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The University of Southern Mississippi

The Relation of ADHD Characteristics to Positive Illusory Bias Among
Gifted Elementary Students: IQ as a Possible Moderator

by

Meredith Manguno

A Thesis
Submitted to the Honors College of
The University of Southern Mississippi
in Partial Fulfillment
of the Requirements for the Degree of
Bachelor of Science in the Department of Psychology

May 2013

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Abstract

The current study examined the relation between Attention-Deficit/Hyperactivity Disorder (ADHD) characteristics and Positive Illusory Bias (PIB) in gifted elementary students. Children with ADHD have a propensity toward a PIB—or seeing themselves in a more positive light than other standards would indicate—even among domains in which they struggle (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007). This tendency toward a PIB may be linked with their encounters of a great number of setbacks and could be a way to create hope and positivity. In comparison, gifted students frequently meet and surpass goals, often with few setbacks. Thus, twice-exceptional students (e.g., gifted students with ADHD) are a unique population that create a potential conflict in PIB research. Several questions remain unanswered regarding this population. Do gifted students with high levels of ADHD symptoms also have the PIB characteristics of individuals with ADHD symptoms in general? How does IQ level impact this relation? The current study tested gifted students on their ADHD characteristics, IQ, academic functioning, and social functioning to study the relation of ADHD characteristics to PIB levels among gifted students. It was hypothesized that PIB would positively relate to ADHD symptoms among gifted students but that, as IQ increased, the relation between PIB and ADHD would weaken. Although the findings did not generally support the hypotheses, there was some partial support and some large effect sizes that may yield more interpretable results with a larger sample size. Thus, future work in this area is recommended to fully understand the relation of ADHD and PIB in the context of giftedness.

Table of Contents

Introduction.....	1
Attention-Deficit Hyperactivity Disorder.....	1
Giftedness.....	3
Giftedness and ADHD.....	4
Positive Illusory Bias.....	4
Current Study and Hypotheses.....	5
Method.....	6
Participants.....	6
Measures.....	7
Procedure.....	10
Results.....	11
Table 1.....	12
Table 2.....	13
Table 3.....	14
Table 4.....	15
Table 5.....	16
Discussion.....	15
Limitations and Directions for Future Research.....	18
Conclusions.....	18
References.....	19
Appendix A.....	22
Appendix B.....	25
Appendix C.....	26
Appendix D.....	29
Appendix E.....	31

The Relation of ADHD Characteristics to Positive Illusory Bias Among Gifted Elementary Students: IQ as a Possible Moderator

The current study examined the relation between attention-deficit/hyperactivity disorder (ADHD) characteristics and inflated self-perceptions, known as a positive illusory bias (PIB), among gifted elementary students. Although previous research shows that children with a diagnosis of ADHD—or even subclinical levels of ADHD symptoms—tend to inflate their perceptions of their competence in many functional domains relative to another standard (e.g., Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007), this relation has not been examined among the gifted population. However, the question is particularly relevant among this population, given that gifted children meet with more successes—particularly academically—than the typical child with ADHD. Thus, the theoretical self-protective function of a PIB may not be as relevant for a gifted child. The current study aimed not only to determine if ADHD characteristics and PIB are related among gifted students but also whether IQ moderated that relation, potentially serving as a protective factor against PIB.

Attention-Deficit Hyperactivity Disorder

ADHD is a childhood disorder characterized by persistent, impairing, and developmentally inappropriate behaviors of inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2000). ADHD is the most common childhood behavioral disorder, as it occurs in approximately 3 to 7% of the childhood population, with boys being overrepresented approximately 3 to 1. The disorder is associated with greater risks for low academic achievement, poor school performance, school suspensions and expulsions, poor peer and family relations, aggression, conduct problems and delinquency, driving accidents and

speeding violations, as well as difficulties in adult social relationships, marriage, and employment (Barkley, 1997).

The diagnosis of ADHD has three subtypes: predominantly inattentive, predominantly hyperactive-impulsive, and combined types (Barkley, 1997). The diagnostic criteria are outlined in the Diagnostic and Statistical Manual for Mental Disorders—Fourth Edition, Text Revision (DSM-IV-TR; APA, 2000). The inattentive type includes symptoms such as the inability to maintain attention, avoiding tasks that require mental effort, losing things and being forgetful, failing to pay close attention to details, and lacking organizational skills. The hyperactive-impulsive type includes symptoms such as an inability to sit still, restlessness, talking excessively, fidgeting, and interrupting others. To be diagnosed with either of these types of ADHD, six or more symptoms of either inattention or hyperactivity/impulsivity, as outlined in the *DSM-IV*, must be present for at least 6 months in two or more settings, with an onset before age 7 years (APA, 2000). Individuals diagnosed with the combined type of ADHD have six or more symptoms in both domains (APA, 2000).

ADHD is a well-researched topic, and the preponderance of the literature indicates that the way this chronic condition manifests itself often varies quite a bit due to individual differences of the person. Often, children are not diagnosed until they begin attending school or until school becomes challenging. It is common to see a direct correlation between intensity of symptoms and levels of impairment in childhood (Sibley & Pelham, 2011), usually reported by parents and teachers of these children. A child or adolescent suspected of having ADHD must be observed in multiple settings to detect which particular symptoms manifest under specific conditions (Rinn & Reynolds, 2012). Some researchers suspect that gifted students are disproportionately singled out for ADHD evaluations (e.g., Rinn & Reynolds, 2012, Sibley &

Pelham, 2011). Gifted individuals often have unusually high energy levels, vivid imaginations, and highly sensitive and emotional dispositions. These behaviors can manifest as displays of enthusiasm, extreme energy, strong responses to sensual stimuli, and deep absorption in chosen tasks, which overlap with characteristics of ADHD (Rinn & Reynolds, 2012). Thus, it is relevant to consider ADHD characteristics among gifted students as well as to determine whether such characteristics relate similarly or differently to some of the outcomes associated with such characteristics when considered within a gifted population.

Giftedness

According to Antshel (2008), The Marland Report states that general intellectual ability, singly or in combination with other abilities, is a criterion for defining giftedness. Specific IQ cut-offs vary from state to state, yet most states stipulate that IQ is only one of the criteria employed to define giftedness (Antshel, 2008, p. 294). The Marland Report also further asserts that gifted/talented programming in the schools will include “at minimum 3% to 5% of the school population” (Antshel, 2008, p. 294). This base rate underscores that IQ is only part of the consideration for gifted placement, given that an IQ of 130 or higher (traditionally considered within the gifted range) is two standard deviations above the mean and, by definition, occurs in less than 3% of the population (Flanagan & Kaufman, 2009).

The National Society for the Gifted and Talented states that evidence to define giftedness may be in all areas of a child’s life (academic, artistic, athletic, and social), but that they must also be using that talent to achieve and perform at exceptionally high levels, far above their peers. Most gifted students are often perfectionist and idealistic, have heightened sensitivity to others and their own expectations, are problem solvers, think abstractly, and define failure as any grade less than an A. Though family members and others may see these signs of giftedness early

in life, most children are identified after starting school (NSGT, 2008). According to the NSGT, there are six areas in which giftedness can be seen. Students usually have unusual talent in one to two areas, which include creative thinking, general intellectual ability, specific academic ability, leadership, psychomotor ability, and visual/performing arts.

Giftedness and ADHD

A student who has exhibited gifted behaviors and has a disability is referred to as a “twice-exceptional student” (Morrison, 2001). These twice-exceptional students exhibit overlapping characteristics of ADHD and giftedness. As stated previously, it may be difficult to differentiate the characteristics of ADHD and giftedness—particularly for individuals not trained to make such distinctions. Much research has focused on this topic, as many believe ADHD is often misdiagnosed in gifted students. Nevertheless, the co-occurrence of ADHD and giftedness does happen, and many students with ADHD are gifted but struggle to find their place among their non-ADHD peers, often leading to self-doubt or low self-esteem. They may have social difficulties and see themselves as being at a disadvantage in this area (Barber & Mueller, 2011). In contrast, ADHD itself has been linked to an inflated sense of self and one’s competence, relative to some other standard, perhaps as a protective mechanism against such self-doubt and low self-esteem. This phenomenon is known as a positive illusory bias (Owens et al., 2007).

Positive Illusory Bias

Children with ADHD tend to overestimate their own competence, reporting an inflated estimation of self-worth, called a positive illusory bias (PIB; Owens et al., 2007). Furthermore, they overstate their perceptions of themselves most strongly in areas where they have the greatest skill deficit (Ek, Westerlund, Holmberg, & Fernell, 2008, p.383). In fact, it has been noted that “because children with ADHD chronically encounter setbacks and failures in a variety of areas,

they may be especially inclined towards a thinking style characterized by positive illusions” (Ek et al., 2008). For example, the peer relationships and behavior of children with ADHD is well known to be impaired, yet children with ADHD often self-report competence in these areas at particularly extreme levels (Owens et al., 2007, p. 376).

Several explanations for PIB have been proposed, including cognitive immaturity, neuropsychological impairment, and social cue processing deficits. However, Owens and colleagues suggested that the theory with the most empirical support to date is that PIB serves a self-protective function (2007, p. 374). If the self-protective theory of PIB is valid, then students who experience more success would be less likely to need to protect against feelings of incompetence or low self-esteem and would, therefore, have less implicit need for a PIB. That is, a more accurate appraisal of their competence would maintain a positive view of self without the need for distortion. Therefore, to examine this possibility is imperative to answer the following questions: (1) Do gifted students with high levels of ADHD symptoms also have the PIB characteristics of individuals with ADHD symptoms in general? (2) How does IQ level impact this relation? The current study aimed to provide such answers.

Current Study and Hypotheses

In the current study, the ADHD and PIB characteristics of gifted students were examined. As stated earlier, high levels of PIB have been seen in children with ADHD. Because of the common success that gifted students experience, it is important to determine if students who are gifted and who have high levels of ADHD symptoms (i.e., approximating the twice-exceptional student) also have these high levels of PIB.

PIB was defined as a discrepancy in children’s perceived competence in the peer/social domain and in the academic domain relative to other criteria of competence in those domains

(i.e., teacher ratings of social competence, teacher ratings of academic competence, and actual academic performance on standardized measures of academic achievement). After standardizing scores, each of the other criteria of competence were subtracted from students' own ratings of their competence. A PIB would be shown by a positive value for a discrepancy score, indicating that the child has overestimated his or her competence in that specific domain.

The first hypothesis is that ADHD symptoms would be positively related to social and academic discrepancy, so that if positively correlated, the relation between PIB and ADHD characteristics would be revealed. That is, PIB was expected to positively relate to ADHD symptoms among gifted students. Nevertheless, it was also hypothesized that IQ scores would moderate the relation between ADHD and PIB in both social and academic functioning such that gifted students with higher ADHD symptoms but also a higher IQ would have a lower PIB in both the social and academic domains than gifted students with higher ADHD symptoms and a relatively lower IQ. That is, it was expected that as IQ increased, it would attenuate the relation between ADHD and PIB in both domains. This hypothesis was based on the theory that PIB serves a self-protective function, which becomes less necessary as children experience more success.

Method

Participants

The participants in the current study were gifted elementary students in two Hattiesburg, Mississippi area public schools. Students in second, third, and fourth grade gifted classrooms in participating schools were recruited. There were 21 participants, with 14 of those female and 7 male. There were 20 Caucasian students and 1 African-American student. Ten of the 21 students were first-born or only children, 9 were second-born, and 1 was third born (this information was

missing for 1 student). Three children had been previously diagnosed with Attention-Deficit/Hyperactivity Disorder, two were diagnosed with an anxiety disorder, one with Oppositional Defiant Disorder, and one with a Speech Disorder.

Data were collected from participants, their parents, and their gifted teachers. Of the parents providing data, 3 were male (fathers of participants) and 18 were female (mothers of participants). A total of 15 of the parents were married, two were separated from their significant other, and four were divorced. Both teachers who provided data for the current study were female.

Measures

The students were evaluated in different domains using the following measures:

Wechsler Abbreviated Scale of Intelligence (WASI; The Psychological Corporation, 1999). This standardized, individually-administered, abbreviated intelligence test was designed for individuals aged 6 to 89 years old to obtain an estimate of intellectual functioning. Students were administered the two-subtest version of the WASI, including nonverbal reasoning (Matrix Reasoning) and verbal reasoning (Vocabulary). These two subtests yield a norm-referenced FSIQ score with a mean of 100 and a standard deviation of 15. The test has been shown to be reliable (split-half, $r = .81$, and test-retest, $r = .83$ to $.95$). The WASI correlates $.81$ with the WISC-III FSIQ, showing good construct validity (The Psychological Corporation, 1999). The test yields a WASI IQ score, which is considered to be an estimate of overall verbal and nonverbal reasoning and is appropriate for use as an estimated IQ score for screening or research purposes (The Psychological Corporation, 1999). The WASI IQ score was used as the measure of participant IQ in the current study.

Woodcock-Johnson-III, Normative Update, Tests of Academic Achievement, Third Edition

(WJ-III-NU ACH; Woodcock, McGrew, & Mather, 2007). This standardized, individually administered test of academic achievement was designed for individuals ages 2 to 90 years old to measure academic achievement comprehensively in the areas of Reading, Writing, Mathematics, and Oral Language. The WJ-III shows good reliability (e.g., internal consistency, split-half reliability, test-retest reliability) and validity (e.g., content validity, correlates highly with other measures of achievement; Woodcock et al., 2001). For the purposes of the current study, two subtests, Letter-Word Identification (which measures basic reading achievement) and Calculation (which measures basic math achievement), were administered. For each subtest, an age-adjusted standard score (normative mean of 100, standard deviation of 15) was calculated. Scores on reading and math achievement are reported for descriptive purposes. In addition, a composite score of these two subtests was calculated (by averaging the standard scores) to use as a measure of actual academic achievement, which was used in the derivation of one of the academic discrepancy scores as described below.

ADHD Rating Scale-IV–Parent Form and Teacher Form (DuPaul, Power, Anastopoulos, & Reid, 1998). The ADHD Rating Scale-IV is a list of the nine inattention and nine hyperactivity/impulsivity symptoms of ADHD from the DSM-IV (APA, 2000). Parents and teachers rated the target child's behaviors on a scale from 0 to 3 for each symptom item. The measure yields subscale scores for Inattention and Hyperactivity/Impulsivity. In previous studies, the measure has demonstrated good internal consistency, test-retest reliability, and concurrent validity (DuPaul et al., 1998; Pelham, Fabiano, & Massetti, 2005). The ADHD Rating Scale-IV has been found to be effective in detecting significant differences between ADHD and control groups and distinguishing among subtypes of ADHD (Pelham et al., 2005), showing its

sensitivity and specificity for assessing ADHD symptoms. For the current study, parent and teacher ratings of ADHD were considered separately (as parent and teacher ratings of such constructs are typically only moderately correlated; Frick Barry, & Kamphaus, 2010) and because behaviors often differ at home and school. Specifically, two ADHD Total scores (based on the average rating across all 18 items of ADHD) were calculated, one based on parent ratings and one based on teacher ratings. These were used as the measure of ADHD characteristics for the current study.

Teacher Observation of Classroom Adaptation–Revised (TOCA-R; Werthamer-Larsson, Kellam, & Wheeler, 1991). Teachers’ ratings of students’ social and academic competence was based on the social scale and academic scale of the TOCA-R. Teachers rated the frequency of behaviors on a six-point scale (1 = *almost never* to 6 = *almost always*) across social and academic items. Previous research has established good validity and high internal consistency for this measure (Werthamer-Larsson et al., 1991). For the purposes of the current study, the scale was scored such that *higher* scores represented *more* teacher-rated competence in these areas. Teachers’ ratings on the social and academic domains of the TOCA-R were provided for descriptive purposes. In addition, the TOCA-R academic scale and TOCA-R social scale were used in the derivation of the discrepancy scores in these areas as described below.

Perceived Competence Scale for Children (PCSC; Harter, 1982). Students responded to each of 36 items by selecting which of two opposing statements is like them, and then indicated to what degree the statement is true by choosing if the statement is “really true” or “sort of true.” Items are averaged to derive six self-perception subscales, ranging from 1 to 4, with higher scores indicating greater perceived competence. The scales include an academic competence scale and a social competence scale. This instrument has been found in previous work to have

adequate reliability and validity (Harter, 1982; Lochman & Dodge, 1994; Lochman & Lampron, 1986). Students' ratings on the social and academic domains of the PCSC were provided for descriptive purposes. In addition, the PCSC academic scale and PCSC peer scale were used in the derivation of the discrepancy scores in these areas as described below.

Demographic and Diagnostic Form. Parents completed a Demographic and Diagnostic Form that was created for the current study (see Appendix A), which included basic demographic information, data about the family structure, academic, medical, and mental health history, and medications prescribed (if any), among other relevant information to describe the sample.

Procedure

A cover letter (see Appendix B) and Parental Consent Form Agreement (see Appendix C) were sent home with students from certain gifted classrooms from each school asking their parents or guardians for permission to participate in the current study. If the parent permitted the child to participate, the Demographic and Diagnostic Form and the ADHD Rating Scale-IV–Parent Rating Form was sent home, and parents were asked to complete the packet and return it to the school in a provided sealed envelope. Researchers collected the parent packets from the schools as they were returned. In addition, once parents completed the Parental Consent Form Agreement for a student, that student's teacher was given a teacher packet that included a Teacher Consent Form (see Appendix D), the ADHD Rating Scale-IV–Teacher Rating Form, and the TOCA-R. Finally, students were tested on the WASI and the WJ-III and were administered the PCSC. After providing verbal assent (Appendix E), the participating students met with the researcher or a research assistant individually during part of their time in their gifted class to complete those measures.

Creation of study variables. Z-scores were determined for student performance on the WJ-III, teacher ratings of academic competence and social competence on the TOCA-R, and academic competence and peer competence on the PCSC. Difference scores between sets of these z-scores were calculated to create three new discrepancy variables: achievement discrepancy (testing), which was self-report of academic competence on the PCSC minus academic performance on the WJ-III (reading and math composite); achievement discrepancy (teacher-report), which was self-report of academic competence on the PCSC minus teacher-report of academic competence on the TOCA-R; and social discrepancy (teacher-report), which was self-report of peer competence on the PCSC minus teacher-report of social competence on the TOCA-R.

Results

Descriptive statistics of variables of interest are presented in Table 1. No variables were significantly skewed. If positive (i.e., higher self-ratings compared to the other standard), the three discrepancy scores would show a PIB. Therefore, frequencies were conducted for the discrepancy scores for all 21 children. The median was positive for only one discrepancy score (i.e., the discrepancy between self-report of academic competence and actual academic achievement on the WJ-III) was positive (median = .26). For this particular discrepancy score, the overall sample did appear to show a PIB. Still, 9 out of 21 students had negative scores and, thus, did not display a PIB. The median for the discrepancy between self-report of academic competence and teacher-report of academic competence was -.02, and the median for the discrepancy between self-report of social competence and teacher-report of social competence was -.20. Therefore, the overall sample did not appear to show a PIB. Still, 9 of 21

Table 1

Descriptive Statistics of Main Variables of Interest

Variable of Interest	Minimum	Maximum	Mean	Standard Deviation	Skewness	Kurtosis
WJ-III Word Identification	99	123	112.90	7.74	-.409	-.83
WJ-III Calculation	92	135	110.86	11.97	.194	-.84
WJ-III Academic Composite	96	129	111.88	8.09	-.04	.33
WASI IQ	104.00	137	119.10	9.25	.26	-.58
TOCA-R Academic Scale	3.33	6.00	4.86	.85	-.67	-.77
TOCA-R Social Scale	3.67	6.00	5.17	.91	-.63	-1.36
PCSC Academic Scale	1.29	3.00	2.27	.49	-.40	-.80
PCSC Peer Scale	1.00	3.00	1.99	.62	-.37	-.96
Achievement Discrepancy 1 ^a	-2.95	2.57	.00	1.39	-.24	-.11
Achievement Discrepancy 2 ^b	-2.16	1.73	.00	1.16	-.20	-.76
Social Discrepancy ^c	-2.5	2.01	.00	1.37	-.46	-.55
Inattention (Parent-report) ^d	.00	2.11	.74	.56	1.22	1.79
Hyperactive-Impulsive (Parent-report) ^d	.00	2.11	.68	.53	1.43	2.24
Total ADHD (Parent-report) ^d	.17	2.11	.71	.52	1.49	2.46
Inattention (Teacher-report) ^d	.00	1.89	.70	.59	.32	-.64
Hyperactive-Impulsive (Teacher-report) ^d	.00	1.78	.57	.58	.88	-.19
Total ADHD (Teacher-report) ^d	.00	1.83	.63	.51	.56	-.25

Note. WJ-III = Woodcock-Johnson-III, Normative Update, Tests of Academic Achievement, Third Edition (WJ-III-NU ACH; Woodcock, McGrew, & Mather, 2007). WASI= Wechsler Abbreviated Scale of Intelligence (The Psychological Corporation, 1999). TOCA-R = Teacher Observation of Classroom Adaptation–Revised (Werthamer-Larsson, Kellam, & Wheeler, 1991). PCSC = Perceived Competence Scale for Children (Harter, 1982).

^a Achievement discrepancy (testing), which was self-report of academic competence on the PCSC minus academic performance on the WJ-III (reading and math composite). ^b Achievement discrepancy (teacher-report), which was self-report of academic competence on the PCSC minus teacher-report of academic competence on the TOCA-R. ^c Social discrepancy (teacher-report), which was self-report of peer competence on the PCSC minus teacher-report of social competence on the TOCA-R. ^d From the ADHD Rating Scale-IV–Parent Form and Teacher Form (DuPaul, Power, Anastopoulos, & Reid, 1998).

students and 10 of 21 students (respectively, for academic and social) had positive scores and, thus, did display a PIB.

Demographic variables (i.e., age, gender, and race) were correlated with the main outcome variables of interest (i.e., the three discrepancy scores) to determine if any controls were needed before testing the hypotheses. No correlations were significant (Table 2); therefore, no controls were used in subsequent analyses.

Table 2
Correlations among demographic variables and outcome variables.

Outcome Variables	Demographic Variables		
	Gender	Age	Race
Achievement Discrepancy 1 ^a	.16	.15	-.09
Achievement Discrepancy 2 ^b	-.35	.18	.00
Social Discrepancy ^c	-.27	.03	.09

^a Achievement discrepancy (testing), which was self-report of academic competence on the PCSC minus academic performance on the WJ-III (reading and math composite). ^b Achievement discrepancy (teacher-report), which was self-report of academic competence on the PCSC minus teacher-report of academic competence on the TOCA-R. ^c Social discrepancy (teacher-report), which was self-report of peer competence on the PCSC minus teacher-report of social competence on the TOCA-R.

To test Hypothesis 1 (i.e., that ADHD symptoms would be positively related to social and academic discrepancy), correlation analyses between the parent- and teacher-report ADHD Total scores and each of the three discrepancy scores were conducted (Table 3). Only one of the six correlations was significant. The correlation between academic discrepancy (i.e., when self-report was compared to teacher-report of academic performance) was significantly positively related to teacher-report of ADHD characteristics, $r = .48, p < .05$.

Table 3

Correlations among predictor variables and outcome variables

Outcome Variables	Predictor Variables	
	ADHD Total (Teacher-report)	ADHD Total (Parent-report)
Achievement Discrepancy 1 ^a	.18	-.30
Achievement Discrepancy 2 ^b	.48*	.02
Social Discrepancy ^c	.15	-.09

^a Achievement discrepancy (testing), which was self-report of academic competence on the PCSC minus academic performance on the WJ-III (reading and math composite). ^b Achievement discrepancy (teacher-report), which was self-report of academic competence on the PCSC minus teacher-report of academic competence on the TOCA-R. ^c Social discrepancy (teacher-report), which was self-report of peer competence on the PCSC minus teacher-report of social competence on the TOCA-R.

* $p < .05$

To test Hypothesis 2 (i.e., that IQ scores would moderate the relation between ADHD and PIB in both social and academic functioning), six moderated multiple regression analyses were conducted. Either the parent-report or teacher-report ADHD Total score and IQ were entered on step 1 (to test for main effects), and the interaction term (Total ADHD X IQ) was entered on step 3 (interaction effect). ADHD and IQ were centered (by subtracting the sample mean) prior to the creation of the interaction term. Results based on teacher-report of ADHD are presented in Table 4, and results of parent-report of ADHD are presented in Table 5. No interactions were significant so planned post-hoc plots were not conducted.

Table 4

Regression analyses examining teacher-report of ADHD and child IQ as predictors of discrepancy scores.

Predictors	Outcome Variables		
	Achievement Discrepancy 1 ^a	Achievement Discrepancy 2 ^b	Social Discrepancy ^c
Model 1 (Main Effects) R^2	.11	.27[†]	.08
Total ADHD (Teacher-report)	-.28	-.22 [†]	.25
WASI IQ	.10	.42	.22
Model 2 (Interaction) $R^2\Delta$.00	.00	.01
Total ADHD (Teacher-report)	-.28	-.23 [†]	.24
WASI IQ	.11	.40	.20
ADHD X IQ	.03	-.06	-.09

^a Achievement discrepancy (testing), which was self-report of academic competence on the PCSC minus academic performance on the WJ-III (reading and math composite). ^b Achievement discrepancy (teacher-report), which was self-report of academic competence on the PCSC minus teacher-report of academic competence on the TOCA-R. ^c Social discrepancy (teacher-report), which was self-report of peer competence on the PCSC minus teacher-report of social competence on the TOCA-R.

[†] trend; $p < .10$.

Discussion

In general, the findings from the current study did not support the first hypothesis (that ADHD would positively correlate with discrepancy, which would be consistent with PIB). However, there was one exception: Teacher-report of ADHD was significantly correlated with one discrepancy score (i.e., when self-report and teacher-report of academic competence were compared). That is, higher symptoms of ADHD reported by teachers within their gifted students were associated with a higher discrepancy between teachers' ratings of their students' academic competence and students' own ratings of their academic competence. It is not clear from the

Table 5
 Regression analyses examining parent-report of ADHD and child IQ as predictors of discrepancy scores.

Predictors	Outcome Variables		
	Achievement Discrepancy 1 ^a	Achievement Discrepancy 2 ^b	Social Discrepancy ^c
Model 1 (Main Effects) R^2	.22	.11	.04
Total ADHD (Parent-report)	-.37 [†]	-.34	.17
WASI IQ	-.36	.04	-.06
Model 2 (Interaction) $R^2\Delta$.09	.05	.02
Total ADHD (Parent-report)	-.31	-.30	.20
WASI IQ	-.31	.00	-.03
ADHD X IQ	-.30	-.23	-.15

^a Achievement discrepancy (testing), which was self-report of academic competence on the PCSC minus academic performance on the WJ-III (reading and math composite). ^b Achievement discrepancy (teacher-report), which was self-report of academic competence on the PCSC minus teacher-report of academic competence on the TOCA-R. ^c Social discrepancy (teacher-report), which was self-report of peer competence on the PCSC minus teacher-report of social competence on the TOCA-R.

[†] trend; $p < .10$.

current study, however, if this is due to a tendency toward an *overestimation* of academic competence by the students (particularly as their ADHD symptoms were higher) or if it was due to an *underestimation* by the teachers (particularly for students with higher levels of ADHD symptoms). Specifically, it is less clear that this finding is truly due to a PIB given the lack of support for a relation between teacher-report of ADHD symptoms and academic discrepancy when comparing self-report to *actual achievement* on a standardized test (which was non-significant). Whereas the latter correlation was positive, the effect size was small (Cohen, 1992)

and non-significant, as was also true of the relation between teacher-report of ADHD symptoms and social discrepancy.

There were no significant findings for the parent-report of ADHD, as most correlations were very small. One report was non-significant but had a medium effect size (Cohen, 1992); however, it was a negative relation such that higher parent-report of ADHD was related to a tendency for the students to underestimate their academic performance relative to their performance on the WJ-III. Given it is not significant, this contrary finding is not interpreted.

There were no significant interactions found in support of the second hypothesis. The magnitude of the beta weights for interactions when teacher-report ADHD was used as a predictor were very small. However, the magnitude of the beta weights for interactions when parent-report ADHD was used as a predictor were small to medium. Thus, with a larger sample, significant findings may be found. However, the nature of those interactions cannot be interpreted within the current sample (i.e., given the interactions are non-significant), so it is not clear if it supports the hypothesis or not.

Although the original model of Positive Illusory Bias being associated with ADHD symptoms among gifted students was not supported, there were some findings in the current study that could be potentially explained when considering the population under study. First, it could be that gifted students' achievement levels are so high that there is little to no room for overestimating their abilities in this area. However, that would not necessarily explain a lack of findings for social discrepancy. In addition, there were many students who did not have many ADHD symptoms reported. If this study was conducted on truly twice-exceptional students (i.e., gifted and ADHD), the outcomes may have been significant. Finally, it could be that the lack of significant findings is because the typical relation between ADHD and PIB found among

children with ADHD or among community samples does not exist among gifted students. If this lack of relation is the true state of affairs among these variables, it could be that perhaps gifted students may not need the self-protection commonly offered by PIB (as reported by Owens et al., 2007), because of their successes.

Limitations and Directions for Future Research

One limitation of the current study was the relatively small number of participants. The results showed a potential for findings to support the hypotheses—particularly a relation between PIB and teacher-rated ADHD symptoms—if a larger number of students were included in the study. Thus, future research is needed with larger samples of gifted students. In addition, this sample was not drawn from a clinical population. Results may look different if only twice-exceptional students—those in a gifted program with an ADHD diagnosis—were participants. Future research should examine this possibility by recruiting gifted students who have also been diagnosed with ADHD. Finally, IQ may not have served as a moderator due the relatively restricted range of IQ found within a gifted sample. Future research can examine whether IQ attenuates the relation between ADHD symptoms and PIB using a broader range of IQ. In fact, if such research demonstrates that ADHD and PIB are only significantly related when IQ is average or lower but that the relation is attenuated when IQ is higher, it would support that the typical relation of ADHD and PIB does not apply in a gifted population—with children’s giftedness serving a protective function against PIB.

Conclusion

Although the findings did not fully support the hypotheses, there were some interesting and informative results that could guide further studies. Further exploration could lead to a greater understanding of the relation of PIB in gifted students with ADHD symptoms.

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Appendix A
Demographic and Diagnostic Form

These forms are for parents/guardians of children involved in the study. Please fill out the following information **about your child**.

Child's Age: _____ **Child's Date of Birth:** (Month/Day/Year) ____/____/____

Child's Gender: Female ___ Male ___ **Child's First and Last Initials:** _____

Child's Race: White ___ Black ___ Hispanic ___ Asian ___ Other _____

Your child's birth order rank: First (Oldest)____ Second____ Third____ Fourth____
Other (Please Specify)_____

Has your child received any other diagnoses? (Please select all diagnoses received)
___ADHD ___Anxiety Disorder ___Conduct Disorder ___Depression ___Learning Disability
___Oppositional Defiant Disorder ___Hearing Impairment
___Other_____

Who diagnosed your child? Psychologist ___ Pediatrician____ Neurologist____
Psychiatrist___ Other (Please specify) _____

Please rate your child's overall **cognitive functioning level**:

___Well Below Average ___Below Average ___Average ___Above Average
___Well Above Average

Is your child currently on any medications? (If so, please list each medication and dosage received)

Have there been any significant changes in your child's life, major life events, in the past two years? (Examples include a birth/death in the family, moving, parental loss of job, parental separation, medical illness in the family, etc.) Please list any/all major life events that have occurred in the past two years.

On a scale of 1 to 5 please rate how much your child appeared to be affected by these major life events, with 1 being not at all or very little and 5 being significantly affected. _____

ABOUT YOU AND YOUR FAMILY**Your Gender:** Female ___ Male ___**Your Age:** _____ years**Location:** (City, State) _____, _____**Your Race:** White ___ Black ___ Hispanic ___ Asian ___ Other _____**Marital Status:** Married ___ Separated ___ Divorced ___ Widowed ___

Never Married/Living Alone ___ Never Married/Living with Someone ___

Education: What is the highest level of education completed by:**Yourself**_____ 6th grade or less_____ Junior high school (7th, 8th, 9th grade)_____ Some high school (10th, 11th grade)

_____ High school graduate

_____ Some college (at least 1 year

or specialized training

_____ College/university graduate

(4-year degree)

_____ Graduate professional degree

(Master's, Doctorate)

Your Spouse/Significant Other**(Only if he/she lives in the household)**_____ 6th grade or less_____ Junior high school (7th, 8th, 9th grade)_____ Some high school (10th, 11th grade)

_____ High school graduate

_____ Some college (at least 1 year

or specialized training

_____ College/university graduate

(4-year degree)

_____ Graduate professional degree

(Master's, Doctorate)

Occupation: Please provide your job title or position, NOT the just name of your employer. For example, if you are a teacher at Lee High School, please state "high school teacher". If you are **retired**, please state your prior occupation. If you **do not work** outside the home, state "unemployed."

What is your occupation? _____

(Please be specific)

What is your spouse's occupation? _____

(Please be specific)

Please list who lives in the household:

Age	Gender	Relation to Child**	Any Diagnoses (If so, please specify)

** Please be specific in describing the relation to child; self, brother, mother, father, step-father, stepbrother, half-brother, adopted sister, grandmother, aunt, cousin, etc.

Appendix B
Parent Letter

Dear Parent(s):

My name is Meredith Manguno, and I am a Senior Honors student at The University of Southern Mississippi. I will be graduating in May 2013 with a Bachelors of Science in Psychology, and am currently recruiting participants for a study on gifted elementary children for my Honors Thesis project. This study is examining the relation between attention difficulties and the perceptions of performance in gifted elementary students.

If you return the attached consent form, I will send you a short packet of a few forms to complete. I will also provide a few forms for your child's gifted teacher. Finally, I will schedule a one-time testing session with your child at his or her school during their gifted class.

Your participation would be greatly appreciated but is completely voluntary. Please notify me at 901.335.7520 or meredith.manguno@eagles.usm.edu (or my faculty advisor; see attached consent form for contact information) if you have any questions.

Thank you,
Meredith Manguno

Appendix C
Parental Consent Form Agreement

THE UNIVERSITY OF SOUTHERN MISSISSIPPI
AUTHORIZATION TO PARTICIPATE IN RESEARCH PROJECT

Consent is hereby given to participate in the study: The Relation between Attention Difficulties and Perceptions of Performance in Gifted Elementary Students

Purpose: This research study is designed to examine the relation between attention difficulties and perceptions of performance in gifted elementary students.

Description of Study: If you agree to participate, your child will be asked to answer simple questions from standardized testing measures, as well as a self-report of their perceived competence. All information provided by you will be accessed by the research team but will not be shared with anyone outside the research team. The dissemination of the results of this study will not identify specific participants' responses individually and will not reveal any identifying information. Your confidentiality and that of your child is important throughout the study. Likewise, throughout the study, your participation is voluntary. You may discontinue at any time without penalty or prejudice.

Benefits: There are no direct personal benefits from participation other than informing the public at large about the results of the research.

Risks: There are no anticipated risks associated with your participation in this study. Completion of the behavioral measures may cause some distress in parents. If so, we will immediately release the parent(s) from the study and provide an appropriate referral if needed. Children may become fatigued while participating in the direct assessments. Children will be given frequent breaks and small motivators (e.g. stickers) to minimize fatigue and maintain engagement. However, if children become too fatigued or frustrated at any point during testing or otherwise wish to stop, testing will immediately cease and will be continued at a later time if desired by the participant.

Confidentiality: All efforts will be made to protect participant's privacy and to maintain the confidentiality of the information acquired through this project. All data gathered in the study from parents, teachers, and children will remain completely confidential. Records will be kept in a filing cabinet in a locked laboratory at The University of Southern Mississippi. Records will only be viewed by qualified researchers and research assistants. Otherwise, no one else will be able to see or use the information. Your name, your child's name, and any other identifying information will not be linked to any findings, results or reports. The results of the project will focus on the overall findings, and no specific information about you or the students will be released.

There are certain limits to confidentiality. If our research information leads us to become concerned about your child's welfare (such as if we see your child as being in any danger), then

we will talk with you about it immediately. We will work with you to get the right kind of help from other professionals with whom we work. If your child is in clear danger, the law states we must refer this to community agencies, so they can provide the needed help. We would make every attempt to talk with you first, before we talked with anyone else.

Participants Assurance: Whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted), the researcher will take every precaution consistent with the best scientific practice. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning the research should be directed to **Meredith Manguno** (principal investigator) at **901.335.7520** or meredith.manguno@eagles.usm.edu or **Tammy D. Barry, Ph.D.** (faculty advisor) at **601.266.5514** or tammy.barry@usm.edu. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820. The participant may print a copy of this consent form or contact Dr. Barry for a copy.

Signatures:

Signature of the Research Parent Participant _____ Date _____

Meredith Manguno (Researcher) _____ Date _____

Other Information:

Child's Name _____ Teacher's Name _____

Age _____ Grade _____

The lab would like to keep a record of contact information to inquire about participation in future studies. If you would like to be included in the database of research participants and to be contacted to receive information about future studies, please provide your contact information below. This information will NOT be stored with your responses to the questions for the current study.

I would like to be contacted about future studies in the lab for which I or my child may qualify.

Yes _____

No _____

If yes:

E-mail Address: _____

Telephone Number: _____

Mailing address: _____

Appendix D
Teacher Consent Form Agreement

The Relation between Attention Difficulties and Perceptions of Performance in Gifted
Elementary Students

This project is being conducted by faculty and students of The University of Southern Mississippi.

Purpose: This research study is designed to examine the relation between attention difficulties and perceptions of performance in gifted elementary students in first through fourth grade.

Study Description: If you choose to participate in the project, you will be asked to answer questions about the students in your class whose parents have consented to participate in this study. If you agree, you will answer questions about the students' on two behavioral questionnaires describing attention, academic, and social skills. Children's IQ and academic achievement will be directly assessed by the researcher in a one-hour session.

Benefits: There are no direct personal benefits from participation other than informing the public at large about the results of the research. To show appreciation for providing the data, you will be provided a gift card to an area store to buy classroom supplies.

Risks: There are no anticipated risks associated with your participation in this study.

Confidentiality: All data gathered in the study will remain completely confidential. Records will be kept in a filing cabinet in a locked laboratory at The University of Southern Mississippi. Records will only be viewed by qualified researchers and research assistants. Otherwise, no one else will be able to see or use the information. Your name, the students' names, and any other identifying information will not be linked to any findings, results or reports. The results of the project will focus on the overall findings, and no specific information about you or the students will be released.

Voluntary Participation: Participation in this project is completely voluntary, and you may withdraw from this project at any time without any negative consequences. Your employment will not be affected if you do not join or withdraw later. If you leave the project early, the information that has already been collected will stay with the research team if the information is needed for this project or any follow-up activities.

Questions concerning the research should be directed to **Meredith Manguno** (principal investigator) at **901.335.7520** or meredith.manguno@eagles.usm.edu or **Tammy D. Barry, Ph.D.** (faculty advisor) at **601.266.5514** or tammy.barry@usm.edu. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the

Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820. A copy of this form will be given to the participant.

Signatures: Your signature below means that you understand the information given to you in this form and you agree to participate in the project. You will be given a copy of this consent form for your records. You may contact us with any further questions before or after consenting to participate.

Name of Teacher (Please Print)
Date

Name of School

Grade Taught

Signature of Research Team Staff
Date

Appendix E
Child Verbal Assent

The University of Southern Mississippi
Department of Psychology
Child Verbal Assent Form

Thank you for agreeing to help us with a project to see how gifted elementary students' level of intellectual functioning relates to their attention abilities and the way that they think about their performance. You will be asked answer questions, problems, and statements to the best of your ability while following the directions given. There will be a few different sets of questions that will ask different things, and a short survey at the end. You may get tired or bored during the study, but we have breaks for you. You can also ask for more breaks if needed. If you need us to stop the study at any time, you just have to let me know. All of the information will be kept confidential. That means no one will know how you did on any of the tests or know your answers. We will put that information in our computers by a number code, not your name. If our research information leads us to become concerned about you, then we will talk with you about it and, if needed, we will work with you to get the right kind of help. Do you have any questions? Do you agree to participate?

Participant's (Child's) Name (print)

_____ Date: _____
Child Signature (for assent)

_____ Date: _____
Researcher's Signature