square statistic, there was a statistically significant lack of fit for the bifactor model, χ^2 (117, N = 391) = 159.559, $p < .01$); however, alternative measures of fit indicated very good fit for the bifactor model (CFI = .998; RMSEA = .031).

Standardized factor loadings (shown in Table 9) for the general factor in the bifactor student self-rating CFA model were all significantly different from zero ($p < .05$) and ranged from .316 to .860 (M = .562, median = .566, SD = .143). For the specific factor of inattention, five of the nine standardized loadings were statistically significant ($p < .05$). The loadings for student-rated inattention ranged from -.250 to .460 (M = .089, median = .080, SD = .253). For the specific factor of hyperactivity/impulsivity, all nine standardized loadings were significant and ranged from .292 to .609 (M = .455, median = .438, SD = .093).

Factor loadings (shown in Table 9) for the general factor in the bifactor teacher-rating CFA model were all significantly different from zero ($p < .05$) and ranged from .617 to .956 (M = .785, median = .788, SD = .096). For the specific factor of inattention, all nine standardized loadings were statistically significant and ranged from .319 to .728 (M = .575, median = .623, SD = .125). For the specific factor of hyperactivity/impulsivity, all but one of the nine standardized loadings were statistically significant and ranged from .061 to .563 (M = .385, median = .465, SD = .178).

Across the student and teacher bifactor models, there were statistically significant items loading onto the specific factor for three of the inattention factors in the student model ("I do not pay attention to details or I may careless mistakes in my schoolwork," "I have trouble listening when other people speak directly to me (e.g., parent, teacher, etc.)", "I avoid or dislike engaging in tasks that require a lot of thinking") and one of the hyperactive/impulsive factors in the teacher

model ("Fidgets with hands and feet or squirms in seat"). However, it is not unexpected that there would be items on the specific factors that are not statistically significant in the bifactor model given that an individual item simultaneously loads onto two factors, the general and the specific inattention factor.

Table 9

Parameter Estimates (Standard Error) Using Robust Weighted Least Squares Estimation for Non-independent Data

	Student Report (n = 399)			Teacher Report (n = 391)		
Item	General	Inattention	H-I	General	Inattention	H-I
1	.568 (.043)	-.059 (.096) ns		.652 (.053)	.623 (.053)	
2	.778 (.031)	-.169 (.083)		.751 (.042)	.547 (.052)	
3	.700 (.039)	-.091 (.081) ns		.751 (.046)	.451 (.062)	
4	.603 (.046)	.283 (.090)		.617 (.061)	.728 (.052)	
5	.539 (.055)	.460 (.085)		.656 (.057)	.672 (.055)	
6	.558 (.042)	.080 (.080) ns		.696 (.055)	.640 (.056)	
7	.581 (.053)	.403 (.087)		.728 (.054)	.631 (.060)	
8	.860 (.030)	-.250 (.088)		.904 (.031)	.319 (.062)	
9	.655 (.038)	.146 (.085)		.773 (.044)	.565 (.058)	
10	.603 (.039)		.292 (.056)	.956 (.028)		.061 (.089) ns
11	.640 (.044)		.438 (.056)	.889 (.037)		.198 (.083)
12	.563 (.055)		.426 (.066)	.861 (.060)		.465 (.096)
13	.489 (.049)		.508 (.052)	.889 (.046)		.228 (.087)
14	.316 (.052)		.482 (.054)	.803 (.065)		.563 (.100)
15	.338 (.050)		.609 (.049)	.853 (.042)		.430 (.082)
16	.343 (.052)		.543 (.058)	.725 (.065)		.533 (.077)
17	.499 (.041)		.382 (.053)	.805 (.068)		.466 (.096)
18	.482 (.045)		.416 (.054)	.818 (.057)		.524 (.084)

Note. All factor loadings are significant at $p < .05$ level, except for items marked ns. H-I = Hyperactivity/Impulsivity.

Research Question 1: ADHD and Life Satisfaction

The first research question addressed "to what extent, if any, does each component of a bifactor model of ADHD (i.e., general ADHD, inattention, and hyperactivity/impulsivity) predict life satisfaction in high schools students when covariates are included (i.e., gender, grade, and SES)?" This question was addressed separately for ADHD symptoms rated by students and symptoms rated by teachers.

In order to address this research question, life satisfaction was added to the bifactor model as an endogenous latent variable as measured by the seven items on the SLSS. The main focus of interest with this model was the assessment of how well the three latent factors (general ADHD, inattention, and hyperactivity/impulsivity) relate to life satisfaction.

Results of the two models (student self-ratings of ADHD and teacher ratings of ADHD) using robust weighted least squares indicated that, based on the chi-square statistic, there was a statistically significant lack of fit for the full SEM that included the three ADHD factors and life satisfaction: Student: χ^2 (317, N = 399) = 491.674, p < .001; Teacher: χ^2 (317, N = 399) = 438.064, p < .01. However, alternative measures of fit for these models indicated very good fit (Student: CFI = .961; RMSEA = .038; Teacher: CFI = .994; RMSEA = .031).

In the student self-rating model with the covariates included, 28.0% of the variance in LS (R^2 = .280, p < .001) was accounted for by the three latent factors (general ADHD, inattention, hyperactivity/impulsivity) and covariates. When the covariates were removed, 22.7% of the variance in life satisfaction was accounted for by the three latent factors (general ADHD, inattention, hyperactivity/impulsivity). When covariates were included, the regression coefficients predicting LS using the general ADHD factor (b = -.343, SE = .041, p <.001) and the inattention factor (b = -.117, SE = .064, p = .066) were negative, whereas the regression

coefficient predicting LS using the hyperactivity/impulsivity factor was positive (b = .050, SE = .046, p = .277). The regression coefficient of the general ADHD factor on LS was the only significant bifactor coefficient for student-rated symptoms of ADHD. When examining the factor loadings for the bifactor model without any external variables or covariates included, all of the factor loadings for the general ADHD and hyperactivity/impulsivity factors were significant. Three of the nine factor loadings for the inattention factor were not significant. This is important to note because the strength of the factor loadings in the bifactor model could affect the relationship between the factor and life satisfaction. For the covariates, the regression coefficient of gender on LS was significant and negative (b = -.347, SE = .091, p <.01). Thus, females reported lower levels of life satisfaction than males. The other two covariates, grade level and SES, were not significant predictors of LS. In summary, when symptoms of ADHD were rated by students and covariates were included in the model, general ADHD was found to be a significant predictor of levels of life satisfaction, whereas the specific factors of inattention and hyperactivity/impulsivity were not significantly related to LS. General ADHD was still a significant predictor of life satisfaction when covariates were not included in the model, and symptoms of ADHD rated by students (i.e., inattention, hyperactivity/impulsivity, and general ADHD) without covariates still contributed to 22.7% of the variance in life satisfaction.

In the model in which symptoms of ADHD were rated by teachers and covariates were included, 23.5% of the variance in LS (R^2 = .235, p < .001) was accounted for by the three latent factors (general ADHD, inattention, hyperactivity/impulsivity) and covariates. When covariates were excluded from the model, only 4.7% of the variance in life satisfaction was accounted for by the three ADHD factors. This demonstrates that teacher-rated symptoms of ADHD are not as strong of predictors of life satisfaction as student-rated symptoms of ADHD once covariates are

not included in the model. This, as well as the fact that the teacher and student ratings of ADHD were not strongly correlated, may suggest that teachers are not the gold standard raters of ADHD symptoms of adolescents. It also seems possible that the relationship between ADHD symptoms and life satisfaction could be stronger with student-rated symptoms of ADHD because the same person is rating both ADHD symptoms and life satisfaction. When covariates were included, the regression coefficient for the general ADHD factor on the LS factor (b = .076, SE = .057, p = .177) was positive and non-significant. The regression coefficients of the inattention factor on LS (b = -.193, SE = .062, p =.002) and the hyperactivity/impulsivity factor on LS (b = -.259, SE = .100, p = .010) were negative. In the model in which symptoms of ADHD were rated by teachers and covariates were included in the model, only the inattention factor of ADHD was found to be a significant predictor of life satisfaction at the .01 level; however, hyperactivity/impulsivity was significant at the .05 level and was approaching significance at the .01 level. When examining the bifactor model without any external variables or covariates included with teacher-rated symptoms of ADHD, all of the loadings for the inattention factor and general factor were significant. Only one of the nine factor loadings for the hyperactivity/impulsivity factors was not significant. Similarly to when students rated symptoms of ADHD, the only covariate that was a significant predictor of life satisfaction was gender (b = -.451, SE = .116, $p < .01$). Again, for gender females were coded as one and males were coded as zero, so this demonstrates that females reported statistically lower levels of life satisfaction in comparison to males in the given sample. Table 10 provides a summary of regression coefficients of life satisfaction and ADHD factors and covariates for student and teacher ratings of ADHD symptoms. Interestingly, the extent to which teacher-rated symptoms of ADHD without covariates included in the model predicted levels of life satisfaction was much less than

when students rated their symptoms of ADHD (i.e., 4.7% for teacher-rated symptoms of ADHD compared to 22.7% for student-rated symptoms of ADHD). It seems that this difference could be due to the difference in raters (i.e., having teachers rate ADHD symptoms while students are self-rating life satisfaction), and it is consistent with correlational data demonstrating that the student-rated ADHD variables were more strongly related to life satisfaction than the teacher-rated ADHD variables.

Table 10

Regression Coefficients of ADHD Factors and Covariates for Student and Teacher Ratings on Life Satisfaction

	Student Ratings (n = 399)		Teacher Ratings (n = 386)	
	Estimate	S.E.	Estimate	S.E.
ADHD Factors				
Inattention	-.117	.064	-.193**	.062
Hyperactivity/Impulsivity	.050	.046	-.259*	.100
General	-.343**	.041	.076	.057
Covariates				
Female	-.347**	.091	-.451**	.116
Grade Level	-.040	.036	.023	.055
SES	-.105	.082	-.043	.133

Note. * $p < .05$. ** $p < .01$. For Gender, 1 = Female; 0 = Male. Grade Level = 9, 10, 11, 12. For SES, 1=FRL, 0=No FRL.

It is important to note that the factor loadings of inattention factors of the bifactor model changed slightly when life satisfaction and the covariates were added to the bifactor model. However, this is not unexpected given the addition of variables to the model, which causes

previously established factor loadings to shift. Of note, in the student model, two of the items comprising the inattention factor were both negative and significant, which is unusual but not unexpected given that, in the bifactor model, the items comprising the inattention factor are also simultaneously loading onto the general ADHD factor.

Research Question 2: Life Satisfaction as a Moderator

The second research question addressed "to what extent, if any, does life satisfaction moderate the relationship between each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) and depressive symptoms, when ADHD symptoms are rated first by students and second by teachers and covariates (i.e., gender, grade, and SES) are included in the model.

In order to address this research question, depression (as measured by the 12 depression items on the BASC) was added to both models from research question 1 (i.e., the bifactor model with ADHD symptoms rated by students, life satisfaction, and the covariates included; the bifactor model with ADHD symptoms rated by teachers, life satisfaction, and covariates included) as an endogenous latent variable. In order to determine if life satisfaction acted as a moderator between ADHD (as measured by the bifactor model) and depression, interaction terms (i.e., inattention x life satisfaction, hyperactivity/impulsivity x life satisfaction, and general ADHD x life satisfaction) were added to the model. The significance of these terms was examined, as significant interaction terms would demonstrate that life satisfaction does serve as a moderator in the relationship between symptoms of ADHD conceptualized via the bifactor model and symptoms of depression.

However, when all interaction terms were included in the model, the model was too large to run appropriately. Thus, three separate models, each with one interaction term included, were

run. Moreover, the ADHD variables were treated as continuous rather than categorical data in these analyses in order to run the models in Mplus. Thus, the factor loadings for the bifactor model changed slightly. However, the factor loadings for the bifactor model when ADHD symptoms were treated as continuous versus when ADHD symptoms were treated as categorical did not appear to be very different.

Three separate models (i.e., one with the inattention x life satisfaction interaction term, one with the hyperactivity/impulsivity x life satisfaction interaction tern, and one with the general ADHD x life satisfaction interaction term) were run for ADHD symptoms rated by students. In the first model, the inattention x life satisfaction interaction was not significant (b = .383, SE = .231, p = .097). In the second model, the hyperactivity/impulsivity x life satisfaction interaction term was not significant (b = .293, SE = .211, p = .166). In the third model, the general ADHD x life satisfaction interaction term was not significant (b = -.213, SE = .120, p = .076). In all three models, life satisfaction was a significant, negative predictor of depression (Model 1: b = -1.294, SE = .180, p < .001; Model 2: b = -1.341, SE = .148, p < .001; Model 3: b = -1.184, SE = .148, p < .001), with lower levels of life satisfaction being associated with higher levels of depressive symptoms, as would be expected conceptually. Inattention and hyperactivity/impulsivity were not significant predictors of depression in Models 1 and 2, respectively. In the third model, general ADHD was a significant, positive predictor of depression (b = .275, SE = .106, p < .001), with higher levels of ADHD symptoms being associated with higher levels of depressive symptoms. In all three models, gender was a significant, positive predictor of depression at the .05 level (Model 1: b = .323, SE = .140, p = .022; Model 2: b = .337, SE = .133, p = .012; Model 3: b = .332, SE = 1.33, p = .013), with higher scores of depression associated with being female. The other two covariates (i.e., grade

level, SES) were not significant predictors of depression in any of the three models. Given that none of the interaction terms were significant in the three models in which symptoms of ADHD were rated by students, it appears that life satisfaction does not moderate the relationship between the three ADHD factors and depression (for student-rated symptoms of ADHD).

Table 11 provides a summary of regression coefficients of life satisfaction and interaction terms, ADHD factors, and covariates for student ratings of ADHD symptoms.

Table 11

Regression Coefficients of Depression on Interaction Terms, Life Satisfaction, ADHD Factors, and Covariates for Student Ratings of ADHD

	Main Effects	Model 1 (n = 386)		Model 2 (n = 386)		Model 3 (n = 386)	
		Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Covariates							
Female	--	.323*	.140	.337*	.134	.332*	.133
Grade	--	.001	.073	.022	.070	.020	.070
SES	--	-.071	.160	-.067	.164	-.102	.155
ADHD Factors							
IA	-.080	.304	.109	--	--	--	--
HI	.077	--	--	-.010	.144	--	--
ADHD	-.467**	--	--	--	--	.275**	.106
Life Satisfaction	--	-1.294**	.180	-1.341**	.148	-1.184**	.148
Interaction Terms	--						
IA x LS	--	.383	.231	--	--	--	--
HI x LS	--	--	--	.293	.211	--	--
ADHD x LS	--	--	--	--	--	-.213	.120

Note. * $p < .05$. ** $p < .01$. IA = Inattention; HI = Hyperactivity/Impulsivity; LS = Life Satisfaction. For Gender, 1 = Female, 0 = Male. Model 1 = Covariates, Inattention, Inattention x Life Satisfaction, and Life Satisfaction on Depressive Symptoms. Model 2 = Covariates, Hyperactivity/Impulsivity, Hyperactivity/Impulsivity x Life Satisfaction, and Life Satisfaction on Depressive Symptoms. Model 3 = Covariates, General ADHD, General ADHD x Life Satisfaction, and Life Satisfaction on Depressive Symptoms. Main effects were calculated for each model by taking out the interaction term to examine the main effect of the ADHD factor.

Three separate models (i.e., one with the inattention x life satisfaction interaction term, one with the hyperactivity/impulsivity x life satisfaction interaction tern, and one with the general ADHD x life satisfaction interaction term) were also run for ADHD symptoms rated by teachers. In the first model, the inattention x life satisfaction interaction was not significant (b = -.042, SE = .166, p = .800). In the second model, the hyperactivity/impulsivity x life satisfaction interaction term was not significant (b = -.054, SE = .068, p = .425. In the third model, the general ADHD x life satisfaction interaction term was significant at the .05 level (b = -.217, SE = .105, p = .039). In all three models, life satisfaction was a significant, negative predictor of depression (Model 1: b = -1.292, SE = .149, p < .001; Model 2: b = -1.318, SE = .154, p < .001; Model 3: b = -1.313, SE = .156, p < .001), with lower levels of life satisfaction being associated with higher levels of depressive symptoms. Inattention, hyperactivity/impulsivity, and general ADHD were not significant predictors of depressive symptoms in Models 1, 2, and 3, respectively. In all three models, gender was a significant predictor of depression at the .01 level or .05 levels (Model 1: b = .333, SE = .125, p = .008; Model 2: b = .304, SE = .135 p = .024; Model 3: b = .299, SE = .139, p = .031), with higher scores of depression associated with being female. The other two covariates (i.e., grade level, SES) were not significant predictors of depression in any of the three models. Given that the first two interaction terms (i.e., inattention x life satisfaction and hyperactivity/impulsivity x life satisfaction) were not significant in the first two models in which symptoms of ADHD were rated by teachers, it appears that life satisfaction does not moderate the relationship between the inattention and depression and hyperactivity/impulsivity and depression (for teacher-rated symptoms of ADHD). Table 12 provides a summary of regression coefficients of life satisfaction and interaction terms, ADHD factors, and covariates for teacher ratings of ADHD symptoms.

Table 12

Regression Coefficients of Depression on Interaction Terms, Life Satisfaction, ADHD Factors, and Covariates for Teacher Ratings of ADHD

	Interaction Terms	Model 1 (n = 386)		Model 2 (n = 386)		Model 3 (n = 386)	
		Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Covariates							
Female	--	.333**	.125	.304*	.135	.299*	.139
Grade	--	.003	.072	.012	.072	.009	.072
SES	--	-.103	.154	-.094	.154	-.083	.155
ADHD Factors							
IA	-.146*	.082	.083	--	--	--	--
HI	-.109	--	--	-.082	.096	--	--
ADHD	.082	--	--	--	--	-.088	.085
Life Satisfaction		-1.292**	.149	-1.318**	.154	-1.313**	.156
Interaction Terms	--						
IA x LS	--	-.042	.166	--	--	--	--
HI x LS	--	--	--	-.054	.068	--	--
ADHD x LS	--	--	--	--	--	.217*	.105

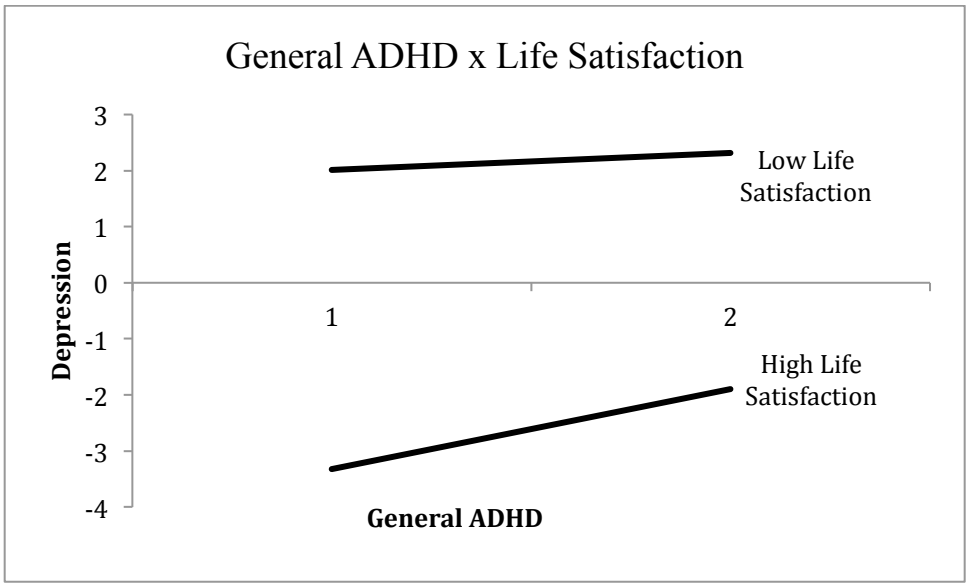
Note. * $p < .05$. ** $p < .01$. IA = Inattention; HI = Hyperactivity/Impulsivity; LS = Life Satisfaction. For Gender, 1 = Female, 0 = Male. Model 1 = Covariates, Inattention, Inattention x Life Satisfaction, and Life Satisfaction on Depressive Symptoms. Model 2 = Covariates, Hyperactivity/Impulsivity, Hyperactivity/Impulsivity x Life Satisfaction, and Life Satisfaction on Depressive Symptoms. Model 3 = Covariates, General ADHD, General ADHD x Life Satisfaction, and Life Satisfaction on Depressive Symptoms. Main effects were calculated for each model by taking out the interaction term to examine the main effect of the ADHD factor.

The interaction term for general ADHD x life satisfaction was significant at the .05 level, thus suggesting that life satisfaction could potentially moderate the relationship between general

ADHD and depressive symptoms. This relationship was examined in more depth in graph form to attempt to portray the nature of the significant interaction between general ADHD and life satisfaction (when ADHD symptoms are rated by teachers). Regression coefficients were used in an equation to develop predicted values to create the interaction graph. The two lines in the graph are not parallel and thus will intersect at some point, thus confirming that there is an interaction between these two variables in which depression is more likely to be affected by general ADHD when there are lower levels of life satisfaction.

Figure 4

General ADHD x Life Satisfaction Interaction Graph



For both models (i.e., student-rated and teacher-rated symptoms of ADHD), the fact that the three interaction terms i.e., inattention x life satisfaction, hyperactivity/impulsivity x life satisfaction, and general ADHD x life satisfaction) were non-significant at the .01 level suggests that life satisfaction does not moderate the relationship between student-rated symptoms of ADHD and depressive symptoms. However, when symptoms of ADHD were rated by teachers,

the interaction between general ADHD x life satisfaction was significant at the .05 level, thus suggesting that life satisfaction may serve as a moderator in this specific relationship.

Research Question 3: Life Satisfaction as a Mediator

The third research question addressed, "to what extent, if any, does life satisfaction mediate the relationship between each component of a bifactor model of ADHD (i.e., general ADHD, inattention, hyperactivity/impulsivity) and depressive symptoms when covariates (i.e., gender, grade, and SES) are included?" The question was divided into two sub-questions. The first sub-question addresses the aforementioned question with ADHD symptoms rated by students, and the second sub-question addresses the aforementioned question with ADHD symptoms rated by teachers.

In order to address this research question, depression (as measured by the BASC) was added to the model from the first research question (i.e., the bifactor model with life satisfaction and covariates) as an endogenous latent variable (see Figure 3 for model of meditation analyses). In examining mediation analyses, it is important to look at multiple possible structural paths, as there is usually more than one structural path from the predictor variable to the outcome variable, thus allowing for both direct and indirect effects (Lau & Cheung, 2012). MacKinnon and colleagues (2004) recommend using a bootstrapping confidence interval technique in Mplus when examining the significant of the mediation effects in structural equation modeling, as this method provides total mediation effects with confidence intervals as well as specific mediation effects.

To address the first component of Research Question 3, life satisfaction was examined as a mediator in the relationship between student-rated ADHD symptoms (as conceptualized by a bifactor model) and depressive symptoms with the three covariates included. First, direct effects

were examined via regression coefficients of depression on life satisfaction and life satisfaction on the three components of the bifactor model. The direct effect of life satisfaction on depression was significant (b = -.206, SE = .054, *p* = .000, 95% Bootstrap Confidence Interval = -.370 to -.100). The direct effect of general ADHD on life satisfaction was also significant (b = -.352, SE = .060, *p* = .000, 95% Bootstrap Confidence Interval = -.469 to -.235). The direct effects of inattention on life satisfaction (b = -.120, SE = .0128, *p* = .347, 95% Bootstrap Confidence Interval = -.370 to .130) and hyperactivity/impulsivity on life satisfaction (b = .054, SE = .074, p = .464, 95% Bootstrap Confidence Interval = -.091 to .199) were not significant. The indirect effect of depression on general ADHD via life satisfaction was also significant (b = .073, SE = .024, *p* = .002, 95% Bootstrap Confidence Interval = .169 to .498). The indirect effects for depression on inattention via life satisfaction (b = .025, SE = .028, *p* = .379, 95% Bootstrap Confidence Interval = -.162 to .410) and depression on hyperactivity/impulsivity via life satisfaction (b = -.011, SE = .017, *p* = .502, 95% Bootstrap Confidence Interval = -.198 to .096) were both non-significant. Results of these analyses, including significant direct and indirect effects, suggest that life satisfaction may serve as a mediator in the relationship between general ADHD (when ADHD symptoms are rated by students) and depressive symptoms.

To address the second component of Research Question 3, life satisfaction was examined as a mediator in the relationship between teacher-rated ADHD symptoms (as conceptualized by the bifactor model) and depressive symptoms with the three covariates included in the model. First, direct effects were examined via regression coefficients of life satisfaction on depression and the three components of the bifactor model on life satisfaction. The direct effect of life satisfaction on depression was negative and significant at the .05 level (b = -.218, SE = .092, *p* = .017, 95% Bootstrap Confidence Interval = -.398 to -.039). The direct effect of general ADHD

on life satisfaction (b = .102, SE = .094, *p* = .275, 95% Bootstrap Confidence Interval = -.081 to .286) and hyperactivity/impulsivity on life satisfaction (b = -.451, SE = .273, *p* = .098, 95% Bootstrap Confidence Interval = -.985 to .083) were both non-significant. The direct effect of inattention on life satisfaction was significant at the .05 level (b = -.206, SE = .092, *p* = .025, 95% Bootstrap Confidence Interval = -.386 to -.026). The indirect effect for depression on inattention via life satisfaction was not significant (b = .218, SE = .135, *p* = .105, 95% Bootstrap Confidence Interval = -.046 to .483). The indirect effects for depression on hyperactivity/impulsivity via life satisfaction (b = -.529, SE = .520, *p* = .309, 95% Bootstrap Confidence Interval = -.491 to 1.549) and depression general ADHD via life satisfaction (b = -.109, SE = .119, *p* = .362, 95% Bootstrap Confidence Interval = -.343 to .125) were also both non-significant. Results of these analyses, including significant direct and indirect effects, suggest that life satisfaction may serve as a mediator in the relationship between inattentive symptoms (when ADHD symptoms are rated by teachers) and depressive symptoms.

Table 13 provides a summary of regression coefficients of life satisfaction on depression, ADHD factors, and covariates for student and teacher ratings of ADHD symptoms.

Table 13

Regression Coefficients of Life Satisfaction, ADHD Factors (Student- and Teacher-Rated ADHD Symptoms), and Covariates on Depression

	Student Ratings (n = 386)		Teacher Ratings (n = 386)	
	Estimate	S.E.	Estimate	S.E.
Depression on LS	-.206**	.054	-.218*	.092
LS on ADHD Factors				
Inattention	-.120	.128	-.206*	.092
Hyperactivity/Impulsivity	.054	.074	-.451	.273
General	-.352**	.060	.102	.094
Depression on Covariates				
Female (1=Female, 0 =Male)	.001	.044	.004	.170
Grade Level (9, 10, 11, 12)	-.003	.012	.006	.026
SES	-.007	.024	-.020	.106

Note. * p < .05. **p < .01. LS = Life Satisfaction.

CHAPTER V: Discussion

The current study first investigated the relationship between symptoms of ADHD (conceptualized via the bifactor model) and life satisfaction in high school students. The second aim of the present study was to determine the role of life satisfaction in the relationship between ADHD symptoms and depressive symptoms. In particular, the current study aimed to determine if life satisfaction serves as a moderator or a mediator in the relationship between symptoms of ADHD and depression. This study adds to the present literature in that there are only two previously published studies, one conducted with young adults (Gudjonsson et al., 2009) and another conducted with middle school students (Ogg et al., 2014), examining the relationship between symptoms of ADHD and life satisfaction. The present study utilized the bifactor model to conceptualize ADHD symptoms, given that this model is believed to possibly be the most accurate model for conceptualizing ADHD (Martel, von Eye, & Nigg, 2010). One of the previous studies examining the relationship between symptoms of ADHD and life satisfaction (Ogg et al., 2014) also used the bifactor model to conceptualize ADHD symptoms.

Key Findings from Descriptive Analyses

Descriptive analyses for the present study demonstrated that a full continuum of ADHD symptoms was present in the study sample, with inattention symptoms ranging from 0-2.67 (according to student self-ratings) and 0-3.00 (according to teacher ratings) and hyperactive/impulsive symptoms ranging from 0-2.78 (according to student self-ratings) and 0-3.00 (according to teacher ratings). Results demonstrated that inattention and hyperactive/impulsive symptoms were similar in prevalence according to student self-ratings.

However, teacher ratings demonstrated higher levels of inattentive symptoms versus hyperactive/impulsive symptoms. The discrepancy in the teacher ratings is consistent with previous research suggesting that inattentive symptoms are more common in adolescents than hyperactive/impulsive symptoms (Wolraich et al., 2005). However, the fact that this did not hold true for student-ratings of ADHD symptoms is surprising, as research has demonstrated that the prevalence of inattention is higher than the other subtypes of ADHD, particularly in adolescence and adulthood, regardless of who is rating symptoms (Willcutt, 2012). It is possible and seems likely due to the conflicting student and teacher reports of inattentive symptoms that adolescents in the given sample may have under-reported their inattentive symptoms due to social desirability or a lack of awareness of their symptoms.

Descriptive statistics on the SLSS also demonstrated that students reported moderately high levels of life satisfaction. Moreover, students reported a nearly full continuum of life satisfaction ratings, with scores ranging from 1.43-6.00. Students also reported levels of depression which were typical compared to the national standardization sample as reported in the BASC manual (Reynolds & Kamphaus, 2004), with a wide range of depression scores present (0-26.0). The sample mean for the Depression subscale of the BASC was comparable to an approximate *T*-score of 45 (when using the sample mean as an individual raw score to determine the corresponding *T*-score), which is well below the clinical level.

Results of correlational analyses for variables of interest were as expected conceptually. For example, there was a significant, negative correlation between life satisfaction and depression, such that as depressive symptoms increase, levels of life satisfaction decrease. This is consistent with previous literature demonstrating that internalizing symptoms such as depression are negatively related to life satisfaction in youth (Diener & Diener, 1996; Lewinsohn

et al., 1991; McKnight et al., 2002; Suldo & Huebner, 2006). However, it is interesting to note that this correlation was stronger than correlations found in past research examining the correlation between life satisfaction and depression. When examining depression items on the BASC and the life satisfaction items on the SLSS, it seems that the content of the items sometimes reflect similar ideas of one's perception of his or her feelings or life (for example, the reverse-scored item on the SLSS stating, "I wish I had a different kind of life" may elicit a similar response as the item on the BASC stating, "I feel like my life is getting worse and worse"). One possible implication of this finding of such a strong correlation between these two constructs could be that, rather than screening for depression, schools could possibly screen for life satisfaction and still catch the kids who meet criteria for or are at-risk for depression. This would be a more positive approach that would possibly be more acceptable to schools and to parents rather than screening for depression. Additional research would be needed to test the validity of this idea (i.e., to ensure that students at-risk for or with clinically elevated levels of depression were identified by life satisfaction measures).

In addition, life satisfaction was significantly, negatively related to inattention and hyperactivity/impulsivity when rated by students on the ASSRS and the BASC. This is also consistent with previous literature demonstrating that lower levels of life satisfaction are associated with higher levels of externalizing psychopathology (Huebner & Alderman, 1993; Suldo & Huebner, 2004a; Valois et al., 2001; Zullig et al., 2001). Interestingly, life satisfaction was not significantly related to symptoms of ADHD when symptoms of ADHD were rated by teachers. It is possible that this could be due to having two different raters. It seems plausible that if students are rating both their symptoms of ADHD and their life satisfaction, they would be more likely to report lower levels of life satisfaction if they are also reporting higher levels of

symptoms, thus demonstrating that their awareness of their difficulties with attention, hyperactivity, and impulsivity. However, if teachers are rating ADHD symptoms, they may be reporting symptoms for students who may not necessarily agree with those ratings for themselves or may not demonstrate an awareness of these symptoms, and thus these students might report higher levels of life satisfaction. This suggestion may be supported by the fact that all of the correlations between student ratings of ADHD symptoms and teacher ratings of ADHD symptoms were either non-significant or weak in strength.

Interestingly, results of the present study demonstrated significant relationships between one of the demographic variables, gender, and life satisfaction. This is surprising given that the large body of research on life satisfaction has not found significant relationships between demographic factors, including gender, and global life satisfaction (Huebner, Drane, & Valois, 2000). One study did find a link between gender and specific domains of satisfaction, with schools reporting higher levels of satisfaction with school and peer relationships than boys (Huebner et al., 2000). In addition, in the parallel study to the present study that was conducted with middle school age students, Ogg and colleagues (2014) did find a significant relationship between life satisfaction and gender, with girls reporting lower levels of life satisfaction as well. Interestingly, that study and the present study were conducted in the same region using similar methods. Additional research should be conducted to examine if this significant relationship between gender and life satisfaction is evident in other geographic areas or with other age groups as well.

Another interesting finding that was not an aim of this study but provides important insight for future research emerged related to teacher ratings of ADHD. It is interesting to note that the correlations between the two different teacher ratings of ADHD were weak for both

ratings of inattention and ratings of hyperactivity/impulsivity. This is important to consider as it is may suggest that their may be some limitations for teaching ratings of symptoms of ADHD in high school students. There are several plausible suggestions that could explain the lack of a strong relationship between these ratings. First, it is possible that both teachers may have accurately rated a student's behavior; however, the student's behavior could vary significantly from class to class. For example, if one of the teachers rating a student's behavior taught the student in the morning, and the second teacher taught the student in the afternoon, it is possible that the student's behavior could manifest differently in each class (e.g., due to fatigue, medication, or other factors). Moreover, a student's level of interest and competence in a class could also affect his or her behavior; thus, a teacher who teaches a student during his or her favorite class could observe very different behaviors than a teacher who teaches a student during his or her most challenging class.

However, it may also be possible that teachers are not as accurate raters of externalizing symptoms as was once believed (Phares, 1997). It may be that teachers do not have adequate training in identifying symptoms of inattention, hyperactivity, and impulsivity in adolescents. It is also possible that teacher bias (i.e., incorrect perceptions of student behavior that could be due to external factors, such as a student's academic performance in the class) could affect the accuracy of teacher ratings of these symptoms.It is interesting to note that the correlation between teacher rated symptoms of inattention was weaker than the correlation between teacher rated symptoms of hyperactivity/impulsivity. Given that inattention is considered to be more difficult to observe than hyperactivity/impulsivity this finding makes sense..

Overall, although the accuracy of teacher ratings of ADHD symptoms was not a primary research question, the data from this study do provide important insight into the question of

whether or not teachers are consistent raters of ADHD symptoms. Additional research should be conducted to further examine the extent to which high school teachers are consistent and accuratee raters of symptoms of ADHD. The present study did not have a full set of data for both sets of teachers; future research could obtain full data from two or more sets of teachers when comparing the consistency between raters in order to have more confidence in the levels of agreement. Comparing ratings to other assessment methods, such as observation, could also help researchers have confidence in the methods they select to measure ADHD symptoms. Future research should consider the importance of using more than one teacher per student. If only one teacher is used, it may be important to consider which type of teacher would best know a student before rating the student (e.g., in the present study, English teachers spent all year with students before rating their behavior, whereas alternative teachers may have only had a student in their class for a semester at a time).

Results of this study also provide important insight into some of the challenges of doing research with a high school population. For example, the difficulty in recruiting teachers and having teacher return surveys in a timely manner suggests that additional methods for recruiting and involving teachers in research should be considered in future studies. For example, in the present study, the response and involvement from English teachers was better than the response and involvement from alternative teachers. This may be due to the fact that the English department heads were involved in recruitment, and the English department as a whole was involved in the project and recruitment from the beginning. It may be that the English teachers had more investment in this project because of being assigned the role of recruitment of students, which also included additional financial incentives. Future research should consider obtaining

buy-in from teachers early on and using incentives for participation that would be motivating to teachers to compensate for their time.

Bifactor Model

Results of the present study demonstrated that the bifactor model with one general ADHD factor and two specific factors of inattention and hyperactivity/impulsivity provided very good fit to the ADHD symptom data reported by students and teachers. Moreover, results of the present study also demonstrated that the bifactor model provided better fit than other models previously used to conceptualize ADHD, such as the one-factor, two-factor, and three-factor models. These results are consistent with recent studies that have examined the bifactor model with various samples using different measures of ADHD, including one study that also examined ADHD symptoms as conceptualized by the bifactor model and life satisfaction (Ogg et al., 2014). Results of the present study demonstrated a slightly worse fit for the student bifactor model (present study: CFI = .980, RMSEA = .038; Ogg and colleagues [2014]: CFI = .995; RMSEA = .028). However, results of the present study demonstrated a slightly better fit for the teacher bifactor model (present study: CFI = .998; RMSEA = .031; Ogg and colleagues [2014]: CFI = .997; RMSEA = .043). Moreover, the fit of the bifactor model in the present study was slightly better than the fit of the bifactor model in a larger scale study conducted by Toplak and colleagues (2012), in which the fit for the bifactor model in a sample of 1350 children and adolescents with ADHD from eight different countries when ADHD symptoms were rated by teachers was .968 (CFI) and .067 (RMSEA). Thus, given the strong empirical support for the bifactor model in recent studies (Dumenci et al., 2004; Gibbins et al., 2011; Martel et al., 2010; Martel et al., 2011; Toplak et al., 2009; Toplak et al., 2012), as well as the good fit of the bifactor

model in the present study, it was determined that the bifactor model would be the best way to conceptualize ADHD symptoms in all analyses in the present study.

ADHD Symptoms and Life Satisfaction

Structural equation modeling was utilized to address the first research question, which examined the relationship between symptoms of ADHD conceptualized by the bifactor model to life satisfaction, when symptoms of ADHD are rated by students and by teachers. In addition, three covariates (i.e., gender, grade level, and SES) were included to address this research question.

Results of the model in which ADHD symptoms were self-rated demonstrated that 28% of the variance in life satisfaction was accounted for by the three factors of the bifactor model, but only the general factor of ADHD was a significant predictor of life satisfaction in the present study. This finding is partially consistent with results of the study by Ogg and colleagues (2014), which demonstrated that both the general and inattention factors of ADHD were significantly and negatively related to life satisfaction when middle school students rated their symptoms of ADHD. Thus, results of both studies demonstrate that the general factor of ADHD is significantly, negatively related to life satisfaction when ADHD symptoms are rated by students. In addition, this is partially consistent with results of the study by Gudjonsson and colleagues (2009) conducted with adults to examine the relationship between symptoms of ADHD and life satisfaction. Gudjonsson and colleagues (2009) found that symptoms of inattention and hyperactivity individually, as well as a total score of inattention and hyperactivity combined, were negatively related to lower levels of global life satisfaction. Thus, this study also found a negative, significant relationship between inattentive symptoms and levels of life satisfaction; however, it also demonstrated a significant, negative, but weaker relationship between

hyperactivity and life satisfaction, which was inconsistent with results of this study. One possible reason for this difference could be due to the use of different measures of both symptoms of ADHD and life satisfaction, as well as differences in the ages of the samples.

Results of the model in which ADHD symptoms were rated by teachers demonstrated that 23.5% of the variance in life satisfaction was accounted for by the three factors of the bifactor model, but only the inattention factor of ADHD was a significant predictor of life satisfaction in the present study. This finding is consistent with results of the study by Ogg and colleagues (2014), which demonstrated that the inattention factor was negatively and statistically significantly related to life satisfaction in middle school students when teachers rated symptoms of ADHD.

Thus, results of the present study are consistent with those of previous studies examining the relationship between symptoms of ADHD and life satisfaction. In general, it seems that general ADHD and inattention are stronger predictors of lower levels of life satisfaction than hyperactivity/impulsivity. One possible explanation for why the two specific ADHD factors, inattention and hyperactivity/impulsivity, may not be stronger predictors of life satisfaction could be because these factors have weaker loadings in the overall bifactor model than the general ADHD factor (i.e., they have smaller standardized loadings). Conceptually, it is also possible that inattention is a stronger predictor of lower levels of life satisfaction among high school students because of its association with academic impairments and the increased focus on academic success in high school (Bussing et al., 2010; Gaub & Carlson, 1997). Moreover, this could be due to the fact that inattention is more strongly related to depression than other subtypes of ADHD (Carlson & Mann, 2000), and depression has a strong, inverse relationship with life satisfaction.

ADHD Symptoms, Life Satisfaction, and Depressive Symptoms

The present study also expanded upon the previous two studies examining the relationship between ADHD symptoms and life satisfaction in that it also examined the role that life satisfaction plays in the relationship between ADHD symptoms and depressive symptoms. In particular, this study sought to examine if life satisfaction may serve as a moderator or a mediator in the relationship between symptoms of ADHD and depressive symptoms. Results of the present study demonstrate that life satisfaction may serve as a mediator in the relationship between symptoms of ADHD and depressive symptoms. Specifically, this study demonstrated that life satisfaction mediated the relationship between general ADHD symptoms and depressive symptoms when ADHD symptoms were rated by students, and life satisfaction mediated the relationship between inattentive symptoms and depressive symptoms when ADHD symptoms were rated by teachers. Conceptually, this is not surprising given that symptoms of ADHD are often associated with comorbid depression, and lower levels of life satisfaction have also been noted to precede the onset of depression (Lewinsohn et al., 1991). Thus, high school students who have symptoms of ADHD who also have low levels of life satisfaction may be particularly at risk for the development of comorbid depression. Given that adolescents with symptoms ADHD are particularly at risk for developing comorbid depression (Jensen, Burke, & Garfinkel, 1988), it is important to consider other factors that may play a role in this relationship. Thus, if life satisfaction does serve as a mediator in the relationship between symptoms of ADHD and depressive symptoms, it is important to consider developing interventions that would improve levels of life satisfaction in order to prevent some of the risk that youth with symptoms of ADHD have of developing comorbid depression.

Results of the present study also suggest that life satisfaction serves as a potential but weak moderator in the relationship between general ADHD and depression when symptoms of ADHD were rated by teachers. This suggests that a student's level of life satisfaction affects the relationship between general ADHD symptoms and symptoms of depression, thus suggesting that the presence of high levels of life satisfaction could possibly serve as a buffer against the development of depressive symptoms for youth with symptoms of ADHD. However, given that the data in the present study are cross-sectional, causation cannot be inferred.

The present study sought to examine the role that depression plays in the relationship between symptoms of ADHD and symptoms of depression in an exploratory fashion. No prior studies have examined the role that life satisfaction plays in this relationship, and given the associations between ADHD and lower levels of life satisfaction (Gudjonsson et al., 2009; Ogg et al., 2014), lower levels of life satisfaction and depression (Suldo & Huebner, 2004a), and ADHD symptoms and depressive symptoms (Jensen et al., 1988), it is important to consider how these factors may interact. Results of the present study suggest that life satisfaction may serve as a mediator or a moderator in the role between ADHD symptoms and depressive symptoms, depending on which factors of ADHD is being examined and the rater of ADHD symptoms (i.e., teachers or students). However, based on the strength of the relationships found in the present study, it seems that life satisfaction most likely serves as a mediator in the relationship between ADHD symptoms and symptoms of depression. This also seems consistent with conceptual understandings of these relationships (i.e., available literature explaining that symptoms of ADHD are associated with lower levels of life satisfaction [Gudjonsson et al., 2009; Ogg et al., 2014] and lower levels of life satisfaction often precede the onset of depression [Lewinsohn et al., 1991]). However, additional research, ideally with longitudinal data, is needed to further

explore these relationships. Longitudinal research examining these relationships would provide support for the directionality of these associations, thus providing additional information as to the role of life satisfaction in the relationship between symptoms of ADHD and depressive symptoms.

Limitations of the Current Study

Although precautions were taken to ensure that valid results were obtained and to address potential threats to validity, this study is not without limitations. First, population validity, or the ability to generalize results from the sample to a larger population, is one potential limitation of this research project. Some unique characteristics of participants in the current study may limit the populations to which results of this study can be generalized. For example, students who agreed to participate in the research study and returned their parental consent forms may differ from other high school students who decline to participate or do not return a parental consent form. However, efforts, such as utilizing incentives in recruitment, were made to recruit a diverse sample of student participants across two diverse high schools. Moreover, the final sample for the current study was compared to the overall student body across both schools, and descriptive statistics (presented in the preceding chapter) demonstrated that the sample was representative of the overall school bodies as well as the larger school district.

The use of self-report and teacher-report methods are potential limitations to the study. However, previous research has indicated that teachers are accurate reporters of student behavior, especially with externalizing behavior (Pelham, Fabiano, & Massetti, 2005; Phares, 1997). Moreover, the fact that expected relationships between ADHD symptoms and other variables, such as the negative relationships identified between ADHD symptoms and academic achievement in reading and mathematics, were identified suggests that teachers were likely

accurate reporters of ADHD symptoms in this study. Regarding use of student self-report data, research has indicated that life satisfaction is most appropriately measured by self-report, as it is an internal, subjective construct (Huebner, 1991). In support of the use of self-report on the BASC Depression subscale, research has demonstrated that children are more accurate reporters of internalizing behavior than they are of externalizing behavior (Reynolds & Graves, 1989). Moreover, research has suggested that parents and teachers may not be aware of the internalizing symptoms a child is experiencing because these symptoms are often inherently covert (Reynolds, 1994), and thus, researchers have suggested that it is preferable to obtain these data from children themselves (Merrell, 1999).

Another limitation of the present study is the fact that only student and teacher ratings of behavior, and not parent ratings of behavior, were collected. This is less of a concern for ratings of life satisfaction and depressive symptoms, which are internal, subjective ratings that are believed to be best rated by the individual. On the other hand, research has suggested that youth may not be the best raters of externalizing behavior such as ADHD symptoms (Pelham, Fabiano, & Massetti, 2005; Phares, 1997), which is why teacher ratings of ADHD were also utilized in the present study. However, typically parent reports are also collected when examining symptoms of ADHD as well in order to examine if the behavior is present across two different settings (e.g., school and home). Although this is a minor limitation in the present study because parent data would have provided additional valuable information, it is not believed that this is a significant limitation because the present study did not seek to examine students who would meet full criteria for ADHD but rather examined the presence of ADHD symptoms on a continuum.

An additional limitation of this study is the fact that symptoms of inattention, hyperactivity, and impulsivity may be due to causes independent of ADHD. For example,

research has demonstrated that students with other conditions (e.g., sleep disorders, depression) may exhibit symptoms of inattention, hyperactivity, and impulsivity. Thus, the findings of the current study may not be directly related to ADHD. In order to account for this limitation, the researcher clearly note that only symptoms of ADHD were examined in the present study; thus, findings are not assumed to be generalized to individuals with a diagnosis of ADHD. In addition, one study has demonstrated that the relationship between ADHD symptoms examined on a continuum and life satisfaction is not statistically different from the relationship between only clinically-elevated ADHD and life satisfaction (Bateman, Ogg, Suldo, & Dedrick, 2011).

An additional limitation of the present study is the fact that the student data were nested within teachers. Intraclass correlations (ICCs) were examined for teacher data for the three bifactor factors (i.e., inattention, hyperactivity/impulsivity, and the general factor), and all ICCs were above the acceptable range (inattention = .098, hyperactivity/impulsivity = .080, general ADHD = .106), thus demonstrating that these are nested data. However, this is not surprising given that students were recruited via teachers for the present study. Future research could consider alternative methods of analysis (i.e., multi-level modeling, which would be an appropriate analysis technique for research designs in which data are organized at more than one level). Future research could examine these relationships with data using multi-level modeling in which students (at the lower level of the model) are nested within teachers (at the higher level of the model).

Lastly, a limitation of the current study is the assumption that there is not another underlying, extraneous factor not controlled for in the present study that could be contributing to the relationship between the predictors (i.e., symptoms of ADHD), the mediator variable (i.e., life satisfaction), and the outcome (i.e., depression). There may have been variables not

observed in the present study that could be accounting for the relationships found in the present study. Moreover, in mediation models in which independent variables are not controlled, it is assumed that the order of variables is correctly specified and that no variables related to the variables in the model are omitted (MacKinnon, 2011). The data in the present study are cross-sectional rather than longitudinal; thus, causation and direction of mediation cannot be determined absolutely in the present study. It is possible that there are variables related to the variables in the present study that were not measured and included in the model. However, the order of the mediation model in the present study is believed to be correctly specified based on conceptualizations from available literature of relationships between symptoms of ADHD, life satisfaction, and symptoms of depression. Moreover, covariates were included as possible variables affecting the independent variables and contributing to relationships in the mediation model.

Contributions to the Literature

The current study contributes to existing literature on life satisfaction given that there are currently only two studies, one which was conducted with an adult population and one of which was conducted with a middle school population, specifically examining levels of life satisfaction in individuals with symptoms of ADHD. These studies have found modest associations between life satisfaction and ADHD symptoms (Gudjonsson et al., 2009; Ogg et al., 2014). Given that research has demonstrated that there is a relationship between the two constructs in adulthood and early adolescence, it is important to examine this relationship in later adolescence as well. Moreover, lower levels of life satisfaction are associated with increased risk for psychopathology (Diener & Diener, 1996; Lewinsohn, Redner, & Seeley, 1991), suicidal ideation or behavior (Valois, Zullig, Huebner, & Drane, 2004), decreased academic, emotional, and social self-

efficacy (Suldo & Huebner, 2006), decreased GPA and self-esteem (Gilman & Huebner, 2006), and impaired relationships with family (Gilman & Huebner, 2006). Given that individuals with ADHD are at higher risk of negative outcomes in multiple domains, it is important to consider if adolescents with ADHD experience lower levels of life satisfaction than their peers. Moreover, it is important to consider if higher levels of life satisfaction may serve as a protective factor against the development of negative outcomes for adolescents with ADHD, such as increased symptoms of depression.

This study provides important insight into the relationship between symptoms of ADHD and life satisfaction in high school students. The results of this study provide additional confirmation of the negative relationship between ADHD symptoms and life satisfaction, and this study is the first to examine this relationship with this population. These findings provide additional support for the importance of considering comprehensive interventions for youth with ADHD and developing tools to identify youth with ADHD who may be particularly at risk for developing lower levels of life satisfaction.

This study also provides additional support for the use of the bifactor model in examining ADHD. Results of this study demonstrate that the bifactor model had the best fit in conceptualizing ADHD in the present study, and this study provides additional support for the use of the bifactor model when conceptualizing ADHD and examining outcome variables related to ADHD.

Moreover, this study was the first to examine how life satisfaction may play a role in the relationship between symptoms of ADHD and depressive symptoms. Given that youth with ADHD are particularly at-risk for developing comorbid depression, it is important to consider other factors that may be involved in this relationship. This study demonstrates that life

satisfaction does play a role in the relationship between ADHD symptoms and depressive symptoms and provides support for further examination of this role in future studies. In particular, the specific role of life satisfaction (i.e., mediator or moderator) should be examined further in longitudinal research. Regardless of the specific role that life satisfaction plays in the relationship between symptoms of ADHD and symptoms of depression, the associations between these three variables in the present study provide additional support for the importance of considering life satisfaction in youth with symptoms of ADHD. In particular, if life satisfaction does mediate the relationship between symptoms of ADHD and symptoms of depression, developing interventions for life satisfaction for youth with ADHD would be a vital step in preventing the development of comorbid depression for such youth.

Unfortunately, there are no current evidence-based interventions to address life satisfaction. This study provides additional support for the importance of developing and collecting data on such interventions. Specifically, additional research is needed to identify malleable factors that could be intervened on to increase life satisfaction, and interventions for youth with low levels of life satisfaction should be piloted and evaluated for efficacy. However, there is some preliminary guidance in the literature suggesting interventions that have shown promise in increasing life satisfaction through positive psychology interventions addressing behaviors (e.g., participation in gratitude journaling) and cognitions (e.g., reframing negative cognitions; Suldo, Savage, & Mercer, 2014).

If life satisfaction serves as a mediator in the relationship between ADHD symptoms and depressive symptoms, interventions addressing life satisfaction (such as the one discussed above) should be considered as a strategy to prevent comorbid depressive symptoms for youth with symptoms of ADHD. This is particularly important to consider given that the present study

demonstrated a strong mediation effect in which life satisfaction mediated the relationship between general ADHD symptoms (rated by students) and depressive symptoms and inattentive symptoms (rated by teachers) and depressive symptoms. Given this preliminary research suggesting that at least part of the relationship between ADHD symptoms and depressive symptoms could be due to life satisfaction, an intervention targeting life satisfaction could be very beneficial in preventing the development of comorbid depressive symptoms for youth with symptoms of ADHD.

However, results of this study examining life satisfaction as a moderator provided a more complicated picture, as Figure 4 demonstrated that the relationship between ADHD symptoms and depressive symptoms was actually stronger when higher levels of life satisfaction were present. This suggests that intervening on life satisfaction actually may not be the best tactic at preventing comorbid depressive symptoms for youth with symptoms of ADHD, as higher levels of life satisfaction would not actually be beneficial in terms of preventing depressive symptoms for youth with ADHD symptoms. However, the finding in the present study may be due to the fact that life satisfaction and depression were so strongly correlated in this data set. Therefore, additional research exploring life satisfaction as a moderator in the relationship between ADHD symptoms and depressive symptoms is needed before determining appropriate interventions related to life satisfaction for youth with symptoms of ADHD.

Implications for School Psychologists

Results of the present study have several important implications for school psychologists. First, the descriptive statistics in the present study demonstrate that there is a subgroup of students at the high school level with significantly elevated symptoms of ADHD. This is important knowledge for school psychologists, as it demonstrates that identifying students with

symptoms of ADHD and working with these students is equally as important at the high school level as it is with younger students.

One promising finding of the present study is that the relationship between symptoms of ADHD and depressive symptoms is largely explained by levels of life satisfaction. This is encouraging because it demonstrates that symptoms of ADHD in isolation are not necessarily associated with increased risk for depression, but rather it is the decrease in life satisfaction associated with the presence of ADHD symptoms that is associated with students being particularly at-risk for developing depression. Interestingly, according to the graph, it seems that when higher levels of life satisfaction are present, the relationship between symptoms of ADHD and depressive symptoms is stronger; however, this relationship may be due to the fact that there is such a strong correlation between life satisfaction and depressive symptoms in this study, and often moderator analyses do not use variables that are such strongly correlated. Results of this study point to the importance of identifying students with symptoms of ADHD who may already demonstrate or be at-risk for developing lower levels of life satisfaction and corresponding depression. School psychologists can play an important role in the identification of students in schools who may need additional supports to aid in the prevention of developing lower levels of life satisfaction and depression. Currently, there are no evidence-based interventions for improving life satisfaction in youth; thus, this study provides further support for the importance of developing and utilizing strategies to improve students' levels of life satisfaction and thus prevent the development of other related concerns. School psychologists can play an important role in developing strategies for identifying and intervening to address lower levels of life satisfaction in students.

Conclusions and Future Directions

This study is the third study to examine the relationship between symptoms of ADHD and life satisfaction, and it is the first to examine this relationship with a sample of high school students. The findings of this study are primarily consistent with those of the previous two studies (Gudjonsson et al., 2009; Ogg et al., 2014) examining this relationship, with general ADHD and inattention negatively impacting life satisfaction and hyperactivity/impulsivity playing less of a role in predicting life satisfaction. Results of the present study also demonstrate that these relationships differ based on who is rating symptoms of ADHD (i.e., students or teachers). This study also goes one step further in that it also examines one of the possible outcomes of symptoms of ADHD and life satisfaction: depressive symptoms. Results of the present study also demonstrated that life satisfaction weakly moderated the relationship between general ADHD and depressive symptoms when ADHD symptoms were rated by teachers. Additionally, results of the present study demonstrated that life satisfaction mediated the relationship between general ADHD (when ADHD symptoms are rated by students) and depressive symptoms and between inattentive symptoms (when ADHD symptoms are rated by teachers) and depressive symptoms. Thus, also the exact role of life satisfaction in the relationship between ADHD symptoms and depressive symptoms still needs to be explored in more depth, results of the present study provide support for the fact that life satisfaction is an important variable to consider in the relationship between ADHD symptoms and depressive symptoms. Additional research, especially longitudinal research, is needed to further explore the role that life satisfaction plays in this relationship and to provide additional information as to the direction of the relationships discovered in the present study.

References

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.

American Psychiatric Association (1980). *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.). Washington, DC: American Psychiatric Association.

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Barkley, R. A. (2006). *Attention-Deficit Hyperactivity Disorder: A handbook for diagnosis and treatment* (3rd ed.). New York, NY: The Guilford Press.

Barkley, R. A., DuPaul, G. J., & McMurray, M. B. (1990). A comprehensive evaluation of attention deficit disorder with and without hyperactivity. *Journal of Consulting and Clinical Psychology, 58,* 775-789.

Barkley, R.A., Fischer, M., Edelbrock, C. S., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: An 8-year prospective follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry, 29,* 546-557. doi: 10.1097/00004583-199007000-00007

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182. doi: 10.1037/0022-3514.6.1171

Bateman, L., Ogg, J., Suldo, S., & Dedrick (2011). Relationships between Life Satisfaction, ADHD Symptoms, and Associated Outcomes in Middle School Students (unpublished thesis). University of South Florida, Tampa.

Biederman, J., Faraone, S., Milberger, S., Curtis, S., Chen, L., Marrs, A., et al. (1996). Predictors of persistence and remission of ADHD into adolescence: Results from a four-year prospective follow-up study. *The Journal of the Academy of Child and Adolescent Psychiatry, 35,* 343-351. doi: 10.1097/00004583-199603000-00016

Burns, G. L., Boe, B., Walsh, J. A., Sommers-Flanagan, R., & Teegarden, L. A. (2001). A confirmatory factor analysis on the DSM-IV ADHD and ODD symptoms: What is the best model for the organization of these symptoms? *Journal of Abnormal Child Psychology, 29,* 339-349. doi: 0091-0627/01/0800-0339

Bussing, R., Mason, D., Bell, L., Porter, P., & Garvan, C. (2010). Adolescent outcomes of childhood Attention-Deficit/Hyperactivity Disorder in a diverse community sample. *Journal of the American Academy of Child & Adolescent Psychiatry, 49,* 595-605. doi: 10.1016/j.jaac.2010.03.006

Carlson, C. L., & Mann, M. (2000). Attention-deficit/hyperactivity disorder, predominantly inattentive subtype. *Child and Adolescent Psychiatric Clinics of North America, 9*, 499-510. doi: 2000-00431-003

Crystal, D. S., Ostrander, R., Chen, R., & August, G. (2001). Multimethod assessment of psychopathology among DSM-IV subtypes of children with attention-deficit/hyperactivity disorder: Self, parent and teacher reports. *Journal of Abnormal Child Psychology, 29*, 189-205. doi: 0091-0627/01/0600-0189

Danckaerts, M., Sonuga-Barke, E. J. S., Banaschewski, T., Buitelaar, J., Döpfner, M., Hollis, C., et al. (2010). The quality of life of children with attention deficit/hyperactivity disorder: A systematic review. *European Child & Adolescent Psychiatry, 19,* 83-105. doi: 10.1007/s00787-009-0046-3

Danforth, J. S., Barkley, R. A., & Stokes, T. F. (1991). Observations of parent-child interactions with hyperactive children: Research and clinical implications. *Child Psychology Review, 11,* 703-727. doi: 10.1016/0272-7358(91)90127-G

Dew, T., & Huebner, E. S. (1994). Adolescents' perceived quality of life: An exploratory investigation. *Journal of School Psychology, 32,* 185-199. doi: 10.1016/0022-4405(94)90010-8

Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science, 7,* 181-185.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49,* 1-5. doi: 10.1207/s15327752jpa4901_13

Diener, E., Oishi, S., & Lucas, R. E. (2009). Subjective well-being: The science of happiness and life satisfaction. In C.R. Snyder & S.J. Lopez (Eds.), *Oxford Handbook of Positive Psychology (2nd Ed)*. (pp. 187-194). New York: Oxford University Press.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125,* 276-302. doi: 0033-2909/99

Dumenci, L., McConaghy, S. H., & Achenbach, T. M. (2004). A hierarchical three-factor model of inattention-hyperactivity-impulsivity derived from the attention problems syndrome of the teacher's report form. *School Psychology Review, 33,* 287–301.

DuPaul, G.J. (2007). School-based interventions for students with Attention Deficit Hyperactivity Disorder: Current status and future directions. *School Psychology Review, 36,* 183-194.

Edwards, G., Barkley, R. A., Laneri, M., Fletcher, K., & Metevia, L. (2001). Parent-adolescent conflict in teenagers with ADHD and ODD. *Journal of Abnormal Child Psychology, 29,* 557-572. doi: 0091-0627/01/1200-0557

Escobar, R., Soutullo, C. A., Hervas, A., Gastaminza, X., Polavieja, P., & Gilaberte, I. (2005). Worse quality of life for children with newly diagnosed attention-deficit/hyperactivity disorder, compared with asthmatic and healthy children. *Pediatrics, 116,* e364-e369. doi: 10.1542/peds.2005-0386

Felce, D., & Perry, J. (1995). Quality of life: Its definition and measurement. *Research in Developmental Disabilities, 16,* 51-74. doi: 10.1061/0891-4222(94)00028-8

Fleming, C. B., Harachi, T. W., Cortes, R. C., Abbott, R. D., & Catalano, R. F. (2004). Level and change in reading scores and attention problems during elementary school as predictors of problem behaviors in middle school. *Journal of Emotional and Behavioral Disorders, 12,* 130-144. doi: 10.1177/10634266040120030101

Florida Department of Education. (2007). Reading and Mathematics: *Technical report for 2006 Florida Comprehensive Assessment Test administrations.* Tallahassee, FL: Author.

Fogle, L. M., Huebner, E. S., & Laughlin, J. E. (2002). The relationship between temperament and life satisfaction in early adolescence: Cognitive and behavioral mediation models. *Journal of Happiness Studies, 3,* 373-392. doi: 10.1023/A:1021883830847

Frazier, T. W., Demaree, H. A., & Youngstrom, E. A. (2004). Meta-analysis of intellectual and neuropsychological test performance in attention-deficit/hyperactivity disorder. *Neuropsychology, 18,* 543-55. doi: 10.1037/0894-4105.18.3.543

Froehlich, T. E., Lanphear, B. P., Epstein, J. N., Barbaresi, W. J., Katusic, S. K., & Kahn, R. S. (2007). Prevalence, recognition, and treatment of Attention-Deficit/Hyperactivity Disorder in a national sample of U.S. children. *Archives of Pediatric Adolescent Medicine, 161*, 857-864. doi: 10.1001/archpedi.161.9.857

Fujita, F., & Diener, E. (2005). Life satisfaction set point: Stability and change. *Journal of Personality and Social Psychology, 88,* 158-164. doi: 10.1037/0022-3514.88.1.158

Gaub, M., & Carlson, C. L. (1997). Behavioral characteristics of DSM-IV ADHD subtypes in a school-based population. *Journal of Abnormal Child Psychology, 25,* 103-111. doi: 10.1023/A:1025775311259

Gibbins, C., Toplak, M. E., Flora, D. B., Weiss, M. D., & Tannock, R. (2011). Evidence for a general factor model of ADHD in adults. *Journal of Attention Disorders, 16,* 635-644. doi: 10.1177/1087054711416310

Gilman, R. (2001). The relationship between life satisfaction, social interest, and frequency of extracurricular activities among adolescent students. *Journal of Youth and Adolescence, 30,* 749-767. doi: 10.1023/A:1012285729701

Gilman, R., & Huebner, E. S. (2003). A review of life satisfaction research with children and adolescents. *School Psychology Quarterly, 18,* 47-65. doi: 10.1521/scpq.18.2.192.21858

Gilman, R., & Huebner, E. S. (2006). Characteristics of adolescents who report very high life satisfaction. *Journal of Youth and Adolescence, 35,* 311-319. doi: 10.1007/s10964-006-9036-7

Gilman, R., Huebner, E. S., & Laughlin, J. E. (2000). A first study of the Multidimensional Students' Life Satisfaction Scale with adolescents. *Social Indicators Research, 52,* 135-160. doi: 10.1023/A:1007059227507

Gittelman, R., Mannuzza, S., Shenker, R., & Bonagura, N. (1985). Hyperactive boys almost grown up: 1. Psychiatric status. *Archives of General Psychiatric, 42,* 937-947. doi: 10.1001/archpsyc.1991.01810250079012

Goldbeck, L., Schmitz, T. G., Besier, T., Herschbach, P., & Henrich, G. (2007). Life satisfaction decreases during adolescence. *Quality of Life Research, 16,* 969-979. doi: 10.1007/s11136-007-9205-5

Graetz, B.W., Sawyer, M.G., Hazell, P.L., Arney, F., & Baghurst, P. (2001). Validity of DSM-IV/ADHD subtypes in a nationally representative sample of Australian children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 40,* 1410-1417. doi: 10.1097/00004583-200112000-00011

Greenspoon, P. J., & Saklofske, D. (2001). Toward an integration of subjective well-being and psychopathology. *Social Indicators Research, 54,* 81-108. doi: 10.1023/A:1007219227883

Gudjonsson, G. H., Sigurdsson, J. F., Eyjolfsdottir, G. A., Smari, J., & Young, S. (2009). The relationship between satisfaction with life, ADHD symptoms, and associated problems among university students. *Journal of Attention Disorders, 12,* 507-515. doi: 10.1177/1087054708323018

Hampel, P., & Desman, C. (2006). Coping and quality of life among children and adolescents with attention deficit/hyperactivity disorder. *Prax Kinderpsychol Kinderpsychiatr, 55,* 425-443.

Higgs, P., Hyde, M., Wiggins, R., & Blane, D. (2003). Researching quality of life in early old age: The importance of sociological dimension. *Social Policy and Administration, 37,* 239-252. doi: 10.1111/1467-9515.00336

Hodgens, J. B., Cole, J., & Boldizar, J. (2000). Peer-based differences among boys with ADHD. *Journal of Clinical Child Psychology, 29*, 443-452.

Hoza, B. (2007). Peer functioning in children with ADHD. *Journal of Pediatric Psychology, 32,* 655-663. doi: 10.1016/j.ambp.2006.04.011

Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55. doi: 10.1080/10705519909540118

Huebner, E. S. (1991). Correlates of life satisfaction in children. *School Psychology Quarterly, 6,* 103-111. doi: 10.1037/h0088805

Huebner, S. (1994). The Students' Life Satisfaction Scale: An assessment of psychometric properties with black and white elementary school students. *Social Indicators Research, 34,* 315-323.

Huebner, E. S., & Alderman, G. L. (1993). Convergent and discriminant validation of a children's life satisfaction scale: Its relationship to self- and teacher-reported psychological problems and school functioning. *Social Indicators Research, 30,* 71-82.

Huebner, E. S., Drane, W., & Valois, R. F. (2000). Levels and demographic correlates of adolescent life satisfaction reports. *School Psychology International, 21,* 187-198. doi: 10.1007/s10902-007-9077-y

Jensen, J. B., Burke, N., & Garfinkel, B. D. (1988). Depression and symptoms of attention deficit disorder with hyperactivity. *Journal of the American Academy of Child and Adolescent Psychiatry, 27,* 742-747.

Jensen, P. S., Martin, D., & Cantwell, D. (1997). Comorbidity in ADHD: Implications for research, practice, and DSM-V. *Journal of American Academy of Child and Adolescent Psychiatry, 36,* 1065-1079.

Kadesjö, B., & Gillberg, C. (2001). The comorbidity of ADHD in the general population of Swedish school-age children. *Journal of Child Psychology and Psychiatry, 42*(4), 487-492.

Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American Psychologist, 62,* 95-108. doi: 10.1037/0003-066X.62.2.95

Klassen, A. F., Miller, A., & Fine, S. (2004). Health-related quality of life in children and adolescents who have a diagnosis of attention-deficit/hyperactivity disorder. *Pediatrics, 114,* 541-547. doi: 10.1542.peds.2004-0844.

Klassen, A. F., Miller, A., & Fine, S. (2006). Agreement between parent and child report of quality of life in children with attention-deficit/hyperactivity disorder. *Child: Care, Health & Development, 32,* 397-406. Doi: 10.1111/j.1365-2214.2006.00609.x

Kline, R. B. (2012). *Practices and Principles of Structural Equation Modeling, 3rd Edition.* New York, NY: The Guilford Press.

Kline, R. B. (2005). *Principles and practices of structural equation modeling* (2nd ed.). New York: The Guilford Press.

Lahey, B. B. (2001). Should the combined and predominantly inattentive types of ADHD be considered distinct and unrelated disorders? Not now, at least. *Clinical Psychology: Science and Practice, 8*, 494-497. doi: 10.1093/clipsy.8.4.494

Landgraf, J. M., & Abetz, L. N. (1997). Functional status and well-being of children representing 3 cultural groups: Initial self reports using the CHQ-CF87. *Psychology & Health, 12,* 839-854. doi: 10.1080/08870449708406744

Lara, C., Fayyad, J., de Graaf, R., Kessler, R., Aguilar-Gaxiola, S., Angermeyer, M., et al. (2009). Childhood predictors of adult attention-deficit/hyperactivity disorder: Results from the World Health Organization World Mental Health Survey Initiative. *Biological Psychiatry, 65,* 46-54. doi: 10.1016/j.biopsych.2008.10.005

Lau, R. S. & Cheung, G. W. (2012). Estimating and comparing specific mediation effects in complex latent variable models. *Organizational Research Methods, 15,* 3-16. doi: 10.1177/1094428110391673

Lent, R. W. (2004). Toward a unifying theoretical and practical perspective on well-being and psychosocial adjustment. *Journal of Counseling Psychology, 51*, 482-509. doi: 10.1037/0022-0167.51.4.482

Lewinsohn, P. M., Redner, J. E., & Seeley, J. R. (1991). The relationship between life satisfaction and psychosocial variables: New perspectives. In F. Strack, M. Argyle, N. Schwartz (Eds.), Subjective well-being: An interdisciplinary perspective (pp. 141-169). New York: Pergamon Press, Inc.

Loe, I. M., & Feldman, H. M. (2007). Academic and educational outcomes of children with ADHD. *Ambulatory Pediatrics, 7*, 82-90. doi: 10.1093/jpepsy/jsl054

MacKinnon, D. P. (2011). Integrating mediators and moderators in research design. *Research on Social Work Practice, 21,* 675-681. doi: 10.1177/1049731511414148

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39,* 99-128. doi: 10.1207/s15327906mbr3901_4

Martel, M. M., Roberts, B., Gremillion, M., von Eye, A. & Nigg, J. T. (2011). External validation of bifactor model of ADHD: Explaining heterogeneity in psychiatric comorbidity, cognitive control, and personality trait profiles within DSM-IV ADHD. *Journal of Abnormal Child Psychology, 39,* 1111–1123. doi: 10.1007/s10802-011-9538-7

Martel, M. M., von Eye, A., & Nigg, J. T. (2010). Revisiting the latent structure of ADHD: Is there a "G" factor? *Journal of Child Psychology & Psychiatry, 51(8)*, 905-914. doi: 10.1111/j.1469-7610.2010.02232.x

Martin-Löf, P. (1974). The notion of redundancy and its use as a quantitative measure of the discrepancy between a statistical hypothesis and observational data. *Scandinavian Journal of Statistics, 1,* 3. doi: 10.2307/4615544

Massetti, G. M., Lahey, B. B., Pelham, W. E., Loney, J., Ehrhardt, A., Lee, S. S., & Kipp, H. (2008). Academic achievement over 8 years among children who met modified criteria for attention-deficit/hyperactivity disorder at 4-6 years of age. *Journal of Abnormal Child Psychology, 36,* 399-410. doi: 10.1007/s10802-007-9186-4

McBurnett, K., Pfiffner, L. J., & Frick, P. J. (2001). Symptom properties as a function of ADHD type: An argument for continued study of sluggish cognitive tempo. *Journal of Abnormal Child Psychology, 29*, 207-213. doi: 0091-0627/01/0600-2070

McCullough, G., Huebner, E. S., & Laughlin, J. E. (2000). Life events, self-concept, and adolescents' positive subjective well-being. *Psychology in the Schools, 37,* 281-290. doi: 10.1002(SICI)1520-6807(200005)37

McKnight, C. G., Huebner, E. S., & Suldo, S. (2002). Relationships among stressful life events, temperament, problem behavior, and global life satisfaction in adolescents. *Psychology in the Schools, 39,* 677-687. doi: 10.1002/pits.10062

Merrell, K. W., & Wolf, T. M. (1998). The relationship of teacher-rated social skills deficits and ADHD characteristics among kindergarten age children. *Psychology in the Schools, 35,* 101-109. doi: 10.1002/(SICI)1520-6807(199804)35

Miranda, A., Soriano, M., Fernández, I., & Meliá, A. (2008). Emotional and behavioral problems in children with attention deficit-hyperactivity disorder: Impact of age and learning disabilities. *Learning Disability Quarterly, 31*, 171-185.

Muthén, L. K., & Muthén, B. O. (1998-2010). *Mplus user's guide*. Sixth Edition. Los Angeles, CA: Muthén & Muthén.

Myers, D., & Diener, E. (1995). Who is happy? *Psychological Science, 6,* 10-19.

New America Foundation. (2011). Hillsborough County School District: Comparative analysis of funding, student demographics, and achievement data. Retrieved from http://febp.newamerica.net/k12/FL/1200870

Nigg, J. T., Goldsmith, H. H., & Sachek, J. (2004). Temperament and attention deficit hyperactivity disorder: The development of a multiple-pathway model. *Journal of Clinical Child and Adolescent Psychology, 33,* 42-53.

Nolan, E. E., Gadow, K. D., & Sprafkin, J. (2001). Teacher reports of DSM-IV ADHD, ODD, and CD symptoms in school children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*, 241-249. doi: 10.1097/00004583-2200102000-00020

Normand, S., Flora, D. B., Toplak, M. E., & Tannock, R. (2012). Evidence for a general ADHD factor in a longitudinal general school population study. *Journal of Abnormal Child Psychology, 40,* 555-567. doi: 10.1007/s10802-011-9584-5

Nunnally, J. C. (1978). Psychometric theory. New York: McGraw-Hill Inc.

Ogg, J. A., Bateman, L., Dedrick, R. F., & Suldo, S. M. (2014 online, awaiting paper publication). The relationship between life satisfaction and ADHD symptoms in middle school students: Using a bifactor model. *Journal of Attention Disorders.* doi: 10.1177/1087054714521292

Park, N. (2005). Life satisfaction among Korean children and youth: A developmental perspective. *School Psychology International, 26,* 209-223. doi: 10.1177/0143034305052914

Pavot, W., & Diener, E. (1993). Review of the Satisfaction with Life Scale. *Psychological Assessment, 5,* 164-172. doi: 10.1037/1040-3590.5.2.164

Phares, V. (1997). Accuracy of informants: Do parents think that mother knows best? *Journal of Abnormal Child Psychology, 25,* 165-171.

Pongwilairat, K., Louthrenoo, O., Charnsil, C., & Witoonchart, C. (2005). Quality of life of children with attention-deficit/hyper activity disorder. *Journal of the Medical Association of Thailand, 88,* 1062-1066.

Reise, S. P., Morizot, J., & Hays, R. D. (2007). The role of the bifactor model in resolving dimensionality issues in health outcomes measures. *Quality of Life Research*, *16*, 19 – 31. doi: 10.1007/s11136-007-9183-7

Reynolds, W. M., & Graves, A. (1989). Reliability of children's reports of depressive symptomatology. *Journal of Abnormal Child Psychology, 17,* 647-655. doi: 10.1007/BF00917728

Reynolds, C. R., & Kamphaus, R. (2004). *Behavior Assessment System for Children* (2nd ed.). Circle Pines, MN: American Guidance Services.

Sawyer, M. G., Whaites, L., Rey, J. M., Hazell, P. L., Graetz, B. W., & Baghurst, P. (2002). Health-related quality of life of children and adolescents with mental disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 41,* 530-537. doi: 10.1186/1477-7525-11-129

Sirgy, M. J., Michalos, A. C., Ferriss, A. L., Easterlin, R. A., Patrick, D., & Pavot, W. (2006). The quality (QOL) research movement: Past, present, and future. *Social Indicators Research, 76*, 343-466. doi: 10.1007/s11205-005-2877-8

Suldo, S. M., & Huebner, E. S. (2004a). Does life satisfaction moderate the effects of stressful life events on psychopathological behavior during adolescence? *School Psychology Quarterly, 19,* 93-105. doi: 10.1521/scpq.19.2.93.33313

Suldo, S. M., & Huebner, E. S. (2004b). The role of life satisfaction in the relationship between authoritative parenting dimensions and adolescent problem behavior. *Social Indicators Research, 66,* 165-195. doi: 10.1023/B:SOCI.0000007498.62080.1e

Suldo, S. M., & Huebner, E. S. (2006). Is extremely high life satisfaction during adolescence advantageous? *Social Indicators Research, 78,* 179-203. doi: 10.1007/s11205-0058208-2

Suldo, S.M., Savage, J.A., & Mercer, S. (2014). Increasing middle school students' life satisfaction: Efficacy of a positive psychology group intervention. *Journal of Happiness Studies, 15,* 19-42. doi: 10.1007/s10902-013-9414-2

Suldo, S. M. & Shaffer, E. J. (2008). Looking beyond psychopathology: The dual-factor model of mental health in youth. *School Psychology Review, 37*, 52-68.

Szatmari, P., Offord, D. R., & Boyle, M. H. (1989). Ontario Child Health Study: Prevalence of attention deficit disorder with hyperactivity. *Journal of Child Psychology and Psychiatry, 30,* 219-230.

Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed). Boston: Pearson Education. doi: 10.1111/j.1469-7610.1989.tb00236.x

Toplak, M. E., Pitch, A., Flora, D. B., Iwenofu, L., Ghelani, K., Jain, U., et al. (2009). The unity and diversity of inattention and hyperactivity/impulsivity in ADHD: Evidence for a general factor with separable dimensions. *Journal of Abnormal Child Psychology, 37,* 1137-1150. doi: 10.1007/s10802-009-9336-y

Toplak, M. E., Sorge, G. B., Flora, D. B., Chen, W., Banaschewski, T., Buitelaar, J., et al. (2012). The hierarchical factor model of ADHD: Invariant across age and national groupings? *Journal of Child Psychology and Psychiatry*, *53*, 292-303. doi: 10.1111/j.1469-7610.2011.02500.x

Topolski, T. D., Edwards, T. C., Patrick, D. L., Varley, P., Way, M. E., Buesching, D. P. (2004). Quality of life of adolescent males with attention-deficit hyperactivity disorder. *Journal of Attention Disorders, 7,* 163-173. doi: 10.1177/108705470400700304

Valois, R. F., Zullig, K. J., Huebner, E. G., & Drane, J. W. (2004). Life satisfaction and suicide among high school adolescents. *Social Indicators Research, 66,* 81-105. doi: 10.1023/B:SOCI.0000007499.19430.2f

Weiss, G., Hechtman, L., Milroy, T., & Perlman, T. (1985). Psychiatric status of hyperactives as adults: A controlled prospective 15-year follow-up of 63 hyperactive children. *Journal of American Academy of Child Psychiatric, 24,* 211-220. doi: 10.1016/S0002-7138(09)60450-7

Weiss, G., Hechtman, L., Perlman, T., Hopkins, J., & Wener, A. (1979). Hyperactives as young adults: A controlled prospective ten-year follow-up of 75 children. *Archives of General Psychiatry, 36,* 675-681. doi: 10.1001/archpsych.1979.01780060065007

Williams, J., & MacKinnon, D. P. (2008). Resampling and distribution of the product methods for testing indirect effects in complex models. *Structural Equation Modeling, 15,* 23-52. doi: 10.1080/10705510701758166

Willcutt, E. G. (2012). The prevalence of DSM-IV Attention-Deficit/Hyperactivity Disorder: A meta-analytic review. *Neurotherapeutics, 9,* 490-499. doi: 10.1007/s13311-012-0135-8

Wolraich, M. L., Feurer, I. D., Hannah, J. H., Baumgaertel, A., & Pinnock, T. Y. (1998). Obtaining systematic teacher reports of disruptive behavior disorders utilizing DSM-IV. *Journal of Abnormal Child Psychology, 26,* 141-152. doi: 10.1023/A:1022673906401

Wolraich, M. L., Lambert, E. W., Baumgaertel, A., Garcia-Tornel, S., Feurer, I. D., Bickman, L., & Doffing, M. A. (2003). Teachers' screening for Attention Deficit/Hyperactivity Disorder: Comparing multinational samples on teacher ratings of ADHD. *Journal of Abnormal Child Psychology, 31,* 445-455. doi: 10.1023/A:1023847719796

Wolraich, M. L., Wibbelsman, C. J., Brown, T. E., Evans, S. W., Gotlieb, E. M., Knight, J. R., et al. (2005). Attention-deficit/hyperactivity disorder among adolescents: A review of the diagnosis, treatment, and clinical implications. *Pediatrics, 115*, 1734-1746. doi: 10.1542/peds.2004-1959

Young, M. H., Miller, B. C., Norton, M. C., & Hill, E. J. (1995). The effect of parental supportive behaviors on life satisfaction of adolescent offspring. *Journal of Marriage and the Family, 57,* 813-822.

Young, S., & Ross, R. R. (2007). R & R2 for ADHD youths and adults: A prosocial competence training program. Ottawa: Cognitive Centre of Canada. Retrieved from www.cognitivecentre.ca

Zullig, K. J., Valois, R. F., Huebner, E. S. Oeltmann, J. E., & Drane, J. W. (2001). Relationship between perceived life satisfaction and adolescent substance use. *Journal of Adolescent Health, 25,* 353-366. doi: 10.1016/S1054-139X(01)00269-5

Appendix A

Parent Consent

Dear Parent or Caregiver:

This letter provides information about a research study that will be conducted by Sarah Fefer, Lisa Bateman, and Dr. Julia Ogg from the School Psychology program at University of South Florida (USF). Our goal in conducting the study is to investigate the experiences of adolescents exhibiting behavioral risk factors.

- ✓ Who We Are: Sarah Fefer, M.A. and Lisa Bateman, M.A. are School Psychology doctoral students at USF. Dr. Julia Ogg is a school psychology professor in the College of Education at USF. We are planning the study in cooperation with the principal and administrators at your high school to ensure the study provides information that will be helpful to the schools.

- ✓ Why We Are Requesting Your Child's Participation: This study is being conducted as part of a project entitled, "Perceptions of Competence and Life Satisfaction: Exploring Behavioral Risk Factors Among High School Students." Your child is being asked to participate because they are a student at a participating high school. Students currently taking an English are being asked to participate.

- ✓ Why Your Child Should Participate: We need to learn more about how to help students be successful during the high school years. The information that we collect from students and teachers may help to increase our overall knowledge of difficulties students frequently encounter in school and help support students' success. Please note that your child will not be paid for participation in the study. However, all students who return parental consent forms will be entered into a drawing for a gift certificate, regardless of if you allow your child to participate or not. Students who complete the surveys will also receive a small gift to thank them for participation.

- ✓ What Participation Requires: If you give permission for your child to participate in the study, he or she will be asked to complete a paper-and-pencil questionnaire. The questionnaire will ask about your child's behaviors (e.g., his/her perception of their ability to pay attention and focus),

his/her perceptions of how he/she does academically and socially [i.e., getting along with peers], how satisfied he/she is with his/her life, how depressed he/she feels, as well as how supported he/she feels by his/her teachers. Completion is expected to take your child about 35 minutes. We will personally administer the questionnaires along with a trained team of researchers from USF during regular school hours. Questionnaires will be administered to students who have parent permission to participate. Each child's teacher will also complete a questionnaire about the student's academic and social competence, their engagement in class, and their behavior. Participation will occur during one class period this Fall semester. In addition, students' school records will be reviewed for academic achievement as well as English language learner and reduced lunch status.

- ✓ Please Note: Your decision to allow your child to participate in this research study is completely voluntary. You are free to allow your child to participate in this research study or to withdraw him or her at any time. If you choose not to allow your child to participate, or if you withdraw your child at any point during the study, this will in no way affect your relationship with the high school, USF, or any other party.

- ✓ Confidentiality of Your Responses and Your Child's Responses: There is minimal risk to your child for participating in this research. We will be present during administration of the questionnaires, along with a team of trained researchers, in order to provide assistance to your child if he or she has any questions or concerns. Your child's privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, and the USF Institutional Review Board may inspect the records from this research project, but you and your child's individual responses will not be shared with school system personnel or anyone other than us and our research assistants. Your child's completed questionnaire will be assigned a code number to protect the confidentiality of his or her responses. Only we will have access to the locked file cabinet stored at USF that will contain: 1) all records linking code numbers to participants' names, and 2) all information gathered from school records. Please note that although your child's specific responses on the questionnaires will not be shared with school staff, if your child indicates that he or she intends to harm him or herself, we will provide your child's name to the school mental health counselors and ask that they follow up with your child to ensure your child's safety. We will also let mental health counselors know if your child scores high on a measure of depression. The mental health counselors will determine if additional follow-up is needed.

- ✓ What We'll Do With Your Responses and Your Child's Responses: We plan to use the information from this study to inform educators and psychologists about helping all students be successful in school. The results of this study may be published. However, the data obtained from you and your child will be combined with data from other people in the publications. The published results will not include your name or your child's name or any other information that would in any way personally identify your child.

- ✓ Questions? If you have any questions about this research study, please contact Dr. Julia Ogg at (813) 974-9698. If you have questions about your child's rights as a person who is taking part in

a research study, you may contact a member of the Division of Research Compliance of the University of South Florida at (813) 974-9343.

✓ Do You Want to Participate or Have Your Child Participate? To permit your child to participate in this study, complete the attached child consent form and have your child turn it in to his or her teacher.

Sincerely,

Sarah Fefer, M. A.

School Psychology Doctoral Student

Lisa Bateman, M.A.

School Psychology Doctoral Student

Julia A. Ogg, Ph.D.

Assistant Professor of School Psychology

USF College of Education

Consent for Child to Take Part in this Research Study

☐ I do not give permission to let my child take part in this study.

☐ I freely give my permission to let my child take part in this study. I understand that this is research. I have received a copy of this letter and consent form for my records.

_____	_____	
Printed name of child	Child's Homeroom Teacher	Date
_____	_____	
Signature of parent of child taking part in the study	Printed name of parent	

Statement of Person Obtaining Informed Consent

I certify that participants have been provided with an informed consent form that has been approved by the University of South Florida's Institutional Review Board and that explains the nature, demands, risks, and benefits involved in participating in this study. I further certify that a phone number has been provided in the event of additional questions.

_____	_____	_____
Signature of person obtaining consent	Printed name of person obtaining consent	Date

Appendix B

Student Assent

Hello!

This letter explains a research study in which we would like you to take part. Our goal in conducting the study is to learn more about your thoughts, feelings, and attitudes related to school, family, friends, and life in general.

- ✓ Who We Are: Sarah Fefer, M.A. and Lisa Bateman, M.A. are School Psychology doctoral students at USF. Dr. Julia Ogg is a school psychology professor in the College of Education at USF. We are planning the study in cooperation with the principal and administrators to ensure the study provides information that will be helpful to the schools.

- ✓ Why We are Asking You to Take Part in the Study: This study is being conducted as part of a project entitled, "Perceptions of Competence and Life Satisfaction: Exploring Behavioral Risk Factors Among High School Students." You are being asked to participate because you are a student at a participating high school. All students currently enrolled in an English class in which the teacher has agreed to participate in this study will be asked to participate.

- ✓ Why You Should Take Part in the Study: We need to learn more about how to help students be successful during the high school years. The information that we collect from you may help increase our overall knowledge of difficulties frequently encountered in school. Please note you will not be paid for your participation in the study. However, all students who complete and return parental consent forms, regardless of whether or not your parents agree to allow you to participate in this study, will have a chance to win a gift card.

- ✓ What Will Happen if You're in the Study: If you choose to take part in the study you and your teachers will be asked to complete a paper-and-pencil questionnaire. The questionnaire will ask about your behaviors (e.g., your perception of your ability to pay attention and focus), your perceptions of how you perform academically and in getting along with your peers, how satisfied you are with your life, how depressed you feel, as well as how supported you feel by your teachers. It will take you about 35 minutes to complete the questionnaire. After you finish, a researcher will look over your questionnaire to ensure that you have answered all of the questions you

intended to answer with only one response. If you choose to take part in the study, we will also look at some of your school records including your grades, English language learner status, FCAT scores, and reduced lunch status.

- ✓ Please Note: Your involvement in this study is voluntary (it's your choice). By signing this form, you are agreeing to take part in this study. Your decision to take part, not to take part, or to stop taking part in the study at any time will not affect your student status or your grades; you will not be punished in any way. If you choose not to take part, it will not affect your relationship with your high school, USF, or anyone else.

- ✓ Privacy of your Involvement: Your privacy and research records will be kept confidential (private, secret) to the extent of the law. People approved to do research at USF, people who work with the Department of Health and Human Services, the USF Institutional Review Board, and its staff, and other individuals acting on behalf of USF may look at the records from this research project. However, your responses to the surveys will not be shared with people in the school system or anyone other than us and our research assistants. Your surveys will be given a code number to protect the confidentiality of your responses. Only we will have the ability to open the locked file cabinet stored at USF that will contain: 1) all records linking code numbers to names, and 2) all information gathered from school records. All records from the study (completed surveys, information from school records) will be destroyed in four years. Please note that although your specific responses and comments will not be shared with school staff, if you say or write that you may harm yourself or someone else, or if your responses on specific surveys indicate extreme emotional distress, we will contact district mental health counselors to make sure everyone is safe. The district mental health counselor may meet with you to make sure you are safe.

- ✓ What We'll Do With Your Responses: We plan to use the information from this study to learn more about how to help students be successful during the teenage years! The information that we collect from you may help increase our overall knowledge of difficulties frequently encountered in school. The results of this study may be published. However, your responses will be combined with other students' responses in the publication. The published results will not include your name or any other information that would identify you.

- ✓ Questions? If you have any questions about this research study, please contact Dr. Julia Ogg at (813) 974-9698. If you have questions about your rights as a person who is taking part in a research study, you may contact a member of the Division of Research Compliance of the University of South Florida at (813) 974-9343.

Thank you for taking the time to take part in this study.

Sincerely,

Sarah Fefer, M. A.

School Psychology Doctoral Student

Lisa Bateman, M.A.

School Psychology Doctoral Student

Julia A. Ogg, Ph.D.

Assistant Professor of School Psychology

USF College of Education

Assent to Take Part in this Research Study

I give my permission to take part in this study. I understand that this is research. I have received a copy of this letter and assent form.

_____ _____ _____

Signature of student taking part in the study Printed name of student Date

Statement of Person Obtaining Assent

I certify that participants have been provided with an assent form that has been approved by the University of South Florida's Institutional Review Board and that explains the nature, demands, risks, and benefits involved in participating in this study. I further certify that a phone number has been provided in the event of additional questions.

_____ _____

Signature of person obtaining assent Printed name of person obtaining assent Date

Appendix C

Teacher Consent

Dear Teacher:

This letter provides information about a research study that will be conducted by Sarah Fefer, Lisa Bateman, and Julia Ogg from the School Psychology Department at University of South Florida (USF). Our goal in conducting the study is to investigate the experiences of adolescents exhibiting behavioral risk factors.

- ✓ Who We Are: Sarah Fefer, M.A. and Lisa Bateman, M.A. are School Psychology doctoral students at USF. Dr. Julia Ogg is a school psychology professor in the College of Education at USF. We are planning the study in cooperation with the principal and administrators to ensure the study provides information that will be helpful to the schools.

- ✓ Why We Are Requesting Your Participation: This study is being conducted as part of a project entitled, "Perceptions of Competence and Life Satisfaction: Exploring Behavioral Risk Factors Among High School Students." You are being asked to participate because you are a teacher of at least one student who is a participant in the study.

- ✓ Why You Should Participate: We need to learn more about how to help students be successful during the teenage years. The information that we collect from teachers may help increase our overall knowledge of difficulties frequently encountered in school and help support students' success. Please note that you will receive a small gift for participating in the study, and an opportunity to win another gift card for assistance in recruiting students.

- ✓ What Participation Requires**:** You will be asked to complete questionnaire about the behavior of each of your students who is a participant in the study. Specifically, you will be asked about your students' academic and social competence, their engagement in class, and their behavior. Completion of the questionnaires is expected to take approximately 10 minutes per student.

- ✓ Please Note: Your decision to participate in this research study must be completely voluntary. You are free to participate in this research study or to withdraw from participation at any time. If you choose not to participate, or if you withdraw at any point during the study, this will in no way affect your relationship with your high school, USF, or any other party.

- ✓ Confidentiality of Your Responses: There is minimal risk for participating in this research. Your privacy and research records will be kept confidential to the extent of the law. Authorized research personnel, employees of the Department of Health and Human Services, the USF Institutional Review Board and its staff, and other individuals acting on behalf of USF may inspect the records from this research project, but your individual responses will not be shared with school system personnel or anyone other than the USF research team. Your completed questionnaire(s) will be assigned a code number to protect the confidentiality of your responses. Only the USF research team will have access to the locked file cabinet stored at USF that will contain all records linking code numbers to participants' names.

- ✓ What We'll Do With Your Responses: We plan to use the information from this study to inform educators and psychologists about helping all students be successful in school. The results of this study may be published. However, the data obtained from you will be combined with data from other people in the publication. The published results will not include your name or any other information that would in any way personally identify you.

- ✓ Questions? If you have any questions about this research study, please contact Dr. Julia Ogg at (813) 974-9698. If you have questions about your rights as a person taking part in a research study, you may contact a member of the Division of Research Compliance of the University of South Florida at (813) 974-9343.

- ✓ Want to Participate? To participate in this study, please sign the attached consent form.

Sincerely,

Sarah Fefer, M. A.

School Psychology Doctoral Student

USF College of Education

Lisa Bateman, M.A.

School Psychology Doctoral Student

USF College of Education

Julia A. Ogg, Ph.D.

Assistant Professor of School Psychology

USF College of Education

Consent to Take Part in this Research Study

I freely give my permission to take part in this study. I understand that this is research. I have received a copy of this letter and consent form for my records.

_____	_____	_____
Signature of teacher	Printed name of teacher	Date

Statement of Person Obtaining Informed Consent

I certify that participants have been provided with an informed consent form that has been approved by the University of South Florida's Institutional Review Board and that explains the nature, demands, risks, and benefits involved in participating in this study. I further certify that a phone number has been provided in the event of additional questions.

_____	_____	_____
Signature of person obtaining consent	Printed name of person obtaining consent	Date

Appendix D

Demographic Form

1. Gender

- ❍ 1) Female
- ❍ 2) Male

2. Ethnicity

- ❍ 1. African American/Black
- ❍ 2. Asian/ Pacific Islander
- ❍ 3. White
- ❍ 4. Hispanic
- ❍ 5. Native American/ Alaska Native
- ❍ 6. Other (Specify _____)

3. Age

❍ 13	❍ 16	❍ 19
❍ 14	❍ 17	❍ 20
❍ 15	❍ 18	❍ 21

4. Grade ❍ 9 ❍ 11
❍ 10 ❍ 12

Appendix E

Students' Life Satisfaction Scale (SLSS)

We would like to know what thoughts about life you've had during the past several weeks. Think about how you spend each day and night and then think about how your life has been during most of this time. Here are some questions that ask you to indicate your satisfaction with life. In answering each statement, circle a number from (**1**) to (**6**) where (**1**) indicates you **strongly disagree** with the statement and (**6**) indicates you **strongly agree** with the statement.

	Strongly Disagree	***Disagree***	***Slightly Disagree***	***Slightly Agree***	***Agree***	***Strongly Agree***
1. My life is going well	1	2	3	4	5	6
2. My life is just right	1	2	3	4	5	6
3. I would like to change many things in my life	1	2	3	4	5	6
4. I wish I had a different kind of life	1	2	3	4	5	6
5. I have a good life	1	2	3	4	5	6
6. I have what I want in life	1	2	3	4	5	6
7. My life is better than most kids'	1	2	3	4	5	6

Appendix F

ADHD STUDENT SELF-RATING SCALE (ASSRS)

Please rate (by circling the correct number) how frequently you do or feel each of the following. Please circle only one number for each item.

		Never	Occasionally	Often	Very Often
1	I do not pay attention to details or I make careless mistakes in my schoolwork.	0	1	2	3
2	I have difficulty continuing to pay attention to what I am doing.	0	1	2	3
3	I have trouble listening when other people speak directly to me (e.g. parent, teacher, etc.).	0	1	2	3
4	Although I understand and try at my schoolwork, I do not follow through and finish it.	0	1	2	3
5	I have difficulty organizing what I do.	0	1	2	3
6	I avoid or dislike engaging in tasks that require a lot of thinking.	0	1	2	3
7	I lose things necessary to work on my tasks or activities (school assignments, pencils, or books).	0	1	2	3
8	I get easily distracted.	0	1	2	3
9	I tend to forget what I am supposed to do every day.	0	1	2	3
10	I fidget with my hands or feet or squirm in my seat.	0	1	2	3
11	I get out of my seat in the classroom or in other situations in which I am supposed to stay seated.	0	1	2	3

12	I run about or climb too much when I am not supposed to.	0	1	2	3
13	It is difficult for me to play quietly when I have free time.	0	1	2	3
14	I am constantly on the go as if I am driven by a motor.	0	1	2	3
15	I talk too much.	0	1	2	3
16	I blurt out answers before questions have been completed.	0	1	2	3
17	I have difficulty waiting in line.	0	1	2	3
18	I butt into the conversations or games of others.	0	1	2	3

Appendix G

VANDERBILT ADHD DIAGNOSTIC TEACHER RATING SCALE

Each rating should be considered in the context of what is appropriate for high school students. Please rate (by circling the correct number) how frequently you feel this student does each of the following. Please circle only one number for each item.

		Never	Occasionally	Often	Very Often
1	Fails to pay attention to details or makes careless mistakes in schoolwork	0	1	2	3
2	Has difficulty sustaining attention to tasks or activities	0	1	2	3
3	Does not seem to listen when spoken to directly	0	1	2	3
4	Does not follow through on instruction and fails to finish schoolwork (not due to opposition behavior or failure to understand)	0	1	2	3
5	Has difficulty organizing tasks and activities.	0	1	2	3
6	Avoids, dislikes, or is reluctant to engage in tasks that require sustaining mental effort.	0	1	2	3
7	Loses things necessary for tasks or activities (school assignments, pencils, or books)	0	1	2	3
8	Is easily distracted by extraneous stimuli.	0	1	2	3
9	Is forgetful in daily activities	0	1	2	3
10	Fidgets with hands or feet or squirms in seat	0	1	2	3
11	Leaves seat in classroom or in other situations in which remaining seated is	0	1	2	3

	expected				
12	Runs about or climbs excessively in situations in which remaining seated is expected	0	1	2	3
13	Has difficulty playing or engaging in leisure activities quietly	0	1	2	3
14	Is “on the go” or often acts as if “driven by a motor”	0	1	2	3
15	Talks excessively	0	1	2	3
16	Blurts out answers before questions have been completed	0	1	2	3
17	Has difficulty waiting in line	0	1	2	3
18	Interrupts or intrudes on others (e.g., butts into conversations or games)	0	1	2	3