2011

The Positive Illusory Bias: Do ADHD Symptoms Differ Among Young Adolescents with Accurate Versus Discrepant Self-Perceptions?

Sarah A. Fefer
University of South Florida, sfefer33@gmail.com

The Positive Illusory Bias: Do ADHD Symptoms Differ Among Young Adolescents with Accurate Versus Discrepant Self-Perceptions?

by

Sarah A. Fefer

A thesis submitted in partial fulfillment
of the requirements for the degree of
Education Specialist
Department of Psychological and Social Foundations
College of Education
University of South Florida

Co-Major Professor: Julia A. Ogg, Ph.D.
Co-Major Professor: Shannon M. Suldo, Ph.D.
Robert Dedrick, Ph.D.
Sarah Kiefer, Ph.D.

Date of Approval:
May 3, 2011

Keywords: Attention-Deficit/Hyperactivity Disorder, self-concept, middle school students, academic self-perception, social self-perception

Acknowledgements

I would like to thank all of the people who have provided guidance and support throughout my thesis research. Specifically, I would like to thank my Co-Major Professors, Drs. Julia Ogg and Shannon Suldo for their expertise and continuous support throughout my studies at University of South Florida and for this project in particular. Their outstanding mentorship enhanced the quality of this thesis, helped me to build my skills as a researcher, and contributed to my passion for the research process. I would also like to thank Dr. Sarah Kiefer for her insight related to self-concept and adolescence, and for her ongoing encouragement. Additionally, I would like to thank Dr. Robert Dedrick for sharing his vast knowledge of statistical analyses and for providing insight into the procedures used for this study. All of the contributions of my committee members have helped me to further my understanding of the entire research process from conceptualization to interpreting results and identifying implications. Dr. Rance Harbor and the principals of each of the middle schools that I worked with deserve a special thank you for helping to ensure that the data collection associated with this project was successful. Also, I am forever grateful to my family for their love and enthusiasm related to all of my academic endeavors. Finally, thank you to my friends and cohort members for being my "Florida family."

Table of Contents

List of Tables iv

Abstract v

Chapter I: Introduction 1
- Statement of the Problem 1
- Theoretical and Conceptual Framework for Self-Concept 4
- Purpose of the Current Study 6
- Definition of Key Terms 7
  - Attention-deficit/Hyperactivity Disorder (ADHD) 7
  - Self-Concept 7
  - Positive Illusory Bias (PIB) 8
  - Accuracy of Self-Perceptions 8
  - Elementary-Age Youth 8
  - Adolescents 9
- Research Questions 9
- Importance of the Current Study to School Psychology 9
- Contributions to the Literature 10

Chapter II: Review of the Literature 12
- Self-Concept 12
  - Terminology 12
  - Global versus Domain Specific Self-Concept 13
  - Multidimensional Theories 14
    - Marsh 15
    - Bracken 17
    - Harter 19
    - Comparison of three models 21
  - Developmental Findings 23
    - Childhood 23
    - Adolescence 24
- Attention-Deficit/Hyperactivity Disorder 28
  - Diagnosis 29
  - Primary Characteristics of ADHD 30
    - Inattention 30
    - Hyperactivity/Impulsivity 31
    - Combined 32
  - Comorbidity 32
  - Developmental Considerations 33

Academic Outcomes 34
Social Outcomes 35
ADHD and Self-Concept 37
Hypotheses to Explain the Positive Illusory Bias 38
Past Literature Exploring the Positive Illusory Bias 42
Absolute self-perceptions 42
Pre/post performance ratings 47
Criterion/discrepancy analysis 50
Conclusions 58

Chapter III: Method 61
Participants 61
Selection of Participants 64
Students 64
Teachers 67
Measures 68
Student Measures 68
Demographic form 68
Florida Comprehensive Assessment Test 69
Self-Perception Profile for Children 70
Center for Epidemiological Studies Depression Scale 72
Teacher Measures 74
Teacher's Rating Scale of the Child's Actual Behavior 74
Vanderbilt ADHD Diagnostic Teacher Rating Scale 75
Procedures 76
Student Survey 76
Teacher Survey 78
Analyses 78
Descriptive analysis 78
Creating Groups Based on the Accuracy of Self-Perceptions 79
Correlational Analyses 81
Research Question Analyses 81
Ethical Considerations 83
Limitations of the Current Study 84

Chapter IV: Results 87
Data Screening 87
Calculating the Accuracy of Self-Perceptions 88
Descriptive Analyses 90
Preliminary Analyses 96
Scale Reliability 96
Correlational Analyses 97
Differences in Symptoms between Groups 100
Assumptions 100
MANOVA Results 102
Groups based on academic self-perceptions and teacher ratings 102

Groups based on academic self-perceptions and standardized achievement scores 104
Groups based on social self-perceptions and teacher ratings 105
Summary of Results 107

Chapter V: Discussion 109
Key Findings from Descriptive Analyses 109
Differences in Symptoms between Self-Perception Groups 111
Academic Domain 111
Social Domain 115
Comparison of Inattentive and Hyperactive/Impulsive Symptoms 117
Implications and Future Directions: Research and Practice 120
Implications for Research 120
Implications for Practice 126
Limitations 128
Conclusions 131
References 133
Appendices 151
Appendix A: Parent Consent Letter 152
Appendix B: Student Assent Letter 154
Appendix C: Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS) 156
Appendix D: Teacher's Rating Scale of the Student's Actual Behavior (SPPC-TRS) 158
Appendix E: Teacher Consent Letter 159
Appendix F: Demographic Form 161
Appendix G: Self-Perception Profile for Children (SPPC) 162
Appendix H: Center for Epidemiological Studies Depression Scale (CES-D) 164
Appendix I: Comparison of Raw Accuracy Scores Across Groups 165

List of Tables

Table 1.	School Demographic Information	63
Table 2.	Demographic Characteristics of Participants	66
Table 3.	Calculating Accuracy Scores	89
Table 4.	Means, Standard Deviations, Ranges, Skew, and Kurtosis of All Measures	91
Table 5.	Means, Standard Deviations, Ranges, Skew, and Kurtosis of Accuracy Variables	92
Table 6.	Demographic Variable Frequencies for Groups based on Academic Teacher Ratings	94
Table 7.	Demographic Variable Frequencies for Groups based on FCAT Scores	95
Table 8.	Demographic Variable Frequencies for Groups based on Social Teacher Ratings	96
Table 9.	Cronbach's Alpha (α) for all Measures Utilized in Analyses	97
Table 10.	Intercorrelations between All Variables of Interest	99
Table 11.	Group Means and Standard Deviations: Academic Accuracy Based on Teacher Ratings	104
Table 12.	Group Means and Standard Deviations: Academic Accuracy based on FCAT Scores	105
Table 13.	Group Means and Standard Deviations: Social Accuracy Based on Teacher Ratings	107
Table 14.	Summary of MANOVA and ANOVA Results	108

Abstract

The purpose of this study was to gain insight into whether inattentive, hyperactive/ impulsive, and depressive symptoms differ among young adolescents with negative, accurate, or positive self-perceptions of their academic and social competence. Current literature suggests that elementary-age children with ADHD display overly positive self-perceptions, often referred to as the positive illusory bias (PIB; Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007). Self-reports of academic and social self-concept were compared to teacher ratings and test scores for 164 middle school students in an effort to determine if the PIB was present within this sample. Inattentive and hyperactive/impulsive symptoms were found to be significantly higher among the positive self-perception group in the academic domain with teacher ratings as the indicator of competence, while depressive symptoms were found to be significantly higher among the negative self-perception group. In the social domain, only inattentive symptoms were shown to be significantly higher in the positive self-perception group compared to the negative and accurate groups. Interestingly, there were no significant differences between groups with achievement test scores as the indicator of academic competence. These findings provide information about the PIB in young adolescents, an understudied group. Implications related to research and practice are also presented.

Chapter I: Introduction

Statement of the Problem

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common childhood mental health diagnoses, impacting five to ten percent of school-age students in the United States (Scahill & Schwab-Stone, 2000). This percentage is even higher when students displaying non-clinical levels of ADHD symptoms are included. The core symptoms associated with this disorder include inattention and/or hyperactivity/impulsivity. A diagnosis of ADHD requires the presence of functional impairments, which must manifest in multiple life domains (American Psychiatric Association [APA], 2000). Social, academic, and behavioral impairments are common for students with ADHD symptoms (Gaub & Carlson, 1997). One might expect that children displaying ADHD symptoms would be at risk for low self-concept in these domains due to frequent difficulties in these areas; however, past studies examining self-perceptions of children with ADHD have demonstrated that these children may not perceive or report these deficits. In contrast, children with ADHD have been shown to overestimate their competence in areas where they experience significant difficulties (Hoza, Gerdes, Hinshaw, Arnold, Pelham, Molina, et al., 2004). These overly positive self perceptions are often referred to as the positive illusory bias (PIB). The PIB has been defined in the following way: “children with ADHD unexpectedly provide extremely positive reports of their own competence in comparison to other criteria reflecting actual

competence" (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007, p. 335). The PIB has been observed across a number of different domains of self-concept, including academic, social, behavior, athletic competence, and physical appearance (Hoza et al., 2004).

Current literature supporting the presence of the PIB in individuals with ADHD has been conducted primarily with elementary-age students. However, symptoms of ADHD have been shown to persist into adolescence and adulthood, with estimates that as many as 65% of children diagnosed with ADHD continue to meet diagnostic criteria during adolescence (Wolraich, Wibbelsman, Brown, Evans, Gotlieb, Knight et al., 2005). Additionally, academic and social problems associated with ADHD may become more pronounced during adolescence due to the increasing academic demands and the increased emphasis on peer acceptance that are associated with middle and high school (Wolraich et al., 2005).

Children and adolescents in the normative population who have high self-concept in academic and social domains have been shown to have more positive outcomes, such as higher academic achievement and positive social relationships (Bracken, 2009). Social self-concept has been shown to be important for initiating and engaging in positive social interactions, which are seen as a key component of mentally healthy children, adolescents, and adults (Bracken, 2009). Additionally, academic success and higher levels of academic self-concept have been shown to have a reciprocal relationship in the general population (Trautwein, Lüdtke, Köller, & Baumert, 2006). Although there has been an association between high levels of self-concept and positive outcomes, this relationship is less clear in children with ADHD. While positive illusions in the general population have been shown to lead to more task-persistence and motivation (Taylor &

Brown, 1988), positive illusions have not proven to be adaptive for children with ADHD. These children have been shown to have less task persistence and lower performance than same-age peers (Hoza, Waschbusch, Owens, Pelham, & Kipp, 2001). The presence of the PIB in the academic and social domains for adolescents with symptoms of ADHD warrants attention for the following reasons: (1) younger children with ADHD have been shown to overestimate their competence in these domains, and symptoms of ADHD persist into adolescence, (2) adolescence is a developmental period marked by increased demands in the academic and social domains, (3) symptoms of ADHD are often associated with impairments in these two domains, and (4) high self-concept in these areas is linked to positive outcomes for adolescents in the general population, but this has not been directly studied for adolescents with ADHD. This study served to determine if the PIB persists through early adolescence for students with symptoms of ADHD.

It is also important to consider how ADHD symptoms may change during this developmental period. Research has shown that inattentive symptoms become more prevalent than hyperactive/impulsive symptoms during adolescence (Smith, Barkley, & Shapiro, 2007; Wolraich et al., 2005). Related to the PIB, only one study has looked specifically at the influence of ADHD subtypes (i.e., Innattentive, Hyperactive/Impulsive, and Combined subtypes) and found differences in the expression of the PIB between these subtypes (Owens & Hoza, 2003). Specifically, the PIB was found only in students with elevated hyperactive/impulsive (HI) symptoms. The current study adds to this small body of literature by determining if the PIB persists despite known changes in symptom profiles from childhood to adolescence, and by examining the presence of the PIB in relation to the adolescent's degree of inattentive and hyperactive/impulsive symptoms

rather than ADHD diagnosis. This is the first investigation of the PIB which has considered the full range of ADHD symptoms rather than only including students with clinical levels of ADHD symptoms.

Comorbid diagnoses are frequent among children and adolescents with symptoms of ADHD, with comorbid depression becoming more prevalent as children with ADHD approach adolescence (Barkley, 2006). Approximately 50% of young adolescents with ADHD were found to exhibit comorbid depression in a clinic based sample (Bird, Gould, & Staghezza, 1993), compared to a 30% rate of comorbidity for younger children with ADHD (Biederman, Mick, & Faraone, 1998). Comorbid depression has been shown to influence the presence of the PIB in children with ADHD, with symptoms of depression decreasing the presence of the PIB and leading to more realistic self-evaluations for children with ADHD (Hoza, Pelham, Dobbs, Owens, & Pillow, 2002). Because the likelihood of students with ADHD exhibiting comorbid depressive symptoms has been shown to increase with age (Smith et al., 2007), it is particularly important to consider depressive symptoms when investigating the relationship between ADHD symptoms and the presence of the PIB in adolescents.

Theoretical and Conceptual Framework for Self-Concept

It is important to adopt a multidimensional, or domain-specific, perspective of self-concept when examining the presence of the PIB because previous research has documented that a student can display positive illusions in one domain, but not in another (Ohan & Johnston, 2002). Domain-specific self-concept reflects an individual's self-perception in a specific realm of functioning and considers an individual's perceptions of their specific qualities, skills, and abilities (Trautwein et al., 2006).

Three dominant multidimensional theories of self-concept have been adopted as the framework for the current study (Bracken, 1992; Harter, 1999; Marsh, 1988). These theories have emerged to explain self-concept in children, adolescents, and adults. The model proposed by Marsh is the most academically focused and considers self-concept within specific academic areas (e.g., reading or mathematics), Bracken's model is oriented around behavioral principles which highlight reinforcement and punishment within the environment as primary in the development of one's self-concept, and Harter's model focuses on cognitive and social factors and emphasizes the importance of developmental considerations. There are several common threads underlying each of these theories. First, each of these theories views self-concept as a multidimensional construct, with different domains representing different contexts. Considering self-concept as a multidimensional construct accounts for differences that are inherent across contexts. Although there is not currently agreement about the specific domains of importance for children and adolescents, these three theorists all propose domains to represent the students' social, academic, and physical self-perceptions (Bracken, 1992; Harter, 1999; Marsh, 1988). Additionally, each of these theories is considered to present a hierarchical view of self-concept, which views global self-concept or overall self-worth to be at the top or primary level of the hierarchy, with specific domains making up a secondary level of self-concept. Lastly, these theorists purport that self-concept must be considered developmentally because individuals experience different contexts as they age and the importance placed on the perceptions of others may change over time (Harter, 1999). Additionally, Harter (1999) purports that an individual's cognitive development and age should be considered when examining domain-specific self-concept and that self-

concept is often differentiated across more domains as individuals age. These three theories of self-concept have been adopted as the framework for the current study, which examined self-concept in the social and academic domains.

Purpose of the Current Study

The purpose of the current study was to gain insight about whether or not levels of ADHD symptoms differ among groups of middle school students with negative, accurate, or positive self-perceptions within the academic and social domains. This study adds to the small body of literature suggesting that the presence of the PIB differs between students with inattentive (IA), hyperactive/impulsive (HI), and depressive symptoms and is the first study to investigate these symptoms on a full continuum. Additionally, the current study replicated methodology (cf. Owens & Hoza, 2003) that has been used in the past by including a criterion against which student reports can be compared. This method is currently recommended as the best practice for measuring the PIB (Owens et al., 2007). This study compared student self-report in the academic and social domain to teacher ratings, and utilized achievement test scores as an additional criterion for the academic domain. Exploring the presence of the PIB in adolescents is a critical gap in the literature that must be addressed to understand whether the PIB continues to be present beyond elementary school. Insight gained about the accuracy of adolescent's self-perceptions in the social and academic domains could be informative in developing interventions to improve academic and social functioning for adolescents with ADHD.

Definition of Key Terms

Attention-deficit/Hyperactivity Disorder (ADHD). ADHD is defined by the core symptoms of inattention, hyperactivity, and impulsivity. A clinical diagnosis of ADHD requires that a child, adolescent, or adult exhibit six or more symptoms in either the area of inattention (IA) or hyperactivity-impulsivity (HI; American Psychiatric Association [APA], 2000). For a diagnosis, these symptoms must be present before age 7, maladaptive, inconsistent with the behavior of others at their age level, and present for at least six months to receive a diagnosis. ADHD is one of the most common mental health problems when children enter school (APA, 2000; Carter, Wagmiller, Gray, McCarthy, Horwitz, Briggs-Gowan, 2010). The current study explored specific ADHD symptoms on a continuum rather than as a diagnostic label. This means that students displaying all levels of inattentive or hyperactive/impulsive symptoms were included in the sample (ranging from no symptoms present to clinically significant levels of symptoms). This method has advantages over looking at only diagnostic levels of symptoms as has been done in the majority of past literature. The primary advantage is that all students, including those who may have elevated symptoms yet not meet diagnostic criteria, are included. As additional rationale for the importance of investigating the full range of ADHD symptoms rather than just diagnoses, recent research suggests that students with sub threshold levels of ADHD symptoms may be significantly at-risk for negative school outcomes and associated impairments (Bussing, Mason, Bell, Porter, & Garvan, 2010).

Self-Concept. Self-concept is a multidimensional and hierarchical construct that is used to refer to an individual's self-evaluations of their competence in specific

domains, such as the academic, social, or behavioral domains (Harter, 1999).

Positive Illusory Bias (PIB). This term refers to the unwarranted overestimation of self-competence, either in comparison to another group or compared to a criteria that is meant to reflect one's actual abilities (Owens et al., 2007).

Accuracy of Self-Perceptions. Accuracy of self-perceptions refers to the discrepancy between student perceptions in a specific domain of functioning and an indicator of actual competence in that domain (i.e., achievement test scores or teacher ratings). Accuracy scores based on each of the indicators of competence are continuous and range from positive to negative, but for the purpose of the current study students were classified into three groups based on the accuracy of their self-perceptions. Students who had self-perceptions that were lower than the external indicator were classified as the "negative self-perception" group, students with self-perceptions that were similar to the indicator of competence were classified as having "accurate self-perceptions," and students with self-perceptions that were higher than seemed warranted based on the indicator of competence were classified as the "positive self-perception" groups. Students in the positive self-perception group were exhibiting a positive illusory bias in either the academic or social domain.

Elementary-Age Youth. Children in grades kindergarten through fifth grade are referred to as elementary-age youth. These students are typically between the ages of 5 and 10. The more specific terms young children/early childhood were used to refer to students in the primary grades (K-2), and middle childhood was used to refer to children in the intermediate grades (3-5).

Adolescents. This term was used to refer to students in sixth through twelfth grade. Middle school age students (grades 6-8) were referred to as young adolescents and are typically between 11 and 14 years old, while high school youth (grades 9-12) are referred to as older adolescents and are typically between the ages of 14 and 18.

Research Questions

1. How do young adolescents with negative, accurate, or positive perceptions of academic competence differ on inattentive, hyperactive/impulsive, and depressive symptoms, when teacher ratings are used as an indicator of actual academic competence?
2. How do young adolescents with negative, accurate, or positive perceptions of academic competence differ on inattentive, hyperactive/impulsive, and depressive symptoms, when achievement test scores are used as an indicator of actual academic competence?
3. How do young adolescents with negative, accurate, or positive perceptions of social competence on inattentive, hyperactive/impulsive, and depressive symptoms, when teacher ratings are used as an indicator of actual social competence?

Importance of the Current Study to School Psychology

Adolescents with symptoms of ADHD are at risk for numerous negative outcomes, such as poor academic performance and negative peer relationships (Wolraich et al., 2005). To further complicate the situation, during adolescence youth are particularly vulnerable for decreased self-concept due to the increased importance of academic and social factors for self-appraisals (Harter, 1999). Adolescents who experience impairments in these two important areas, such as youth with symptoms of

ADHD, may be particularly at-risk for low self-perceptions (Barkley, 2006). It is important to understand if the self-concept of adolescents with symptoms of ADHD align with the positive illusions found in elementary-age youth with ADHD (Hoza et al., 2002).

It is critical that school psychologists gain an understanding of the academic and social self-concept of adolescents with symptoms of ADHD because these domains are often the target of assessment and intervention efforts. It has been suggested that self-concept may be a factor in adherence to complex behavioral interventions (Hoza & Pelham, 1995; Lindeman & Behm, 1999). Positive illusions may serve as a barrier to treatment if children do not believe they are experiencing difficulty. Furthermore, findings related to the PIB may suggest that the accuracy of self-report data from adolescents with symptoms of ADHD may be questionable. An understanding of the PIB will serve to enhance the effectiveness of school psychologists in assessing and improving the academic and social functioning of adolescents with symptoms of ADHD.

Contributions to the Literature

The current study enhances the current knowledge base related to the PIB in students with symptoms of ADHD by extending this research into middle-school aged students. This research elucidates whether the PIB persists into adolescence for students with symptoms of ADHD, using the methodology recommended by Owens and colleagues (2007) to extend upon past literature. Additionally, this study adds to past literature, which has only considered clinically significant levels of ADHD symptoms, by examining the relationship between the accuracy of self-concept and the degree of specific ADHD symptoms. Furthermore, the current study adds to the small body of research suggesting that the presence of the PIB differs between students with inattentive

or hyperactive/impulsive symptoms and students with depressive symptoms. Exploring the presence of the PIB in young adolescents with a full range of ADHD symptoms, and determining if findings from studies of younger children with clinical levels of symptoms can be replicated in this age group, is important to gain an understanding of the developmental course of this intriguing phenomenon.

Chapter II: Review of the Literature

This chapter outlines the knowledge base of self-concept in adolescents with Attention-deficit/Hyperactivity Disorder (ADHD) through a discussion of three important elements: the construct of self-concept, an overview of ADHD, and past research on the self-concept of children and adolescents with ADHD. A thorough understanding of the definition, proposed models, and developmental nature of self-concept must be established before this construct can be examined in terms of the accuracy of self-perceptions for adolescents with symptoms of ADHD and depression. A review of influential literature related to these three elements is then presented, and support for the current study is provided through a discussion of self-concept within domains that are of particular importance for adolescents with symptoms of ADHD.

Self-Concept

Terminology. Researchers investigating self-concept have struggled to find uniform terminology to describe the way that individuals view themselves. Terms such as self-perception, self-worth, self-esteem, and self-concept are among the many terms used to describe how one perceives oneself or his/her overall competence. There is not currently a consensus for the terminology to be used in the literature (Valentine, Dubois, & Cooper, 2004). It has been suggested that self-esteem, global self-concept, and other more general terms are nearly impossible to differentiate (Bracken, Bunch, Keith, & Keith, 2000), and are too complex and comprehensive to have a meaningful relationship

with specific domains of functioning (e.g., academic, social, or physical domain; Valentine et al., 2004). For the purpose of this review, the term self-concept has been selected to represent different variations of domain specific self-perception that have been used in past literature. The term self-concept has been selected because this is the term that is commonly used to refer to self-evaluations of attributes in specific domains, such as the academic, social, or behavioral domains (Harter, 1999). The multidimensional nature of this term, which includes global and domain specific self-concept (Bracken, 2009; Harter, 1999; Marsh, 1994), will allow for a focus on domains that are salient for adolescents with ADHD.

Global versus Domain Specific Self-Concept. Early research on self-concept focused on a unidimensional construct of self-evaluation that represents individuals' overall feelings toward themselves, often referred to as self-esteem (Coopersmith, 1967; Marsh, 2008). Unidimensional models of self-concept focus on a person's overall sense of his/her worth as a person or their feelings averaged across multiple domains (Harter, 1999). These early conceptions led to the widespread use of measures designed to evaluate self-concept through averaging an individual's responses to a variety of questions into a single score (e.g., Coopersmith, 1967; Piers & Harris, 1964; Rosenberg, 1979). Some of the instruments using a single global self-concept score continue to be widely used as measures of overall perceived competence (Marsh, 2008).

In response to the widespread use of self-concept measurement tools that viewed self-concept as a single score, Shavelson, Hubner, and Stanton (1976) provided an initial multidimensional model of self-concept. This seminal work posited that self-concept must be viewed as a domain specific construct that is influenced by the environment. The

dissemination of this model led to widespread agreement among psychological researchers about the importance of investigating self-concept within specific contexts (Bracken, 2009). Since this influential contribution, many theories have emerged that view self-concept as a multidimensional construct (Bracken, 2009; Harter, 1999; Marsh, 1990). Multidimensional self-concept refers to self-perceptions that are differentiated into specific domains (e.g., academic, behavioral, social, physical appearance). Considering self-concept as a multidimensional construct accounts for differences that are inherent across domains and allows individuals to judge their adequacy differently across contexts. Current theorists suggest that self-concept is best summarized using a profile of scores across different domains rather than as a single aggregate score (Harter, 1999; Marsh & Hattie, 1996). It is important to note that multidimensional theories of self-concept often include self-esteem or global self-concept as a separate dimension that focuses on a person's general contentment with themselves (Manning, Bear, & Minke, 2006). Models that propose multiple levels of self-concept are considered to be hierarchical (Harter, 1999). Global self-concept is often viewed as encompassing self-evaluations from multiple domains and is therefore viewed as the broadest and highest level of self-concept within hierarchical models (Bracken & Howell, 1991; Harter, 1999).

Multidimensional Theories . Current theorists are not in agreement about exactly how the distinct domains of self-concept are defined. Some theorists believe that it is important to further disaggregate contexts within the academic and social domains (Marsh, 1993, 1994) to include evaluations related to subjects such as mathematics or reading, while other researchers include age-dependent domains such as job competence for adolescents and adults (Harter, 1999). Three dominant multidimensional theories

have emerged to explain self-concept in children, adolescents, and adults (Bracken, 1992; Harter, 1999; Marsh, 1988). The model proposed by Marsh is the most aligned with the multidimensional perspective originally proposed by Shavelson and colleagues (1976), Bracken's model is oriented around behavioral principles, and Harter's model focuses on cognitive and social factors and emphasizes the importance of developmental considerations. The following section will explain these theories that have a common focus on multidimensional self-concept, as well as examine the unique contributions of each theory.

Marsh. Herbert Marsh's conceptualization of self-concept is highly influenced by the seminal work of Shavelson and colleagues (1976). According to Shavelson's model, the definition of self-concept must include seven criteria: stable, structured, hierarchical, multiple domains, developmental, evaluative, and must be distinguishable from other constructs such as self-esteem (Crain & Bracken, 1994; Shavelson et al., 1976). Marsh incorporates each of these aspects into his current model, which is often referred to as the Marsh/Shavelson model (Marsh & Shavelson, 1985). This model views self-concept as being highly differentiated across domains, and evaluates academic self-concept within specific subject areas (Marsh, 1990).

Marsh's hierarchical/multidimensional view of self-concept considers evaluations of the "general self" (Marsh's terminology for global self-concept) to be at the top of the hierarchy. Underneath the general self is a broad intermediate level that includes academic and nonacademic self-concepts (Marsh & Hattie, 1996). Academic and non-academic self concept are further broken down into physical abilities and peer relations (nonacademic domain), and verbal and math (academic domain). This model is

considered to be an integration between unidimensional and multidimensional conceptions of self-concept, because both domain-specific and global evaluations are included (Marsh, 2008).

Marsh accounts for changes in the domains of interest as children age, and this model is therefore considered to be developmental (Marsh, 1990). According to this model, children as young as kindergarten are able to evaluate their competence across multiple domains such as academic versus nonacademic (Marsh, Debus, & Bornholt, 2005); however, Marsh and colleagues (2005) acknowledge that as children age they are more likely to differentiate their self-evaluations across more specific contexts, such as distinguishing between their math and verbal abilities.

Marsh proposes that a specific domain of self-concept is more informative than utilizing global self-concept because this has been shown to be related more closely with actual outcomes (Marsh, 2008). For example, Marsh (1992) has found that performance in specific subject areas is highly correlated with self-concept in that subject area, and reasonably uncorrelated with global self-concept. Marsh's model and the research validating this model (Marsh, Byrne, & Shavelson, 1988) highlight the importance of considering self-concept as a multidimensional construct, with two levels of domain specific evaluations further differentiated into core subject areas (i.e., verbal and math), rather than focusing solely on a broad academic domain or global evaluations. However, Marsh's model does not account for differentiation in non-academic areas beyond physical abilities and peer relationships; therefore, this model may fail to acknowledge the importance of domains such as family, athletic competence, or behavioral conduct

(Bracken, 2009; Harter, 1999) that are suggested to be important for child and adolescent self-concept.

Bracken. Bruce Bracken's model of self-concept is linked to behavioral principles (Bracken, 2009). This model emphasizes the importance of learning experiences, achievement and failure, and others' reactions to behavior for the development of self-concept (Bracken, 2009). In line with Bracken's behavioral orientation, self-concept is viewed as "a learned, organized response pattern that is acquired and maintained through an individual's action upon and reactions to stimuli in various environmental contexts" (Crain & Bracken, 1994, p. 497).

Bracken's model is similar to other contemporary models in that self-concept is viewed as multidimensional, with specific domains representing the differing contexts. Bracken views self-concept as being differentiated across six context-dependent domains including academic, affect, competence, family, physical, and social self-concept. Bracken's model is also hierarchical and emphasizes the importance of considering global self-concept. Global self-concept is viewed as the primary level of self-concept, which is purported to encompass a portion of each of the six distinct yet correlated secondary domains (Bracken, 2009; Bracken & Howell, 1991). Bracken emphasizes that domain specific self-concept is more meaningful than global self-concept for examining the relationship between self-concept and outcomes within a specific domain (Bracken et al., 2000).

Bracken's model deemphasizes the developmental nature of self-concept that is central to other self-concept theories (e.g., Harter, 1982; Marsh, 1992). Bracken believes that each of the six proposed domains is relevant for children, adolescents, and adults

(Bracken et al., 2000). A study conducted by Crain and Bracken (1994) investigated self-concept among a large sample of children and adolescents and found that the same domains of self-concept were represented by all ages included in the sample, suggesting that the six domains proposed in this model are appropriate across all age groups. However, Bracken proposes that as individuals age, their self-concept becomes more fixed within these domains and greater differences are seen between these domains among individuals (Bracken, 2009). Bracken (2009) acknowledges the importance of examining self-concept developmentally, but concludes that current research does not support developmental differences in the domains of self-concept.

Bracken's theory of self-concept has been supported through an exploratory factor analysis investigating whether self-concept is hierarchical and multidimensional (Bracken et al., 2000). The factor structure of 29 subscales from five pre-established multidimensional self-concept scales was examined in a sample of 221 students in fifth through eighth grade (Bracken et al., 2000). This investigation supported a one factor solution (global self-concept) as the best fit to the data. This finding supports Bracken's hierarchical theoretical model of self-concept. Additionally, support was provided for six factors representing six specific domains of self-concept including: social, competence, affect, academic, family, and physical, as a model with 6 latent factors provided the best fit to the data when the correlation with global self-concept was accounted for. The competence domain, representing a person's perception of their ability to get their needs met, is the least empirically supported because it overlaps significantly with other domains.

Harter. The focus of this model is on cognitive aspects of the self and the importance that individuals place on specific domains, a concept that was first introduced by William James (1890). Harter views the self as being a cognitive construction that aligns with the individual's stage of cognitive development (Harter, 2006). This model views the construction of self as a continuous process with each level influencing the next rather than as a stage-like progression (Harter, 1999). Furthermore, Harter (1999) suggests that social influences are a vehicle for shaping self-concept. Harter's model incorporates Cooley's (1902) early notion of the *looking glass self*, the idea that people view themselves by internalizing their perceptions of how others view them. Harter (1999) purports that self-concept is strongly influenced by consideration of the perceived opinions of significant others, such as parents, teachers, or caregivers. Additionally, the values of the larger society are thought to be incorporated into the self-perceptions of children, adolescents, and adults (Harter, 1999).

This model of self-concept is also hierarchical in nature, with global self-worth at the top of the hierarchy. Unlike other theorists who view global self-concept as correlated with all of the specific domains of self-concept (Bracken, 2009), Harter believes that it is important to ask about self-worth directly in order to obtain an evaluation of the individual's feelings of overall worth as a person. This model allows for global self-worth to be examined as a construct that is separate from domain specific self-evaluations and allows for relationships to be examined between global and domain specific self-concept. In contrast to other hierarchical models, Harter emphasizes that the influence of domain specific self-concepts on global self-worth will not be the same for each person and that different hierarchies may exist for each individual. The second tier

of Harter's hierarchy consists of the specific domains of self-concept that vary depending on developmental level. Harter views these domains as distinct and uncorrelated with other specific domains or with global self-worth (Harter, 1999). For children (approximately age 5-11), Harter examines five domains which include scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct, in addition to global self-worth. For adolescents (approximately age 12-18), Harter adds three additional domains based on contexts and concerns that become more salient beginning in early adolescence; these include job competence, close friendship, and romantic appeal (Harter, 1988). The domains that students acknowledge at different ages have been supported through exploratory factor analysis suggesting different factor structures across different age groups (Harter, 1985, 1999).

Harter's model of self-concept is also the most developmentally focused model of the three models presented here. Harter emphasizes the importance of looking at individual differences in the development of self-concept due to differing social contexts that individuals experience. The self-concept of adolescents has been found to be more differentiated across domains than the self-concept of children; this finding further highlights the importance of considering domain-specific rather than global self-concept when working with adolescents (Harter, Bresnick, Bouchey, & Whiteshell, 1997). It is purported that the impact of social influences on self-concept is different across development as self-concept becomes less dependent on the evaluations of others as individuals get older (Harter, 1999). In addition, Harter suggests that for some individuals self-concept tends to decrease during late childhood/early adolescence, and then gradually begins to increase again through adolescence and adulthood (Harter &

Pike, 1984); however, for others self-concept remains relatively stable over time despite more differentiation between domains. Harter's model emphasizes individual differences in the development of self-concept (Harter, 2006).

Support for Harter's five domains of self-concept for children is provided through an exploratory factor analysis investigating each of the five proposed domains of self-concept as a separate factor for three samples of students ranging from fifth through eighth grade (Harter, 1985). Across three distinct samples (students ranging from 5th to 8th grade) a clear five factor pattern was identified for domain specific self-concept, with low correlations between factors. The supported factors include scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct. There is also evidence that all domains are correlated with global self-worth, with physical appearance being the most highly correlated (at a moderately high level: .62 - .73; Harter, 1985).

Comparison of three models. The similarities between the three models presented here are quite evident. Each model considers self-concept to be a hierarchical and multidimensional construct with a global evaluation at the apex of the hierarchy. Additionally, each of these theorists emphasizes that the domains of self-concept become further differentiated as children age. These theorists generally agree about the domains that should be included within the model. Each theorist considers domains related to academic, social, and physical evaluations, although they do not agree on the level of specificity required for describing these domains.

Despite the vast similarities, each model has unique contributions. Marsh's model contains an intermediate level of self-concept that is not included in other models.

Additionally, Marsh has demonstrated that academic self-concept can be further differentiated into core subject areas (verbal and math; Marsh et al., 1988), while other theorists consider all academic subject areas to be encompassed within their scholastic competence or academic domains (Bracken, 1992; Harter, 1999). However, there is a lack of empirical support for the domains that are differentiated beyond the math and verbal domains and uncertainty about where other academic areas are accounted for within Marsh's model (Marsh, 1990). Additionally, some theorists believe that specific domains of self-concept are correlated (Bracken, 2009), while others view domains as being correlated only at low levels (Harter, 1985; Marsh & Hattie, 1996).

The current study focuses on self-concept in two specific domains of functioning, social and academic, which have been supported by each of these three theories (Bracken, 2009; Harter, 1999; Marsh, 2008). The social acceptance and scholastic competence domains, as measured by the Self-Perception Profile for Children (Harter, 1985), were examined in this study as these domains are related to the primary challenges frequently experienced by adolescents with ADHD. Additionally, these domains are linked to important outcomes such as academic achievement and the development of adequate social skills (Bracken, 2009; Trautwein et al., 2006), which have particular relevance to the school setting. These domains were viewed within a multidimensional and hierarchical model of self-concept, with particular attention to the developmental focus and consideration of individual differences that are central to Harter's model. The scholastic or academic domain examines the student's perception of their overall academic abilities and performance across multiple subject areas (Harter, 1985). The

social acceptance domain evaluates the degree to which the student feels as though they are popular, liked, and accepted by their peers (Harter, 1985).

Developmental Findings. There is evidence that self-concept is a developmental construct which should be evaluated differently for different age-groups (Harter, 1999; Marsh et al., 2005). Similarities among the self-concept of individuals at a particular developmental level are suggested to be directly related to cognitive abilities (Harter, 1999). The numerous changes in self-concept from early childhood to adolescence will be highlighted below.

Childhood. During their early years, a child's self-concept is often overly positive, which is attributed to an observed disconnect between the child's desired and actual self (Harter & Pike, 1984). Overly positive self-evaluations are considered to be normative between the ages of four and seven (Manning, Bear & Minke, 2006) and are suggested to be adaptive at this age due to increased task persistence in the face of failure (Taylor & Brown, 1988). At this point in development, children have not developed the skills that are required to alter their self-evaluations based on social comparisons or feedback from others (Ruble & Dweck, 1995). Additionally, young children (those in the primary grades) are not able to acknowledge that they can have one feeling and another simultaneously, and have difficulties differentiating between their abilities in different contexts or domains (Harter & Pike, 1984). During middle childhood (intermediate grades), children begin to develop a greater reliance on feedback from others, which leads to more realistic self-perceptions (Harter, 1999; Marsh, 1994). Consequently, self-perceptions become less positive and more realistic as children move from early to middle childhood (Harter & Pike, 1984). Middle childhood (approximately the ages of 8-

11) is pinpointed as the beginning of differentiation of self-concept between domains (Harter, 1999).

Adolescence. Adolescence is a time when self-concept is particularly vulnerable (Marsh, 1990; Harter, 1999). This vulnerability stems from two sources: increasing differentiation across domains (Harter, 2006) and the increased importance of social factors (Rosenberg, 1986). During this time, adolescents may experience contradictory views from their own self-perceptions and the opinions of others (Demo & Savin-Williams, 1992). As differentiation between domains occurs, "multiple selves" (Harter, 1999, p. 9) emerge which are purported to stem from pressure to act differently across different roles that emerge in adolescence. It is suggested that younger adolescents have not developed the cognitive capacity to integrate their perceptions across multiple domains into a cohesive self-concept which can cause adolescents to experience contradictory roles; this leads to increased vulnerability and confusion over their real or true self (Harter et al., 1997). While there is general agreement that self-concept becomes more differentiated with age, there are currently conflicting findings related to the stability of self-concept during adolescence. According to Bracken, global self-concept is quite stable and comparable to the stability of other learned patterns of behavioral responses over time; however, domain-specific self-concept is considered to be much less stable and more amenable to change (Bracken et al., 2000; Crain & Bracken, 1994). Both Harter and Bracken assert that exposure to new experiences, new people, and new environments during adolescence leads changes in evaluations of behavior across domains as children age (Crain & Bracken, 1994; Harter, 1999).

Harter (1998, 1999) and Marsh (1994) suggest that domain specific self-concept

of most adolescents has a trajectory that is a flat u-shape, with an initial decrease in pre/early adolescence followed by a period of stability and then gradual increases through late adolescence and adulthood. Research indicates that there is a slight decline in self-concept during early adolescence (age 11-13), which is followed by gradual increases in both global and domain-specific self-concept (Marsh, Smith, Marsh, & Owens, 1988). Some researchers associate this initial decrease in self-concept with the transition to middle or junior high school (Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991). Eighth grade has been suggested to mark the beginning of a gradual increase in self-concept that continues through late adolescence (Cairns, McWhirter, Duffy, & Barry, 1990; Demo & Savin-Williams, 1992). These findings suggest the importance of the school environment for shaping the global and domain specific self-concept of children and adolescents.

There is some evidence that contradicts research indicating a u-shaped trajectory of self-concept for children and adolescents. In a large cross-sectional study of 2,501 students in fifth through twelfth grade, Crain and Bracken (1994) found that younger students (age ten and eleven) had significantly higher global self-concepts than fifteen and sixteen year olds. Additionally, no significant differences in levels of domain specific self-concept were detected across the age group. These authors also found that students begin to highly differentiate their self-concept across domains around age 13 (Crain & Bracken, 1994).

Few researchers have directly explored the developmental nature of domain-specific self-concept in adolescence (Cole, Maxwell, Martin, Peeke, Seroszynski, Tram et al., 2001; Shapka & Keating, 2005). Most studies examining adolescents have examined

global self-concept or self-esteem, which does not account for the differentiation that occurs across domains throughout adolescence. To address this gap in the extant literature, two studies examined the development of domain specific self-concept (Cole et al., 2001; Shapka & Keating, 2005).

Shapka and Keating (2005) examined changes in domain specific and global self-concept throughout high school. Two cohorts within a Canadian sample of students in grades 9-13 (N = 518) completed the Harter Self-Perception Profile for Adolescents (Harter, 1988) three times over a two year period. No changes were detected after one year, supporting the idea that adolescence is a time of stability or gradual changes in self-concept. Results indicated that there were increases in most domains (close friendships, job competence, romantic relationships, and social acceptance) over a two year period, with the exception of scholastic competence which was shown to decrease over time. Global self-concept, appearance, and athletic competence remained stable over this two year time period. This study supports the notion that many domains have a flat u-shaped trajectory, with gradual increases following a period of stability in mid adolescence, but suggests that this trajectory varies across domains. The decrease that was observed in scholastic competence was most pronounced for the students who were in ninth grade at the beginning of the study, which suggests that scholastic competence may be negatively impacted by the increasing academic demands and social comparisons that occur during high school (Shapka & Keating, 2005).

Cole and colleagues (2001) also examined domain-specific self-concept longitudinally. Data were collected two times per year over six years in two cohorts of students (third and sixth grade at the beginning of the study; N= 855) using the Harter

Self-Perception Profile (Harter, 1985, 1988). This study evaluated behavioral, physical, and sports competence, in addition to scholastic and social competence. Behavioral competence decreased in elementary school, and then gradually increased during middle school and high school. Males' perceptions of their physical appearance increased from elementary school to middle school, while female physical self-concept decreased; however, both males and females had increasing physical self-concept during high school. Sports competence was shown to slightly decrease during both middle and high school, with females' decreasing more than males. Cole and colleagues found that participants' academic competence ratings gradually increased throughout the elementary years, followed by a drop during the transition to middle school. However, the transition to high school was marked by an increase in academic self-concept followed by a period of relative stability in this domain. This provides support for a u-shaped trajectory in the academic domain. Conversely, social acceptance was marked by a positive trajectory throughout the elementary years. During the transition to middle school, social self-concept was shown to continue to increase at a very gradual rate. Furthermore, social self-concept during the high school years remained relatively stable (Cole et al., 2001). These studies demonstrate the importance of considering self-concept at a domain-specific level for adolescents because each domain may have its own unique developmental trajectory related to cognitive and social influences.

It is imperative to understand the development of self-concept due to the important outcomes that are shown to be related to self-concept in adolescents. First, individuals with positive self-views tend to have higher levels of satisfaction with their lives (McCullough, Huebner, & Laughlin, 2000). Social self-concept is important for

initiating and engaging in positive social interactions, which are seen as a key component of mentally healthy children, adolescents, and adults (Bracken, 2009). Additionally, there is evidence that there is a strong reciprocal relationship between academic success and higher levels of academic self-concept (Trautwein et al., 2006). Considering that adolescence is a developmental period marked by increased demands in the academic and social domains, these domains are crucial to highlight. This is of particular importance for populations that may exhibit academic and social impairments, such as those experienced by children and adolescents with ADHD. The self-concept of children with ADHD has been explored in past literature, and findings do not seem to align with theories that purport that self-concept is high when frequent success and feedback from the environment is experienced (Harter, 1999). The self-concept of children with ADHD tends to remain high despite frequent experiences with failure (Owens et al., 2007). The following section will outline the core symptoms and characteristics of this disorder, as well as the associated impairments, before presenting unique findings related to the self-concept of this population.

Attention-Deficit/Hyperactivity Disorder

ADHD is one of the most common childhood mental health diagnoses, impacting five to ten percent of school-age students in the United States (Scahill & Schwab-Stone, 2000). Therefore, there are numerous students with ADHD within every school, and approximately one student with ADHD in every classroom. This review will provide a description of ADHD and the diagnostic criteria for the disorder, highlight the dominant symptoms, describe comorbidity with other disorders, emphasize the persistence of

ADHD from childhood to adolescence, and discuss the outcomes associated with the dominant symptoms of ADHD.

Diagnosis. A clinical diagnosis of ADHD requires that a child, adolescent, or adult exhibit six or more symptoms in either the area of inattention (IA) or hyperactivity-impulsivity (HI; American Psychiatric Association [APA], 2000). These symptoms must be maladaptive, inconsistent with the behavior of other's at their age level, and be present for at least six months to receive a diagnosis. Examples of IA symptoms include difficultly following instructions, sustaining attention, being forgetful, or easily distractible. Examples of HI symptoms include problems with waiting one's turn, talking excessively, interrupting, and fidgeting. Hyperactivity and impulsivity are grouped together due to past research suggesting that they are a single behavioral dimension (Achenbach & Edelbrock, 1983), which some researchers have labeled as disinhibition (Barkley, 2006). A diagnosis of ADHD requires that at least some of these symptoms are present and problematic before the age of seven and that functional impairments stemming from these symptoms are present in multiple life domains (e.g., school and home). According to the Diagnostic and Statistical Manual, Fourth Edition, Text Revision (DSM-IV-TR; APA, 2000), an ADHD diagnosis is currently separated into three different subtypes depending on the specific symptoms that are present. These include: 1) ADHD predominantly inattentive type (IA; presenting 6 or more symptoms of inattention and less than 6 symptoms of hyperactivity-impulsivity), 2) ADHD predominantly hyperactive-impulsive type (HI; 6 or more symptoms of hyperactivity-impulsivity and less than 6 symptoms of inattention), and 3) ADHD combined type (C; 6 or more symptoms in both areas). Despite the acknowledged distinction between the two

subtypes of the disorder within the DSM-IV-TR, there is some debate about whether the IA subtype is a disorder that is distinct from ADHD (Barkley, 2001). Despite the debate, it seems that most researchers agree that there are differences between the symptoms and impairments experienced across subtypes (Gaub & Carlson, 1997). Furthermore, recent research suggests that the impairments associated with ADHD symptoms are present among students who display sub threshold levels of ADHD symptoms and therefore do not meet diagnostic criteria (Bussing et al., 2010). For this reason it is important to consider a full range of ADHD symptoms.

Primary Characteristics of ADHD.

Inattention. Students displaying predominantly IA symptoms display a different behavioral manifestation of ADHD than their HI or C subtype counterparts. Socially, children with the IA subtype are often characterized as appearing withdrawn, sluggish, and passive (McBurnett, Pfiffner, & Frick, 2001; Milich, Balentine, & Lynam, 2001). Shyness has also been found to be prevalent among this population (Hodegens, Cole, & Boldizar, 2000). Additionally, IA behaviors have been shown to be highly related to academic difficulties (Barkley, 2006). Some research has shown that students with the predominantly IA subtype of ADHD have greater academic impairments and a higher percentage of comorbid learning disabilities than students with other ADHD subtypes (Gaub & Carlson, 1997). IA is demonstrated through difficulties with sustaining effort and attention to tasks, particularly tasks that are uninteresting or repetitive (Barkley, 2006). Distractibility is also a common area of difficulty for children with the inattentive subtype of ADHD; many students with ADHD are easily distracted by internal stimuli, such as thoughts or feelings, as well as external distractions (Barkley, 2006). Shifting

from one task to the next and failing to follow through with activities are also associated with IA (Wolraich et al., 2005). Prevalence rates of comorbidity with other externalizing disorders, including Conduct Disorder (CD) and Oppositional Defiance Disorder (ODD) have been shown to be lower for the IA ADHD subtype compared to the other ADHD subtypes (Crystal, Ostrander, Chen, & August, 2001). Children with the IA subtype have been shown to have more internalizing symptoms, including higher rates of depression and social withdrawal than children with other subtypes of ADHD (Carlson & Mann, 2000). Interestingly, IA has been found to be the most common presenting symptom for adolescents with ADHD, as other symptoms (such as HI) may change or become less visible as students reach adolescence (Wolraich et al., 2005).

Hyperactivity/Impulsivity. The combination of the HI symptoms, as seen in the DSM-IV-TR, is the result of factor-analytical studies indicating that hyperactivity and impulse control make-up a single behavioral dimension (Achenbach & Edelbrock, 1983; DuPaul, Anastopoulos, Power, Reid, Ikeda, & McGoey, 1998). This combination is particularly important when considering ADHD in older students, because difficulties with hyperactivity at a young age may later be reflected through poor impulse control or self-monitoring skills (Smith, Barkley, & Shapiro, 2007). Manifestations of impulsive symptoms include quick or careless responding to questions or requests, failure to consider consequences, interrupting others, difficulty taking turns or waiting, and problems with delaying gratification (Barkley, 2006). Hyperactivity is directly related to difficulties with impulsivity and is often considered to be a failure to regulate activity levels which results in higher rates of motor activity (Berlin & Bohlin, 2002). Impulsivity is often thought of as an underlying factor that contributes to the other core

symptoms of ADHD and this symptom, often called disinhibition, is considered the best marker to distinguish students with ADHD from students without the disorder (Barkley, 2006). Children who meet the diagnostic criteria for the HI subtypes tend to have more externalizing behavior and peer problems than those with an IA subtype (Gaub & Carlson, 1997). However, it has been shown that these students often do not exhibit high levels of internalizing symptoms or deficits in academic skills like those experienced by their IA classmates (Gaub & Carlson, 1997).

Combined. Individuals with the combined subtype (C) of ADHD, defined as the presence of 6 or more symptoms of inattention and hyperactivity/impulsivity, have been shown to behave similarly to those with the HI subtype and exhibit comparable impairments (Barkley, 2003). However, students with the ADHD-C subtype were found to display more significant academic difficulties, in addition to behavioral impairments associated with HI symptoms, than students with the HI subtype (Lahey, Applegate, McBurnett, Biederman, Greenhill, Hynd et al., 1994).

Comorbidity. Students with ADHD symptoms are often found to exhibit clinical levels of symptoms of other psychological disorders. The ADHD-C subtype has been found to demonstrate the highest levels of comorbidity among all three ADHD subtypes (Barkley, 2003). Comorbidity is found with both internalizing and externalizing disorders and is prevalent across all age groups. Estimates of the rates of comorbidity in samples of children with ADHD range from 44% in community samples (Szatmari, Offord, & Boyle, 1989) to 87% in clinical samples (Kadesjö & Gillberg, 2001). Oppositional Defiance Disorder (ODD) is the most common comorbid diagnosis, and Conduct Disorder (CD) is also common among students with ADHD. Past research indicates that

between 25-55% of adolescents meeting criteria for ADHD also display antisocial behavior associated with ODD and CD (Barkley, 2006). It has been suggested that the presence of ADHD in early childhood is the greatest risk factor for later antisocial behavior and diagnosis of CDD or ODD (Lahey, McBurnett, & Loeber, 2000).

Depression has also been identified as occurring at high rates within individuals with ADHD; 25-30% of children with ADHD display depressive symptoms (Barkley, 2006; Biederman, Mick, & Faraone, 1998). It is suggested that the prevalence of comorbid internalizing disorders increases with age, with the rate of 25 to 30 percent of children with ADHD displaying comorbid anxiety/depression increasing up to approximately 50 percent during adolescence (Barkley, 2006). One study including students with ADHD between 9 and 16 years old found that 48% of their sample exhibited comorbid depression (Bird, Gould, & Staghezza, 1993). Levels of depression surpassed the levels of comorbid ODD/CD (36%) and comorbid anxiety disorder (36%) found within this sample (Bird et al., 1993). This rate suggests a significant increase in depressive symptoms in adolescence compared to samples of younger children with ADHD (Wolraich et al., 2005).

Developmental Considerations. Recent research has concluded that 65% of childhood diagnoses of ADHD persist into adolescence (Wolraich et al., 2005), with ranges from 43-80% (Smith et al., 2007). It has been suggested that the notion that ADHD is outgrown may have stemmed from the fact that the symptoms of ADHD change as children become adolescents, with hyperactive symptoms being less prevalent and less visible (Wolraich et al., 2005). Some suggest that hyperactive symptoms are just an early manifestation of problems with impulsivity and disinhibition, which would

explain why hyperactive behaviors decrease with age (Smith et al., 2007). While the levels of motor activity may decrease with age, this difficulty with inhibiting responses will likely manifest as a deficit in self-monitoring and regulation during adolescence (Barkley, 2006).

These deficits related to disinhibition often lead to impairments in the academic and social domains for children and adolescents with ADHD; these impairments are associated with increasing academic and social demands that accompany puberty and the transition into middle school and high school (Wolraich et al., 2005). Academics become more challenging and demanding and higher levels of independence are expected during late childhood and adolescence. Additionally, relationships with peers become increasingly important during this developmental period (Brown, 2004). Symptoms of ADHD may exacerbate the challenges associated with the developmental period of adolescence. Students with symptoms of ADHD tend to have lower academic achievement and more social difficulties than adolescents without symptoms of ADHD (Barkley, 2006).

Academic Outcomes. Adolescents with ADHD tend to have difficulties that can significantly impact their school performance; these students are three times more likely than their peers to have been retained and are also at higher-risk for dropping out of school (Barkley, Fischer, Edelbrock, & Smallish, 1990). Underachievement has been found to be a common problem for adolescents with ADHD. It is estimated that thirty to forty-five percent of children with ADHD have received special education services related to their academic impairments by the time they reach adolescence (Barkley, 2006). Eighty percent of children with ADHD are two grades or more below grade level

by the time they are eleven years old (Cantwell & Baker, 1992). While children with IA symptoms are more likely to exhibit academic skill deficits, children and adolescents presenting higher levels of HI symptoms tend to have difficulties with behavioral aspects of academic performance such as motivation, task persistence, or productivity (Barkley, 2003). Difficulties with productivity for children and adolescents with ADHD are a primary contributor to their academic impairments and this under-productivity is likely related to underdeveloped executive functioning skills, such as self-monitoring (Barkley, 2003). Learning disabilities are also common in students with ADHD, with approximately half of special education students with ADHD qualifying as having a learning disability (Shnoes, Reid, Wagner, & Marder, 2006).

Other common academic difficulties experienced by adolescents with ADHD include the tendency to procrastinate, be disorganized, become distracted easily, have difficulty with completing projects, and receive poor grades (Wolraich, et al., 2005). These problems are more pronounced on tasks that require sustained effort and attention and are not of high interest to these students (Barkley, 2006). The increased academic demands, more independence and responsibility for work completion, switching between a variety of teachers and subjects, and increased volume of homework associated with middle school and high school can present significant challenges for adolescents with ADHD (Wolraich et al., 2005). The grades of students with ADHD tend to decline throughout each school year during middle school, with grades at the beginning of the year being higher than the end of the year as the demands become more intense (Shultz, Evans, & Serpell, 2009).

Social Outcomes. Because of the value that is often placed on peer interactions

during adolescence, problems with peers have the potential to become most pronounced during this developmental period for students with and without ADHD (Brown, 2004). This is likely related to the increasing importance of peer acceptance during this time, as well as the changes to the social environment associated with achieving a new level of independence (Wolraich et al., 2005). Poor social skills contribute to the social difficulties of children with ADHD. While some children are able to effectively learn to manage their impulsive behavior in social settings by the time they reach adolescence, others still have significant impairments in this area. Common impairments include intruding into conversations, being aggressive, intense, or emotional, and speaking in an excessive and disorganized manner (Barkley, 2003). A study investigating the relationship between self-control, ADHD, bullying, and bully victimization in a large sample of middle school students found that low self-control was correlated with higher rates of bullying; however, middle school youth with ADHD were shown to be victims of bullying whether or not difficulties with self-control were present (Unnever & Cornell, 2003). ADHD status was more highly correlated with being victimized by bullies than height, weight, age, or relative strength (Unnever & Cornell, 2003). Children with ADHD may not understand the nuances of social interaction, such as the concept of reciprocity or skills for initiating or exiting a conversation (Barkley, 2003). These negative social behaviors may lead students with ADHD to be rejected, avoided, or bullied by their peers. While other students are joining extracurricular activities and engaging in social events, children and adolescents with ADHD are often treated differently or rejected from these activities (Barkley, 2006). This rejection becomes particularly problematic during adolescence, as peers become more important to the adolescents overall sense of self

(Wolraich et al., 2005).

Adolescents with ADHD are at-risk for a variety of negative outcomes associated with academic and social functioning. Barkley (2006) asserts that impairments associated with ADHD may start to impact self-acceptance and personal satisfaction during later developmental phases (i.e., adolescence), and indicates that low self-esteem may be a concern for adolescents with ADHD. For this reason, it is particularly important to understand the way that adolescents with symptoms of ADHD view themselves within the academic and social domains, as these are areas where they experience significant difficulties. The following will include a discussion of past research related to the self-concept of children with ADHD.

ADHD and Self-Concept

Given the difficulties that adolescents with ADHD commonly experience, one might expect that children with symptoms of ADHD would be at risk for having low self-perceptions. Past research does not support this notion, and instead some children with ADHD have been found to have inflated positive perceptions of their own abilities (Evangelista, Owens, Golden, & Pelham, 2008). These overly positive self perceptions are often referred to as the positive illusory bias (PIB; Hoza, Pelham, Milich, Pillow & McBride, 1993). The PIB has been defined as when, "children with ADHD unexpectedly provide extremely positive reports of their own competence in comparison to other criteria reflecting actual competence" (Owens et al., 2007, p. 335).

Positive illusions are not unique to children with ADHD. Examinations of self-concept in the general population have indicated that inflated self-perceptions are often observed in young children (Harter, 1999; Harter & Pike, 1984; Manning et al., 2006;

Taylor & Brown, 1988). However, it has been suggested that the positive illusions observed in children with ADHD are unique compared to the general population for three reasons (Owens et al., 2007). First, the discrepancy between self-reported and actual competence observed is larger for children with ADHD and goes beyond what are considered normative positive illusions for young children. Additionally, the positive illusions have not proven to be adaptive for children with ADHD; these children continue to give up on tasks easily and have lower performance than same-age peers (Hoza et al., 2001), whereas positive illusions in the general population have been shown to lead to more task-persistence and motivation (Taylor & Brown, 1988). Finally, the self-concept of children with ADHD does not align with past self-concept theories which suggest that when self-perceptions are positive, it is due to experiences of success, and negative self-concepts stem from experiences of failure (Harter, 1999). In contrast, the self-perceptions of children with ADHD remain high despite frequent experiences of failure (Owens et al., 2007).

Hypotheses to Explain the Positive Illusory Bias. Efforts to explain the causes and the function of the PIB phenomenon are still ongoing. Currently, there are four hypotheses that have been proposed to explain the PIB including cognitive immaturity, neuropsychological deficits, ignorance of incompetence, and self-protection (Owens et al., 2007). Each of these hypotheses currently has limited empirical support, with some having no direct support at all. Therefore, it is difficult to determine which hypothesis is most viable to explain the causes and function of PIB.

The hypothesis of cognitive immaturity is that children with ADHD are not as cognitively mature as their same-age peers and therefore may exhibit positive illusions

much longer than what is typical for young children in the normative population (Milich, 1994). This hypothesis has an underlying assumption that children with ADHD will eventually outgrow their immature cognitions that lead them to display the PIB (Owens et al., 2007). One recent longitudinal study evaluating the PIB over a six-year period suggests that cognitive immaturity is not an accurate explanation for the PIB because positive illusions persisted throughout adolescence in the social domain and the PIB was not shown to decrease over time as would be expected if cognitive immaturity was maintaining the PIB (Hoza, Murray-Close, Arnold, Hinshaw, Hechtman, & MTA Cooperative Group, 2010). Some available indirect empirical evidence also challenges the viability of this hypothesis. For example, in young children within the general population overestimation of competence serves the function of improving persistence with novel tasks (Taylor & Brown, 1988); however, children with ADHD have been shown to give up on tasks easily (Hoza et al., 2001; Milich & Okazaki, 1991). Additionally, children with ADHD have been shown to accurately rate the competence of others (Evangelista et al., 2008) Additional longitudinal or cross-sectional research is needed in order to fully evaluate this hypothesis for explaining the PIB in children with ADHD.

The ignorance of incompetence hypothesis is that children with ADHD are not able to recognize their deficits because they lack the skills needed to determine what would constitute success in an area in which they are unskilled or incompetent (Hoza et al., 2002). In support of this hypothesis, it has been shown that children with ADHD overestimate their competence most in areas where they experience the greatest impairments (Hoza et al., 2002). According to the logic behind this hypothesis, it would

be likely that children with ADHD would inaccurately rate their own abilities and the abilities of others in areas in which they were incompetent. However, a recent study found that students with ADHD are able to accurately assess the performance of other children (Evangelista et al., 2008). This finding calls into question the promise of the ignorance of incompetence hypothesis to explain the PIB.

The neuropsychological deficit hypothesis has not yet been fully evaluated but remains as one potential explanation for the PIB (Owens et al., 2007). This hypothesis stems from the fact that children with ADHD often have impairments in executive functioning, which plays a key role in accurately evaluating performance and abilities. Owens and colleagues suggest that the neurologically-based deficits in the frontal lobe associated with ADHD, which result in impairment in executive functions, may underlie the PIB in children with ADHD. Support for this hypothesis has been found with patients with frontal lobe damage and problems with executive functioning. These patients have been shown to display a condition called anosognosia, a lack of awareness of personal errors that is neurologically based (Stuss & Benson, 1987). Individuals with this anosognosia condition are able to accurately rate the competence of others, despite inaccurate self-evaluations (Ownsworth, McFarland, & Young, 2002; Starkstein, Jorge, Mizrahi & Robinson, 2006). Similarly, children with ADHD have been shown to accurately rate the abilities of others (Evangelista et al., 2008). No study directly examining the relationship between deficits in executive functioning, ADHD, and the PIB has been conducted; therefore the viability of this hypothesis for explaining the PIB is plausible, but currently unknown.

The self-protective hypothesis currently has the most support for being a viable explanation of the function of the PIB. This hypothesis purports that children with ADHD have positive illusions of their own competence to ward off feelings of inadequacy (Diener & Milich, 1997). Evidence supporting this hypothesis includes the fact that children's perceptions of others' competence is unimpaired (Evangelista et al., 2008), and children with ADHD exhibit the PIB most prominently in the area of greatest impairment (Hoza et al., 2002; 2004). Additionally, several studies have shown that positive feedback leads to more accurate self-perceptions in the social domain (Diener & Milich, 1997; Ohan & Johnston, 2002). This lends support to the self-protective hypothesis because after positive feedback was received, the students may have no longer felt the need to inflate their perceptions of competence because they were told that they were doing well. A recent 6-year longitudinal study following students who were between the ages of 8 and 13 at the beginning of the study purports that substantial differences in the PIB between the social and behavioral domain over time provides evidence for the self-protective hypothesis (Hoza et al., 2010). It is suggested that adolescents with ADHD likely have significant social impairments and thus require significant self-protection within the social domain because social aspects are valued during adolescence; however, little self-protection in the behavioral domain is needed due to normative shifts towards more defiant behavior during adolescence (Hoza et al., 2010). Thus, the PIB was found to consistently remain in the social domain and decrease in the behavioral domain across the six year study (Hoza et al., 2010). The self-protective hypothesis has the most direct empirical support of all the hypotheses discussed herein. However, the PIB is likely to be best explained by a combination of these hypotheses.

More insight into the developmental trajectory of the PIB and determining if the PIB is present in adolescents with symptoms of ADHD provides additional information to help elucidate the cause and function of the PIB.

Past Literature Exploring the Positive Illusory Bias. Empirical research conducted on the topic of the positive illusory bias has evolved over the past decade. Past findings related to the presence of the positive illusory bias for children with ADHD are mixed and it is important to review past literature to understand trends in these findings. It has been suggested that conclusions drawn about whether or not the PIB is present in children with ADHD may relate to the specific method used to investigate this phenomenon (Owens et al., 2007). Therefore, it is important to understand the implications that the methods used may have on findings related to the PIB. Three methods have been used in past research on the PIB: absolute self-perceptions, pre/post performance ratings, and discrepancy or criterion analysis (Owens et al., 2007). The following section will include a description of each method, an explanation of past studies investigating the PIB using this method, and the corresponding results.

Absolute self-perceptions. Using absolute self-perceptions involves comparing self-ratings of children with ADHD to a group of control children. For example, children with and without ADHD rate their competence in the academic domain and then their levels of perceived competence are compared. Findings from past research utilizing this methodology are mixed. Several researchers have compared the global self-concept of students with ADHD and control groups to investigate the presence of the PIB or determine if there are differences between mean levels of self-concept between groups. These findings do not support the presence of the PIB at the level of global self-concept.

In an early study on the global self-perceptions of children with ADHD, Horn, Wagner, and Ialongo (1989) found that boys and girls (age 7-9) with ADHD had lower overall self-perceptions than children in the control group. A more recent study conducted by Hanc and Brzezinska (2009) also found that children (age 11-13) with higher levels of ADHD symptoms have lower perceptions of their overall competence. Other early studies investigating the global self-concept of young adults who were hyperactive as children (Hechtman, Weiss, & Perlman, 1980; Slomkowski, Klein, & Mannuzza, 1995) indicated that this group had lower global self-concepts than the non-hyperactive control group as adolescents (age 16-23) and young adults (age 23-30).

In contrast, other researchers have investigated the PIB at a domain-specific level. Ialongo and colleagues used the method of absolute self-perceptions to investigate multiple domains of self-concept and reported that the ADHD group (age 7-11) had lower academic, social, behavioral and global self-concept than a group of non-ADHD controls (Ialongo, Lopez, Horn, Pascoe, & Greenberg, 1994). In one study, no significant difference was found between the performance ratings of children (age 8-13) with ADHD, and the ratings of a non-ADHD control group in multiple domains including social, scholastic, behavioral, physical, and global self-concept (Hoza et al., 1993). The only notable difference between the children with ADHD and the non-ADHD control children in this study was in the domain of athletic competence, where boys with ADHD provided more positive self-evaluations than the non-ADHD controls. This finding provides preliminary evidence for the presence of the PIB in the athletic domain, but suggests contradictory conclusions. It remains unclear if a PIB is present in the other

domains investigated because there is no measure of the actual competence/abilities of the students in either the ADHD or control groups (Hoza et al., 1993).

Other studies utilizing absolute self-perceptions have investigated the impact of comorbid conditions, such as aggression or depression, on the presence of the PIB. Treuting and Hinshaw (2001) examined the effect of aggressive behavior on the global, behavioral, intellectual, physical, anxiety, popularity, and happiness self-perceptions of children (age 7-12) with ADHD. These authors found that aggressive children with ADHD demonstrated lower self-concept than both control children and nonaggressive children with ADHD (who only had lower levels of self-concept in the popularity domain compared to control children with other domains rated the same as controls; Treuting & Hinshaw, 2001). This study also examined the presence of depressive symptoms among the three participant groups and found that aggressive children with ADHD had the highest levels of depressive symptoms and the lowest global self-concept. This finding demonstrates the importance of examining comorbid symptoms when investigating the presence of the PIB to achieve a better understanding of which symptoms may be influencing the child's self-concept.

Gresham, MacMillan, Bocian, Ward, and Forness (1998) utilized a modified version of the absolute self-perceptions methodology to examine the academic and social self-perceptions of three groups of students in 3rd and 4th grade: one group of students who were considered to be hyperactive, inattentive, impulsive, and have conduct problems (based on internalizing and externalizing subscale scores more than 2 standard deviations above the gender mean on the Social Skills Rating System- Teacher [SSRS-T]; Gresham & Elliot, 1990) another group whose scores on the SSRS-T indicated the

presence of internalizing and externalizing symptoms 1 standard deviation above the mean, and a matched control group. Although these researchers used multiple sources of data within each domain including peer reports, teacher ratings, school records, as well as self-reports, they did not directly compare the self-reports of the children in their study to any of these objective criterion. Rather, mean differences in student rated self-concept between these groups were examined and data from other sources were used as measures of outcomes within each domain. Results indicated that there was no difference between the children in either group and the control children in social or global self-concept, and that children in the two symptomatic groups had lower academic self-concept ratings than students in the control group. However, it is important to note that all of the groups rated themselves within the average range of self-concept. The authors concluded that this could be seen as evidence of the PIB because outside sources (i.e. peer reports, teacher ratings, and school records) indicated that the children in two different symptomatic groups had significant impairments within the academic and social domains when compared to the control group. The group displaying symptoms of ADHD and conduct problems was shown to have worse academic and social outcomes than children in the other two groups, indicating that the PIB may be greatest for those displaying ADHD symptoms. The method used in this study demonstrates one way that self-concept ratings can be corroborated by outside sources; however, this is still considered to be absolute methodology because there was no direct comparison between self-ratings and a specified criterion.

Only one study (Hanc & Brzezinska, 2009) using absolute methodology to investigate the self-perceptions of students with symptoms of ADHD has considered the

intensity or severity of ADHD symptoms. Hanc and Brezinkska (2009) compared ratings of competence in Polish children (age 11-13) with varying degrees of ADHD symptoms and found no significant differences between groups with different levels of ADHD symptoms in terms of self-rated social competence (including social adjustment and cooperation skills). The authors suggest that this lack of differences could be attributed to the PIB, because these students likely differ in terms of social impairment (Hanc & Brzezinska, 2009). However, general feelings of competence, as well ratings of adaptive properties, knowledge and skills, acknowledgement, emotional factor, and belief in success, were shown to be lower for students with higher levels of ADHD symptoms (Hanc & Brzezinska, 2009).

When interpreting these inconclusive results, it is important to consider sample characteristics such as age, comorbidity, subtype, and symptom severity. Studies that found that the children with ADHD had lower self-perceptions than the control group children did not account for comorbid internalizing symptoms (Horn et al., 1989; Ialongo et al., 1994; Slomkowski et al., 1995); while Hoza and colleagues (1993) controlled for internalizing symptomatology and found no differences between the ADHD and control groups. Trueting and Hinshaw (2001) also accounted for comorbid aggression and depression and found that the group of children with ADHD who exhibited both aggressive and depressive symptoms had the lowest self-concept. These findings demonstrate the importance of considering various comorbid conditions when investigating issues pertinent to self-concept, including the PIB (Treuting & Hinshaw, 2001). Additionally, the samples utilized in the studies by Slomkowski and colleagues (1995) and Hechtman and colleagues (1980) were much older, consisting of

adolescents/young adults age 16-30 years compared to samples of children below the age of 13 utilized in the other studies presented here. The age of participants could have an impact on the presence of the PIB and further research is needed on this topic. Furthermore, these two studies investigated global self-concept, which is in contrast to the majority of research on the PIB that focuses on domain-specific self-concept.

Utilizing absolute self-perceptions to examine the presence of the PIB yields mixed results and has some major limitations. A primary challenge with this method is that it does not allow for comparisons between children's actual performance and his/her self-ratings and relies solely on comparisons of mean levels of self-concept between groups. Given the difficulties and impairments often experienced by children with ADHD, it is logical that accurate self-perceptions would be lower than children without ADHD. However, this method does not account for any differences that may exist in the actual abilities or competence between the groups of children with ADHD and the non-ADHD controls. Based on findings in this line of research, it is evident that relying solely on the self-report of children with ADHD leads to inconclusive results.

Pre/post performance ratings. Understanding of the PIB has been advanced by the use of pre-task and post-performance ratings to investigate the self-perceptions of children with ADHD. This method involves children predicting or rating their performance on a task and then comparing their self-ratings to their actual performance and/or to children in a control group. Children with ADHD have been shown to inflate their ratings of their own performance more than children in the control group, despite the fact that children with ADHD are consistently shown to perform worse on these tasks (e.g., Milich & Okazaki, 1991; Hoza, Waschbusch, Pelham, Molina, & Milich, 2000;

Hoza et al., 2001).

Past research has utilized a method of asking children to predict their performance on tasks that include word games, such as find-a-word or word-search puzzles. Whalen, Henker, Hinshaw, Heller, and Huber-Dressler (1991) found that 80% of children (age 7-13 years) with ADHD in their sample predicted that they would complete the word-search task with perfect accuracy, compared to only 43% of the control group. Another study found that children (age 9-11) with ADHD consistently predicted better performance than children in the control group on a find-a-word task, despite experiencing less success and more frustration than the control group (Milich & Okazaki, 1991). Additionally, on a story-recall task where the performance between the ADHD and non-ADHD groups was comparable, children (grades 3-7) with ADHD were still shown to have higher pre-task performance predications than their non-ADHD peers (O'Neill & Douglas, 1991).

Other methods include having a researcher manipulate situations to determine whether the child will experience success or failure with a task and then asking the children to rate their performance after they complete the task. Hoza and colleagues (2000) examined the social self-concept of boys (age 7-13 years) with ADHD using this method. These researchers had each student participate in one successful and one unsuccessful task that involved initiating a child confederate in conversation. Boys with ADHD were rated at less socially effective when completing this task; however, the boys evaluated their own performance higher than control boys who were rated as being more successful with this task. Interestingly, the boys with ADHD were shown to have higher overestimation after the unsuccessful social interaction. This finding lends support to the

hypothesis of self-protection in the social domain, because the boy's overestimation could be a method to combat feeling of inadequacy after the task was completed unsuccessfully.

An extension of the previous study was conducted to examine post-task predictions in the academic domain (Hoza et al., 2001). Children (age 7-13 years) with ADHD were shown to be less successful and extend less effort than the control group on a find-a-word task. However, the post-task ratings of children with and without ADHD were comparable. This finding indicates the children with ADHD rated their ability as higher than what was actually observed and shows that these boys with ADHD were optimistic about their performance even though it was poor (Hoza et al., 2001).

The studies summarized here demonstrate consistent findings that children with ADHD rate their performance as higher than what is actually observed or higher than children without ADHD. This method of using children's performance on a task as a basis for comparing their self-ratings provides a useful measure of the PIB, because it allows for comparison between their actual abilities and their self-ratings. It is important to note that all of these studies utilized samples of boys only. Additionally, internalizing and aggressive symptoms were not accounted for in these studies. Potential limitations to this methodology include the fact that it is difficult to assess multiple domains of self-concept within one study because a separate task would need to be designed to assess each domain of self-concept. Also, this method only allows for the evaluation of self-concept on a specific task (e.g., find-a-word task), rather than assessing how a student feels about a domain in general. Furthermore, the academic tasks used in past research

(e.g., mazes, word-find tasks) may not be representative of academic tasks that children encounter in school.

Criterion/discrepancy analysis. The current best practice recommendation in terms of methodology for exploring the PIB is the discrepancy and criterion analysis, which involves comparing the child's report of competence to some form of objective source (Owens et al., 2007). This is distinct from the pre/post method discussed previously, because this method compares a child's perception of their overall abilities within a given domain, rather than task-specific evaluations, to the objective source. The source for the criterion can be another rater (typically teacher or parent) or a child's performance on an objective measures, such as an achievement test score. To calculate a discrepancy, the criterion score is subtracted from the child's self-rating and the result is a discrepancy or difference score. High and positive difference scores are suggestive of overestimation of competence by the student. Consistent results documenting the presence of the PIB in children with ADHD have been gathered using this methodology (Evangelista et al., 2008; Hoza et al., 2002; 2004; Owens & Hoza, 2003).

Hoza and colleagues have conducted several studies utilizing this methodology by comparing the self-ratings of children on the multiple domains of the Self-Perception Profile for Children (SPPC; Harter, 1985) with the accompanying teacher rating scale that is directly comparable (Teacher Report of Child's Actual Behavior, Harter, 1985). Hoza and colleagues (2002) investigated the academic, social, behavioral, athletic, and physical domains, as well as global self-concept. Using the discrepancy method, boys (ages 7-13 years) with ADHD were shown to overestimate their academic, behavioral, and social competence compared to teacher ratings, significantly more than boys in the

control group (Hoza et al., 2002). This study also considered the influence of depressive symptoms on the presence of the PIB and found that the group of boys with ADHD and comorbid symptoms of depression (assessed using the Children's Depression Inventory [CDI]; Kovacs, 1992) had a decreased presence of the PIB. Children with ADHD and comorbid depression were shown to have more realistic self-perceptions than those with ADHD and no depressive symptoms across multiple domains.

In a similar study using the discrepancy method, Hoza and colleagues (2004) demonstrated that the PIB exists in the scholastic, social, athletic and behavioral domains for both boys and girls (ages 7-10 years) with ADHD and also showed that the overestimation of competence in children with ADHD was found regardless of whether the child's teacher, mother, or father served as the criterion reporter (Hoza et al., 2004). The two studies using the criterion/discrepancy analysis described here (Hoza et al., 2002; 2004) have also provided evidence that the PIB is most prominent in the child's domain of greatest deficit. Children who had low academic achievement were shown to have the greatest discrepancy in the academic domain, and children with conduct problems had the greatest discrepancy in the behavioral domain (Hoza et al., 2002, 2004).

Owens and Hoza (2003) also utilized the discrepancy methodology in their examination of how ADHD subtype may contribute to the presence of the PIB. This study, which utilized clinic and school-based recruitment methods, was the first to explore the PIB in relation to ADHD subtypes. This study focused solely on the academic domain and used teacher reports and standardized achievement tests scores as two methods of comparison utilizing a discrepancy analysis. These authors found significant differences between a group of children (ages 9-12 years) who were primarily

inattentive (IA), and another group of children who displayed hyperactive/impulsive and combined (HICB) symptoms. The children in the IA and control groups were shown to have self-perceptions in the academic domain that aligned with the criterion; conversely, the children in the HICB group were shown to overestimate their competence compared to the two criterion measures that were used. Larger discrepancies were found when teacher ratings were used as the criterion compared to standardized achievement test scores. It was also demonstrated that more severe HICB symptoms were associated with larger discrepancies between the child's report and the criterion; thus, higher levels of hyperactive/impulsive symptoms were related to more overestimation of competence (Owens & Hoza, 2003). The results of this study suggest that subtype and symptom severity may be important considerations when examining the self-perceptions of children with ADHD; the PIB may not be present in children who are primarily inattentive or children with less severe ADHD symptoms. This may be particularly important to consider when examining the PIB in adolescents because there is evidence that hyperactive symptoms decrease over time and IA symptoms become more prevalent as children age (Wolraich et al., 2005).

A study conducted in Sweden with 635 twelve year-old children also suggests that it is important to consider the intensity of ADHD symptoms when determining the accuracy of self-perceptions (Diamantopoulou, Henricsson, & Rydell, 2005). Diamantopoulou and colleagues (2005) utilized peer nominations, and self and teacher reports to explore the relationship between peer relations, student perceptions, and varying levels of intensity of ADHD symptoms. These authors found that children with higher levels of ADHD symptoms did not perceive their peer relationships to be more

negative, despite teacher ratings and peer nominations suggesting that higher levels of ADHD symptoms were related to social rejection and peer dislike (Diamantopoulou et al., 2005). While low levels of ADHD symptoms were also significantly related to peer dislike, these students reported feelings of loneliness that were more aligned with the external criterion used (teacher ratings and peer nominations; Diamantopoulou et al., 2005). This study suggests that the degree of ADHD symptoms may be an important consideration when exploring the PIB.

In an effort to determine if children with ADHD are able to accurately rate the competence of others, Evangelista and colleagues (2008) used the discrepancy analysis methodology to investigate the presence of the PIB in the academic, social, athletic, physical, and behavioral domains. This study was designed to elucidate whether the PIB is a function of the inability of children with ADHD to accurately rate competence in general, or if it was only their own competence that this group was inaccurate in rating. Boys and girls with ADHD overestimated their own competence compared to teacher ratings in all of these domains. When the absolute self-concept of the children in the ADHD group was compared to control children, children with ADHD reported lower self-perceptions in all domains with the exception of athletic competence. However, when these self-ratings were compared to teacher ratings, the children with ADHD significantly overestimated their competence in all domains, while the control children did not. This shows the importance of investigating the PIB using a criterion rather than simply comparing self-concept scores between groups. All children in this study were also asked to share their perceptions of the academic and social competence of others through a video task. Results suggest that there was no difference in the ability of

children with and without ADHD in judging the competence of others in either the academic or the social domains. Both groups were able to accurately rate the abilities of others. This study provides evidence that suggests that the ignorance of competence hypothesis is not a viable explanation of the PIB because children with ADHD are able to accurately judge the competence of others. Another unique aspect of this study is that both clinic and community based samples were utilized.

In order to test the hypothesis of self-protection, Ohan and Johnston (2002) used positive feedback during social and academic tasks to determine if this would decrease the discrepancy between the self-perceptions of boys with ADHD and their actual performance. This study combined the pre-task prediction and the discrepancy analysis methods to explore the PIB in boys with and without ADHD. First, students predicted their performance on a maze-completion task. After being individually instructed on the maze-task and completing the mazes, boys were given positive, average, or no feedback from a member of the research team. All of the boys were shown to rate their performance similarly in the academic and social domain. Because the boys with ADHD had lower performance compared to the boys without ADHD, they were shown to have larger discrepancies between their self-rated competence and their actual competence on both the academic and social tasks. Boys with ADHD who received positive feedback from their teacher were shown to have a smaller difference between their actual and self-reported competence in the social domain. In other words, the positive illusions in the social domain decreased when positive feedback was given in the social domain. This finding was not replicated in the academic domain, as boys with ADHD had even larger discrepancies between their actual and self-rated academic competence after receiving

positive feedback. This study demonstrates the importance of considering each self-concept domain independently when investigating potential ways to decrease the presence of the PIB in children with ADHD.

To extend the findings of past researchers, Whitley, Heath, and Finn (2008) used a combination of absolute self-perception comparisons and a discrepancy analysis to determine if the presence of the PIB was related to externalizing behaviors or specifically to ADHD. Past research (e.g., Hoza et al., 2004) could not make this distinction because the comparison groups included students who were not exhibiting emotional or behavior problems. To answer this question, the self-perceptions of students with ADHD (based on teacher reported symptoms in the clinical range on the Child Behavior Checklist [CBCL; Achenbach, 1991] and SSRS [Gresham & Elliot, 1990]) ages 6-13 years, were compared to a matched control group of students exhibiting both internalizing and externalizing problems (based on teacher nominations), but who did not meet ADHD criteria. Students' self-perceptions were also compared to teacher ratings in the academic, social, and behavioral domains. The results of this study indicated that there was no difference between the absolute self-perceptions of students with ADHD and other emotional or behavioral problems. If these researchers had only conducted this comparison of absolute self-perceptions between these two groups, the presence of positive illusions may have been overlooked. However, it was found that teachers rated the competence of the students in the ADHD group significantly lower than the students in the comparison group, which indicates that teachers perceived students with ADHD to be experiencing more deficits across the academic, social, and behavioral domains. Thus, when difference scores were calculated, significant differences in the self-perceptions

between the groups were noted. Specifically, the students with ADHD overestimated their competence in all three domains significantly more than students in the non-ADHD group. This is especially noteworthy because students with ADHD were compared to students identified as having emotional and behavioral problems. While the authors suggest that this difference in discrepancies found between groups may be a result of biased teacher ratings towards students with ADHD, the findings of this study are suggestive that the PIB may be directly related to symptoms associated with ADHD, rather than with behavioral difficulties in general.

The first longitudinal study of the PIB utilized discrepancy analysis to investigate the PIB in the social and behavioral domains among 513 children with ADHD that were 8-13 years old at the beginning of the six year study (Hoza et al., 2010). This ADHD group was compared to a group of 284 comparison peers without elevated ADHD symptoms. Results from this study indicate that children with ADHD exhibited larger and more positive discrepancies between self and teacher rated competence than the control group in both the social and behavioral domains across all time points. Interestingly, this study also noted that students with ADHD demonstrate a trend of increasing social self-perceptions during early adolescence which is similar to what has been demonstrated in normative samples. However, less increase in social self-perceptions was noted in the ADHD group compared to students without ADHD symptoms.

This study also investigated the PIB's relationship with depression and aggression over time as a means to determine whether or not the PIB is adaptive. Decreased PIB in the social and behavioral domain were found to be associated with higher levels of

depressive symptoms, while increases in the PIB in the behavioral domain were predictive of more aggression. It is important to note that the authors suggest that more negative perceptions may be the result of depression rather than the cause, and therefore they concluded that the PIB does not serve as a protective factor for depressive symptoms. This study also purported that the self-protective hypothesis may be a viable explanation for the PIB because adolescents with ADHD were more likely to overestimate their competence in the social domain (an area where impairments are viewed quite negatively during adolescence and therefore require self-protection) compared to the behavioral domain (where impairments may be more normative due to a tendency towards more deviant behaviors during the developmental period of adolescence). Additional research is needed to further explore this finding.

One potential criticism for using this discrepancy analysis methodology is that there is some evidence that parents and teachers may have negatively biased reports of children with ADHD (Eisenberg & Schneider, 2007; Whitley et al., 2008). However, given the consistency in ratings found across raters (Hoza et al., 2004), and the consistent findings demonstrating the presence of the PIB when utilizing a criterion (Evangelista et al., 2008; Hoza et al. 2002, 2004; Owens & Hoza, 2003), it is unlikely that a negative bias is accounting entirely for the PIB. Yet, utilizing perceptions from others and objective outcome measures (e.g., achievement test scores or school records) to complete discrepancy analyses is suggested as the best method for ensuring the validity of this construct (Owens et al., 2007).

The studies discussed herein that have utilized the discrepancy and criterion analysis to address some of the limitations with previous studies and yield more

consistent results than studies using other methods to examine the PIB. All of the studies using this method provided support for the presence of the PIB in several domains of self-concept. However, it is important to note that the majority of these studies have used primarily elementary-age samples and clinic-based recruitment for participants with diagnosable levels of ADHD symptoms. It is important to focus future research on older students (middle school age or above) and utilize school-based recruitment methods in order to achieve a larger range of symptom severity and to address these gaps in the literature. Furthermore, it is important that considerations learned from these studies (such as the importance of considering subtype and depressive symptoms) are accounted for when examining the PIB in adolescents in order to yield results that can be compared across age groups. It is also important to be aware of how differing methodologies may lead to different conclusions about the presence of the PIB. The use of discrepancy analysis with a criterion is recommended as the best practice in examining the PIB in samples of children, adolescents, or adults with ADHD (Owens et al., 2007).

Conclusions

It is important to conduct research with the goal of further understanding the self-concept of young adolescents demonstrating ADHD symptoms. The self perceptions of students with ADHD are unique compared to individuals without ADHD, and while more research is needed, these differences may help inform future assessment and intervention efforts. Previous research on self-concept suggests that the PIB may not be present in adolescents with symptoms of ADHD (Hecthman et al., 1980; Slomkowski et al., 1995). Traditional theories of self-concept suggest that negative feedback from the environment can lead to negative self-perceptions (Harter, 1999). Considering the impairments that

are experienced by students with ADHD symptoms, it is likely that they have received negative feedback from both the home and school environments that may influence the presence of the PIB. This negative feedback received throughout their lives may accumulate and make a negative mark on the self-concept of these adolescents that persists into adulthood, as was evidenced in past research conducted by Hechtman et al. (1980) and Slomkowski and colleagues (1995) indicating low self-esteem in adolescents and young adults with ADHD. In the normative population, self-concept has been shown to decrease during the middle school years and then begin to gradually increase as student's age (Harter, 1999). Considering this finding, which suggests that the PIB may not be present during the middle school years, in conjunction with recent research on the PIB suggesting that positive illusions persist in the social but not behavioral domains (Hoza et all., 2010), more research is needed to understand whether or not the self-concept of adolescents with symptoms of ADHD aligns with the PIB that has been found in elementary-aged children with ADHD.

There is a clear need for studies utilizing the discrepancy/criterion methodology that has been used in past research endeavors focused on the PIB in children, to extend this research to middle and high school populations. The PIB has been found to be less prevalent in children who exhibit symptoms of depression (Hoza et al., 2002), and students who have primarily inattentive ADHD symptoms (Owens & Hoza, 2003). These factors must be considered when investigating the persistence of the PIB into adolescence, as more students with ADHD exhibit primarily inattentive symptoms as they enter adolescence (Wolraich et al., 2005), and the rates of depression also increase

during this developmental period (Bird et al., 1993). These factors alone may lead to a decreased prevalence of the positive illusory bias in adolescents.

The function of the PIB is not currently well understood and it is not clear if this phenomenon leads to adaptive or maladaptive outcomes. However, children and adolescents with ADHD experience significant impairments in the academic and social domains, such as academic underachievement and high rates of rejection by peers. If the PIB was shown to persist into adolescence then this could lead to problems with intervention compliance if these students do not perceive that they have impairments that could warrant improvements from intervention efforts. Additionally, the PIB could contribute to these students having difficulty learning from their past mistakes. However, the PIB may also lead to positive aspects such as being open to many new experiences, and attempting more challenging social and academic tasks. There is not currently a research foundation that allows for conclusions about the presence of the PIB in adolescents, and therefore the function of this phenomenon is unknown.

Chapter III: Method

The purpose of the current study was to gain insight into the presence of the positive illusory bias (PIB) within the academic and social domains for middle school students exhibiting symptoms of ADHD. The accuracy of academic and social self-concept was determined through a comparison of students' self-ratings of competence to teacher ratings and achievement test scores. These comparative data were classified into three categories of young adolescents with negative, accurate, or positive self-perceptions. Differences in inattentive (IA), hyperactive/impulsive (HI), and depressive symptoms among these three groups of young adolescents were investigated. The following chapter details the methods utilized for the current study, beginning with a description of participant characteristics and participant selection, followed by a description of the measures and procedures that were used to collect data from students and teachers. Then, the analyses for each research question are explained. Finally, a discussion of ethical considerations and limitations of the study is provided.

Participants

Participants in grades six through eight were recruited from two public middle schools in a large school district in a southeastern state. These two middle schools were selected based on their varied socioeconomic and cultural variables and because the administrators at these schools expressed interest in working with the University of South Florida research team. Each of these schools had some unique features. School one had

a magnet program that focuses on science, mathematics, technology, and engineering in which 15% of the student body was enrolled. Additionally, school 1 was a certified Advancement Via Individual Determination (AVID) school, meaning that study skills were taught school-wide in an effort to decrease the achievement gap between students from various ethnic and socioeconomic backgrounds. Only one third of the schools in the county were certified AVID schools. School 1 had recently received a school grade of B; however this school had previously been a C school. Ten percent of the students at School 1 were enrolled there due to School Choice, a program that allows students to choose and apply to schools that they desire to attend. School 2 was described by an administrator as having fewer specialized programs, with no magnet components and a gifted program. School 2 had recently received a school grade of A, and had also received grades of A in the past. Twenty-five percent of students at school 2 were enrolled there due to School Choice. At school 1, 80% of the students qualified to receive free and reduced price school lunches; while 53.5% of students qualified at school 2 (compared to 2007-2008 state average of approximately 45%; U.S. Department of Education, 2008). Eighty-one and 58.8% of the student bodies at these two middle schools were from an ethnic minority background (compared to 2007-2008 state average of approximately 54%; U.S. Department of Education, 2008). More information on the demographics of these two schools can be found in Table 1.

Table 1

School Demographic Information

	School 1 % (*n*)	School 2 % (*n*)	Total % (*n*)
Gender			
Male	52.8% (473)	47.9% (521)	50.1% (994)
Female	47.2% (422)	52.1% (567)	49.9% (989)
Race/Ethnicity			
American Indian or Alaskan Native	0.6% (5)	0.2% (2)	0.4% (7)
Asian or Pacific Islander	2.7% (24)	3.4% (37)	3.1% (61)
Black, Non-Hispanic	52.7% (472)	6.3% (69)	27.3% (541)
Hispanic	20.0% (179)	42.6% (463)	32.4% (642)
Multiracial	5.1% (46)	6.3% (69)	5.8% (115)
White, Non-Hispanic	18.9% (169)	41.2% (448)	31.1% (617)
Free & Reduced Lunch Status			
Yes	80.0% (716)	53.5% (582)	65.5% (1298)
No	20.0% (179)	46.5% (506)	34.5% (685)
Receiving ESL Services	12.5% (112)	14.6% (159)	13.7% (271)
Students Enrolled in ESE	20.3% (182)	15.3% (166)	17.6% (348)
Grade Level			
Six	31.1% (278)	35.5% (386)	33.5% (664)
Seven	35.6% (319)	33.2% (361)	34.3% (680)
Eight	33.3% (298)	31.4% (342)	32.3% (640)
Total Enrollment	45.1% (895)	54.9% (1,088)	100.0% (1,983)

The current study was part of a larger study that investigated the experiences of adolescents exhibiting inattention, hyperactivity, and impulsivity, in order to better understand how these behaviors relate to academic, social, family, and substance use outcomes. The principal investigators (PIs), Dr. Julia Ogg and Dr. Rance Harbor, received approval to conduct this study from the Institutional Review Board (IRB) at the University of South Florida (USF; Ogg & Harbor, 2009), and the participating school district. Data were collected during the Spring semester of 2010 by a research team consisting of graduate students from USF, including the author of this research. Students were supervised by the PIs, Dr. Julia Ogg and Dr. Rance Harbor, faculty members in the USF School Psychology Program. The current study includes secondary analysis of data from the above referenced dataset to answer the research questions, and separate IRB approval was obtained before beginning analyses.

Selection of Participants.

Students. In order to participate, students were required to be enrolled full-time at one of the middle schools included in this study and to obtain parental informed consent for their participation (see Appendix A). In addition, students reviewed and signed a student assent form just prior to data collection (see Appendix B). Students served exclusively in self-contained special education classrooms and non-English speaking students were excluded from the present study. While the exact number of students excluded based on these criteria is unknown, 12.5% and 20.3% of students at School 1 and 14.6% and 15.3% of students at school 2 receive English as a Second Language (ESL) or Exceptional Student Education (ESE) services, respectively. As can be seen in Table 1, total enrollment across both schools was 1983 (school 1 n = 895;

school 2 *n* = 1088). Parental consent was obtained for a total of 198 students, which represents 10% of the total enrollment across both schools, and 12% of the total enrollment across both school if ESL (Total = 1,652; School 1 *n* = 784; School 2 *n* = 868) or ESE students (Total = 1,687; School 1 *n* = 765; School 2 *n* = 922) are excluded. It is important to note that not all ESE students were excluded from the sample, only those students served in self-contained classrooms; however, these percentages provide a better understanding of the response rate in the current study. One-hundred eighty-three students were present and gave assent to participate in the current study (9% of the total student body).

Table 2

Demographic Characteristics of Participants (n = 183)

	School 1 Sample (*n* = 85)		School 2 Sample (*n* = 98)		Total Sample (*n* = 183)	
Variable	n	%	N	%	N	%
Gender	85	100	98	100	183	100
Male	26	30.6	40	40.8	66	36.1
Female	59	69.4	58	59.2	117	63.9
Grade	85	100	98	100	183	100
6	55	64.7	30	30.6	85	46.4
7	14	16.5	33	33.7	47	25.7
8	16	18.8	35	35.7	51	28.0
Ethnicity	85	100	98	100	183	100
African-American	40	47.1	8	8.2	48	26.2
Asian/Pacific Islander	3	3.5	2	2.0	5	2.7
White	21	24.7	45	45.9	66	36.1
Hispanic	15	17.6	37	37.8	52	28.4
Native American/ Alaska Native	0	0	0	0	0	0
Other	6	7.1	6	6.1	12	6.6
Free/Reduced Price Lunch*	85	100	98	100	183	100
Yes	62	72.9	44	44.9	106	57.9
No	23	27.1	54	55.1	77	42.1

*Free and reduced price lunch status reported was obtained from student records

Descriptive statistics of the demographics of the entire sample of study participants are provided in Table 2. A comparison between the sample and the school demographic data presented above suggests that a larger percentage of the current sample came from school 2; however, this is representative considering that school 2 is larger than school 1. Additionally, females were overrepresented as a whole within the current sample, particularly from school 1 where 47.2% of the student body is female, compared to 69.4% female within the current sample. In terms of ethnicity, this sample appears to be well-aligned with the percentages of students of each ethnic background represented at each school. In terms of socioeconomic status, with free or reduced price lunch as an indicator, there was a smaller percentage of students in the current sample receiving free/reduced price lunch compared to the student body as a whole (57.9% receiving FRL in this sample, 65.5% across the two schools). However, the breakdown of FRL across schools in the current sample matches school data, with school 1 having a higher percentage of students from low socioeconomic status. Lastly, at school 1 there was overrepresentation of students in sixth grade (64.3% of study participants from school 1 were in grade 6, whereas only 31.1% of students attending school 1 were in sixth grade). The participants at school 2 were more evenly distributed across grade levels, with the highest percentage of students in 8th grade.

Teachers. Homeroom teachers of student participants were asked to complete the Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS; Wolraich, Feurer, Hannah, Baumgaertel, & Pinnock, 1998; see Appendix C) and the Self-Perception Profile for Children Teacher Rating Scale (SPPC-TRS; Harter, 1985; see Appendix D) for each student in their homeroom class who provided self-report data and had parent permission

to participate. Homeroom teachers were selected for participation because the administrator at each school suggested that these teachers knew each student in their homeroom classes very well. Homeroom teachers had students in their classrooms for the longest period of the day because this homeroom time was in addition to an academic subject area. Therefore, these teachers were expected to be the best source of information about a student's academic and social functioning in the school context. If a student's homeroom teacher declined to participate, the administrator selected another teacher that had the student in his or her class throughout the school year. At school one 42% of students had their survey completed by a teacher other than their homeroom teacher, while at school two only 6% had their survey completed by another teacher. A letter of informed consent (see Appendix E) was distributed to all teachers with student participants in their homeroom class. Teachers were informed of the small incentive available for each questionnaire packet that they completed. Specifically, teachers received a $2 gift card for each individual student packet they completed. Fifty-one teachers completed questionnaires for 1-10 students each; this resulted in teacher data for all students included in the current study.

Measures

Multiple sources of data from students and teachers questionnaires were obtained in this study. Additional data were gathered from student records, including information about students' Free/Reduced Lunch (FRL) status as an indicator of SES, and also reading and math scale scores from the Florida Comprehensive Assessment Test (FCAT).

Student Measures.

Demographic form. The demographic form (see Appendix F) contained 14

questions regarding age, grade, gender, race/ethnicity, attendance, school discipline and arrest history, past and present mental health status, and socioeconomic status (SES). Questions specific to ethnicity and gender were utilized in this study. All demographics questions included multiple choice answer sets. This measure had been used in previous research with adolescents (Snodgrass, 2009).

Florida Comprehensive Assessment Test. Florida Comprehensive Assessment Test (FCAT) reading and math scale scores (combined) were used as an index of a student's overall academic achievement. The FCAT is a standardized test given to all students in grades three through eleven in the state of Florida. This assessment is designed to measure student progress towards meeting the benchmarks specified in Florida's statewide standards (Next Generation Sunshine State Standards) and is therefore linked with the curriculum that is taught to Florida students. Several scores are available for the FCAT including scaled scores and levels. FCAT reading and math scale scores range from 100-500, with 100 being the lowest score and 500 being the highest score. These scale scores correspond with FCAT levels, which range from 1 (*lowest*) to 5 (*highest*) and indicate a student's level of success mastering the Florida Sunshine State Standards for each grade level (Florida Department of Education, 2008). The Sunshine State Standards represent the challenging curriculum content that Florida students are expected to learn at each grade level. A level 1 indicates that the student has "little success" with the content of the Sunshine State Standards, and a level 5 is assigned when a student demonstrated success with the most challenging content of the Sunshine State Standards (Florida Department of Education, 2008, p. 1). While the exact relationship between FCAT level and scale score is dependent on both grade level and subject area, a

scale score ranging from 100 to approximately 260 corresponds with level 1, levels 2-4 correspond with scale scores ranging from approximately 260 through 380, and a scale score of approximately 380-500 corresponds with a FCAT level 5 (Florida Department of Education, 2008). FCAT reading scores and math scale scores have high internal consistency (Cronbach's alphas range from .85 to .90 for reading, and .94-.95 for math for 6th to 8th graders; Florida Department of Education, 2007). In the present study, students' scale scores on the reading and math portion of 2010 FCAT were obtained from school records in June/July 2010 from school FCAT reports. For the purpose of this study, FCAT reading and math scale scores were combined to provide an estimate of students' overall academic competence.

Self-Perception Profile for Children. The Self-Perception Profile for Children (SPPC; Harter, 1985; see Appendix G) measures six domains including scholastic, social, and athletic competence, as well as physical appearance, behavioral conduct, and global self-worth. This scale is suggested for measuring the self-concept of children in third grade or above, and has been used with children in grades 3 through 8. For the purpose of the current study, the scholastic competence and social acceptance domains were used to represent the academic and social domains. Each of the subscales representing these domains includes six items per subscale, for a total of 12 items (two additional sample items are included for practice, but are not scored). Completing this measure involved two steps. First, students were asked to decide which of two opposite sentences (for example, "some kids would rather play outdoors in their spare time" but "other kids would rather watch T.V.") best described them. Then, students were asked to indicate whether the statement was "sort of true" or "really true" for them. This question format

is called a “structure alternative format” (Harter, 1982, p. 89) and was designed to combat the tendency for children to provide socially desirable responses. Each item on the SPPC is scored from 1 to 4, with one indicating low perceptions of competence and four indicating high perceived competence. Three items are reverse scored within each domain because the less competent or adequate self-description is provided first. After accounting for items that are reverse scored, the six items within each domain are averaged, resulting in separate subscale means for each domain. As recommended by the author, in order to calculate an average the student must answer at least 3 out of the 6 items per domain. Items where more than 1 response was indicated (i.e., more than one box checked) were not considered when calculating an average. Total scores (subscale means) for each domain range from 1 to 4, with higher scores indicating higher perceived competence in that domain.

The SPCC has been used in both elementary and middle school samples (grades 3-8); however, psychometric properties of the SPCC specific to the middle school sample are presented as these provide the best match to the sample in the current study. This scale has high internal consistency for each subscale within two samples of middle school students (Cronbach’s alpha=.80 across both samples for the social domain and .80 in a sample of 748 sixth and seventh graders and .85 in a sample of 390 sixth, seventh and eighth graders for the scholastic domain; Harter, 1985). Using exploratory factor analysis, Harter (1985) examined the factor structure of data within three samples of middle school students. In three samples including students in 5^{th} through 8^{th} grade, a clear five factor model emerged including physical appearance, behavioral conduct, and athletic competence, in addition to the two factors that are included in this study: social

acceptance and academic competence (Harter, 1985). Cross loadings between domains was small (Harter, 1985). Test-retest reliability was also collected with two samples of third through sixth graders, with retesting occurring at three months for one sample, and nine months for another sample. Test retest reliability was .78 and .80 at three months, and .78 and .75 at nine months for the scholastic and social domains, respectively (Harter, 1982). Convergent validity has been calculated between the SPPC and the teacher rating scale component of this scale (see details below). It has been found that pupil and teacher ratings within the scholastic domain have a moderate correlation of .55 for sixth grade students, .31 for seventh grade students, and .66 for eighth grade students (Harter, 1982). Scholastic competence ratings were also found to be correlated with standardized achievement test scores from the Iowa Test of Basic Skills. Correlations with this measure were found to be .45, .29, and .44 for sixth, seventh and eighth graders, respectively. For the social domain, the domain-specific SPPC scores were moderately correlated (r = .59) with sociometric standing based on the Roster and Rating Scale for 4^{th}- 6^{th} grade students (Harter, 1982). The Harter Self-Perception scale was selected based on these strong psychometric properties, its prior use with middle school students, and also because past studies investigating the PIB in students with ADHD have predominantly utilized the SPPC (e.g., Evangelista et al., 2008; Owens & Hoza, 2003).

Center for Epidemiological Studies Depression Scale. The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977; see Appendix H) is a 20 item self-report measure designed to screen for depressive symptoms and determine the prevalence of depressive symptoms in the general population. This measure is not intended to provide a clinical diagnosis of depression and high scores do not indicate that

a diagnosis of depression is warranted. Individuals completing this scale were asked to indicate the frequency of their experiences with various behaviors and emotions during the past week (e.g., "I thought my life had been a failure," and "I felt that people disliked me"). Four of the twenty items are worded positively to assess for positive affect (e.g. "I felt hopeful about the future") and are therefore reverse scored. All responses are on a 4-point scale, ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Scores were averaged and range from 0 to 3, with higher scores indicating that the individual was experiencing more depressive symptoms. If scores are totaled, then the maximum score on the CES-D is 60. In adults it was recommended that individuals scoring 16 or higher were identified as at-risk for a clinical diagnosis of depression (Radloff, 1977). More recent research investigating appropriate cutoff scores to be used with adolescent samples indicate that a score of 24 yields a 9.2% depression prevalence rate in a sample of students in grades 7-12. This prevalence rate is closer to the estimated community-based prevalence rate of 1.5-8%, while using a cutoff of 16 yielded a high prevalence rate of 28.7% (Rushton, Forcier, & Schectman, 2002).

The CES-D has been shown to have high internal consistency and moderate test-retest reliability within adolescent samples (Roberts, Lewinsohn, & Seeley, 1991). Internal consistency was high with coefficient alpha of .88 in a high school population, and test-retest reliability was moderate for a mean follow-up interval of 9.6 days (r = .61; Roberts et al., 1991). This scale is designed to measure depressive symptoms during the past week; therefore, it is expected that higher correlations would be observed for shorter test-retest intervals compared to longer intervals. Criterion validity evidence for the CES-D with a group of high school students is provided through its high and positive

correlations with another instrument measuring depressive symptomalogy, the Beck Depression Inventory (BDI; r =.70; Roberts et al., 1991).

Teacher Measures.

Teacher's Rating Scale of the Child's Actual Behavior. The teacher rating scale of the SPPC (SPPC-TRS; Harter, 1985; see Appendix D) follows the same format as the SPPC to assess children's competencies within specific domains. The three items that make up the Scholastic Competence domain and the three items of the Social Acceptance domain were utilized for this study. To complete this measure, teachers were first asked to decide which of two opposite sentences best described the actual competence of the target student. For example, "This child is really good at his/her schoolwork OR This child can't do the school work assigned." Secondly, the teacher was asked to indicate whether they believed the statement was "sort of true" or "really true" for the student. Each item on the SPPC is scored from 1 to 4, with one indicating low perceptions of student competence and four indicating high perceptions of student competence. Two of the three items for the scholastic domain are reverse scored, and one of the three items from the social subscale is reverse scored meaning that the less competent descriptor is listed first. After accounting for items that are reverse scored, the three items within each domain were averaged, resulting in separate subscale means for each domain. Scores from each domain were used as a criterion for judging the accuracy of children's self-perceptions in the academic and social domains.

A factor analysis conducted with the teacher rating scale resulted in a similar four factor solution to the students', with evidence of four factors: cognitive (originally Harter [1982] called this the cognitive domain; however, in 1985 Harter renamed this same scale

scholastic competence; Harter, 1985), social, physical, and general self-concept (Harter, 1982). The Scholastic Competence and Social Acceptance subscales were analyzed in the current study. The average factor loading was .84 for the Scholastic Competence subscale and .74 for the Social Acceptance subscale. The teacher rating scale also has high internal consistency reliabilities (Cronbach's alpha=.96 and .93 for the Scholastic Competence and Social Acceptance domains, respectively; Harter, 1982).

Vanderbilt ADHD Diagnostic Teacher Rating Scale. The Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS; Wolraich et al., 1998; see Appendix C) is a 43 item rating scale that was used to allow teachers to report the presence and severity of inattention, hyperactivity, and impulsivity displayed by a child 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. To complete this scale, the teacher was asked to consider each rating in the context of age-appropriate behaviors for the student. There are nine items that assess Inattention and nine items assessing Hyperactive/Impulsive symptoms. Examples of items from these scales include: "Is forgetful in daily activities" and "fidgets with hands or feet or squirms in seat", respectively. The VADTRS also includes items that can be used to screen for coexisting conditions. ADHD and comorbid symptoms are rated on a four point scale from 0 (*never*) to 3 (*very often)*. The degree of both inattentive and hyperactive/impulsive symptoms was considered for each student participant, with the degree of these symptoms ranging from 0 to 3 (averaged across the 9 items of the VADTRS representing each symptom type).

The VADTRS is reported to have adequate internal consistency for both the Inattention (coefficient alpha = .92) and the Hyperactivity/Impulsivity (coefficient alpha = .90) with an economically and ethnically diverse standardization sample from Tennessee (Wolraich et al., 1998). In a study sampling from Spain, Germany, and urban and suburban U.S. regions, internal consistencies ranged from .95 to .96 for Inattention items, and from .87 to .93 for Hyperactivity and Impulsivity items (Wolraich, Lambert, Baumgaertel, Garcia-Tornel, Fuerer, Bickman, et al., 2003b). Internal consistencies ranged from .91 to .94 across samples from an urban elementary school system (Wolraich et al., 2003a). Using confirmatory factor analysis, Wolraich and colleagues (1998) found that data most strongly supported a two factor solution (Inattention and Hyperactivity/Impulsivity separately) rather than considering all the symptoms together or as three separate symptoms (e.g., Inattention, Hyperactivity, and Impulsivity). No test-retest data have been reported for this instrument.

Procedures

Student Survey. A packet of questionnaires, including the measures described above as well as others not relevant to this study, were compiled into a comprehensive packet. Measures in the survey packet were counterbalanced to control for order effects. Specifically, six versions of the survey packet were administered. The questionnaire packet and instructions were piloted with a group of 15 middle school students in a 7th grade English class that included students who were average or typically achieving for their grade level. After completing the pilot questionnaire, students were asked questions about the clarity and ease of/time required for completion. Some students noted difficulty with the response format of the SPPC during piloting. Therefore, two sample items

within the measure (see Appendix G), and a sample item that was presented and taught by a member of the research team before survey administration, were subsequently added. These additional sample items were meant to decrease confusion about the response format used for this measure and to increase the accuracy of completion on the SPPC.

A letter of informed consent (see Appendix A) was sent home to parents of all students attending the two middle schools (N = 2,000) prior to data collection. Students were offered separate incentives for three aspects of data collection. Specifically, students were entered into an initial drawing for a $25 gift card for a local store for returning signed parent consent forms, and were entered into an additional drawing for another $25 gift card after completed parent measures (not relevant to the current study) were submitted. Furthermore, students received a small thank you gift (<$1.00) for completing the survey packet on the day of data collection.

A list of students who obtained parental consent for participation was compiled prior to data collection. Students who returned their parent consent forms were asked to report to a predetermined location in the school for survey completion during their elective class period on one school day during the spring semester of 2010. Completion of the survey packet took approximately 40 minutes. One of the PIs or a graduate student who was trained for the administration of this particular study read aloud the student assent form to all students prior to survey completion and explained several example items that were representative of questions within the survey packet. Confidentiality and the voluntary nature of the survey were explained to students, and they were told that they could withdraw their participation at any time. Once assent was obtained,

participants independently completed all of the measures included in the questionnaire packet. Researchers monitored the room throughout survey administration to ensure accurate completion of the study materials and to answer any questions that students had. Additionally, when students finished their survey, one of the PIs or a trained graduate student asked each student to look over their survey and pay close attention to whether they answered every question that they wanted to answer, and that they only chose one response per item. Students were also asked to make sure that they did not unintentionally miss or skip pages.

Teacher Survey. Informed consent was gathered from each teacher participant (see Appendix E). On the day of data collection for student self-report data, members of the research provided a packet of rating scales to each student participant's homeroom teacher. The number of rating scales administered to each teacher was dependent on the number of student participants in each classroom. Teachers were given approximately one week to complete the rating scales. Completion of the questionnaires was estimated to be 5 minutes per student. Contact information for one of the PIs was provided to each teacher so that they had a means to ask questions related to survey completion.

Analyses

A series of statistical analyses were performed to answer the research questions to be addressed in this study.

Descriptive analysis. Means, standard deviations, and additional descriptive data (i.e., skew, kurtosis, etc.) were obtained for the entire sample for all variables of interest, which included: student academic self-concept (6 academic items of SPPC), student social self-concept (6 social items of SPPC), average depression score (CES-D),

teacher ratings of students' academic competence (3 items of TRS), teacher ratings of students' social competence (3 items of TRS), FCAT reading and math scale scores (from school records) and ADHD symptoms (VADTRS). This also served as a method to screen for participants with missing data. Any participant with an entire measure missing was excluded from analyses (a total of 19 participants were excluded for this reason). However, to retain students with only a few items missing it was determined that all averages would be calculated based on the availability of at least two-thirds of the data on that measure. There was only one instance when an average could not be calculated using the two-thirds rule. One participant was excluded because 4 of the 9 inattention items were missing from the VADTRS and therefore an average of inattentive symptoms could not be obtained.

These descriptive analyses helped to ensure that necessary assumptions, including independence of data, homogeneity of variance, and normality of distributions, were not violated. This allowed for sample demographic characteristics to be compared to the demographics of each of the middle schools to determine if the sample was representative in terms of these demographic variables. Furthermore, Cronbach's alpha was calculated for each measure to determine the internal consistency of these measures for this particular sample (reported in chapter IV). SPSS 19.0 statistical software was used to complete all analyses.

Creating Groups Based on the Accuracy of Self-Perceptions. Using standardized discrepancy scores to explore the phenomenon of the PIB has been recommended as the best method (Owens et al., 2007). To determine the accuracy of students' self-perceptions in the academic domain based on teacher ratings, z-scores were

created for the scholastic competence subscale score of the SPPC, and for scholastic competence subscale score on the TRS. Student reading and math FCAT scores were converted to z-scores and then averaged to indicate how far a student's score was above or below the sample mean. All of the z-scores were calculated based on the mean of the data from the sample of student participants which were included in the current study (N = 164). Converting to z-scores ensured that all measures were on the same metric. This allowed for FCAT scores to be directly compared to students' self-ratings on the SPPC. FCAT scores served as a second indicator of students' actual academic competence. To determine the accuracy of students' self-perceptions in the social domain, z-scores were created for the social subscale scores from the SPPC, and for the social subscale scores on the TRS. Raw accuracy scores were also calculated based on measures that have the same metric (the SPPC student and teacher versions; see Appendix I).

Difference scores were calculated by subtracting the standardized criterion scores (academic/social teacher rating or FCAT score) from the standardized self-perceptions score. High difference scores in either domain suggest higher discrepancy between a student's self-perceptions and another indicator of competence in that specific domain (academic or social). The sign of the difference score is also important, with a positive discrepancy indicating overestimation of competence and a negative discrepancy score indicating low perceived competence. The use of discrepancy analysis has been used in a past study investigating the presence of the PIB based on ADHD subtypes (Owens & Hoza, 2003). These difference scores were used to create three groups of students with negative, accurate, or positive self-perceptions of competence compared to an external indicator of competence. Students with discrepancy scores that were one half standard

deviation below the mean (less than approximately -.5 depending on the indicator of actual competence utilized in the discrepancy analysis) were classified as the negative self-perceptions group for each of the three indicators of competence. Students with discrepancy scores between one half standard deviation above and below the mean were classified as the accurate self-perceptions group for each separate indicator of competence. Lastly, students with discrepancy scores higher than one half standard deviation above the mean made up the positive self-perception group. It was decided to use one half standard deviations above or below the mean to determine the group classification because this method divided the sample into nearly equal thirds, and because this is closely aligned with methods described in previous research (Gresham et al., 2000). This group classification (negative, accurate, and positive self-perceptions) represented the independent variable for each of the research questions.

Correlational Analyses. To determine the bivariate relationships between self-perceptions, actual achievement, competence, accuracy of social and academic self-perceptions, and specific symptoms of ADHD (IA, HI), correlation coefficients were calculated between each variable of interest. A correlation coefficient (ranging from -1 to +1) provided information about the strength and direction of the relationship between two variables. A correlation matrix is provided to determine the bivariate associations between all variables of interest in this study (see Table 10).

Research Question Analyses. The following research questions were developed to determine if young adolescents with negative, accurate, or positive self-perceptions in the academic and social domains differ on ADHD and depressive symptoms:

1. How do young adolescents with negative, accurate, or positive perceptions of academic competence differ on inattentive, hyperactive/impulsive, and depressive symptoms, when teacher ratings are used as an indicator of actual academic competence?
2. How do young adolescents with negative, accurate, or positive perceptions of academic competence differ on inattentive, hyperactive/impulsive, and depressive symptoms, when achievement test scores are used as an indicator of actual academic competence?
3. How do young adolescents with negative, accurate, or positive perceptions of social competence differ on inattentive, hyperactive/impulsive, and depressive symptoms, when teacher ratings are used as an indicator of actual social competence?

To determine if symptoms of ADHD and depression are related to the accuracy of self-perceptions in the academic and social domain for middle school students, data were subjected to a series of three separate Multivariate Analysis of Variance (MANOVA). Three groups of students with negative, accurate, or positive self-perceptions were contrasted on inattentive, hyperactive/impulsive, and depressive symptoms in each analysis. Separate MANOVA were conducted for the groups based on the discrepancies between self-perceptions and each of the three separate indicators of competence (accuracy of academic self-perceptions with teacher ratings as the criterion [Q1], accuracy of academic self-perceptions with FCAT scores as the criterion [Q2], and accuracy of social self-perceptions with teacher ratings as the criterion [Q3]). In each MANOVA, inattentive, hyperactive/impulsive, and depressive symptoms were the

dependent variables. MANOVA results indicate whether there were statistically significant differences among the groups on a combination of the dependent variables. When MANOVA results were significant, each of the dependent variables was then considered separately to determine which symptoms differed across the three groups using univariate Analysis of Variance (ANOVA). Lastly, Tukey's follow-up tests were conducted in order to determine which groups were significantly different from each other on each of the dependent variables.

Ethical Considerations

Precautions were taken throughout the current study to protect all participants. IRB approval from the University of South Florida (Ogg & Harbor, 2009) and the collaborating local school district was obtained prior to data collection; this ensured that precautions were taken to protect human research participants.

A parental consent form (see Appendix A), which outlined the goals and procedures for the project, was distributed so that parents were aware of all aspects of the study. All of the potential risks and benefits associated with the child's participation in the study were included in this parent consent letter. The letter included the contact information for one of the PIs to provide parents with the opportunity to discuss questions or concerns pertaining to the nature of the proposed project.

For all students who returned a signed parent consent form, a student assent form was administered before survey completion (see Appendix B). The student assent form outlined the risks and benefits of the study and allowed students to decide whether or not they wanted to participate. One of the PIs or a trained member of the research team read the letter out-loud to students at the time of data collection to ensure student

understanding. Additionally, time was provided to answer students' questions and inform students of their option to withdrawal from the study at any time. Teacher consent was sought from all teachers with student participants in their classoom and teachers were provided with a copy of the consent letter, which described the study purpose and the timeframe for survey completion (see Appendix E). This letter also included contact information for one of the PIs in order to address any questions that teachers may have.

The participants' confidentiality was ensured in part by examining data only in aggregate; individual students were not identifiable. Student responses were only known by study investigators. There were two instances in which confidential data were shared and these were clearly specified in the parental consent and student assent forms. Specifically, district school psychologists were notified and provided immediate threat assessments to any student who indicated that they were going to harm themselves or someone else. School psychologists were also provided with a list of students who scored at or above a cutoff score of 24 on the CES-D, as this score is considered to be indicative of risk of depression among adolescents (Roberts et al., 1991; Rushston et al., 2002). The investigators provided a mental health professional at each school with the names of all students who scored above this cutoff on the day of data collection. The school was responsible for determining how this information was used.

Limitations of the Current Study

When carrying out this research project, precautions were taken to ensure that valid results were obtained and to address potential threats to validity. First, all measures were piloted with average-achieving 7th grade students to ensure that items were clear and

could be understood by this age group. When the surveys were administered, six counterbalanced versions of the survey packet were distributed to control for order effects. All of the graduate students assisting with data collection received training to ensure that they understood the correct answer format for each measure, and to ensure that student questions were answered in a uniform manner. During administration, these trained graduate students and one of the PIs circulated throughout the area where surveys were administered to assist students. All of these procedures helped to control for errors.

Because all threats to validity cannot be controlled prior to data analysis, the researcher took precautions when interpreting the results of this study. Population validity is limited in this quantitative research project. Additionally, the use of self-report and teacher report methods were potential limitations to this study design.

Population validity is the ability to generalize results from the sample to a larger population. Some unique participant characteristics may limit the populations to which results of the results of the study can be generalized. The methods of this study involved collecting data from a convenience sample; and it must be considered that students who agreed to participate in the research study and returned their parental consent forms may differ from other middle school students who declined to participate or did not return a parental consent form. The researcher took precautions to compare the study sample to the demographics of both of the middle schools through the use of descriptive statistics to ensure that all sub-populations of students represented at these middle schools were included in the study sample. The middle schools where this study was carried out were selected based on their diverse population with students from varied ethnic and socioeconomic backgrounds.

Self-report methods for the current study were selected because this is one of the only ways to determine if the PIB phenomenon is displayed for middle school students with symptoms of ADHD. For the purpose of this study, self-report is a recommended method for measuring the presence of this PIB when the self-report is compared to an objective criterion such as a teacher rating or standardized reading scores (Owens et al., 2007). However, with self-report research it is important to note that the self-ratings reflect the students' perceptions of their abilities and not their actual abilities. It is also important to consider that using teacher reports for the levels of ADHD symptoms and the criterion to determine the accuracy of students' self-perceptions could be a limitation to this study. Teachers are suggested to be the most relevant reporters for students' daily behavioral concerns (Gadow, Drabick, Loney, Sprafkin, Salisbury, Azizian, & Schwartz, 2004). Mitsis, McKay, Shultz, Newcorn, and Halperin (2000) suggest that when behavior in school is of interest, parent input cannot replace teacher input. Additionally, past research has shown that the PIB is present whether parent or teacher ratings of competence are used as the criterion and that there is consistency across raters on the Harter Teacher Rating Scale (Hoza et al., 2004). In the current study, FCAT reading and math scale scores were also used to calculate discrepancy scores in the domain of academic competence. These discrepancy scores were compared to discrepancies calculated with teacher ratings used as the indicator of actual competence to determine if there were significant differences in discrepancies when using teacher ratings or FCAT scores as the indicator of academic competence. Teacher reports were selected for this study because teachers have opportunities to observe their students in both academic and social settings.

Chapter IV: Results

This chapter presents the results of statistical analyses conducted to answer the three research questions within the current study. Procedures used to screen the data gathered for the current study, a discussion of procedures for calculating and grouping students based on the accuracy of their self-perceptions, and descriptive analyses comparing the three groups are presented first. Preliminary analyses will follow, which include examining scale reliabilities and correlations among variables of interest. Subsequently, results of multivariate analysis of variance (MANOVA) and follow-up tests are presented to demonstrate how groups of students with negative, accurate, or positive academic and social self-perceptions differ on ADHD and depressive symptoms based on multiple indicators of actual academic and social competence.

Data Screening

During data entry for the dataset analyzed in the current study, integrity checks were completed for 11% of complete surveys to ensure accurate data entry. When an error was found on one or more items, an additional survey was checked for accuracy. A total of 14% of surveys were checked for errors until no additional errors were found.

Data were screened using SPSS 19 statistical software to determine the presence of univariate and/or multivariate outliers. Based on data screening procedures suggested by Tabachnick and Fidell (2007), univariate outliers were defined as data with z-scores greater than positive or negative 3.3 on any variable of interest. One univariate outlier for depressive symptoms was identified ($z = 3.69$); however, this participant was retained

for analyses because their average score, 2.6 on a three point scale, is within the defined range of symptoms of the CES-D. The four additional univariate outliers identified (for a total of 5 univariate outliers) overlap with the multivariate outliers on the hyperactive/impulsive symptom variable explained below. These multivariate outliers were defined as participants scoring higher than 16.27, the criterion determined by the Mahalanobis distance for three dependent variables (Tabachnick & Fidell, 2007). Further investigation into unique characteristics of these four cases indicated that three had significantly elevated hyperactive/impulsive symptoms that were within the limits of the possible VADTRS scale averages (2.43 - 3 on a 3 point scale), and one had high levels of IA symptoms (3 on a 3 point scale). Because participants with elevated ADHD symptoms are of particular interest in the current study, these cases were retained in all subsequent analyses.

The data set originally included 183 participants (as seen in Table 2); however, upon screening for incomplete data, 19 participants were removed due to incomplete data on at least one whole measure included in the current study (two were excluded due to missing data on the SPPC, SPPC-TRS and VADTRS; four were excluded due to missing data on both the VADTRS and the SPPC-TRS; one participant was excluded due to missing half of the IA items on the VADTRS; one participant was excluded due to missing SPPC-TRS data; 10 students were excluded due to missing data on the SPPC only; and one student was excluded due to missing FCAT scores). The data set used in all analyses for the current study consisted of 164 participants.

Calculating the Accuracy of Self-Perceptions

To create three groups based on the accuracy of self-perceptions in the academic

and social domains, discrepancy scores within each domain were created. Three different discrepancy scores were calculated by subtracting each of the criterion z-scores from the self-perception z-score within that domain as described in Table 3.

Table 3

Calculating Accuracy Scores

Name of Accuracy Variable	Equation for Calculating Discrepancy Score
Academic Accuracy (objective criterion; FCAT)	(Standardized Academic SPPC Score) – (Standardized mean FCAT Math/Reading scores)
Academic Accuracy (teacher perception; SPPC-TRS)	(Standardized Academic SPPC Score) – (Standardized Academic SPPC-TRS scores)
Social Accuracy (teacher perception; SPPC-TRS)	(Standardized Social SPPC Score) – (Standardized Social SPPC-TRS scores)

Three groups for each accuracy variable were formed based on these discrepancy scores. Standardized z-scores were used to calculate all accuracy variables so that measures could be compared despite having different metrics, and because this is in line with previous research on the PIB (e.g., Hoza et al., 2004). For the two SPPC measures, which are on the same metric, raw accuracy scores were also calculated and compared across groups (see Appendix I). In the academic domain, students were grouped based on the discrepancy between their standardized scores of their perceptions of academic competence and their teacher's standardized rating of their academic competence and also based on the discrepancy between standardized self-perceptions and standardized FCAT scores. In the social domain, groups were created based on the discrepancy between standardized social self-perception ratings and standardized teacher ratings of social competence. The "negative self-perception" groups represent students who

underestimated their competence compared to the teacher. Specifically, these students had a discrepancy score at least one half standard deviation below the mean for a given indicator of competence. The "accurate" group had discrepancy scores within one half standard deviation above or below the mean of zero, while the "positive self-perception" group had discrepancy scores more than one half standard deviation above the group mean. This method yielded three groups of students with differing self-perceptions for each indicator of competence utilized. Note, in line with the only moderate correlation between FCAT scores and teacher reports of academic and social competence, a student could be in a different group based on the area of competence examined (for instance, a student could be "accurate" in the academic domain when FCAT scores were used as the criterion, but have "negative" or "positive" self-perceptions when teacher reports of academic competence were utilized as the criterion). Also, as perceptions of competence are domain-specific, a single student could be viewed as having "accurate" self-perceptions in one area (e.g., academic), while having "negative" or "positive" self-perceptions in another domain (e.g., social).

Descriptive Analyses

Descriptive statistics for the measures used in the current study are presented in Table 4. Means, standard deviations, range, skewness, and kurtosis of each of the variables were calculated. Overall, symptom means were low; however, a full range of symptoms is evidenced within the current sample (see Table 4). Skewness and kurtosis were included to assess for univariate normality beyond investigating univariate outliers that fall outside of the range of z-scores between -3 and +3. The highest obtained values were for the hyperactive/impulsive symptoms variable (skew = 2.25, kurtosis = 4.96),

which is the same variable that was found to have 5 univariate and multivariate outliers based on high standardized scores. Inspection of the data indicated that all levels of symptoms were within the range allowable by the reliable symptom scales. The hyperactive/impulsive symptom variable was transformed (natural log) and the analyses were run with and without this variable transformed. No substantial differences were noted in comparisons of results of research questions when the transformed versus non-transformed variable were utilized as a dependent variable; therefore, the non-transformed hyperactive/impulsive variable was used in all analyses for ease of interpretation.

Table 4

Means, Standard Deviations, Ranges, Skew, and Kurtosis of All Measures (*n* = 164)

Variable	*M*	*SD*	Range	Skewness	Kurtosis
Inattentive Symptoms	0.70	0.81	0 – 3	1.12	0.24
Hyperactive/Impulsive Symptoms	0.37	0.62	0 – 3	2.25	4.96
Depressive Symptoms	0.66	0.53	0 – 2.6	1.13	0.82
Academic Self-Perceptions	3.02	0.66	1 – 4	-0.29	-0.54
Social Self-Perceptions	3.00	0.60	1.17 – 4	-0.49	0.10
Teacher Ratings of Academic Competence	3.16	0.79	1 – 4	-0.58	-0.59
Teacher Ratings of Social Competence	3.15	0.79	1 – 4	-0.76	-0.05
Math Achievement Test Scores(FCAT)	329.76	52.14	100-428	-0.97	2.33
Reading Achievement Test Scores (FCAT)	329.59	56.31	141-500	-0.13	.83

Note. Higher scores reflect increased levels of the construct indicated by the variable name.

Descriptive statistics of the accuracy variables are presented in Table 5. The scores provided in Table 5 are standardized scores (see Appendix I for raw scores). Accuracy scores ranged from -2.96 to 3.68, with negative numbers indicative of

underestimation of competence and positive numbers indicating overestimation of competence. All of the obtained values for skewness and kurtosis were between -1.0 and +1.0, demonstrating a normal distribution of the calculated discrepancies.

Table 5

Means, Standard Deviations, Ranges, Skew, and Kurtosis of Accuracy Variables (n = 164)

Variable Name	*M*	*SD*	Range	Skewness	Kurtosis
Academic Accuracy (FCAT)	-0.01	1.01	-3.40 – 2.94	-0.26	0.94
Academic Accuracy (SPPC-TRS)	0.00	1.14	-2.96 – 3.30	-0.30	0.37
Social Accuracy (SPPC-TRS)	0.01	1.16	-2.49 – 3.68	0.33	-0.04

Note. Higher scores reflect increased levels of the construct indicated by the variable name.

To determine if the participants who were classified into the negative, accurate, and positive perceptions groups significantly differed in terms of school, grade level or gender, chi-square tests for independence were employed for each of the accuracy variables based on the three separate indicators of competence. School was found to be significantly related to grouping for the two academic indicators of competence (see Tables 6 and 7) but not for the social domain (see Table 8). Grade level was not found to be significantly related to grouping for any of the three indicators of competence across the academic (see Tables 6 and 7) or social domains (see Table 8). Notably, though, more than half of the positive self-perception group was made up of students in the 6th grade across the three accuracy variables. Seventh and 8th grade students comprised only 19.6-26.1% of the positive self-perceptions groups across all three indicators of competence within the academic and social domains; however, these percentages are in line with the overall distribution of the sample; there were more 6th

grade students in the current sample compared to students in 7th and 8th grade. Chi-square tests for independence indicated a significant association between school and self-perception group status with teacher ratings as the indicator of academic competence , χ^2 (2, N = 164) = 11.56, p = .00. Specifically, almost twice as many students in the negative self-perception group came from school 1 and almost twice as many students in the accurate group were from school 2. Students in the positive group were more evenly distributed across schools, particularly considering that school 2 made up a larger percentage of the sample. Additionally, a significant relationship between gender and self-perception group status, χ^2 (2, N = 164) = 17.73, p = .00, was identified when teacher ratings of academic competence were used as the indicator. Despite the fact that the majority (63.9%) of the current sample was female, the majority of students in the positive self-perceptions group were male.

Table 6

Demographic Variable Frequencies for Groups based on Academic Teacher Ratings

Variable	Negative (%)	Accurate (%)	Positive (%)	Chi-Square
School				11.56**
1	65.4	34.8	41.3	
2	34.6	65.2	58.7	
Grade				2.43
6	48.1	42.4	54.3	
7	26.9	25.8	26.1	
8	25.0	31.8	19.6	
Gender				17.73**
Female	80.8	69.7	41.3	
Male	19.2	30.3	58.7	
Total Per Group	n = 52	n = 66	n = 46	

** $p < .01$

A significant relationship between school and self-perception group was found again when FCAT scores were utilized as a second indicator of academic competence, χ^2 (2, N = 164) = 8.43, p = .02. Specifically, school 2 had a larger percentage of students in the accurate self-perception group and school 1 had more students demonstrating positive self-perceptions (see Table 7). However, no significant associations between gender and self-perception group status were identified with FCAT scores as an indicator of competence, χ^2 (2, N = 164) = 2.08, p = .35.

Table 7

Demographic Variable Frequencies for Groups based on FCAT Scores

Variable	Negative (%)	Accurate (%)	Positive (%)	Chi-Square
School				8.43*
1	42.3	36.5	63.3	
2	57.7	63.5	36.7	
Grade				2.02
6	46.2	41.9	55.1	
7	28.8	28.6	20.4	
8	25.0	28.6	24.5	
Gender				2.08
Female	71.2	58.7	67.3	
Male	28.8	41.3	32.7	
Total Per Group	n = 52	n = 63	n = 49	

* $p < .05$

When the association between school and social self-perception group status was explored, no significant relationship was identified, χ^2 (2, N = 164) = 5.03, p = .08. When the relationship between accuracy in the social domain and gender was explored, gender was shown to be significantly related to group status, χ^2 (2, N = 164) = 10.82, p = .00. The vast majority of students with negative social self-perceptions were female. There was an even split between boys and girls in the positive self-perceptions group within the social domain, despite the preponderance of females in the sample.

Table 8

Demographic Variable Frequencies for Groups based on Social Teacher Ratings

Variable	Negative (%)	Accurate (%)	Positive (%)	Chi-Square
School				5.03
1	57.1	36.2	46.0	
2	42.9	63.8	54.0	
Grade				2.49
6	50.0	41.4	52.0	
7	21.4	32.8	24.0	
8	28.6	25.9	24.0	
Gender				10.82**
Female	80.4	63.8	50.0	
Male	19.6	36.2	50.0	
Total Per Group	$n = 56$	$n = 58$	$n = 50$	

** $p < .01$

Preliminary Analyses

Scale Reliability. Prior to the subsequent analyses, all scales utilized within the study (i.e., SPPC and SPPC-TRS academic and social domains, VADTRS inattentive and hyperactive/impulsive subscales, and the CES-D) were analyzed to determine their internal consistency. Cronbach's alpha ranged from .73 (Social self-perceptions) to .96 (Inattentive symptoms), indicating acceptable estimates of reliability for each scale (see Table 9).

Table 9

Cronbach's Alpha (α) for all Measures Utilized in Analyses

Scale Name	Number of Items	Cronbach's Alpha (α)
Academic subscale of SPPC (Academic self-perceptions)	6	.81
Social subscale of SPPC (Social self-perceptions)	6	.73
Academic subscale of SPPC-TRS (Teacher ratings of academic competence)	3	.89
Social Scale of SPPC-TRS (Teacher ratings of social competence)	3	.92
CES-D (Depressive symptoms)	20	.89
Inattentive subscale of VADTRS (IA symptoms)	9	.96
Hyperactive/Impulsive subscale of VADTRS (HI symptoms)	9	.95
Florida Comprehensive Assessment Test Combined Scale Score (reading/math)	2	.84

Correlational Analyses. Pearson product-moment correlations among all variables of interest in the current study are presented in Table 10. The academic and social subscales of the SPPC were moderately correlated with the corresponding subscale of the SPPC-TRS (r = .35 and .32, respectively, $p < .01$). Additionally, a small correlation between the academic and social subscales within the SPPC (r = .21, $p < .01$) and a moderate correlation between these subscales on the SPPC-TRS (r = .34, $p < .01$) are evident.

A large positive correlation was found between the subscales of the VADTRS

(i.e., inattentive and hyperactive/impulsive symptoms; $r = .64$, $p < .01$). This is in line with past research suggesting that these two subscales are highly correlated ($r = .75$-$.79$; Wolraich et al., 2003). As was expected, a high correlation is evident between academic accuracy based on FCAT scores and academic accuracy based on SPPC-TRS ratings ($r = .59$, $p < .01$). Social and academic accuracy with SPPC-TRS as the indicator of competence were also significantly positively correlated ($r = .28$, $p < .01$). A review of the correlation matrix indicated that of the two types of ADHD symptoms, inattentive symptoms were more highly correlated with accuracy in the academic and social domains. Depressive symptoms were shown to have significant negative relationships with academic and social self-perceptions, all three indicators of competence (i.e., FCAT reading and math scores, and academic and social teacher ratings), and academic accuracy scores based on SPPC-TRS scores.

Table 10

Intercorrelations Between All Variables of Interest (n = 164)

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Academic Self-Perceptions	1										
2. Social Self-Perceptions	.21**	1									
3. Academic Teacher Ratings	.35**	.06	1								
4. Social Teacher Ratings	.12	.32**	.34**	1							
5. FCAT Math Scores	.47**	.18**	.45**	.26**	1						
6. FCAT Reading Scores	.39**	.24**	.46**	.18**	.73**	1					
7. Inattentive Symptoms	-.31**	-.04	-.75**	-.33**	-.36**	-.26**	1				
8. Hyperactive/Impulsive Symptoms	-.14	.01	-.34**	-.20*	-.25**	-.19**	.64**	1			
9. Depressive Symptoms	-.35**	-.34**	-.16**	-.22**	-.33**	-.30**	.13	.10	1		
10. Academic Accuracy (SPPC-TRS)	.57**	.13	-.57**	-.20*	-.02	-.06**	.39**	-.18*	.17*	1	
11. Academic Accuracy (FCAT)	.57**	.00	-.11	-.10*	-.40**	-.47**	.01	.08	-.07	.59**	1
12. Social Accuracy	.08	.58**	-.24**	-.58**	-.07	.05	.25*	.18*	-.12	.28**	.09

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

Differences in Symptoms between Groups

To determine if groups of students with negative, accurate, or positive academic self-perceptions differed on inattention, hyperactive/impulsivity, and depressive symptoms, a series of three separate MANOVAs were performed for each accuracy indicator. This omnibus multivariate analysis was selected because it adjusts for the potential increased risk of Type I error that results from conducting multiple univariate analyses. Additionally, this analysis allows for the investigation of differences between groups based on a combination of dependent variables including inattentive, hyperactive/impulsive, and depressive symptoms. One MANOVA was conducted for each of the accuracy variables (2 for the academic domain, and one for the social domain). An alpha level of .05 was used to determine statistical significance. Significant MANOVAs were followed-up with univariate analyses (ANOVAs) to determine the specific symptom type on which the groups may differ, followed by Tukey tests to determine which groups differed from the other on the particular symptom type. With the follow-up analyses, a Bonferroni adjustment was utilized to control for type I error by setting a more stringent alpha value of .017 (.05/3 for three dependent variables).

Assumptions. All assumptions of MANOVA were examined prior to conducting analyses to determine if MANOVA was an appropriate method to answer these research questions. Sampling was considered in order to determine if the assumption of independence of observations was met. Although students were clustered within two schools and therefore responses are not truly independent, the sample was drawn from a well-defined population (middle school students) and the assumption of independence of observation vectors is not a significant concern. However, it is important to note that

these results are not likely to generalize to the whole population, but rather to middle school students similar to those sampled within the current study. To assess the normality of the current data set, examinations of skewness and kurtosis, as well as multivariate and univariate outliers occurred during data screening. The presence of outliers and some evidence of higher than desirable skew or kurtosis values is not considered to be a concern because a sample size of 164 students will allow for robust results despite any instances of non-normality (Tabachnick & Fidell, 2007) and all scores fell within expected ranges. The linearity assumption was examined by generating a matrix of scatterplots to determine if a linear relationship exists between all pairs of dependent variables. No evidence of non-linearity was noted in the examination of these scatterplots; therefore the linearity assumption was satisfied. Significant Box's M statistics indicated that the homogeneity of variance-covariance matrix assumption was violated; there is evidence of unequal covariance when the indicator of competence was academic teacher ratings (Box's M = 70.73, F (12, 104667.79) = 5.73, p = .00), FCAT scores (Box's M = 42.13, F (12, 114155.49) = 3.415, p = .00), and social teacher ratings (Box's M = 45.80, F (12, 121044.06) = 3.71, p = .00). Tabachnick and Fidell (2007) purport that Box's M can be too strict with larger sample sizes, it is very sensitive to violations of normality, and violations of this assumption are more robust when sample sizes per group are large. While MANOVA is considered to be an appropriate analysis technique, knowing that assumptions have been violated indicate that caution should be used when interpreting the results of the current study. Further precautions were taken when interpreting multivariate test statistics by examining Pillai's Trace for significance instead of the more common Wilks' Lamda. Pillai's Trace is suggested to be more robust

to violations of assumptions and is robust when the number of participants in each group is unequal (Tabachnick & Fidell, 2007).

MANOVA Results. Results of multivariate analysis of variance (MANOVA) are presented separately for each of the three separate indicators of competence utilized to group students by negative, accurate, and positive self-perceptions. Group means and standard deviations for each symptom (i.e., inattentive, hyperactive/impulsive, and depressive symptoms) are presented following each description of MANOVA results.

Groups based on academic self-perceptions and teacher ratings. A one-way between-groups MANOVA was performed to investigate differences in symptoms across groups of students with varying accuracy of academic self-perceptions based on teacher ratings of academic competence. Three dependent variables were examined: inattentive symptoms, hyperactive/impulsive symptoms, and depressive symptoms. The independent variable was group membership (negative, accurate, or positive) based on discrepancy scores between academic self-perceptions and teacher ratings of academic competence. Statistically significant differences between self-perception group means were found among the combined symptom variables (inattentive, hyperactive/impulsive, and depressive symptoms), Pillai's Trace 0.23, F (6, 320) = 6.89, p = .00; partial eta squared = .11.

Given the significance of the omnibus test, univariate main effects were examined. Significant main effects for all of the symptom variables were found using a Bonferroni adjusted alpha of .017. These included inattentive symptoms F (2, 161) = 12.95, p = .000, partial eta squared = .14, hyperactive/impulsive symptoms F (2, 161) = 5.35, p = .006, partial eta squared = .06, and depressive symptoms F (2, 161) = 4.27, p =

.016, partial eta squared = .05. The partial eta squared values indicate that 14% of the variance in inattentive symptoms can be explained by their membership in either the negative, accurate, or positive self-perceptions group, compared to only 6 and 5 percent, respectively, for hyperactive/impulsive and depressive symptoms.

Tukey post-hoc comparisons of the three self-perceptions groups consisted of conducting pairwise comparisons to determine which symptoms were related to the negative, accurate, and positive groups. Each pairwise comparison was tested at the .05/3, or .017 Bonferroni adjusted significance level. Results indicate that the positive perceptions group had significantly higher inattentive symptoms when compared to the negative and accurate self-perception groups (which did not significantly differ from each other on inattentive symptoms). Additionally, the accurate and the positive group differed on levels of hyperactive/impulsive symptoms, with the positive self-perceptions group having significantly higher levels of hyperactive/impulsive symptoms. When using the adjusted alpha level, no statistically significant difference in depressive symptoms was noted between pairs of groups; however, the trend in the data was for the negative self-perception group to have higher levels of depressive symptoms than the positive self-perception group (alpha = .018). Descriptive statistics were calculated by group (e.g., negative, accurate, positive self perception; see Table 11).

Table 11

Group Means and Standard Deviations: Academic Accuracy Based on Teacher Ratings

Variable	Negative (n = 52)	Accurate (n = 66)	Positive (n = 46)
Inattentive Symptoms	.46 (.52)	.57 (.76)	1.18 (.95)[a, b]
Hyperactive/Impulsive Symptoms	.34 (.58)	.23 (.38)	.61 (.83)[b]
Depressive Symptoms	.83 (.56)	.61 (.49)	.54 (.49)

Note. Higher scores reflect increased levels of the construct indicated by the variable name. a = positive group significantly higher than negative group; b =positive significantly higher than accurate group

Groups based on academic self-perceptions and standardized achievement scores. A second between-groups MANOVA for the academic domain was performed to investigate differences in symptoms across groups of students with varying accuracy of academic self-perceptions based on achievement test (FCAT) scores. The same three dependent variables were included (inattentive, hyperactive/impulsive, and depressive symptoms) in these analyses. The independent variable was group membership based on discrepancy scores between academic self-perceptions and an average of FCAT reading and math scores as an indicator of actual academic competence. No statistically significant differences between self-perception group means were found among the combined symptom variables (inattentive, hyperactive/impulsive, and depressive symptoms), Pillai's Trace 0.047, F (6, 320) =1.28, p = .27; partial eta squared = .023. Given that this omnibus test was not significant, no univariate effects were tested.

Despite the lack of statistical significance, between group means of inattentive, hyperactive/impulsive and depressive symptoms were examined across groups (e.g., negative, accurate, positive self perception; see Table 12). All three groups had similar mean levels of inattentive and depressive symptoms.

Table 12

Group Means and Standard Deviations: Academic Accuracy Based on FCAT Scores

Variable	Negative (n = 52)	Accurate (n = 63)	Positive (n = 49)
Inattentive Symptoms	.69 (.79)	.72 (.84)	.69 (.81)
Hyperactive/Impulsive Symptoms	.28 (.42)	.33 (.59)	.52 (.79)
Depressive Symptoms	.65 (.48)	.69 (.60)	.63 (.47)

Note. Higher scores reflect increased levels of the construct indicated by the variable name.

Groups based on social self-perceptions and teacher ratings. A final one-way between-groups MANOVA was performed to investigate differences in symptoms across groups of students with varying accuracy of social self-perceptions. Teacher ratings were the only indicator of actual social competence available and thus utilized in the current study. Inattentive, hyperactive/impulsive, and depressive symptoms were the dependent variables. The independent variable was group membership based on discrepancy scores between a student's social self-perceptions and teacher social competence ratings. Statistically significant differences between self-perception group means were found among the combined symptom variables (inattentive, hyperactive/impulsive, and depressive symptoms), Pillai's Trace 0.115, F (6, 320) = 3.27, p = .004; partial eta squared = .06. Because the MANOVA omnibus test was significant, univariate main

effects were examined. Significant main effects were found for both ADHD symptoms using a Bonferroni adjusted alpha of .017. These include inattentive symptoms F (2, 161) = 9.04, p = .00, partial eta squared = .10 and hyperactive/impulsive symptoms F (2, 161) = 4.42, p = .014, partial eta squared = .05. The three groups were not found to significantly differ on their levels of depressive symptoms F (2, 161) = .87, p = .42, partial eta squared = .011. The partial eta squared data indicate that 10% of the variance in inattentive symptoms can be explained by their membership in either the negative, accurate, or positive self-perceptions group, compared to 5% for hyperactive/impulsive symptoms.

Post hoc analyses were conducted for only inattentive and hyperactive/impulsive symptoms because univariate follow-up tests were not significant for depressive symptoms. Each pairwise comparison was tested at the .05/3, or .017 Bonferroni adjusted significance level. Results parallel the findings from teaching ratings in the academic domain for inattentive symptoms. Specifically, the positive perceptions group had significantly higher inattentive symptoms compared to the negative and accurate self-perception groups. When using the adjusted alpha level, no statistically significant difference in hyperactive/impulsive symptoms was noted across the groups. The mean and standard deviations were also calculated for each group (e.g., negative, accurate, positive self perception; see Table 13). When examining descriptive data, the positive self-perception group appears to have a trend for higher mean levels of hyperactive/impulsive symptoms than the other 2 groups. Additionally, similar mean levels of depressive symptoms were found across the three groups.

Table 13

Group Means and Standard Deviations: Social Accuracy Based on Teacher Ratings

Variable	Negative (n = 56)	Accurate (n = 58)	Positive (n = 50)
Inattentive Symptoms	.56 (.72)	.51 (.73)	1.09 (.87)[a, b]
Hyperactive/Impulsive Symptoms	.27 (.47)	.29 (.46)	.58 (.84)
Depressive Symptoms	.73 (.54)	.60 (.48)	.66 (.56)

Note. Higher scores reflect increased levels of the construct indicated by the variable name.
a = positive group significantly higher than negative group; b =positive significantly higher than accurate group

Summary of Results

In summary, groups of young adolescents with accurate versus discrepant self-perceptions of academic and social abilities were found to differ on inattentive, hyperactive/impulsive, and depressive symptoms when teacher ratings were used as the criterion (see Table 14). Specifically, when accuracy of academic self-perceptions was determined using teacher ratings as the criterion, univariate tests showed significant main effects for all three symptoms (inattentive, hyperactive/impulsive, and depressive symptoms). Both inattentive and hyperactive/impulsive symptoms were found to be significantly higher in the positive self-perception or PIB group compared to the other two groups. In the social domain, significant main effects were identified for inattentive and hyperactive/impulsive symptoms, and statistically significant differences in inattentive and hyperactive/impulsive symptoms between the groups were detected. Follow-up tests indicated that inattentive symptoms were significantly higher in the positive self-perception group compared to the other two groups while there were no significant differences in hyperactive/impulsive symptoms between groups in the social

domain. No significant differences between groups on these symptoms (inattentive, hyperactive/impulsive, and depression) were detected when using achievement test scores as the indicator of academic competence.

Table 14

Summary of MANOVA and ANOVA Results

Accuracy Measure	Pillai's Trace ($p < .05$)	Follow-up Univariate ANOVA ($p < .017$)
Academic Accuracy (TSPPC)	0.23 ($p = .00$)	IA = 12.95 ($p = .00$) HI = 5.35 ($p = .006$) Dep = 4.27 ($p = .016$)
Academic Accuracy (FCAT)	.047 ($p = .27$)	Follow-up tests were not warranted
Social Accuracy (TSPPC)	.115 ($p = .004$)	IA = 9.04 ($p = .00$) HI = 4.42 ($p = .014$) Dep = 0.87 ($p = .42$)

Note. TSPPC= Teacher Ratings and FCAT= Achievement test scores.

Chapter V: Discussion

The current study investigated how groups of middle school students with negative, accurate, or positive perceptions of competence differ on inattentive, hyperactive/impulsive and depressive symptoms. Multiple indicators of actual competence were utilized to determine the accuracy of self-perceptions across the academic and social domains. The primary purpose of this study was to gain an understanding of whether the PIB persists for young adolescents with elevated ADHD symptoms. Research questions addressed include the degree to which groups of students with negative, accurate or positive self-perceptions of competence differ on inattention, hyperactivity/impulsivity, and depressive symptoms (1) in the academic domain when teacher ratings were used as an indicator of actual academic competence, (2) in the academic domain when achievement test scores were used as an indicator of actual academic competence, and (3) in the social domain when teacher ratings were used as an indicator of actual social competence. This chapter summarizes the results of the current study and relates these findings to existing literature. The chapter also includes a discussion of limitations of this research, and implications for both research and practice.

Key Findings from Descriptive Analyses

Findings from preliminary descriptive analyses indicate that more inattentive symptoms were present in this sample of young adolescents compared to hyperactive/impulsive symptoms. This is consistent with extant literature findings that

suggest that inattention is the most common presenting symptom for adolescents with ADHD as hyperactive/impulsive symptoms may become less visible during adolescence (Wolraich et al., 2005). In terms of self-concept, average academic and social self-concept ratings were high (above 3 on a 1-4 scale) and nearly identical, suggesting that on average the young adolescents within this sample viewed their competence highly across both of these important domains. Interestingly, past literature suggests that self-concept becomes more differentiated across domains in early adolescence (Harter, 2006). It is important to note that while group means were similar across domains, correlations between these self-perception scores were low, suggesting that individuals do differentiate between their academic and social competence. A similar pattern was noted when examining teacher ratings of social and academic competence, with average ratings being high and very similar across these domains, but with correlations suggesting that teachers differentiate across ratings of academic and social competence.

One other interesting relationship was identified when examining the descriptive data. Specifically, significant associations were found between group status and gender. Females were more likely to fall within the negative self-perception group, which is consistent with past literature suggesting that females may be more prone to lower self-perceptions during adolescence (Harter, 1999). More males were shown to have positive self-perceptions in the academic domain, while there was an even split between males and females with positive social self-perceptions. Unlike the current sample which consisted of more female young adolescents than males, the majority of past studies on the PIB have consisted of samples of boys with ADHD (e.g., Hoza et al., 2002). There is currently a lack of consensus in past literature related to the relationship between gender

and the PIB, but it is suggested that the PIB is present across both genders (Owens et al., 2007).

Differences in Symptoms between Self-Perception Groups

Academic Domain. Multiple indicators of actual academic competence were used to achieve a multi-source perspective of students' actual academic abilities. Students were identified as having negative, accurate, or positive self-perceptions based on the discrepancy scores between their academic self-perceptions and their actual competence based on (1) teacher ratings of academic competence, and (2) achievement test scores (i.e., FCAT scores). Comparing results across these two indictors of academic competence suggests that the symptoms present (i.e., inattentive, hyperactive/impulsive, and depression) among self-perception groups differed depending on which indicator of competence was utilized for determining if a student has negative, accurate, or positive perceptions of their academic competence. This is in contrast with past findings suggesting that accuracy based on teacher ratings and standardized achievement tests both yield significant relationships with ADHD symptoms (Owens & Hoza, 2003). It is important to note that Owens and colleagues found that the relationship between accuracy of academic self-perceptions and ADHD symptoms was stronger when teacher ratings were used, as was the case in the current study. Thus, it appears that the indicator of actual competence selected for comparison may have an impact on findings related to the presence of the PIB.

When teacher ratings were utilized as the indicator of academic competence, the self-perception groups were shown to differ in terms of both ADHD and depressive symptoms. Follow up tests suggest that 14% of the variance in inattentive symptoms was

explained by self-perception group status, compared to 5% and 6% for depressive and hyperactive/impulsive symptoms, respectively. The positive self-perception group had significantly higher levels of both inattentive and hyperactive/impulsive symptoms compared to the accurate and negative self-perception groups. In contrast, the negative self-perception group had the highest mean levels of depressive symptoms compared to the other groups. Despite a significant main effect, pairwise comparisons with the significance level adjusted to control for type I error suggest that depressive symptoms do not significantly differ between pairs of groups. Overall, results are consistent with past literature in suggesting that individuals in the positive group, the group of students who are displaying the PIB, have higher levels of ADHD symptoms compared to the other two groups (Owens & Hoza, 2003). These results also suggest that the negative group had a trend toward higher levels of depressive symptoms. Two previous studies investigating depression that compared positive illusions among two groups of students with ADHD, those with and without depression, found that students with ADHD and depression were similar to their non-diagnosed peers in that they did not overestimate their competence. These studies demonstrated that the presence of depression may lead to more accurate self-evaluations for students with ADHD (Hoza et al., 2002; 2004). Other studies with non-ADHD samples have investigated the influence of depressive symptoms on self-perceptions and found that depression is related to negative self-perceptions (Gladstone & Kaslow, 1995; Kistner, David-Ferdon, Repper, & Joiner, 2006). Consistent with past literature, ADHD and depressive symptoms were found to be differentially associated with self-perception group in the current study. Students with higher levels of ADHD symptoms, particularly inattentive symptoms, were found to display positive

academic self-perceptions compared to teacher ratings, whereas the negative self-perception group demonstrated a trend of higher levels of depressive symptoms.

Notably, there were no statistically significant differences in ADHD or depressive symptoms between self-perception groups formed on the basis of achievement test scores. Despite the lack of statistically significant differences between groups, the positive self-perception group showed a trend for higher levels of hyperactive/impulsive symptoms compared to the other two groups when achievement test scores were used as the indicator of competence. Although it was determined that this difference was non-significant, this observed trend is in line with the only past study that has examined the relationship between the PIB and ADHD subtype, which found that the PIB was more common in students with hyperactive/impulsive symptoms compared to inattentive symptoms (Owens & Hoza, 2003).

These authors also found differing results when teacher ratings or achievement test scores were used as the indicator of actual academic competence. In line with the current research, more overestimation was evidenced when teacher ratings were used as the criterion to compare with self-perceptions (Owens & Hoza, 2003). There are several possible explanations for these findings. Eisenberg and Schneider (2007) investigated teacher perceptions of children with ADHD and found that teachers in their sample had negatively biased perceptions of the academic abilities of students with ADHD that were beyond what could be explained by the students' achievement test scores. Thus, it is possible that negative teacher bias contributed to differences in findings between self-perception groups based on teacher ratings and FCAT scores as indicators of actual competence (Eisenberg & Schneider, 2007). The differences between the two indicators

could be attributed to the fact that state-wide achievement tests may not measure academic abilities that are commensurate with the types of academic skills that students and/or teachers consider when rating overall academic competence. While achievement tests such as the FCAT primarily measure academic knowledge, teacher ratings may account for a wider range of academic competencies such as organization, study skills, and engagement (Owens & Hoza, 2003). These skills, known as academic enablers, have been shown to contribute to the academic underachievement of students with ADHD (Volpe, DuPaul, DiPerna, Jitendra, Lutz, Tresco, et al., 2006). Because these enabling skills have been demonstrated as an important component of academic achievement, teacher ratings may be a valuable indicator of competence because they may include information about competence in specific academic subjects, as well as general skills like academic enablers.

In sum, when teacher ratings were used to determine self-perception grouping, the positive self-perception group was shown to have significantly higher levels of both ADHD symptoms (i.e., inattentive and hyperactive/impulsive symptoms). As in past research, higher levels of ADHD symptoms are associated with positive illusions of academic competence when compared to teacher ratings (Hoza et al., 2002, 2004; Owens & Hoza, 2003). However, percentages of variance explained by inattentive (14%) versus hyperactive/impulsive (6%) symptoms is in contrast to past literature on the PIB which suggests that hyperactive/impulsive symptoms are more highly related to overestimation of competence in elementary-age children (Owens & Hoza, 2003). In the current study, inattentive symptoms accounted for a larger amount of variance than hyperactive/impulsive symptoms. Potential explanations for this finding are included

below in the comparison of inattentive versus hyperactive/impulsive symptoms. It is important to gain insight into the relationship between the PIB and inattentive symptoms, as these symptoms tend to become more prominent than hyperactive/impulsive symptoms as students enter adolescence (Wolriach et al., 2005), as shown by the higher prevalence of elevated inattentive symptoms in this middle school sample.

Social Domain. When investigating the differences in overall symptoms across groups of middle school students with varying accuracy of social self-perceptions, the three self-perception groups differed in terms of ADHD symptoms. In contrast to the academic domain, teacher ratings were used as the only indicator of social competence. Follow-up tests suggest that group status has significant main effects on inattentive and hyperactive/impulsive symptoms, with 10% of the variance in inattentive symptoms explained by self-perception group status, compared to 5% for hyperactive/impulsive symptoms. Groups did not differ significantly on depressive symptoms at the univariate level. Post hoc analyses indicate that the positive perception group had significantly higher inattentive symptoms compared to the other groups. Hyperactive/impulsive symptoms were not found to significantly differ across groups when pairwise comparisons adjusted to control for type I error were conducted. When examining mean scores, the positive self-perception group had higher levels of hyperactive/impulsive and inattentive symptoms, and although results were not significant, the negative self-perception group demonstrated a trend of higher levels of depressive symptoms, compared to the other two groups.

Notably, the relationship between group membership and inattentive symptoms in the academic domain was demonstrated to be slightly stronger than the relationship

shown in the social domain (when teacher ratings were used as the indicator of competence in both domains). It is unclear why the magnitude of this relationship is slightly stronger in the academic versus the social domain. One potential explanation is that students with higher levels of inattentive symptoms have been shown to experience greater academic difficulties and less peer problems than children with predominantly hyperactive/impulsive symptoms (Gaub & Carlson, 1997). Past literature on the PIB suggests that boys with ADHD tend to overestimate their competence the most in the domains where they experience the greatest impairment (Hoza et al., 2002). Perhaps greater academic impairments for students with high levels of inattentive symptoms contribute to the differences in the variance in inattentive symptoms accounted for by membership in the negative, accurate, or positive self-perception group.

In sum, groups were found to differ significantly on inattentive and hyperactive/impulsive symptoms in the social domain, with the positive self-perception group having significantly higher levels of inattentive symptoms compared to the other two groups. Symptoms of depression were statistically similar across groups. Because the only previous study examining specific ADHD subtype focused solely on the academic domain (Owens & Hoza, 2003), these findings about the relationship between specific ADHD symptoms and accuracy within the social domain cannot be compared to any past literature. One study investigating the overall intensity of ADHD symptoms suggested that higher levels of overall ADHD symptoms were more highly related to the PIB in the social domain (Diamantopoulou et al., 2005). However, this study and others focusing solely on ADHD as a diagnosis (Hoza et al., 2004) did not examine the influence of hyperactive/impulsive and inattentive symptoms separately. Past research

suggests that social impairments differ based on ADHD subtype, with inattentive symptoms related to shyness and social passivity (Hodegens et al., 2000) and hyperactive/impulsive symptoms linked to interrupting or intruding in social conversations and limited consideration of social consequences (Barkley, 2006). Children with predominantly hyperactive/impulsive symptoms have been shown to experience more social difficulties than students with symptoms of inattention (Gaub & Carlson, 1997). While it is well documented that ADHD symptoms are associated with positive illusions within the social domain (Owens et al., 2007), the current study suggests that the overestimation of social competence may be more highly associated with inattentive symptoms compared to hyperactive/impulsive symptoms. Further research should be conducted in order to provide more definitive conclusions regarding the relationship between specific ADHD symptoms and accuracy of self-perceptions in the social domain.

Comparison of Inattentive and Hyperactive/Impulsive Symptoms

Results suggest that higher levels of inattentive symptoms are associated with positive self-perceptions when teacher ratings were used as the indicator of academic and social accuracy. This suggests a relationship between the PIB and inattentive symptoms in young adolescence. While hyperactive/impulsive symptoms were also found to be significantly related to group status, twice as much variance was accounted for by inattentive for both the academic (14%) and social (10%) domains compared to hyperactive/impulsive symptoms (6% and 10%, respectively). This is in contrast to past literature on the PIB which suggests that hyperactive/impulsive symptoms are more highly related to overestimation of competence in elementary-age children (Owens &

Hoza, 2003). The only study to investigate differences in the PIB across ADHD subtypes, which included elementary-age students, found only one marginally significant ($p < .10$) result indicating higher levels of inattentive symptoms may be associated with overestimation of academic competence when based on teacher ratings (Owens & Hoza, 2003). However, the authors suggest that this finding be interpreted with caution as their overall results demonstrated more support for significant associations between hyperactive/ impulsive symptoms and the presence of the PIB in the academic domain (Owens & Hoza, 2003). Given that the current findings related to the importance of inattentive symptoms are unique when compared to previous literature (e.g., Owens & Hoza, 2003), it is important to generate possible explanations of why these symptoms may be more highly associated with accurate versus discrepant group membership in the current study. Notably, the univariate statistical analyses utilized in the current study did not account for high intercorrelation between the ADHD symptoms, which could have influenced that amount of variance that was suggested to be accounted for by inattentive or hyperactive/impulsive symptoms alone. Because the current study included students who are older than participants in the majority of past research (which have included elementary-age students), inattentive symptoms were more prevalent than hyperactive/impulsive symptoms among participants within the current sample. This is in line with past research suggesting that inattentive symptoms are more common and visible than hyperactive/impulsive symptoms among adolescents with ADHD (Wolraich et al., 2005). Depressive symptoms have also been shown to become much more prevalent among adolescents with ADHD compared to children (Barkley, 2006; Bird et al., 1993).

Furthermore, the accumulation of negative feedback related to academic and/or social impairments over time for middle school students with symptoms of ADHD could contribute to findings that overestimation of competence is related to both ADHD symptoms (not just hyperactive/impulsive as in past research with elementary-age samples; Owens & Hoza, 2003). While the effect of negative feedback for students with ADHD has not been directly evaluated, Ohan and Johnston (2002) found that boys with ADHD who received positive feedback tended to lower their self-perceptions, while no change was noted when boys received average or no feedback. These authors suggest that this finding may be related to the need to protect ones self-image, and that when the elementary age boys in their study received positive feedback the need for self-protection was diminished and thus they provided more realistic self-ratings. These findings suggest that an accumulation of negative feedback over time may lead to increased need for self-protection during adolescence. Furthermore, current longitudinal research including adolescents with ADHD supports the self-protective hypothesis as the most viable explanation of the PIB (Hoza et al., 2010). Lastly, self-concept literature suggests that feedback from others is viewed as more important during adolescence compared to other developmental stages (Harter, 1999; Marsh, 1994). Adolescents with impairments associated with ADHD symptoms may be likely to inflate their self-ratings in an effort to protect their self-image in the face of negative feedback from others (e.g., teasing from peers, poor grades, negative feedback from parents and teachers about academic and/or social performance, etc.).

Future research examining differences between specific ADHD symptoms is needed in order to further understand the different findings of the current study compared

to the past study investigating the PIB among different ADHD subtypes (Owens & Hoza, 2003). The findings from the current study add insight into the presence of the PIB among young adolescents, as inattentive symptoms tend to become more prominent than the hyperactive/impulsive symptoms during this developmental stage.

Implications and Future Directions: Research and Practice

Implications for Research. The current study makes a significant contribution to the existing literature on self-perceptions among students with ADHD in several ways. Specifically, the sample and methodology used in the current study is unique compared to past research on the PIB, a continuum of ADHD and depressive symptoms are considered rather than only clinical levels, and the discrepancy method incorporating multiple indicators of competence was utilized. Directions for future research are also discussed.

First, the sample and sampling procedures utilized in the current study are quite different than the majority of the past research focusing on the PIB. This study has served to extend the investigation of the PIB to young adolescents, as the majority of past literature on the PIB has been conducted with elementary-age samples. Age is an important consideration when examining the PIB because specific areas of impairment and the presence and severity of ADHD and comorbid symptoms may change for adolescents compared to children. For this reason, findings from past research conducted with elementary age children is unlikely to generalize to young adolescent, adolescent, or young adult samples. This underscores the importance of conducting longitudinal and cross-sectional research with middle school, high school, and college age samples to understand how the PIB is impacted by accumulation of feedback and experience, changes in impairment, and symptoms as students grow older.

Second, past research on the PIB has solely investigated the self-perceptions of clinically referred samples or school-children with diagnosable levels of ADHD symptoms compared to students without an ADHD diagnosis. Considering symptoms on a continuum provides insight about the relationship between the degree of ADHD symptoms and the accuracy or bias of self-perceptions across two important domains. Findings from this study suggest that investigating the full range of symptoms and grouping students based on the accuracy of their self-perceptions, rather than an ADHD diagnosis, are alternative methods to investigating the PIB, and may provide insight about how to better explore this phenomenon within school-based samples. This is particularly important for adolescents because hyperactive/impulsive symptoms often decrease or become less visible during this time and symptoms may not reach levels of diagnosable significance (Wolraich et al., 2005). As additional support for the importance of considering symptoms on a continuum in relation to self-perception group, a recent study utilizing a community sample of adolescents with varying levels of ADHD symptoms found that students with sub threshold levels of ADHD symptoms (i.e., symptoms present but not meeting diagnostic criteria) are at higher risk of negative school outcomes than their counterparts who are diagnosed with ADHD. Furthermore, students with ADHD and sub threshold ADHD symptoms were at significant risk for continued functional impairment through adolescence (Bussing et al., 2010). This study suggests the importance of considering a full range of ADHD symptoms when conducting research with this population in order to best inform prevention and intervention efforts. Because the findings in the present study are different when compared to the only other study that has looked at severity of both inattention and hyperactive/impulsive symptoms (Owens &

Hoza, 2003), additional research using older age groups and symptom severity rather than diagnosis is warranted in hopes that more research will shed light on these contradictory findings.

The diverse nature of this sample is an additional important contribution to the PIB literature, as the majority of the extant research has used samples consisting of primarily elementary-age Caucasian males. It is noteworthy that there were significant differences in the accuracy of self-perceptions between the two middle schools included in the current study, especially considering the difference in ethnicity and SES of the student bodies across the two schools. Further research using diverse samples will allow for a better understanding of whether the PIB phenomenon extends to more diverse groups of students. Additionally, future research should explore demographic features beyond those examined in the current study (i.e., gender, school, and grade level) to provide more information about the relationship between the PIB and ethnic or socioeconomic diversity.

In addition, the investigation of specific ADHD and depressive symptoms among groups of students with varying self-perceptions adds to the sparse literature that has taken these variables into account in the study design. Only one study has previously considered ADHD subtype in their investigation of the PIB (Owens & Hoza, 2003). While three previous studies have considered the presence of depressive symptoms (Hoza et al., 2002; 2004; Owens & Hoza, 2003), only one study considered specific levels of depressive symptoms rather than accounting for only clinical levels of depression (Owens & Hoza, 2003). More research is needed in order to fully understand the relationship between positive illusions and specific symptoms in adolescent populations.

Only one previous study has grouped students in a similar way to the methods used in the current study (Gresham et al., 2000). However, this study did not investigate differences in symptoms across these negative, accurate, or positive groups or make attempts to explain why the groups differed in their academic and social self-perceptions. Rather, this study focused on outcomes related to positive and negative illusions of competence and found that children with positive self-perceptions had more problem behavior and lower academic competence than students in the other groups (Gresham et al., 2000). More studies utilizing this type of grouping, rather than grouping based on symptoms as has occurred in other studies on the PIB (e.g., Owens & Hoza, 2003), will contribute to the literature by examining factors that differ among students with self-views that are either discrepant or accurate compared to external indicators of competence. This methodology allows for specific symptoms and other characteristics (such as demographic factors) to be compared between students who display the PIB and those who do not.

Furthermore, the discrepancy methodology utilized in this study is representative of the current best practice measurement recommendations for the PIB (Owens et al., 2007). This is the first time that this methodology has been used for students with a full range of ADHD symptoms, which is a unique contribution to the literature that allows for the PIB to be investigated in a much broader group of students (those without an ADHD diagnosis). However, it is important to note that the use of discrepancy scores in this type of analyses raised challenges in the interpretability of the results. For this reason, alternatives to calculating discrepancy scores between students' self-perceptions and an external criterion should be explored and warrant attention in future research (Owens et

al., 2007). Considerations regarding the use of standardized scores in discrepancy analyses are warranted. Within the current study z-scores created for all self-perception, teacher rating, and test scores were based on the mean of the entire sample (N = 164). Notably, previous published studies on the PIB have not explained the comparison sample that was used (e.g., Evangelista et al., 2008; Owens & Hoza, 2004). Future research should consider which comparison groups (e.g., entire sample, grade level, gender specific) may serve as the best reference group to calculate standardized scores, and should report the selected group in future publications.

An additional challenge for future research in this area will be to develop alternative, more objective, indicators of competence in all domains of competence. For example, in the current study multiple indicators of competence (standardized test scores and teacher ratings) were utilized in the academic domain; however, only teacher ratings was used as an indicator of social competence. In the future, methods such as direct observation, task performance measures, peer or teacher nomination methods, or rating scales could also be utilized as indicators of competence in the social or behavioral domains. Comparing the accuracy of self-perceptions across multiple indicators of competence is important because this may provide a fuller picture of a student's competence in a given domain. This will also allow for research on the PIB to be extended to older adolescents and young adults, for whom teacher ratings may not be available or may not provide a full portrayal of social competence. Within the academic domain, measurement of the PIB may be advanced by gathering student and teacher ratings across multiple teachers and subject areas. This is a particularly relevant direction for extending this research into middle school and high school samples as teachers only

see students for one subject, compared to elementary school where teaching multiple subjects is more typical. This method of measuring the accuracy of academic self-perceptions is more aligned with Marsh's conceptualization of self-concept as varying across specific academic areas (Marsh & Hattie, 1996). Mixed methods research should also be considered for future investigations of the PIB , as qualitative data gathered from focus groups or interviews with students with the PIB may provide more insight than survey methodology about the function of this intriguing phenomenon. This would allow researchers to ask more specific questions about student, parents, or teacher perceptions of the PIB in students with symptoms of ADHD. Extensions upon current survey methodology may also provide insight about factors which discriminate students who display the PIB in multiple domains from those who display the PIB in only one domain. Past research suggests that students display the greatest overestimations of competence in the area where they experience the most impairment (Hoza et al., 2004), but little is known about why individual variability in the PIB is noted across domains of competence. These are important direction for future research as many questions remain unanswered regarding the PIB, such as why the presence of the PIB may change based on the indicator of competence used for comparison or the specific domain investigated.

Lastly, the question of whether or not the PIB is adaptive is still unanswered by the current study and other research conducted in this area. In order to fully understand the PIB, we must first elucidate the function of this phenomenon. The self-protective hypothesis currently has the most support for explaining the PIB (Hoza et al., 2010), and thus it is crucial that more research is conducted to confirm or disconfirm the adequacy of this explanation of the PIB and provide further support for or against the proposed

hypotheses for explaining the PIB. The findings from this study also highlight the importance of considering age level when considering the function of the PIB, as this may also change as students progress through school.

Implications for Practice. The current study provides preliminary evidence that the PIB persists into adolescence for students with elevated levels of ADHD symptoms. Unfortunately, with regard to intervention, the specific actions taken with these students will be dependent on future research providing information on the function of the PIB and whether or not the PIB is found to be adaptive or maladaptive. Insight related to the hypothesis that best explains the PIB for students with symptoms of ADHD will likely lead to prevention or intervention efforts that either decrease or bolster these overly positive self-perceptions. Some emerging literature suggests that the PIB may be a risk factor for increased aggression, and that the PIB does may not serve as a protective factor against depression (Hoza et al., 2010). These findings that the PIB is likely not adaptive suggest that interventions for these students prior to adolescence may be warranted, particularly because comorbid internalizing and externalizing disorders are increasingly common for adolescents with ADHD (Carlson & Mann, 2000; Crystal et al., 2001). Furthermore, findings from previous literature suggest that the presence of the PIB may decrease the effectiveness of behavioral interventions due to adherence issues (Hoza & Pelham, 1995). Children who do not believe that they are experiencing difficulty in a given domain may not fully engage in the complex behavioral interventions that may be necessary to see improvements within their areas of impairment.

Findings from the current study are also important for consideration while assessing students with ADHD symptoms. The presence of the PIB in this young

adolescent sample may suggest that self-report data from students with symptoms of ADHD may not be accurate. While it is more well-known that students with ADHD may not provide accurate reports of the externalizing behavior (Barkley, Fischer, Edelbrock, & Smallish, 1991), findings from the current study and other investigations of the PIB in children with ADHD symptoms suggest that these students may also provide inaccurate reports of their academic and social abilities. This information will likely impact how school psychologists use self-report data as they will need to consider that student reports merely reflect their perceptions of their abilities and may not truly reflect their competence. These findings also highlight the importance of getting data from multiple sources when conducting evaluations related to ADHD. Additionally, differences in findings between teacher ratings and FCAT scores within the current study serve as a reminder about the importance of considering multiple sources of information when evaluating students with ADHD symptoms. It is known that students with ADHD display inconsistent behavior across settings and depending on the environmental context (DuPaul & Stoner, 2003), which is further impetus to use multiple sources of information for any student with symptoms of ADHD. The design of this study may also have meaningful implications for school-based practices. Unlike past studies on the PIB that looked at diagnostic criteria for ADHD, this study considered behaviors that were present from a teacher's perspective. Beyond diagnosis, understanding the severity of ADHD symptoms may be more useful for developing interventions that target an individual's specific areas of impairment.

Increased understanding and awareness that the PIB may persist into adolescence may lead to improvements in the current practices used for assessing and intervening to

address with this population. The unique challenges and increased demands associated with the transitions to middle and high school for a student with symptoms of ADHD underscore the importance of shedding light on this understudied population.

Limitations

There are several limitations of the current study that warrant discussion at this time. Specifically, limitations related to the use of (1) teacher report, (2) missing data on the SPPC, (3) a convenience sample, and (4) discrepancy scores are presented.

The first limitation that will be discussed is the use of teacher report as an indicator of actual competence. While it is acknowledged that teacher reports of competence may be biased (Eisenberg & Schnieder, 2007), it is important to note that teachers are suggested to be the most relevant reports for students' daily concerns experienced at school (Gadow et al., 2004). Teacher reports were deliberately selected for this study because teachers have opportunities to observe students in both academic and social settings. However, the nature of middle school scheduling may limit the ability of teachers to provide accurate ratings of social and academic competence. This measurement challenge is unique in comparison to past studies on the PIB, which have included predominantly elementary-age youth. Middle school students likely see teachers for only one period rather than for the entire day as is more common in elementary schools. The use of ratings from only one teacher, rather than all of the students' teachers, may be a limitation to the current study as this teacher may not be equipped to provide ratings of a students' academic and social competence. Several attempts were made to account for this potential limitation. First, students' homeroom teachers were selected as raters whenever possible because students spend the longest

period of the day with this teacher. Additionally, FCAT scores were selected as an additional indicator of academic competence.

Missing data on the SPPC is also a potential limitation as 12 students were excluded for completing this measure incorrectly (2 of these students also had missing data on the two teacher measures used in this study). On the SPPC, students are asked to read two sentences and decide which one is most like them before deciding if the statement is "sort of true" or "really true" for them. These students checked one box for each sentence, therefore providing more than one response per item. These errors were made despite students receiving additional instructions and a sample of this "structure alternative format" (Harter, 1982, p. 189) prior to completing the measure. No notable trends were seen upon examination of the demographic characteristics of the 12 students excluded due to missing data on this measure; however, it is unknown whether these students had any unique characteristics that led to their difficulty completing this measure.

Another potential limitation in the current study is related to the use of a convenience sample. Because participants were only selected from two middle schools in one school district results may not generalize to populations which are very different from the current sample. It must also be considered that students who returned their parent consent form and who agreed to participate in this study may differ from those who did not. Precautions were taken to compare the study sample to the demographics of both of the middle schools and the school district to ensure that all sub-populations of students were represented. The only notable differences between the current sample and the school and district demographic data are that females and sixth grade students are

overrepresented within the current sample. Despite these limitations, it is important to note that this sample is substantially more diverse in terms of gender and ethnic background than past studies investigating the PIB.

In terms of measurement, the use of the discrepancy analysis to determine accuracy certainly has some limitations. First, there is the potential that children with higher levels of ADHD symptoms may be more likely to overestimate their competence because they experience impairments beyond those of children without these symptoms (Owens et al., 2007). If a student has high competence in an area, a large discrepancy between self and teacher ratings may not be possible (if they rate themselves as high as possible, a teacher may not be able to rate them as even more competent). Additionally, there is increased risk of Type II error with discrepancy scores because the reliability tends to be significantly lower than the reliabilities of the variables used to calculate the discrepancy (Edwards, 2001). In the current study, the reliability of the scales used to calculate the discrepancy ranged from .73 to .92. While these are considered to be acceptable estimates of reliability, the moderate internal consistency of the social subscale of the SPPC ($\alpha = .73$) is a limitation. It is noted that this reliability is similar to previous research with samples of students in 3rd through 8th grade, with alphas ranging from .75 to .80 (Harter, 1985). The second limitation relevant to the use of discrepancy scores is that they tend to be highly correlated with their components (Cronbach, 1958). This limitation was addressed by calculating and reporting correlations between all variables of interest. Although there are limitations to the discrepancy approach, this is currently the best practice standard for measuring the PIB (Owens et al., 2007), and future research should explore alternatives considering the known limitations of this

method.

Conclusions

Findings garnered from the current study suggest that the PIB is present within the academic and social domains for middle school students, and that students with overly positive self-perceptions exhibit significantly higher levels of inattentive symptoms than students with accurate or negative self-perceptions. Hyperactive/impulsive symptoms were also shown to be prevalent among students in the positive self-perception group, particularly within the academic domain. This study adds to the small body of literature that has considered ADHD symptoms, and has gone a step further by examining levels of ADHD symptoms rather than considering ADHD as a diagnostic label. Findings are unique when compared to past research in that inattentive symptoms were more highly related to perceptions of competence that are higher than an indicator of actual competence in both academic and social domains. The only study that had previously examined the PIB by specific ADHD subtype suggested that students with inattentive symptoms were less likely than students with predominantly hyperactive/impulsive symptoms to display the PIB (Owens & Hoza, 2003). It is important to note that the prior study considered only the academic domain, and included students between 9 and 12 years of age. Notably, inattentive symptoms are the most common presenting symptom for adolescents with ADHD (Wolraich et al., 2005) and these symptoms were found to be much more prevalent than hyperactive/impulsive symptoms within the current sample. The differences in findings between the current study and past research on the PIB underscore the importance of extending this body of research to older populations. This study also suggests that the presence of the PIB is

dependent on the indicator of competence that is selected for comparison with self-ratings. In the current study, there was only evidence of the PIB when teacher ratings were used as the indicator of competence in the academic domain.

This body of literature on the PIB would benefit from longitudinal exploration of the PIB in relation to ADHD symptoms as this type of research design would likely provide insight about the function of the PIB and about the persistence of the PIB across developmental periods. This study is also unique in that the level of depressive symptoms was considered, and students in the negative self-perception group were more likely to have increased levels of depressive symptoms. Insight gained from the current study regarding the accuracy of adolescents' self-perceptions in the social and academic domains in relation to inattentive, hyperactive/impulsive, and depressive symptoms provides insight about the presence of the PIB in middle school students, and suggests that the PIB is demonstrated by young adolescents with elevated ADHD symptoms.

References

Achenbach, T. M. (1991). *CBCL teacher's report form for ages 5-18.* Burlington, VT: Center for Children, Youth, & Families, University of Vermont.

Achenbach, T. M., & Edelbrock, C. S. (1983). *Manual for the Revised Child Behavior Profile and Child Behavior Checklist*. Burlington: University of Vermont, Department of Psychiatry.

American Psychiatric Association (APA). (2000). *Diagnostic and Statistical Manual of Mental Disorders (4th Ed.) Text Revision.* Washington DC: author.

Barkley, R. A. (2001). The inattentive type of ADHD as a distinct disorder. In H. Quay & A. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 295-316). New York: Plenum Press.

Barkley, R. A. (2003). Attention-deficit/hyperactivity disorder. In E. J. Mash, R. A. Barkley, E. J. Mash & R. A. Barkley (Eds.), *Child psychopathology (2nd ed.).* (pp. 75-143). New York, NY: Guilford Press.

Barkley, R. A. (2006). *Attention-deficit hyperactivity disorder, 3rd ed.: A handbook for diagnosis and treatment*. New York, NY: Guilford Press.

Barkley, R. A., Fischer, M., Edelbrock, C. S., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: I. an 8-year prospective follow-up study. *Journal of the American Academy of Child & Adolescent Psychiatry, 29*(4), 546-557.

Barkley, R. A., Fischer, M., Edelbrock, C., & Smallish, L. (1991). The adolescent outcome of hyperactive children diagnosed by research criteria: III. Mother-child interactions, family conflicts and maternal psychopathology. *Journal of Child Psychology and Psychiatry, 32*(2), 233-255.

Berlin, L., & Bohlin, G. (2002). Response inhibition, hyperactivity, and conduct problems among preschool children. *Journal of Clinical Child and Adolescent Psychology, 31*(2), 242-251.

Biederman, J., Mick, E., & Faraone, S. V. (1998). Depression in attention deficit hyperactivity disorder (ADHD) children: "True" depression or demoralization? *Journal of Affective Disorders, 47,* 113-122.

Bird, H. R., Gould, M. S., & Staghezza, B. M. (1993). Patterns of diagnostic comorbidity in a community sample of children aged 9 through 16 years. *Journal of the American Academy of Child & Adolescent Psychiatry, 32*(2), 361-368.

Bracken, B. A. (1992). *Multidimensional self-concept scale.* Austin, TX: Pro-Ed.

Bracken, B. A. (2009). Positive self-concepts. In R. Gilman, E. S. Huebner & M. J. Furlong (Eds.), *Handbook of positive psychology in schools.* (pp. 89-106). New York, NY: Routledge/Taylor & Francis Group.

Bracken, B. A., Bunch, S., Keith, T. Z., & Keith, P. B. (2000). Child and adolescent multidimensional self-concept: A five-instrument factor analysis. *Psychology in the Schools, 37*(6), 483-493.

Bracken, B. A., & Howell, K. K. (1991). Multidimensional self concept validation: A three-instrument investigation. *Journal of Psychoeducational Assessment, 9,* 319-328.

Brown, B. (2004). Adolescents' relationships with peers. In R. Lehrer & L. Steinberg (Eds.), *Handbook of adolescent psychology (2nd Ed;* pp. 363-394). New York, NY: Wiley.

Bussing, R., Mason D. M., Bell, L., Porter, P., & Garvan, C. (2010). Adolescent outcomes of children attention-deficit/hyperactivity disorder in a diverse community sample. *Journal of the Academy of Child & Adolescent Psychiatry, 49*(6), 595-605.

Cairns, E., McWhirter, L., Duffy, U., & Barry, R. (1990). The stability of self-concept in late adolescence: Gender and situational effects. *Personality and Individual Differences, 11*(9), 937-944.

Carlson, C. L., & Mann, M. (2000). Attention-deficit/hyperactivity disorder, predominately inattentive subtype. *Child and Adolescent Psychiatric Clinics of North America, 9*(3), 499-510.

Carter, A.S., Wagmiller, R.J., Gray, S.A., McCarthy, K.J., Horwitz, S.M., & Briggs-Gowan, M.J. (2010). Prevalence of DSM-IV Disorder in a Representative, Healthy Birth Cohort at School Entry: Sociodemographic Risks and Social Adaptation. *Journal of the American Academy of Child and Adolescent Psychiatry, 49,* 686-698.

Cole, D. A., Maxwell, S. E., Martin, J. M., Peeke, L. G., Seroczynski, A. D., Tram, J. M., et al. (2001). The development of multiple domains of child and adolescent self-concept: A cohort sequential longitudinal design. *Child Development, 72*(6), 1723-1746.

Cooley, C. H. (1902). *Human nature and the social order.* New York, NY: Charles Scribner's Sons.

Coopersmith, S. (1967). *The antecedents of self-esteem.* San Francisco, CA: W. H. Freeman.

Crain, R. M., & Bracken, B. A. (1994). Age, race, and gender differences in child and adolescent self-concept: Evidence from a behavioral-acquisition, context-dependent model. *School Psychology Review, 23*(3), 496-511.

Cronbach, L. J. (1958). Proposals leading to analytic treatment of social perception scores. In R. Tahiuiri & L. Petrullo (Eds.), *Person perception and interpersonal behavior* (pp. 353-379). Stanford, CA: Stanford University Press.

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*(3), 189-205.

Diamantopoulou, S., Henricsson, L., & Rydell, M. (2005). ADHD symptoms and peer relations of children in a community sample: Examining associated problems, self-perceptions, and gender differences. *International Journal of Behavioral Development*, 29(5), 388-398.

Diener, M. B., & Milich, R. (1997). Effects of positive feedback on the social interactions of boys with attention deficit hyperactivity disorder: A test of the self-protective hypothesis. *Journal of Clinical Child Psychology, 26*(3), 256-265.

Demo, D. H., & Savin-Williams, R. (1992). Self-concept stability and change during adolescence. In R. P. Lipka, T. M. Brinthaupt, R. P. Lipka & T. M. Brinthaupt (Eds.), *Self-perspectives across the life span.* (pp. 116-148). Albany, NY: State University of New York Press.

DuPaul, G. J., Anastopoulos, A. D., Power, T. J., Reid, R., Ikeda, M. J., & McGoey, K. E. (1998). Parent ratings of attention-deficit/hyperactivity disorder symptoms: Factor

structure and normative data. *Journal of Psychopathology and Behavioral Assessment, 20*(1), 83-102.

Edwards, J. R. (2001). Ten difference score myths. *Organizational Research Methods, 4,* 265-287.

Eisenberg, D. & Schneider, H. (2007). Perceptions of academic skills of children diagnosed with ADHD. *Journal of Attention Disorders, 10*(4), 390-397.

Evangelista, N. M., Owens, J. S., Golden, C. M., & Pelham, W. E. J. (2008). The positive illusory bias: Do inflated self-perceptions in children with ADHD generalize to perceptions of others? *Journal of Abnormal Child Psychology, 36*(5), 779-791.

Florida Department of Education. (2008). *FCAT Achievement Levels.* Tallahassee, FL: Author.

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

Gadow, K. D., Drabick, D. A. G., Loney, J., Sprafkin, J., Salisbury, H., Azizian, A., et al. (2004). Comparison of ADHD symptom subtypes as source-specific syndromes. *Journal of Child Psychology and Psychiatry, 45*, 1135-1149.

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.

Gladstone, T. R., & Kaslow, N. J. (1995). Depression and attributions in children and adolescents: A meta-analytic review. Journal of Abnormal Child Psychology, 23, 597–606.

Gresham, F. L., & Elliot, S. N. (1990) *Social Skills Rating System.* Circle Pines, MN: American Guidance Service.

Gresham, F. M., MacMillan, D. L., Bocian, K. M., Ward, S. L., & Forness, S. R. (1998). Comorbidity of hyperactivity-impulsivity-inattention and conduct problems: Risk factors in social, affective, and academic domains. *Journal of Abnormal Child Psychology, 26*(5), 393-406.

Hanc, T. & Brzezinka, A. I. (2009). Intensity of ADHD symptoms and subjective feelings of competence in school age children. *School Psychology International 30*(5), 491-506.

Harter, S. (1982). The perceived competence scale for children. *Child Development, 53,* 87-97.

Harter, S. (1983). Developmental perspectives on the self- system. In E. M. Hetherington (Ed.), P. H. Mussen (Series Ed.), *Handbook of child psychology*: *Socialization, personality, and social development.* (4th ed., pp. 275-385). New York, NY: Wiley.

Harter, S. (1985). *Manual for the self-perception profile for children.* University of Denver Denver, CO.

Harter, S. (1988). *Manual for the self-perception profile for adolescents.* University of Denver, CO.

Harter, S. (1998). The development of self-representations. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology, Vol 3, Social, emotional, and personality development.* (5^{th} edition., pp. 553-617). Hoboken, NJ: Wiley.

Harter, S. (1999). *The construction of the self: A developmental perspective*. New York, NY US: Guilford Press.

Harter, S. (2006). The self. In N. Eisenberg, W. Damon, R. M. Lerner, N. Eisenberg, W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 3, social, emotional, and personality development (6th ed.*;(pp. 505-570). Hoboken, NJ: John Wiley & Sons Inc.

Harter, S., Bresnick, S., Bouchey, H. A., & Whitesell, N. R. (1997). The development of multiple role-related selves during adolescence. *Development and Psychopathology, 9*(4), 835-853.

Harter, S., & Pike, R. (1984). The pictorial scale of perceived competence and social acceptance for young children. *Child Development, 55*(6), 1969-1982.

Hodgens, J. B., Cole, J., & Boldizar, J. (2000). Peer-based differences among boys with ADHD. *Journal of Clinical Child Psychology, 29*(3), 443-452.

Heath, N. L., & Glen, T. (2005). Positive illusory bias and the self-protective hypothesis in children with learning disabilities. *Journal of Clinical Child & Adolescent Psychology, 34*(2), 272-281.

Hechtman, L., Weiss, G., & Perlman, T. (1980). Hyperactives as young adults: Self-esteem and social skills. *Canadian Journal of Psychiatry, 25*(6), 478-482.

Horn, W. F., Wagner, A. E., & Ialongo, N. (1989). Sex differences in school-aged children with pervasive attention deficit hyperactivity disorder. *Journal of Abnormal Child Psychology, 17*(1), 109-125.

Hoza, B., Gerdes, A. C., Hinshaw, S. P., Arnold, L. E., Pelham, W. E. J., Molina, B. S. G., et al. (2004). Self-perceptions of competence in children with ADHD and comparison children. *Journal of Consulting and Clinical Psychology, 72*(3), 382-391.

Hoza, B., Murray-Close, D., Arnold, L. E., Hinshaw, S. P., Hechtman, L., & The MTA Cooperative Group. (2010). Time-dependent changes in positively biased self-perceptions of children with attention-deficit/hyperactivity disorder: A developmental psychopathology perspective. *Development and Psychopathology, 22*, 375-390.

Hoza, B. & Pelham, W. E. (1995). Social-cognitive predictors of treatment response in children with ADHD. *Journal of Social & Clinical Psychology, 14*, 23-35.

Hoza, B., Pelham, W. E. J., Dobbs, J., Owens, J. S., & Pillow, D. R. (2002). Do boys with attention-deficit/hyperactivity disorder have positive illusory self-concepts? *Journal of Abnormal Psychology, 111*(2), 268-278.

Hoza, B., Pelham, W. E., Milich, R., & Pillow, D. (1993). The self-perceptions and attributions of attention deficit hyperactivity disordered and nonreferred boys. *Journal of Abnormal Child Psychology*, *21*(3), 271-286.

Hoza, B., Waschbusch, D. A., Owens, J. S., Pelham, W. E., & Kipp, H. (2001). Academic task persistence of normally achieving ADHD and control boys: Self-evaluations, and attributions. *Journal of Consulting and Clinical Psychology*, *69*(2), 271-283.

Hoza, B., Waschbusch, D. A., Pelham, W. E., Molina, B. S. G., & Milich, R. (2000). Attention-deficit/hyperactivity disordered and control boys' responses to social success and failure. *Child Development, 71*(2), 432-446.

Hymel, S., Bowker, A., & Woody, E. (1993). Aggressive versus withdrawn unpopular children: Variations in peer and self-perceptions in multiple domains. *Child Development, 64*(3), 879-896.

Ialongo, N. S., Lopez, M., Horn, W. F., & Pascoe, J. M. (1994). Effects of psychostimulant medication on self-perceptions of competence, control, and mood in children with attention deficit hyperactivity disorder. *Journal of Clinical Child Psychology, 23*(2), 161-173.

James, W. (1890). The consciousness of self. In W. James (Ed.), *The principles of psychology, vol I.* (pp. 291-401). New York, NY: Henry Holt and Co.

Johnson, B. & Christensen, L. (2004). *Educational research: Quantitative, qualitative, and mixed approaches* (2nd ed.). Boston, MA: Allyn and Bacon.

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.

Kovacs, M. (1992). *Children's Depression Inventory (CDI) manual.* North Tonawanda, NY: Multi-Health Systems.

Kistner, J. A., David-Ferdon, C. F., Repper, K. K., & Joiner, T. E. Bias and accuracy of children's perceptions of peer acceptance: Prospective associations with depressive symptoms. *Journal of Abnormal Child Psychology, 34*(3), 349-361.

Lahey, B., Applegate, B., McBurnett K., Biederman, J., Greenhill, L., Hynd, G., et al. (1994). DSM-IV field trials for attention deficit/hyperactivity disorder in children and adolescents. *American Journal of Psychiatry, 151*, 1673-1685.

Lahey, B., McBurnett, K., & Loeber, R. (2000). Are attention-deficit/hyperactivity disorder and oppositional defiant disorder developmental precursors to conduct disorder? In A. J. Sameroff, M. Lewis, & S.M. Miller (Eds.), *Handbook of*

developmental psychopathology (2nd ed., pp. 431-446.). New York: Kluwer Academic Plenum.

Lindenman, M., & Behm, K. (1999). Cognitive strategies and self-esteem as predictors of bracewear complicance among adolescents with juvenile rheumatoid arthritis. *Pediatric Orthopediatry, 19*, 494-299.

Manning, M. A., Bear, G. G., & Minke, K. M. (2006). Self-concept and self-esteem. In G. G. Bear, K. M. Minke, G. G. Bear & K. M. Minke (Eds.), *Children's needs III: Development, prevention, and intervention.* (pp. 341-356). Washington, DC: National Association of School Psychologists.

Marsh, H. W. (1988). Causal effects of academic self-concept on academic achievement: A reanalysis of newman (1984). *Journal of Experimental Education, 56*(2), 100-103.

Marsh, H. W. (1990). The structure of academic self-concept: The Marsh/Shavelson model. *Journal of Educational Psychology, 82*(4), 623-636.

Marsh, H. W. (1992). Content specificity of relations between academic achievement and academic self-concept. *Journal of Educational Psychology, 84*(1), 35-42.

Marsh, H. W. (1993). Relations between global and specific domains of self: The importance of individual importance, certainty, and ideals. *Journal of Personality and Social Psychology, 65*(5), 975-992.

Marsh, H. W. (1994). Using the national longitudinal study of 1988 to evaluate theoretical models of self-concept: The self-description questionnaire. *Journal of Educational Psychology, 86*(3), 439-456.

Marsh, H. W. (2008). A multidimensional, hierarchical model of self-concept: An important facet of personality. In G. J. Boyle, G. Matthews, D. H. Saklofske, G. J.

Boyle, G. Matthews & D. H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment, vol 1: Personality theories and models.* (pp. 447-469). Thousand Oaks, CA: Sage Publications, Inc.

Marsh, H. W., Debus, R., & Bornholt, L. (2005). Validating young children's self-concept responses: Methodological ways and means to understand their responses. In D. M. Teti (Ed.). *Handbook of research methods in developmental science.* (pp. 138-160). Oxford, UK: Blackwell.

Marsh, H. W., & Hattie, J. (1996). Theoretical perspectives on the structure of self-concept. In B. A. Bracken, & B. A. Bracken (Eds.), *Handbook of self-concept: Developmental, social, and clinical considerations.* (pp. 38-90). Oxford, England: John Wiley & Sons.

Marsh, H. W., & O'Mara, A. (2008). Reciprocal effects between academic self-concept, self-esteem, achievement, and attainment over seven adolescent years: Unidimensional and multidimensional perspectives of self-concept. *Personality and Social Psychology Bulletin, 34*(4), 542-552.

Marsh, H. W., & Shavelson, R. (1985). Self-concept: Its multifaceted, hierarchical structure. *Educational Psychologist, 20*(3), 107-123.

Marsh, H. W., Smith, I. D., Marsh, M., & Owens, L. (1988). The transition from single-sex to coeducational high schools: Effects on multiple dimensions of self-concept and on academic achievement. *American Educational Research Journal, 25*(2), 237-269.

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*(3), 207-213.

McCullough, G., Huebner, E. S., & Laughlin, J. E. (2000). Life events, self-concept, and adolescents' positive subjective well-being. *Psychology in the Schools, 37*(3), 281-290.

Milich, R., Balentine, A. C., & Lynam, D. R. (2001). ADHD combined type and ADHD predominantly inattentive type are distinct and unrelated disorders. *Clinical Psychology: Science and Practice, 8*(4), 463-488.

Milich, R. (1994). The response of children with ADHD to failure: If at first you don't succeed, do you try, try again? *School Psychology Review, 23*(1), 11-28.

Milich, R., & Okazaki, M. (1991). An examination of learned helplessness among attention-deficit hyperactivity disordered boys. *Journal of Abnormal Child Psychology, 19*(5), 607-623.

Mitsis, E. M., McKay, K. E., Schulz, K. P., Newcorn, J. H., & Halperin, J. M. (2000). Parent teacher concordance for DSM-IV attention-deficit/hyperactivity disorder in a clinic-referred sample. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*, 308-313.

Ogg, J. A., & Harbor, R. (2009). The experiences of and perceptions toward adolescents exhibiting inattention, hyperactivity, and impulsivity. Application for Initial Review: University of South Florida Social and Behavioral Institutional Review Board.

O'Neill, M. E., & Douglas, V. I. (1991). Study strategies and story recall in attention-deficit disorder and reading disability. *Journal of Abnormal Child Psychology, 19*(6), 671-692.

Ohan, J. L., & Johnston, C. (2002). Are the performance overestimates given by boys with ADHD self-protective? *Journal of Clinical Child and Adolescent Psychology, 31*(2), 230-241.

Owens, J. S., Goldfine, M. E., Evangelista, N. M., Hoza, B., & Kaiser, N. M. (2007). A critical review of self-perceptions and the positive illusory bias in children with ADHD. *Clinical Child and Family Psychology Review, 10*(4), 335-351.

Owens, J. S., & Hoza, B. (2003). The role of inattention and hyperactivity/impulsivity in the positive illusory bias. *Journal of Consulting and Clinical Psychology, 71*(4), 680-691.

Ownsworth, T. L., McFarland, K. M., & Young, R. (2002). The investigation of factors underlying deficits in self-awareness and self-regulation. *Brain Injury, 16*, 291-309.

Piers, E. V., & Harris, D. B. (1964). Age and other correlates of self-concept in children. *Journal of Educational Psychology, 55*, 91-95.

Radloff, L. S. (1977). The CES-D scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385-401.

Resnick, R. J. (2005). Attention deficit hyperactivity disorder in adults: They don't all outgrow it. *Journal of Clinical Psychology, 61*(5), 529-533.

Roberts, R. E., Lewisohn, P. M., & Seeley, J. R. (1991). Screening for adolescent depression, a comparison of depression scales. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*, 58-66.

Rosenberg, M. (1979). *Conceiving the self.* Malabar, FL: Robert E. Krieger.

Rosenberg, M. (1986). Self-concept from middle childhood through adolescence. In J. Suls & A. Greenwald (Eds.), *Psychological perspectives on the self.* (pp. 107-136). Hillsdale, NJ: Erlbaum.

Ruble, D. N., & Dweck, C. S. (1995). Self-perceptions, person conceptions, and their development. In N. Eisenberg, & N. Eisenberg (Eds.), *Social development.* (pp. 109-139). Thousand Oaks, CA: Sage Publications, Inc.

Rushton, J. L., Forcier, M., & Schectman, R. M. (2002). Epidemiology of Depressive Symptoms in the National Longitudinal Study of Adolescent Health. *Journal of the American Academy of Child and Adolescent Psychiatry, 41,*199-205.

Scahill, L. & Schwab-Stone, M. (2000). Epidemiology of ADHD in school-age children. *Child and Adolescent Psychiatric Clinics of North America, 9*(3), 541-555.

Schultz, B. K., Evans, S. W., & Serpell, Z. N. (2009). Preventing failure among middle school students with attention deficit hyperactivity disorder: A survival analysis. *School Psychology Review, 38*(1), 14-27.

Schnoes, C., Reid, R., Wagner, M., Marder, C. (2006). ADHD among students receiving special education services: A national survey. *Exceptional Children, 72*(4), 483-496.

Seroczynski, A. D., Cole, D. A., & Maxwell, S. E. (1997). Cumulative and compensatory effects of competence and incompetence on depressive symptoms in children. *Journal of Abnormal Psychology, 106,* 586-597.

Shapka, J. D., & Keating, D. P. (2005). Structure and change in self-concept during adolescence. *Canadian Journal of Behavioural Science, 37*(2), 83-96.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research, 46*(3), 407-441.

Slomkowski, C., Klein, R. G., & Mannuzza, S. (1995). Is self-esteem an important outcome in hyperactive children? *Journal of Abnormal Child Psychology, 23*(3), 303-315.

Smith, B. H., Barkley, R. A., & Shapiro, C. J. (2007). Attention Deficit (Hyperactivity) Disorder. In E. Mash & R. Barkley (Eds.), *Assessment of Childhood Disorders* (pp. 53-131). New York, NY: Guilford Press.

Snodgrass, H. (2009). *Adolescent Response to Peer Substance Use.* (Unpublished master's thesis). University of South Florida, Tampa, FL.

Starkstein, S. E., Jorge, R., Mizrahi, R., & Robinson, R. G. (2006). A diagnostic formulation for anosognosia in Alzheimer's disease. *Journal of Nuerology, Nuerosurgery, & Psychiatry, 77,* 719-725.

Stuss, D. T., & Benson, D. F. (1987). The frontal lobes and control of cognition and memory. In E. Pereceman (Ed.), *The frontal lobes revisited.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Szatmari, P., Boyle, M. H., & Offord, D. R. (1989). ADHD and conduct disorder: Degree of diagnostic overlap and differences among correlates. *Journal of the American Academy of Child & Adolescent Psychiatry, 28*(6), 865-872.

Tabachnick, B. G. & Fidell, L.S. (2007). Using multivariate statistics (5^{th} ed). Boston: Pearson Education.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*(2), 193-210.

Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2006). Self-esteem, academic self-concept, and achievement: How the learning environment moderates the dynamics of self-concept. *Journal of Personality and Social Psychology, 90*(2), 334-349.

Treuting, J. J., & Hinshaw, S. P. (2001). Depression and self-esteem in boys with attention-deficit/hyperactivity disorder: Associations with comorbid aggression and explanatory attributional mechanisms. *Journal of Abnormal Child Psychology, 29*(1), 23-39.

Unnever, J. D., & Cornell, D. G. (2003). Bullying, self-control, & ADHD. *Journal of Interpersonal Violence*, *18*(2), 129-147.

U.S. Department of Education, National Center for Education Statistics, Common Core of Data. (2008). *State Nonfiscal Survey of Public Elementary/Secondary Education: Florida State Education Data Profile (2007-2008)*. Retrieved from http://nces.ed.gov/programs/stateprofiles/sresultasp?mode=full&displaycat=1&s1=12

Valentine, J. C., DuBois, D. L., & Cooper, H. (2004). The relation between self-beliefs and academic achievement: A meta-analytic review. *Educational Psychologist, 39*(2), 111-133.

Volpe, R. J., DuPaul, G. J., DiPerna J. C., Jitendra A. K., Lutz, J. G., & Junod R. V. (2006). Attention deficit hyperactivity disorder and scholastic achievement: A model of mediation via academic enablers. *School Psychology Review*, *35*(1), 47-61.

Whalen, C. K., Henker, B., Hinshaw, S. P., Heller, T., & Huber-Dressler, A. (1991). Messages of medication: Effects of actual versus informed medication status on

hyperactive boys' expectancies and self-evaluations. *Journal of Consulting & Clinical Psychology, 59*(4), 602-606.

Whitley, J. L, Heath, N. L., & Finn, C. A. (2008). The role of attention-deficit hyperactivity disorder in the self-perceptions of children with emotional and behavioural difficulties. *McGill Journal of Education, 43*(1), 65-80.

Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991). Transitions during early adolescence: Changes in children's domain-specific self-perceptions and general self-esteem across the transition to junior high school. *Developmental Psychology*, *27*(4), 552-565.

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.

Wolraich, M. L., Hannah, J. N., Pinnock, T. Y., & Baumgaertel, A. (1996). Comparison of diagnostic criteria for attention-deficit hyperactivity disorder in a county-wide sample. *Journal of the American Academy of Child & Adolescent Psychiatry, 35*(3), 319-324.

Wolraich, M. L., Lambert, W., Doffing, M.A., Bickman, L., Simmons, T. & Worley, K. (2003a). Psychometric properties of the Vanderbilt ADHD Diagnostic Parent Rating Scale in a referred population. *Journal of Pediatric Psychology, 28,* 559-568.

Wolraich, M. L., Lambert, E. W., Baumgaertel, A. , Garcia-Tornel, S., Feurer, I. D., Bickman, L. et al. (2003b). Teachers' screening for attention deficit/hyperactivity

disorder: comparing multinational samples on teacher ratings of ADHD. *Journal of Abnormal Child Psychology, 31,* 445-455.

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*(6), 1734-1746.

Appendices

Appendix A: Parent Consent Letter

(Modified to fit in current document)

Dear Parent or Caregiver:

This letter provides information about a research study that will be conducted at _____ Middle School by Dr. Julia Ogg and Dr. Rance Harbor. Dr. Ogg is a professor from the University of South Florida and Dr. Harbor is a school psychologist in _____County, as well as a visiting professor at the University of South Florida. Our goal in conducting the study is to investigate the experiences of adolescents exhibiting symptoms of inattention, hyperactivity, and impulsivity and to better understand the perceptions of adolescents toward those exhibiting these behaviors.

- ✓ Who We Are: Julia Ogg, Ph.D. is a professor in the College of Education at the University of South Florida (USF). Rance Harbor, Ph.D. is a school psychologist in _____County and a visiting professor at USF. We are planning the study in cooperation with the principal and administrators of _____ Middle School to ensure the study provides information that will be helpful to the schools.
- ✓ Why We Are Requesting Your Participation and Your Child's Participation: This study is being conducted as part of a project entitled, "The Experiences of and Perceptions toward Adolescents Exhibiting Inattention, Hyperactivity, and Impulsivity." You and your child are being asked to participate because your child is a student at _____ Middle School. All students at _____ Middle School are being asked to participate.
- ✓ Why You and Your Child Should Participate: We need to learn more about how to help students be successful during the pre-teen and teenage years. The information that we collect from students and parents may help increase our overall knowledge of difficulties frequently encountered in school and help support students' success. Please note neither you nor your child will be paid for your 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.
- ✓ What Participation Requires: If you give permission for your child to participate in the study, he or she will be asked to complete paper-and-pencil questionnaires. The surveys will ask about your child's behaviors, feelings about themselves, medication use, substance use, life events, and about how family members get along. They will also be asked to report their gender, ethnicity, experiences getting in trouble, diagnoses, and the marital status of their parents. Completion is expected to take your child about 40 minutes. We will personally administer the questionnaires at _____ Middle School 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. Participation will occur during one class period this Spring semester. In addition, students' school records will be reviewed for academic achievement (e.g., grades, FCAT scores) and reduced lunch status. If you choose to participate, you will be asked to complete a questionnaire about your child's behavior. Completion of the questionnaire is expected to take about 5 minutes.
- ✓ Please Note: Your decision to participate and 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. You are also free to decide if you would like to participate in this study or to withdraw at any time. If you choose not to participate or 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 _____ Middle School, USF, or any other party.
- ✓ Confidentiality of Your Responses and Your Child's Responses: There is minimal risk to you and 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 questionnaire and 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. The questionnaires will be kept for 5 years and then will be destroyed. 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

Appendix A: Continued

harm him or herself, we will provide your child's name to the mental health counselors at _____ Middle School and ask that they follow up with your child to ensure your child's safety. We will also let school 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 publication. The published results will not include your name or your child's name or any other information that would in any way personally identify you or 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 you or 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 (top portion below) and have your child turn it in to his or her 1st period teacher. If you would like to participate in this study, please complete the parent consent form (2nd portion of form below). If you choose to participate, your child will also bring the questionnaire home for you to fill out.

Sincerely,

Julia A. Ogg, Ph.D.
Assistant Professor of Educational Psychology
USF College of Education

Rance Harbor, Ph.D.
School Psychologist & Visiting Professor
_____County & 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

Consent For You To Take Part in this Research Study

☐ I do not give permission to participate in this 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 parent taking part in study | Printed name of parent | 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 B: Student Assent Letter

(Modified to fit in current document)

Hello!

This letter explains a research study that we would like you to take part in. 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: Julia Ogg, Ph.D. is a professor in the College of Education at the University of South Florida (USF). Rance Harbor, Ph.D. is a school psychologist in _____ County and a visiting professor at USF. Several doctoral students in the College of Education at USF are also part of the team. We are working with your principal and administrators to make sure this study will be helpful to your school.

- ✓ Why We are Asking You to Take Part in the Study: This study is being conducted as part of a project entitled, "The Experiences of and Perceptions toward Adolescents Exhibiting Inattention, Hyperactivity, and Impulsivity." You are being asked to participate because you are a student at _____ Middle School.

- ✓ Why You Should Take Part in the Study: We need to learn more about how to help students be successful during the pre-teen and teenage years! The information that we collect from you may help increase our overall knowledge of difficulties frequently encountered in school and help support your success. Please note you will not be paid for your participation in the study. However, all students who complete and return parental consent forms will be entered into a drawing for a gift certificate.

- ✓ What Will Happen if You're in the Study: If you choose to take part in the study you will be asked to complete a paper-and-pencil questionnaire. The survey will ask you about your thoughts and behaviors. It will take you about 40 minutes to complete the questionnaire. If you choose to take part in the study, we will also look at some of your school records including your grades, 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 _____ Middle 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

Appendix B: Continued

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 pre-teen and teenage years! The information that we collect from you may help increase our overall knowledge of difficulties frequently encountered in school and help support your success. 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,

Julia A. Ogg, Ph.D.	Rance Harbor, Ph.D.
Assistant Professor of School Psychology	School Psychologist & Visiting Professor
USF College of Education	County & 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

_____

Your Homeroom Teacher

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: Vanderbilt ADHD Diagnostic Teacher Rating Scale (VADTRS)

Vanderbilt ADHD Diagnostic Teacher Rating Scale

Name: _____ Grade: _____

Date of Birth: _____ Teacher: _____ School: _____

Each rating should be considered in the context of what is appropriate for the age of the children you are rating.

	Frequency Code: 0 – Never; 1 – Occasionally; 2 – Often; 3 – Very Often				
1.	Fails to give 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 oppositional 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 sustained 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 expected	0	1	2	3
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
19.	Loses temper	0	1	2	3

(continued on next page)

Appendix C: Continued

Frequency Code: 0 = Never; 1 = Occasionally; 2 = Often; 3 = Very Often				
20. Actively defies or refuses to comply with adults' requests or rules	0	1	2	3
21. Is angry or resentful	0	1	2	3
22. Is spiteful and vindictive	0	1	2	3
23. Bullies, threatens, or intimidates others	0	1	2	3
24. Initiates physical fights	0	1	2	3
25. Lies to obtain goods for favors or to avoid obligations (i.e., "cons" others)	0	1	2	3
26. Is physically cruel to people	0	1	2	3
27. Has stolen items of nontrivial value	0	1	2	3
28. Deliberately destroys others' property	0	1	2	3
29. Is fearful, anxious, or worried	0	1	2	3
30. Is self-conscious or easily embarrassed	0	1	2	3
31. Is afraid to try new things for fear of making mistakes	0	1	2	3
32. Feels worthless or inferior	0	1	2	3
33. Blames self for problems, feels guilty	0	1	2	3
34. Feels lonely, unwanted, or unloved; complains that "no one loves him/her"	0	1	2	3
35. Is sad, unhappy, or depressed	0	1	2	3

PERFORMANCE

	Problematic		Average	Above Average	
Academic Performance					
1. Reading	1	2	3	4	5
2. Mathematics	1	2	3	4	5
3. Written expression	1	2	3	4	5
Classroom Behavioral Performance					
1. Relationships with peers	1	2	3	4	5
2. Following directions/rules	1	2	3	4	5
3. Disrupting class	1	2	3	4	5
4. Assignment completion	1	2	3	4	5
5. Organizational skills	1	2	3	4	5

Appendix D: Teacher's Rating Scale of the Student's Actual Behavior (SPPC-TRS)

TEACHER'S RATING SCALE OF THE STUDENT'S ACTUAL BEHAVIOR (SPPC)

Student Name_____ Class/Grade/Group_____

Rater's Name_____

For each student, please indicate what you feel he/she is actually like, in your opinion. First decide whether you feel the individual is more like the teenagers described on the left or the right side of each statement. Then, for that side only, indicate whether that statement is **really** true, or just **sort of true**, for that individual. (If you feel that you do not have enough information to make a judgment on a given question, just leave that item blank.)

Look at the sample sentences below (a and b), sometimes you will check one side, other times you will check the other side of the page, but you only check <u>one</u> box per item. Do NOT check both sides of an item.

	Really True	Sort of True				Sort of True	Really True
a)	☑	☐	This child likes to go to movies in their spare time	**BUT**	This child would rather go to sports events.	☐	☐
b)	☐	☐	This child likes to eat hamburgers	**BUT**	This child would rather eat hotdogs.	☑	☐
1.	☐	☐	This child is really good at his/her schoolwork	**OR**	This child can't do the school work assigned.	☐	☐
2.	☐	☐	This child finds it hard to make friends.	**OR**	For this child it's pretty easy.	☐	☐
3.	☐	☐	This child often forgets what s/he learns.	**OR**	This child can remember things easily.	☐	☐
4.	☐	☐	This child has a lot of friends.	**OR**	This child doesn't have many friends.	☐	☐
5.	☐	☐	This child has trouble figuring out the answers in school.	**OR**	This child almost always can figure out the answers.	☐	☐
6.	☐	☐	This child is popular with others his/her age.	**OR**	This child is not very popular.	☐	☐

Appendix E: Teacher Consent Letter
(Modified to fit in Current Document)

Dear Teacher:

This letter provides information about a research study that will be conducted at _____ Middle School by Dr. Julia Ogg and Dr. Rance Harbor. Dr. Ogg is a professor from the University of South Florida and Dr. Harbor is a school psychologist in _____ County, as well as a visiting professor at the University of South Florida. Our goal in conducting the study is to investigate the experiences of adolescents exhibiting symptoms of inattention, hyperactivity, and impulsivity and to better understand the perceptions of adolescents toward those exhibiting these behaviors.

- ✓ Who We Are: Julia Ogg, Ph.D. is a professor in the College of Education at the University of South Florida (USF). Rance Harbor, Ph.D. is a school psychologist in _____ County and a visiting professor at USF. We are planning our study in cooperation with the principal and administrators of _____Middle School 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, "The Experiences of and Perceptions toward Adolescents Exhibiting Inattention, Hyperactivity, and Impulsivity." 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 pre-teen and 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 gift card for participating in the study.
- ✓ What Participation Requires: You will be asked to complete a questionnaire(s) about the behavior of each of your students who is a participant in the study. Completion of the questionnaire(s) is expected to take between 5 and 10 minutes.
- ✓ 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 _____ Middle 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.

Appendix E: Continued

- ✓ 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,

Julia A. Ogg, Ph.D.
Assistant Professor of Educational Psychology
USF College of Education

Rance Harbor, Ph.D.
School Psychologist & Visiting Professor
_____ County & 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 F: 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

❍ 10	❍ 14	❍ 18
❍ 11	❍ 15	❍ 19
❍ 12	❍ 16	❍ 20
❍ 13	❍ 17	❍ 21

4. Grade

❍ 6	❍ 9	❍ 11
❍ 7	❍ 10	❍ 12
❍ 8		

5. Estimated GPA
- ❍ 4.0 or higher (A)
- ❍ 3.0-3.9 (B)
- ❍ 2.0-2.9 (C)
- ❍ 1.0-1.9 (D)
- ❍ Less than 1.0 (F)

6. Are you on Free or Reduced Lunch (e.g. do you pay for your lunch in the cafeteria)?
- ❍ 1. Yes
- ❍ 2. No

7. Do you attend school regularly?
- ❍ 1. No
- ❍ 2. Sometimes
- ❍ 3. Yes

8. Including last year, and this year, have you received any discipline referrals for behaviors other than being tardy?
- ❍ 1. Often (More than 5)
- ❍ 2. Some (1-5)
- ❍ 3. Never

9. Including last year, and this year, have you been suspended out of school (including ATOSS)?
- ❍ 1. Often (More than 5 days)
- ❍ 2. Some (1-5 days total)
- ❍ 3. Never

10. Including last year, and this year, have you been arrested?
- ❍ 1. Often (More than 2 times)
- ❍ 2. Some (1-2 times)
- ❍ 3. Never

11. Have you ever been diagnosed with ADHD?
- ❍ 1. Yes
- ❍ 2. No

12. Have you ever been diagnosed with Anxiety, Depression, or other mental health problems?
- ❍ 1. Yes
- ❍ 2. No

13. Have you ever been prescribed medication for ADHD?
- ❍ 1. Yes, and I still take the medication.
- ❍ 2. Yes, but I no longer take medication.
- ❍ 3. No

14. Have you ever been prescribed medication for Anxiety, Depression, or other mental health problems?
- ❍ 1. Yes, and I still take the medication.
- ❍ 2. Yes, but I no longer take medication.
- ❍ 3. No

15. My biological parents are:
- ❍ 1. Married
- ❍ 2. Divorced
- ❍ 3. Separated
- ❍ 4. Never married
- ❍ 5. Never married but living together
- ❍ 6. Widowed

Appendix G: Self-Perception Profile for Children (SPPC)

What I Am Like

Each question below talks about two kinds of kids, and we want to know which kids are most like you. First, we want you to decide if you are more like the kid on the left side or the right side. Next, decide whether that is sort of true for you, or really true for you. For each item, you only check <u>one</u> box. Look at the sample sentences below (a and b), sometimes you will check one side, other times you will check the other side of the page, but you only check <u>one</u> box per item. Do NOT check both sides of an item.

SAMPLE SENTENCES

	Really True for Me	Sort of True for Me				Sort of True for Me	Really True for Me
a)	☑	☐	Some kids like to go to movies in their spare time	**BUT**	Other kids would rather go to sports events.	☐	☐
b)	☐	☐	Some kids like to eat hamburgers	**BUT**	Other kids would rather eat hotdogs.	☑	☐
1.	☐	☐	Some kids feel that they are very *good* at their school work.	**BUT**	Other kids *worry* about whether they can do the school work assigned to them.	☐	☐
2.	☐	☐	Some kids find it *hard* to make friends.	**BUT**	Other kids find it's pretty *easy* to make friends.	☐	☐
3.	☐	☐	Some kids feel like they are *just as smart* as other kids their age.	**BUT**	Other kids aren't so sure and *wonder* if they are as smart.	☐	☐
4.	☐	☐	Some kids have *a lot* of friends.	**BUT**	Other kids *don't* have very many friends.	☐	☐
5.	☐	☐	Some kids are pretty *slow* in finishing their school work.	**BUT**	Other kids can do their school work *quickly*.	☐	☐
6.	☐	☐	Some kids would like to have a lot more friends.	**BUT**	Other kids have as many friends as they want.	☐	☐

Appendix G: Continued

7.	☐	☐	Some kids often *forget* what they learn.	**BUT**	Other kids can remember things *easily*.	☐	☐
8.	☐	☐	Some kids are always doing things with *a lot* of kids.	**BUT**	Other kids usually do things by *themselves*.	☐	☐
9.	☐	☐	Some kids do *very well* at their class work.	**BUT**	Other kids *don't* do very well at their class work.	☐	☐
10.	☐	☐	Some kids wish more people their age liked them.	**BUT**	Other kids feel that most people their age *do* like them.	☐	☐
11.	☐	☐	Some kids have *trouble* figuring out the answers in school.	**BUT**	Other kids almost *always* can figure out the answers.	☐	☐
12.	☐	☐	Some kids are *popular* with others their age.	**BUT**	Other kids are *not* very popular.	☐	☐

Appendix H: Center for Epidemiological Studies Depression Scale (CES-D)
CES-D

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the **<u>past week</u>**. (Circle one number on each line)

During the past week…		**Rarely or none of the time (less than 1 day)**	**Some or a little of the time (1-2 days)**	**Occasionally or a moderate amount of time (3-4 days)**	**Most or all of the time (5-7 days)**
1	I was bothered by things that usually don't bother me.	**0**	**1**	**2**	**3**
2.	I did not feel like eating; my appetite was poor.	**0**	**1**	**2**	**3**
3.	I felt that I could not shake off the blues even with help from my family or friends.	**0**	**1**	**2**	**3**
4.	I felt I was just as good as other people.	**0**	**1**	**2**	**3**
5.	I had trouble keeping my mind on what I was doing.	**0**	**1**	**2**	**3**
6.	I felt depressed.	**0**	**1**	**2**	**3**
7.	I felt that everything I did was an effort.	**0**	**1**	**2**	**3**
8.	I felt hopeful about the future.	**0**	**1**	**2**	**3**
9.	I thought my life had been a failure.	**0**	**1**	**2**	**3**
10.	I felt fearful.	**0**	**1**	**2**	**3**
11.	My sleep was restless.	**0**	**1**	**2**	**3**
12.	I was happy.	**0**	**1**	**2**	**3**
13.	I talked less than usual.	**0**	**1**	**2**	**3**
14.	I felt lonely.	**0**	**1**	**2**	**3**
15.	People were unfriendly.	**0**	**1**	**2**	**3**
16.	I enjoyed life.	**0**	**1**	**2**	**3**
17.	I had crying spells.	**0**	**1**	**2**	**3**
18.	I felt sad.	**0**	**1**	**2**	**3**
19.	I felt that people dislike me.	**0**	**1**	**2**	**3**
20.	I could not get "going."	**0**	**1**	**2**	**3**

Appendix I: Comparison of Raw Accuracy Scores Across Groups

Raw Academic Discrepancy Scores with Teacher Ratings as the Indicator of Competence

Accuracy Group	Minimum	Maximum	*M* (*SD*)
Positive (PIB)	.17	2.33	.89 (.54)
Accurate	-.50	.33	-.17 (.27)
Negative	-2.17	-.50	-.99 (.40)

Note. M= Mean; SD = Standard Deviation

Raw Social Discrepancy Scores with Teacher Ratings as the Indicator of Competence

Accuracy Group	Minimum	Maximum	*M* (*SD*)
Positive (PIB)	.17	2.5	.82 (.53)
Accurate	-.67	.33	-.18 (.26)
Negative	-1.83	-.33	-.98 (.34)

Note. M= Mean; SD = Standard Deviation