June 2019

Perceived Stigma and the Positive Illusory Bias in Children with ADHD: A Novel Test of the Self-Protection Hypothesis

Avery Brooke Albert
Syracuse University

Abstract

Background: Despite displaying significant functional impairments across a variety of domains, children with ADHD have been found to overestimate their academic, social, and behavioral competence. This phenomenon has been termed positive illusory bias (PIB). The self-protection theory of PIB in ADHD suggests that PIB may function as a coping mechanism, allowing children with ADHD to defend themselves against feelings of inadequacy and low self-esteem. The present study aims 1) to test the self-protection theory of PIB in children with ADHD by examining the relationship between perceived stigma and PIB in the social and academic domains, and 2) to examine how age, gender, race/ethnicity, ADHD symptomology, and comorbid symptomology are associated with PIB.

Method: Data were collected from 90 children (22 with ADHD and 68 without) ages 8-13 and their mothers through an online survey. 70% of children were white non-Hispanic (59% of children with ADHD, 74% of children without ADHD), and 44% were female (9% of children with ADHD, 53% of children without ADHD). Surveys measured child reported depression and anxiety symptoms, perceptions of stigma, and self-perceived competence in academic and social domains, and parent-reported ADHD symptoms, aggression, and competence in social and academic domains. Social and academic PIB's were calculated by creating standardized discrepancy scores between child-reported competence and parent-reported competence in social and academic domains.

Results: There was a small effect of ADHD status on academic PIB, but not on social PIB. Inattentive symptoms were associated with marginally greater academic PIB and aggression was associated with marginally greater social PIB, while depressive symptoms were associated with significantly reduced PIB in the social domain and marginally reduced PIB in the academic

domain, and anxiety symptoms were associated with significantly reduced PIB in the academic domain. There was a significant interaction between racial/ethnic minority status and ADHD status for academic PIB, whereby for children with ADHD, racial/ethnic minority status was associated with lower academic PIB, while for children without ADHD, racial/ethnic minority status was associated with greater academic PIB. Perceived stigma was associated with significantly reduced PIB in both academic and social domains, across children with and without ADHD.

Conclusions: Personal characteristics such as race and comorbid symptomology may be important for understanding who is more or less likely to display PIB. Children who perceive greater stigma for their problem behaviors may be less likely to display PIB.

Keywords: ADHD, positive illusory bias, self-perceptions, stigma, children

Perceived Stigma and the Positive Illusory Bias in Children with ADHD: A Novel Test of the Self-Protection Hypothesis

Avery B. Albert

B.A., Colgate University, 2014

Thesis

Submitted in partial fulfillment of the requirements for the degree of

Master's of Science in *Psychology*

Syracuse University

June 2019

Acknowledgements

I would like to thank Dr. Kevin Antshel for his mentorship. I would also like to thank Dr. Larry Lewandowski and Dr. Leonard Newman for taking the time to serve on my proposal committee and providing valuable feedback, and Dr. Aesoon Park for joining my committee as my defense chair. Undergraduate RA, Laurie Boucicaut provided valuable help with recruitment. I would also like to thank Dr. Stephen Glatt for his support of this research. Finally, I would like to thank Dr. Gary Siperstein for the mentorship and opportunities he provided that set me on this path.

Table of Contents

Perceived Stigma and the Positive Illusory Bias in Children with ADHD: A Novel Test of the Self-Protection Hypothesis

Attention Deficit/Hyperactivity Disorder (ADHD)

Attention Deficit/Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder affecting approximately 5% of children worldwide (Polanczyk, de Lima, Horta, Biederman, and Rohde, 2007). ADHD is characterized by cross-situational symptoms of hyperactivity, impulsivity, and/or inattention that are developmentally inappropriate and cause impairment in major areas of functioning (American Psychological Association [APA], 2013). Children with ADHD often struggle academically, behaviorally, and socially. More specifically, ADHD has been associated with learning difficulties, academic underachievement, disruptive and aggressive behaviors, difficulty in peer relationships, and low peer-acceptance (Barkley, 2014; Hoza et al., 2005). For many individuals, ADHD continues into adolescence and young adulthood and has been associated with negative outcomes such as substance abuse, risky driving behavior, conduct problems, and internalizing problems later in development (Jerome, Habinski, and Segal, 2006; Biederman et al., 2006).

Given the significant impairments associated with ADHD, one might think children with ADHD would be at risk for developing negative self-perceptions. While there is some support for this view (Mezulis, Abramson, Hyde, and Hankin, 2004), a larger body of research has found that, on the contrary, children with ADHD tend to have inflated self-perceptions, and to over-estimate their competence across academic, social, behavioral, and athletic domains (Owens, Goldfine, Evangelista, Hoza, and Kaiser, 2007). This phenomenon of having overly positive self-perceptions of competence in comparison to external measures of competence has been termed Positive Illusory Bias (PIB) (Hoza, Pelham, Dobbs, Owens, and Pillow, 2002).

PIB in Children with ADHD

While positively biased self-perceptions are not unique to children with ADHD, they seem to serve a different function in children with ADHD than in typically developing children. A slight positive bias has been found to be adaptive in typically developing children, as it is related to task-persistence and motivation (Taylor and Brown, 1988). Children with ADHD, however, seem to display a greater overestimation despite lower competence (Owens et al., 2007), and this overestimation does not seem to have the same positive impact on motivation. On the contrary, children with ADHD tend to give up easily on challenging tasks (Hoza, Waschbusch, Owens, Pelham, and Kipp, 2001). PIB has also been related to several negative outcomes in children with ADHD, including aggressive behavior (Hoza, Murray-Close, Arnold, Hinshaw, and Hechtman, 2010; Jia, Jiang, and Mikami, 2016; Kaiser, Hoza, Pelham, Gnany, and Greiner, 2008; Mikami, Calhoun, and Abikoff, 2010), poor social functioning (Jia et al., 2016; Linnea, Hoza, Tomb, and Kaiser, 2012; Mikami et al, 2010; Ohan and Johnston, 2011), general impairment and maladjustment (Ohan and Johnston, 2011; Swanson, Owens, and Hinshaw, 2012) and risky driving behavior in adolescence (Hoza et al., 2013). These findings suggest that while PIB may be adaptive for typically developing children, PIB is likely maladaptive for children with ADHD. Further, PIB has been found to predict poor response to treatment among children and adolescents with ADHD (Hennig, Schramm, and Linderkamp, 2017; Mikami et al., 2010), indicating that it may be valuable to assess and address PIB as part of treatment for children with ADHD.

While PIB is more prevalent and problematic among children with ADHD than among typically developing children, not all children with ADHD display this bias. In fact, Bourchtein, Langberg, Owens, Evans, and Perera (2016) found that less than half (47%) of children with

ADHD displayed a PIB in any domain, and even fewer (18%) consistently overestimated their competence, displaying a global PIB across domains. Thus it is important to understand the personal characteristics that may be related to the presence of PIB in children with ADHD.

Gender. Most studies examining PIB in children with ADHD have focused on boys, as the prevalence of ADHD is higher in boys than girls (APA, 2013). In fact, in a comprehensive review of PIB in children with ADHD conducted in 2007, ten out of fifteen of the studies reviewed included exclusively male participants, and the participants of the remaining five studies were majority male (Owens et al., 2007). As such, few studies have examined potential gender differences in PIB, and findings from studies that have examined gender are mixed. While some studies have found no gender differences in PIB (McQuade, Mendoza, Larsen, and Breaux, 2017), others have found differences between boys and girls within specific domains of competence. Hoza and colleagues (2004) found that boys and girls with ADHD displayed similar patterns of over-estimation across domains of competence. However, girls tended to under-estimate their physical appearance compared to boys, and boys tended to over-estimate their behavioral competence compared to girls; these gender differences were not specific to children with ADHD, but rather were found across the total sample. A second study that examined gender differences found that girls had greater academic PIB than boys, across both children with and without ADHD (Owens and Hoza, 2003). A third study, which examined over-estimation of competence with regard to executive functioning abilities among adolescents with ADHD found that boys were more likely to overestimate their executive functioning abilities than girls (Steward, Tan, Delgaty, Gonzales, and Bunner, 2017).

Finally, a study conducted by Swanson et al. (2012), examined PIB specifically in girls with ADHD, and found that although girls with ADHD displayed positive discrepancies

compared to typically developing girls, their absolute self-perceptions of competence were not positive. Rather, girls with ADHD in this study reported slightly negative self-perceptions, which when compared to even more negative adult reports of competence, led to a positive discrepancy score. The findings of this study suggest a different story from studies examining PIB in boys with ADHD, whose absolute self-perceptions have been found to be positive and similar to or greater than the self-perceptions reported by their typically developing peers (Hoza et al., 2002). The present study aims to further clarify this issue by examining potential gender differences in PIB.

Age. The phenomenon of PIB in ADHD has primarily been studied in child populations. In fact, at the time that Owens and colleagues conducted a comprehensive review of PIB in ADHD in 2007, no studies had examined PIB in adolescents or young adults with ADHD. Several recent studies, however, have contributed to the literature by examining PIB in older populations, with findings suggesting that PIB may be common among individuals with ADHD across the lifespan (Fabiano et al., 2015; Jiang and Johnston, 2012; Prevatt et al., 2012; Steward et al., 2017; Volz-Sidiropoulou, Boecker, and Gauggel, 2016). Only one study has examined the trajectory of PIB longitudinally within subjects with ADHD as they age (Hoza et al., 2010). Thus, it is unclear whether the same individuals who display PIB in childhood continue to display PIB in adolescence and adulthood. Hoza et al. (2010) found that for children with ADHD social PIB peaks in late childhood and slowly declines in adolescence, while behavioral PIB declines more steeply across childhood and early adolescence and begins to level out by late adolescence. This suggests that it may be important to examine or account for age differences when measuring PIB in children and adolescents with ADHD. The present study aims to further clarify this issue by examining potential age differences in PIB.

ADHD Presentation. Few studies have examined the potential impact of ADHD presentation on PIB in children with ADHD, as the majority of studies examining PIB in children with ADHD have either included exclusively children with hyperactive-impulsive or combined presentations of ADHD (Hoza et al., 2004; Hoza et al., 2013; McQuade et al., 2011), or have had too few children with the inattentive presentation to be able to test presentation differences (Ohan and Johnston, 2002). One study conducted by Owens and Hoza (2003) found evidence for an ADHD presentation effect on PIB. This study found that children with hyperactive/impulsive or combined presentations of ADHD were significantly more likely than children with the inattentive presentation of ADHD to overestimate their competence within the academic domain. At least one study, however, has provided evidence contradicting this. In their study of PIB in girls with ADHD, Swanson and colleagues (2012) found no significant differences in PIB based on ADHD presentation. The potential impact of ADHD presentation on PIB in children with ADHD requires further examination, and the present study aims to address this issue.

Comorbid Symptomology. Several previous studies have examined the impact of comorbid depressive symptoms and aggressive behavior or conduct problems on PIB in children with ADHD (see Jiang and Johnston, 2014). Depressive symptoms have consistently been found to be associated with attenuated PIB in children with ADHD (Hoza et al., 2002; Hoza et al., 2004; McQuade et al., 2011; Owens and Hoza, 2003). Only one study has provided evidence that might contradict this (McQuade et al., 2017), however this study utilized a parent-report measure of depression, which may not be the most valid way to assess internalizing symptoms in children (Moretti, Fine, Haley, and Marriage, 1985). Findings regarding the relationship between aggressive behavior or conduct problems and PIB in children with ADHD have also been quite

consistent. Aggressive symptoms have been found to be positively associated with PIB in children with ADHD, such that children with ADHD with comorbid aggressive symptoms display a significantly larger PIB than children with ADHD without comorbid aggressive symptoms (Hoza et al., 2002; Hoza et al., 2004; Ohan and Johnston, 2011; Volz-Sidiropoulou et al., 2016). These findings suggest that comorbid symptomology is important to examine and consider when measuring PIB in children with ADHD. While comorbid depressive and aggressive symptoms have been studied in several previous studies, to our knowledge, no previous study has examined the impact of anxiety symptoms, which are commonly comorbid with ADHD (Biederman, Newcorn, and Sprich, 1991), on PIB in children with ADHD. The present study aims to examine the impact of depressive, aggressive, and anxiety symptoms on PIB.

Race/Ethnicity. Studies examining PIB in children with ADHD often include majority white, non-Hispanic samples. Thus, to our knowledge, no previous study has examined the potential impact of racial or ethnic background on level of PIB in children with ADHD. Given that differences in ADHD symptom severity, diagnosis rates, and treatment utilization and dropout have been found for children of different racial and ethnic backgrounds, and the paucity of research examining factors that might contribute to these differences (Miller, Nigg, and Miller, 2009), it is important for studies to examine potential racial differences in ADHD-related phenomena. The present study aims to address this gap in the PIB literature by examining the impact of racial/ethnic background on PIB.

Theoretical Explanations for PIB in ADHD

In addition to the importance of understanding which children with ADHD display PIB, the apparent maladaptive nature of PIB in children with ADHD suggests that understanding the

cause and function of PIB among these children could be important for reducing the likelihood of negative outcomes. Thus far, four different theories have attempted to explain the cause and function of PIB in children with ADHD: cognitive immaturity, ignorance of incompetence, deficits in executive functioning, and self-protection.

The cognitive immaturity theory (Milich, 1994) posits that PIB in children with ADHD may be a reflection of their delayed cognitive development and immaturity (Whalen, 1989). It is common and adaptive for typically developing younger children to be overly optimistic about their competence. This optimism leads to sustained persistence which in turn can help facilitate the mastery of new skills during early childhood (Bjorklund and Green, 1992). Due to their cognitive immaturity and protracted cognitive development (Shaw et al., 2007), however, children with ADHD may maintain the overly positive perceptions of early childhood further into development than their typically developing peers (Milich, 1994).

The ignorance of incompetence theory suggests that because children with ADHD have impaired functioning in many areas, they might also lack the skills needed to recognize competence within these domains of functioning. According to this theory, children with ADHD would not be able to accurately perceive their own competence or the competence of others (Hoza et al., 2002).

Minimal support has been found for the cognitive immaturity and ignorance of incompetence theories of PIB in children with ADHD. Children with ADHD do seem to be able to accurately perceive others' competence (Evangelista, Owens, Golden, and Pelham, 2008), which provides evidence against the ignorance of incompetence theory. Additionally, the developmental trajectory of PIB in ADHD does not align with the cognitive immaturity theory. The cognitive immaturity theory would suggest that children with ADHD would display a

similar developmental trajectory of PIB compared to typically developing peers, but on a delayed schedule. However, Hoza and colleagues (2010) found this was not the case. Rather, children with ADHD display a unique developmental trajectory (Hoza et al., 2010).

The deficits in executive functioning theory posits that PIB is a result of the executive functioning deficits common among children with ADHD. According to this theory, children with ADHD may be capable of recognizing competence in others but are not able to accurately perceive their own competence due to difficulties with self-monitoring and self-awareness (Owens and Hoza, 2003). This theory has garnered some support from the literature, as several studies have found a significant positive relationship between executive functioning and PIB in children with ADHD, such that greater deficit in executive functioning is associated with greater PIB (Chan and Martinussen, 2016; Evangelista et al., 2008; McQuade et al. 2011; Owens and Hoza, 2003).

Finally, the self-protection theory suggests that because children with ADHD have low competence across several domains of functioning and likely receive considerable negative feedback regarding their competence, PIB may be a coping mechanism for these children to defend or protect themselves against feelings of inadequacy (Diener and Milich, 1997). By holding overly optimistic self-evaluations, children with ADHD may be able to bolster their self-esteem and maintain positive self-perceptions in spite of their challenges. The self-protection theory has received extensive support in the extant literature (Emeh and Mikami, 2014; Hoza et al., 2002; Hoza et al., 2004; McQuade et al., 2017; Ohan and Johnston, 2002; Owens et al. 2007; Volz-Sidiropoulou et al., 2016).

The Self-Protection Theory

Several studies have found indirect evidence supporting the self-protection theory of PIB. Findings revealing that children with ADHD provide greater overestimations of their competence in areas that their competence is lowest may be interpreted as providing support for this theory (Hoza et al., 2002; Hoza et al., 2004). Children with ADHD may feel a greater need to self-protect in areas that they perceive the greatest threat to their competence and thus to their self-esteem. A study finding that adolescents with ADHD display a greater PIB in areas of functioning relevant to the deficits associated with ADHD provides similar support (Volz-Sidiropoulou et al., 2016). Another finding that supports the self-protective theory is that there is a significant positive correlation between PIB and social desirability bias for children with ADHD but not for children without ADHD (Ohan and Johnston, 2011). This suggests that PIB may be a way for children with ADHD to present themselves more positively and thus bolster their self-esteem. Additionally, several studies have found that PIB is negatively related to depressive symptoms in children with ADHD, suggesting that PIB could serve a protective function against the development of depression in these children (Hoza et al., 2004; Mikami et al., 2010; McQuade et al., 2014; Owens and Hoza, 2003).

Three studies have conducted more direct tests of the self-protection theory of PIB in children with ADHD. Diener and Milich (1997) first tested this theory in a study examining the self-evaluations of boys with ADHD before and after receiving positive or no feedback for their performance on a social cooperation task. This study included 120 boys ages 8 to 11, 30 of whom had received a diagnosis of ADHD. Participants were randomly assigned to receive positive or no feedback for their performance on a social cooperation task, and feedback was presented as if it was coming from a peer partner. Findings revealed that prior to receiving

feedback, boys with ADHD provided overly positive reports of their performance compared to control boys. After receiving positive feedback, however, boys with ADHD gave less positive reports of their performance while control boys gave more positive reports. This suggests that boys with ADHD may have been using overly positive self-evaluations to bolster their self-esteem, yet after receiving positive feedback they felt less need to bolster themselves in this way and gave more accurate self-evaluations. It is important to note that in addition to excluding females, this study excluded males who only had inattentive symptoms of ADHD with no symptoms of hyperactivity or impulsivity, and also excluded boys with comorbid disorders, or even symptoms of other disorders, aside from conduct disorder. Thus, their sample was limited to boys with hyperactive/impulsive or combined type ADHD and few other problems, and therefore, these findings may not be generalizable to the wider population of children with ADHD.

A study conducted by Ohan and Johnston (2002) utilized a similar procedure to that of Diener and Milich (1997) and found similar results. This study aimed to test the self-protection theory of PIB in children with ADHD by examining how performance feedback impacted children's self-evaluations in both social and academic domains. This study included 88 boys, ages 7 to 12, with and without ADHD. Participants were asked to estimate how they would perform on a maze task, as well as how much the teacher administering the task would like them. After completing the task with the teacher, participants were randomly provided positive, neutral, or no feedback, and then were asked to estimate their performance and how much the teacher liked them again. Children with ADHD who received positive feedback significantly reduced their estimates of teacher-liking, while those who received neutral or no feedback did not. Control children displayed the opposite pattern, with those who received neutral feedback

reducing their estimates of teacher-liking. The same interaction between ADHD status and feedback condition was not found for estimates of maze performance, with all children in the positive feedback condition increasing their estimates in this domain. Thus, findings support the self-protection hypothesis for PIB in children with ADHD within the social domain, but not within the academic domain. Again, it is important to note that these findings may not be generalizable to the wider population of children with ADHD, as only boys were included, and the majority had combined-type ADHD. Additionally, their measure of "teacher liking" may not be an accurate measure of peer social competence in children with ADHD.

In addition to these studies examining the impact of feedback from peers and teachers, a study conducted by Emeh and Mikami (2014) examined the impact of parental feedback on PIB in children with ADHD. Their sample included 56 children, ages 7 to 10, with and without ADHD, 73% of whom were male, and their parents. Children's behaviors were observed during a free play period with other children in the lab. Following free play, parents were asked to give their child feedback on their behavior and social interactions to help improve the child's relationship with other children. Parent behaviors were coded for praise, criticism, and warmth. Results revealed a significant interaction between ADHD status and parent feedback, such that children with ADHD who received more criticism displayed a larger social PIB, while greater warmth was associated with larger social PIB in control children. These findings support the self-protection theory of PIB in children with ADHD, by revealing that children with ADHD who receive more negative feedback from their parents have greater levels of social PIB than those who receive more positive feedback. However, this evidence was only found in the social domain, and not the behavioral domain. While this study sample did include girls, it was underpowered to test gender differences or ADHD subtype differences. Additionally, the

feedback provided by parents in a lab setting may not reflect the kind of feedback parents give their children in more natural settings.

To summarize, all three of these studies tested the self-protection theory of PIB in children with ADHD by examining the relationship between PIB and different forms of feedback, and all found evidence for the self-protection theory of PIB within the social domain (Diener and Milich, 1997; Emeh and Mikami, 2014; Ohan and Johnston, 2002). However, support was not found for PIB in the academic (Ohan and Johnston, 2002) or behavioral (Emeh and Mikami, 2014) domains. While informative, these three studies have some important limitations. First, all three studies were conducted in laboratory settings. While this allows for controlled studies with high internal validity, it limits the generalizability of findings, as children and parents may behave differently while being observed in a lab setting than in a natural setting. Additionally, all three studies included limited samples of entirely or majority white males with the hyperactive/impulsive or combined subtype of ADHD, and few comorbid problems. Thus, it is unclear if findings can be generalized to other children with ADHD. Finally, each of these studies used different methods for measuring PIB, with one simply comparing performance estimates of children with and without ADHD (Diener and Milich, 1997), one utilizing repeated measures ANOVA to compare child estimates of performance to their actual performance (Ohan and Johnston, 2002), and one utilizing discrepancy between child and teacher reported competence (Emeh and Mikami, 2014).

The method utilized by Emeh and Mikami (2014) – creating a discrepancy score between child-reported competence and teacher- or parent-reported competence within a particular domain – is the most widely used technique for measuring PIB (Owens et al., 2007). When this discrepancy score is positive, with the child reporting significantly greater competence than their

teacher or parent, the child is said to display PIB. There are, however, concerns with the interpretability of discrepancy score measures of PIB. Namely, discrepancy scores may reflect a negative bias on the part of teachers and parents rather than a positive bias on the part of children. In fact, two studies have found that when a more objective external measure of competence was used rather than teacher- or parent-report, there were no longer significant positive discrepancies between child-reported competence and actual competence among children with ADHD (Swanson et al., 2012; Chan and Martinussen, 2016). The present study aims to consider the self-protection theory of PIB using novel methods that address some of the methodological limitations of the previous literature.

Given the evidence for the self-protection theory of PIB, it is surprising that no previous study has considered the impact of stigma on PIB in ADHD. The social psychological literature suggests that the experience of stigma presents a threat to the self, to which stigmatized individuals often respond with self-protective mechanisms aimed to reduce this threat and protect their self-esteem (Crocker and Major, 1989). Thus, it is possible that for children with ADHD, perceived stigma contributes to the use of PIB as a self-protective coping mechanism. The current study aims to fill this gap in the literature by examining the relationship between stigma and PIB among children with ADHD.

Stigma

Individuals with ADHD experience significant stigma related to their diagnosis (Lebowitz, 2016). Common stigmatizing beliefs about ADHD include perceiving children with ADHD to be careless, dangerous, violent, more likely to get in trouble, and less intelligent compared to their typically developing peers (Lebowitz, 2016). While the general public might have negative stereotypes surrounding the diagnostic label of ADHD, it is actually the symptoms

of ADHD themselves that are most stigmatizing (Ohan, Visser, Moss, and Allen, 2013). A review conducted by Lebowitz (2016) suggests that stigmatizing views of ADHD are prevalent among individuals of all ages – parents, teachers, children, and adolescents. Individuals with ADHD themselves report that they feel others view them negatively, perceive them as "stupid," and treat them differently because of their ADHD (Singh et al., 2010). Fear of stigma and negative judgment from others may prevent individuals with ADHD and parents of children with ADHD from seeking treatment (Mojtabai et al., 2011; Gulliver, Griffiths, and Christensen, 2010). As such, stigma is a clinically significant concept that may impact long-term outcomes for children with ADHD.

One of the implications of having a stigmatizing condition is that this stigma presents a threat to personal well-being that is additional to the impact of the condition itself. Stigma causes further stress by making stigmatized individuals feel the need to exert effort to try to hide their condition from others who might view them negatively because of it (Hinshaw and Stier, 2008), or to protect their self-esteem from being damaged by these negative views (Crocker and Major, 1989). Because of this, examining the relationship between children's perceptions of stigma and PIB could serve as an additional test of the self-protection theory of PIB in children with ADHD. The self-protection theory suggests that children who perceive their disorder to be more stigmatizing may perceive a greater threat to their competence and self-esteem, and thus may feel a greater need to bolster their self-esteem and protect against feelings of inadequacy by overestimating their competence. Providing some support for this possibility, previous studies have found that the more threatened individuals feel in response to negative feedback the more likely they are to engage in self-protection strategies such as the self-serving bias and better-than-average-effect (Sedikides and Alicke, 2012). Additionally, stigmatized individuals have

been found to display the same or higher self-esteem compared to non-stigmatized individuals, despite the threat posed by stigma (Crocker and Major, 1989). This suggests that there may be self-protective processes at play among other marginalized groups in response to stigma. Nonetheless, this topic has not been considered in the ADHD literature.

Examining the relationship between stigma and PIB in children with ADHD would increase our understanding of the cause and function of PIB in these children. Given the maladaptive nature of PIB in children with ADHD, this examination could have important implications for reducing the likelihood of negative outcomes for children with ADHD. Finding a relationship between stigma and PIB would provide additional support for the self-protective theory of PIB and suggest that it may be important to address the stigma associated with ADHD in addition to typical treatment of symptoms and impairment. This may provide support for intervention programs such as Making Socially Accepting Inclusive Classrooms (MOSAIC; Mikami et al., 2013), which in addition to behavioral management for children with ADHD, include a classroom-wide intervention that promotes social inclusion and helps foster more positive attitudes toward children with ADHD.

Aims of the Present Study

The present study aims to test the self-protection theory of PIB in children with ADHD by examining the relationship between perceptions of stigma and PIB in the social and academic domains. To our knowledge, there is only one previous study that has measured both PIB and stigma in ADHD (Wiener et al., 2012), yet this study did not directly examine the relationship between these two constructs. In addition to using a novel construct to test the self-protection theory of PIB, the present study aims to compare different methods for measuring PIB (i.e., standardized discrepancy between self-reported and parent-reported competence vs. standardized

discrepancy between self-reported competence and a more objective measure of competence). Finally, the present study aims to examine how other personal factors, including gender, age, race/ethnicity, hyperactive/impulsive symptoms and inattentive symptoms of ADHD, and comorbid depressive, aggressive, and anxiety symptoms impact degree of PIB in children with and without ADHD.

Hypotheses

Hypothesis 1a: It is hypothesized that, consistent with previous research (Owens et al., 2007), children with ADHD will display PIB in both academic and social domains.

Hypothesis 1b: It is hypothesized that for children with ADHD, PIB calculated using a more subjective parent-report of competence as the external measure of competence will be larger than PIB calculated using a more objective measure of competence (grades in school, and number of friendships/play-dates). This would be in line with findings from Swanson et al. (2012) and Chan and Martinussen (2016) that suggest a negative bias on the part of adult reporters may contribute to the magnitude of PIB found in children with ADHD.

Hypothesis 2a: Findings with regard to gender differences in PIB in the literature are mixed, with some findings suggesting no differences between boys and girls, and other findings suggesting that boys might display greater PIB than girls (Owens et al., 2007). It is hypothesized that in the present study, male gender will predict greater PIB in both academic and social domains, across both ADHD and control groups. This would be in line with previous findings from Hoza et al. (2004) and Steward et al. (2017), which found greater overestimation of competence in boys across their total samples.

Hypothesis 2b: It is hypothesized that age will have a negative relationship with PIB among children with ADHD in the present study, such that older children with ADHD will

display smaller PIB than younger children with ADHD. For children without ADHD, the same pattern is expected to emerge in the academic domain. However, the opposite pattern is expected to emerge within the social domain of PIB. This would be consistent with findings from Hoza and colleagues (2010) regarding the trajectory of PIB from childhood into adolescence, which suggest that typically developing children display social bolstering in early adolescence.

Hypothesis 2c: To our knowledge, no previous study has examined racial/ethnic differences in PIB among children with ADHD. It is hypothesized that children from racial or ethnic minority backgrounds may be more likely to display PIB than children from white, non-Hispanic backgrounds, as these children may feel the need to protect against the negative stereotypes associated with their marginalized racial/ethnic identity in addition to the negative stereotypes associated with ADHD. This would align with findings reported by David and Kistner (2000), suggesting that African-American children display a greater overestimation of social competence compared to white children, though this study did not include children with ADHD.

Hypothesis 2d: Although findings regarding the impact of ADHD presentation on PIB are mixed, it is hypothesized that, consistent with findings from Owens and Hoza (2003), greater hyperactive/impulsive symptoms will predict greater PIB, while inattentive symptoms will not be predictive of PIB, in both children with and without ADHD.

Hypothesis 2e: Consistent with previous findings (Jiang and Johnston, 2014), it is hypothesized that comorbid aggressive symptoms will be predictive of greater PIB in both social and academic domains, in both children with and without ADHD. It is also hypothesized that comorbid depressive symptoms will be predictive of lower PIB in both social and academic domains in both children with and without ADHD. It is hypothesized that anxiety symptoms may

function similarly to depressive symptoms, as these are related internalizing disorders (Cummings, Caporino, and Kendall, 2014).

Hypothesis 3: It is hypothesized that, in line with the self-protection theory of PIB in children with ADHD, there will be a significant positive relationship between perceived stigma and PIB in both social and academic domains for children with ADHD. For children without ADHD, consistent with findings from a previous study of the self-protection theory of PIB (Ohan and Johnston, 2002), the opposite pattern is expected to emerge.

Methods

Participants

Participants were 90 children, ages 8-13 (M = 10.63, SD = 1.7) and their mothers. Forty-four percent of participants were female and 70% of participants were white, non-Hispanic. Participants included 22 children with ADHD and 68 children without ADHD. See Table 1 for more details about the demographics of the total sample. Children with and without ADHD were not excluded from participation on the basis of comorbid conditions. This ensured that our sample reflected the natural heterogeneity that exists among children diagnosed with ADHD, rather than being an unnaturally clean sample. It was important for the comparison sample to be heterogeneous as well, so we would not be comparing an ADHD+ other psychiatric symptoms sample to a completely typically developing sample with no psychiatric symptoms. This allowed us to examine the impact of ADHD, and not general psychopathology, on PIB.

Procedures

Participants were recruited from several different sources within the greater Syracuse community. One source for recruitment was the Psychological Services Center (PSC) at Syracuse University. The PSC provides therapy and assessment services for children and adults,

and has an embedded ADHD clinic. Past and current clients who consented to be contacted about opportunities to be involved in future research projects were contacted about the opportunity to participate in the present study. Another source of recruitment was the Longitudinal Family / Molecular Genetics Study at SUNY Upstate Medical University. This participant pool was made up of over 600 families from the greater Syracuse community, which included children with and without psychiatric disorders, including ADHD, with over one third of families from racial or ethnic minority backgrounds. Participants from this pool who consented to be contacted about opportunities to be involved in future research were likewise contacted about the opportunity to participate in the present study. Finally, families of children with ADHD (but not children without ADHD) were also recruited through local schools and pediatricians. Out of the 90 total participants, 88% were recruited from the SUNY Upstate Medical University study sample, 9% from the PSC, and 3% from schools or pediatricians.

Eligible participants from the above recruitment sites were contacted via email, phone and/or a targeted flyer about the opportunity to participate in an online survey. The survey was programmed through Qualtrics to include a section to be completed by mothers, followed by a section to be completed by children. The survey began with an informed consent page on which the parent was able to accept or decline participation for themselves and for their child. Parents who elected to participate then completed all measures relevant to them. Following this was a child assent page, on which children were able to accept or decline participation, and then begin the child portion of the survey. Parents were informed that while they may help their child complete their portion of the survey, they should allow their child to answer the survey questions on their own, and should avoid influencing their child's answers. Measures were administered in a fixed order for both the parent portion of the survey and the child portion of the survey. At the

end of the survey, parents were given the option to provide their email address to receive two $5 Amazon gift cards (one for them and one for their child) to thank them for their participation in this study.

Measures

Parent Survey.

Demographics. Parents reported basic demographic information about themselves, including their gender, age, race, ethnicity, marital status, number of children, household income, and highest level of education. Additionally, parents reported basic demographic information about their child, including their gender, age, grade in school, race, and ethnicity. Parents reported on their child's mental health status, including current and past diagnoses, and current and past use of psychotropic medication. Finally, parents of children with ADHD were asked if their child was aware of their diagnosis, so that children who were not aware of their ADHD diagnosis were not presented with questions that asked directly about this label.

Objective measures of Social and Academic Competence. In order to collect a more objective measure of academic competence, parents were asked to report on their child's academic performance (i.e., their grades in school). For parents of children in middle school, this Likert scale question was asked in terms of letter grades (i.e., Mostly A's, A's and B's, Mostly B's, B's and C's, Mostly C's, etc.). For parents of children in elementary school, this Likert scale question was asked in terms of number grades (i.e., Mostly 4's, 4's and 3's, Mostly 3's, 3's and 2's, Mostly 2's, etc.). Responses were standardized within elementary-aged participants and within middle school-aged participants, so scores were more directly comparable across grading systems.

In order to collect a more objective measure of social competence, parents were asked to report the number of reciprocal, close friendships their child has on a 4-point scale from *none* to *4 or more*, and the number of times their child spent time with friends outside of school over the past month on a 4-point scale from *none* to *7 or more*. Responses were standardized, and an average of the standardized responses to these two questions was taken. These measures served as a more objective external measure of competence in calculating academic and social PIB.

Conners 3 – Parent Report (Conners 3-P) – Short Form. The Conners 3-P was used to measure parent report of both inattentive and hyperactive/impulsive symptoms of ADHD in children, as well as symptoms of other common comorbid problems, including aggression and executive functioning deficits (Conners, 2008). The short form of this instrument includes 45 items and is designed to assess symptoms of ADHD in children ages 6 to 18. Parents were asked to respond to items about their child's behavior on a 4-point Likert scale from *never* to *very often*. The Conners 3-P allows for the calculation of inattention, hyperactivity/ impulsivity, learning problems, executive functioning, defiance/aggression, and peer/family relations composites, and has been found to have good to excellent reliability and validity, with internal consistency ranging from .85 – .94 (Kao and Thomas, 2010). Internal consistency within the present study was similar (Inattention = .93, Hyperactivity/Impulsivity = .92, Learning Problems = .80, Executive Functioning = .84, Aggression = .87, and Peer/Family Relations = .86). The inattention, hyperactivity/impulsivity, and defiance/aggression composites were used in analyses in the present study (Hypotheses 2D and 2E).

Teacher's Rating Scale of Child's Actual Behavior (TRS). The TRS was used as the more subjective parent-report measure of children's academic and social competence. This instrument was developed as a companion scale to the Self-Perception Profile for Children

(Harter, 2012), and is appropriate for use with both teachers and parents, and has been used with parents in several previous studies (Emeh, Mikami, and Teachman, 2015; Hoza et al., 2004; Jia et al., 2016). This scale was designed to measure children's actual competence in five domains: scholastic, social, behavioral, athletic, and physical appearance. Parents were presented with two opposing statements about their child (e.g. "my child finds it hard to make friends" vs. "for my child it's pretty easy to make friends"), and are asked to mark *really true* or *sort of true* for the statement that best fits their child (a 4-point scale). Previous studies have reported good internal consistency for parent reports on the TRS (Cronbach's alpha = .80 – .88) (Hoza et al., 2004). For the purposes of this study, only the 6 items measuring social and scholastic domains of competence were administered. Internal consistency of these subscales within the present study were similar (academic competence = .82, social competence = .84). These measures served as more subjective external measures of competence in calculating academic and social PIB.

Child Survey.

Conners 3 – Self-Report (Conners 3-SR) – Short Form. The Conners 3-SR was used to measure self-report of both inattentive and hyperactive/impulsive symptoms of ADHD, as well as common comorbid symptoms, including aggression (Conners, 2008). The short form of this instrument includes 41-items and was designed to assess symptoms in children ages 8 to 18. Participants were asked to respond to items about their behavior on a 4-point Likert scale from *never* to *very often*. The Conners 3-SR allows for the calculation of inattention, hyperactivity/impulsivity, learning problems, defiance/aggression, and peer/family relations composites and has been found to have good to excellent reliability and validity, with internal consistency ranging from .85 – .94 (Kao and Thomas, 2010). Internal consistencies within the present study were acceptable to good (Inattention = .86, Hyperactive/Impulsive = .70, Learning

Problems = .76, Aggression = .79, Peer/Family Relations = .89). For the purposes of the present study the Conners 3-SR was used to prompt children about their ADHD-related problem behaviors, about which they then responded to further questions regarding stigma.

Attributions for ADHD Questionnaire (AAQ) – Stigmatization Scale. The AAQ Stigmatization Scale was used to measure children's self-perceptions of stigma with regard to problem behaviors endorsed on the Conners 3-SR and with regard to ADHD diagnosis for children with ADHD who were aware of their diagnostic label. The AAQ was developed to assess both children's attributions and feelings of stigmatization with regard to problem behaviors endorsed on the Dominic-R – a similar measure that consists of ADHD and related symptoms (Kaidar, Wiener, and Tannock, 2003). For the purposes of this study, only the 10 items related to stigma were administered. These items asked children about their perceptions of stigmatization from teachers, parents, and peers. Participants responded to items on a three-point scale from *never* to *a lot*. The Stigmatization Scale has been found to have acceptable internal consistency in past studies (Cronbach's alpha = .69 – .76) (Wiener et al., 2012), and good internal consistency in the present study (Cronbach's alpha = .83).

Child Depression Inventory 2 (CDI-2) – Self-Report Short Form. The CDI-2 self-report short form was used to measure depressive symptoms in children. This 12-item instrument was designed to measure depressive symptoms in children ages 7 to 17 (Kovacs, 1992). Participants were asked to respond to items about their mood on a 3-point scale. The CDI-2 has been found to have good internal consistency (Cronbach's alpha = .67 – .91), and the short form has been found to be highly correlated with the longer self-report form at .95 ($p < .001$), suggesting that the short form is a good screener for depressive symptoms and has construct validity with the

longer measure (Bae, 2012). Internal consistency in the present study was acceptable (Cronbach's alpha = .78).

Generalized Anxiety Disorder Screener (GAD-7). The GAD-7 was used to measure self-reported anxiety symptoms. This 7-item instrument was designed as a brief screening measure for generalized anxiety, and has been validated for use in both clinical and general populations of adults and adolescents (Spitzer, Kroenke, Williams, and Lowe, 2006; Lowe et al., 2008). Participants were asked to think about the past two weeks and respond to items on a 4-point Likert scale from *not at all* to *nearly every day*. The GAD-7 has been found to have excellent internal consistency (Cronbach's alpha = .92), and to have good convergent validity with other validated anxiety measures, such as the Beck Anxiety Inventory (BAI) (r = .72) (Spitzer et al., 2006). Internal consistency within the present study was good (Cronbach's alpha = .85).

Self-Perception Profile for Children (SPPC). The SPPC was used as a self-report measure of children's perceived academic and social competence. This instrument was designed to measure children's self-perceived competence across five domains: scholastic, social, behavioral, athletic, and physical appearance, as well as their global self-worth (Harter, 2012). Children were presented with two opposing statements (e.g. "some kids find it hard to make friends" vs. "other kids find it pretty easy to make friends"), and are asked to choose which statement best fits them, and mark *really true for me* or *sort of true for me* for that statement (a 4-point scale). Previous studies have reported good internal consistency for the SPPC (Cronbach's alpha for scholastic domain = .80 – .85; social domain = .75 – .84). Within the present study, internal consistency was also good (academic competence = .80, social competence = .84). This measure, along with the companion Teacher Rating Scale of Child's Actual Behavior (TRS), have been used to measure PIB in several previous studies (Hoza et al., 2002; Hoza et al., 2004;

Mikami et al., 2010; McQuade et al., 2017). For the purposes of this study, only the 12 items measuring scholastic competence and social competence were administered.

Planned Statistical Analyses

Missing Data / Data Validity. Cases with no child data (i.e., the mother completed the parent section of the survey yet the child did not complete any of the child section of the survey, n = 17) were removed from the dataset prior to analyses, as these cases were clearly unusable. Cases that included any amount of child data were kept in the dataset. This resulted in the 90 participants described previously. Listwise deletion was then utilized on an analysis by analysis basis in order to maximize use of available data. No more than 3 cases out of 90 (3%) were deleted due to missing data for any analysis.

Two validity items were included in the child survey in order to monitor survey comprehension. Eight children provided an incorrect response to at least one of the validity items (3 children with ADHD and 5 children without ADHD; X^2 (1) = .901, p = .288). These children were compared to children who responded correctly to the validity items for all of the demographic and clinical variables, and no significant differences emerged. Thus these eight cases were not removed based upon incorrect response to validity items.

Children were asked whether they received help from an adult to complete their portion of the survey. Thirty-nine percent of children reported receiving adult assistance. Children who received assistance were significantly younger than those who reported not receiving assistance (t = 3.8, p < .001). Children who received assistance also had significantly lower academic performance grades (t = 2.4, p = .020), and greater inattention (t = -2.1, p = .039), as reported by parents. Logistic regression examining these three variables as predictors of receiving adult assistance revealed that inattention was not a significant predictor when age and grades were

accounted for (B = -.025, p = .723) whereas age and grades remained significant predictors (B = .593, p < .001 and B = .689, p = .030, respectively). Given the clear developmental nature of these findings, all parent-assisted cases were kept, and adult assistance was not accounted for in subsequent analyses.

Calculating PIB. PIB was calculated using the total sample of 90 participants (22 children with ADHD and 68 children without ADHD). Consistent with numerous previous studies examining PIB in ADHD, PIB was calculated using standardized difference scores between children's self-reported competence and an external measure of competence (Owens et al., 2007). Four different PIB scores (two subjective, two objective) were calculated: 1) Social subjective: the discrepancy between children's self-reports of competence for the social domain of the SPPC and parents' reports of their child's competence for the social domain of the TRS; 2) Academic subjective: the discrepancy between children's self-reports of competence for the scholastic domain of the SPPC and parents' reports of their child's competence for the scholastic domain of the TRS; 3) Social objective: the discrepancy between children's self-reports of competence for the social domain of the SPPC and the more objective measure of social competence (number of friendships/play-dates); 4) Academic objective: the discrepancy between children's self-reports of competence for the scholastic domain of the SPPC and the more objective measure of academic competence (grades in school).

Demographics. In order to determine if there were any significant demographic differences between the ADHD and control group, t-tests and chi-square tests were conducted comparing these groups on child age, gender, and race/ethnicity, as well as parent education and income. If significant differences emerged, these variables will be considered as potential covariates in subsequent analyses.

Site Differences. In order to determine if there were differences between participants with ADHD who were recruited from the three different sites, t-tests and chi square tests were conducted on demographic variables. T-tests were also conducted comparing these groups on ADHD symptoms. This was an important step, as the present study relied on parent report that their child had been diagnosed with ADHD, and different diagnostic procedures were likely used to diagnose ADHD across sites. Participants recruited from the PSC were likely to have undergone a thorough clinical assessment and been diagnosed with ADHD by a multi-disciplinary team, utilizing cognitive test data, parent interview data, as well as teacher and self-reports. Participants from other sites may have been diagnosed through a less thorough process (e.g. by pediatricians, utilizing symptom checklists). If significant differences emerge, recruitment site will be considered as a potential covariate in subsequent analyses.

Utilized Sample. Primary analyses, with the exception of the analyses for hypothesis 2D, which utilized the total sample (N = 90), were conducted twice. First, analyses were conducted utilizing a constricted control group, which excluded control participants with inattentive or hyperactive symptoms more than 1.5 standard deviations away from the control group mean, in order to remove control participants with elevated ADHD symptoms. This resulted in a control group of 53 children (N = 75). (see Table 2 for demographic information on this group). Second, analyses were conducted utilizing an age and gender matched control group of 22 children (N = 44) (see Table 3 for demographic information on this group).

Hypothesis 1a: Independent samples t-test was used to test the hypothesis that participants with ADHD would display greater PIB in both academic and social domains compared to participants without ADHD. Effect sizes were calculated using Hedges' *g*.

Hypothesis 1b: Paired-samples t-test was used to test the hypothesis that PIB in children with ADHD would be greater when parent-reported competence on the TRS was used as the external measure of competence in calculating PIB than when the more objective measures of competence were used. Should a significant difference be found between these methods of measuring PIB, PIB calculated using the more objective external measure of competence would be used in all subsequent analyses. If no difference were found, an aggregate (mean) of the two measures of PIB within each domain would be used in all subsequent analyses.

Skewness and Kurtosis of the final PIB scores were examined to determine normality prior to conducting the remaining analyses.

Hypothesis 2a: Multiple linear regression was used to test the hypothesis that gender would be predictive of PIB, with boys displaying greater PIB than girls, across both ADHD and control groups. Predictors were entered into the models in two steps, with the first step including main effects of gender and ADHD status, and the second step adding the interaction term for these predictors. Finding a significant positive main effect of male gender would support our hypothesis.

Hypothesis 2b: Multiple linear regression was used to test the hypothesis that age would negatively predict PIB for children with ADHD, but would positively predict social PIB for children without ADHD. Predictors were entered into the models in two steps, with the first step including main effects of age and ADHD status, and the second step adding the interaction term for these predictors.

Hypothesis 2c: Multiple linear regression was used to test the hypothesis that children from racial/ethnic minority backgrounds would display greater PIB than white, non-Hispanic children, across both ADHD and control groups. Predictors were entered into the models in two

steps, with the first step including main effects of racial/ethnic minority status and ADHD status, and the second step adding the interaction term for these predictors. Finding a significant positive main effect of racial/ethnic minority status would support our hypothesis.

Hypothesis 2d: Multiple linear regression was used to test the hypothesis that hyperactive/impulsive symptoms examined dimensionally would be predictive of PIB in children with and without ADHD, while inattentive symptoms examined dimensionally would not be predictive of PIB.

Hypothesis 2e: Multiple linear regression models were used to test the hypothesis that comorbid aggressive symptoms would be predictive of greater PIB, and to test the hypothesis that comorbid depressive and anxiety symptoms would be predictive of lower PIB, across both children with ADHD and children without ADHD. Predictors were entered into the models in two steps, with the first step including main effects of comorbid symptoms and ADHD status, and the second step adding the interaction term for each pair of predictors.

Hypothesis 3: Multiple linear regression was used to test the hypothesis that greater perceived stigma would predict greater PIB for children with ADHD but not for children without ADHD. Predictors were entered in two steps, with the first step including the main effects of perceived stigma and ADHD status, and the second step adding the interaction term between these two variables.

Power Analyses. Power analyses were conducted using G*Power. Effect sizes were assumed based on previous studies examining the impact of ADHD and other characteristics on PIB. Medium effects were assumed for main effects, and smaller effects were assumed for interaction effects. Power analyses assuming a medium effect and power of 0.8 suggested that 128 participants (64 per group) would be needed to have adequate power for the independent

samples t-test utilized for hypothesis 1a. Power analyses assuming a medium effect and power of 0.8 suggested that 34 participants would be needed to have adequate power for the paired samples t-test utilized for hypothesis 1b. Power analyses assuming a medium effect and power of 0.8 suggested 55 participants would be needed to have adequate power for the linear regression analyses utilized for hypothesis 2d. Finally, power analyses for the multiple linear regression analyses assuming a medium effect and power of 0.8 suggested that 77 participants would be needed to have adequate power to examine main effects associated with hypotheses 2a-c,e, and hypothesis 3; and power analyses assuming a smaller effect and power of 0.8 suggested that 114 participants would be needed to have adequate power to examine interaction effects associated with hypotheses 2a-c, e, and hypothesis 3. Thus, the analyses for hypotheses 1b and 2d are adequately powered, and the analyses for hypotheses 1a, 2a-c,e and 3 are underpowered, particularly the analyses utilizing the matched sample.

Results

Group differences

In the total sample, there was a significant gender difference between the ADHD and control group (X^2 (1) = 13.49, $p < .001$), such that the ADHD group included significantly fewer females than the control group (9% vs. 53%). This gender difference was also present when using the restricted control group, excluding children with elevated ADHD symptoms (X^2 (1) = 14.88, $p < .001$). This difference is not surprising, given elevated prevalence of ADHD among males compared to females (Cuffe, Moore, and McKeown, 2005). There were no significant differences between the ADHD and control group on any other demographic variables, including age, race/ethnicity, parent education, and parent income. Thus, no demographic variables were considered as covariates in the following analyses. See Table 1 for demographics on the full

sample, Table 2 for demographics on the restricted control group, and Table 3 for demographics on the matched control group.

There were, however, significant differences between ADHD and control participants across a number of other variables of interest within the present study. Children with ADHD had significantly greater parent-reported inattention, hyperactivity, learning problems, aggression, and peer relationship problems (large effects; Hedges' g's all > 0.8). Children with ADHD had significantly lower parent-reported competence in both academic and social domains, both measured objectively and subjectively (large effects; Hedges' g's all > 0.8). Children with ADHD reported significantly greater perceived stigma, and significantly lower academic and social competence (medium to large effects; Hedges' g's 0.66, 0.96, and 0.63, respectively). However, children with ADHD reported equivalent global self-worth to their peers without ADHD. Additionally, differences in depressive and anxious symptoms approached significance (p's = .08 and .07, respectively), with the ADHD group reporting greater symptoms (medium effects; Hedges' g's 0.46 and 0.55, respectively). This pattern of findings was similar when examining the matched sample. However, due to reduced statistical power in those analyses, the differences for aggression, perceived stigma, depression, and anxiety lost, or fell further from, significance with this smaller sample size.

Ascertainment Site Differences

There was a significant difference in parent-reported inattentive symptoms between participants with ADHD recruited from the PSC compared to participants with ADHD recruited from schools and pediatricians, with those recruited from the PSC reporting significantly lower inattention (p = .049). The difference between participants recruited from the PSC and SUNY-Upstate approached significance (p = .06). Given that the participants from the PSC were more

likely to have had a more comprehensive diagnostic assessment, and had elevated rates of pharmacotherapy for their ADHD symptoms (75% of PSC participants vs. 40% of SUNY-Upstate participants, and 33% of school/pediatrician participants), this finding of lower symptom levels among this group was expected. Site was not accounted for in the following analyses. See Table 4 for site differences within the ADHD group.

Hypothesis 1A

Independent samples t-test revealed no significant mean differences in social or academic PIB between ADHD and restricted control participants. However, differences were in the expected directions (i.e. all PIB scores were in the negative direction for control participants, but in the positive direction for participants with ADHD). Given the limitations of our sample size and associated statistical power, it is less likely to detect meaningful effects examining only *p*-values; thus effect sizes were also calculated and interpreted. These analyses revealed a small to medium effect of ADHD status on academic PIB (Hedges' $g = 0.37$) and a small effect on social PIB (Hedges' $g = 0.21$) (See Table 5). Findings were similar when examining the matched control sample (Hedges' $g = .31$ for academic and Hedges' $g = .16$ for social) (See Table 6).

Hypothesis 1B

Academic PIB calculated using the more objective external measure of competence (i.e., parent report of grades in school) was strongly correlated with academic PIB calculated using the more subjective external measure of competence (i.e., parent report on the TRS) (Pearson $r = 0.69$, $p < .001$). The same was true of social PIB calculated using the more objective external measure of competence (i.e., parent report of reciprocal friendships and playdates) and the more subjective external measure of competence (i.e., parent report on the TRS) (Pearson $r = 0.50$, $p < .001$). Paired samples t-tests revealed no significant differences between subjective and objective

PIB scores for the overall sample, or when examining only participants with ADHD (p's > 0.7). Thus, the remaining analyses utilize a single aggregated score for academic PIB and a single aggregated score for social PIB.

Skewness and kurtosis of the distribution of these aggregated PIB scores were examined for normality, and both fell within the normal range (academic PIB skewness = -.566, kurtosis = 1.29; social PIB skewness = -.277, kurtosis = -.286) according to standards suggested by Bishara, Li, and Nash (2017) of +/- 1 for skewness and +/- 2 for kurtosis.

Hypothesis 2A

Linear regression analyses revealed no significant effect of gender on social or academic PIB when utilizing the restricted control group (See Tables 7 and 8) or when utilizing the matched sample (See Tables 9 and 10).

Hypothesis 2B

Linear regression revealed no significant effects of age on social or academic PIB in analyses utilizing the restricted control group (See Tables 11 and 12) or analyses utilizing the matched control group (See Tables 13 and 14).

Hypothesis 2C

Linear regression revealed no significant effect of racial/ethnic minority status on social PIB. For academic PIB, however, an ADHD: Race interaction approached significance, such that for children with ADHD, racial or ethnic minority status was associated with lower academic PIB, while for children without ADHD, racial or ethnic minority status was associated with greater academic PIB. This represented a medium effect (Beta = -.324, p = .066) (See Tables 15 and 16). Findings were similar for the matched sample, with the interaction effect being large,

and reaching statistical significance (ADHD: Race interaction Beta = -.566, p = .028) (See Tables 17 and 18).

Hypothesis 2D

Linear regression utilizing the total sample revealed that inattentive symptoms were not associated with social PIB. The effect of inattentive symptoms on academic PIB approached significance (Beta = .194, p = .07), such that greater parent-reported inattention was associated with greater academic PIB (See Tables 19 and 20). Similarly, linear regression revealed that hyperactive/impulsive symptoms were not associated with social or academic PIB (See Tables 21 and 22).

Hypothesis 2E

Aggression. Linear regression revealed a small main effect of aggression on Social PIB that approached significance (Beta = .229, p = .069), such that greater aggression was marginally associated with greater social PIB. However, there was no effect of aggression on academic PIB (See Tables 23 and 24). This social PIB finding was similar for the matched sample (Beta = .290, p = .075). Similarly, no effect of aggression on academic PIB emerged when utilizing the matched sample (See Tables 25 and 26).

Depression. Linear regression revealed a significant main effect of depressive symptoms on social PIB (Beta = -.271, p = .024), and a marginally significant effect on academic PIB (Beta = -.222, p = .062), such that greater depressive symptoms were associated with reduced PIB. ADHD status also has a marginally significant, small effect on academic PIB when accounting for depressive symptoms (Beta = .215, p = .071) (See Tables 27 and 28). These findings were similar for the matched sample, which showed a marginally significant effect of depression on social PIB (Beta = -.284, p = .07) (See Tables 29 and 30).

Anxiety. Linear regression revealed a significant main effect of anxiety symptoms on academic PIB (Beta = -.348, p = .003), such that greater anxiety symptoms were associated with reduced PIB. ADHD status also has a significant effect on academic PIB when accounting for anxiety symptoms (Beta = .254, p = .029) (See Tables 31 and 32). Findings were similar for the matched sample, which showed a marginally significant main effect of anxiety on academic PIB (Beta = -.279, p = .075) (See Tables 33 and 34).

Hypothesis 3

Linear regression revealed a significant main effect of perceived stigma on both social and academic PIB (Beta = -.290, p = .017 and Beta = -.284, p = .018, respectively), such that greater perceived stigma was associated with reduced PIB in both domains. Additionally, ADHD status had a significant effect on academic PIB when accounting for perceived stigma (Beta = .242, p = .042) (See Tables 35 and 36). Findings were similar for the matched sample, which showed a marginally significant effect of perceived stigma on social PIB (Beta = -.306, p = .054) (See Tables 37 and 38).

Exploratory Post-Hoc Analyses

In order to better understand the pattern of results described above, a few additional post-hoc analyses were conducted, beyond the planned analyses utilized to test the study's major hypotheses.

In order to better understand the smaller effect of ADHD status on PIB in the present study, the rates of internalizing symptoms within our ADHD sample were more closely examined. The percentage of participants with elevated depressive symptoms and anxiety symptoms were calculated in order to more directly compare rates of internalizing symptoms in the present study to previous studies. Among participants with ADHD, 33% displayed elevated

depressive symptoms (defined as a T-score above 65 on the CDI-2 self-report) and 38% displayed elevated anxiety symptoms (defined as a raw score of 10 or higher on the GAD-7). Among participants without ADHD, 12% displayed elevated depressive symptoms, and 12% displayed elevated anxiety symptoms.

In order to gain a better understanding of the significant interaction between racial/ethnic minority status and ADHD, rates of stigma among white non-Hispanic and racial ethnic minority children with ADHD were examined. Independent samples t-test revealed a non-significant difference in perceived stigma based on race yet this difference represented a medium effect (Hedge's $g = 0.62$). Among children with ADHD, racial/ethnic minority children were found to perceive greater stigma for their ADHD-related behaviors than white non-Hispanic children ($t = -1.44$, $p = .16$; white non-Hispanic M = 5.77, SD = 4.0; racial/ethnic minority M = 8.78, SD = 5.8).

Finally, Pearson correlations between major variables of interest were calculated in order to better characterize the relationships between these variables, beyond the regression analyses conducted. These are presented in Table 39.

Discussion

The present study examined PIB among children with and without ADHD in order to better understand its nature and function, and which children are most likely to display this bias. More specifically, the present study tested the theory that PIB serves a self-protective function for children with ADHD by examining the relationship between PIB and perceived stigma. Gender, age, race/ethnicity, inattentive symptoms, hyperactive/impulsive symptoms, aggression, depressive symptoms, and anxiety symptoms were all examined as characteristics that may be associated with PIB. This was the first study to our knowledge to examine the impact of

race/ethnicity on PIB in children with ADHD, as well as the first to examine the impact of anxiety symptoms, and the first to examine the relationship between perceived stigma and PIB. Findings suggest that each of these characteristics has an important impact on PIB.

Impact of ADHD on PIB

Results indicated a small, but nonsignificant, effect of ADHD status on academic PIB, and no effect of ADHD status on social PIB. Although these effects were in the expected directions, these effects were smaller than those reported in previous studies examining differences in PIB between children with and without ADHD. Previous studies have generally found medium to large effects across social and academic domains of PIB (Hoza et al., 2002; Hoza et al., 2004; Evangelista et al., 2008). There are at least three possible explanations for this finding: the rate of internalizing symptoms in the present sample, the demographics of the present sample, and methodological differences between this study and previous studies.

Internalizing symptoms. One possible explanation for the smaller ADHD effect in the present study is the relatively higher rates of internalizing symptoms among the participants with ADHD in our sample. Although nonsignificant, the differences in depressive and anxiety symptoms between participants with and without ADHD in the present study approached significance, and represented medium effects, and low statistical power may have limited our ability to detect significant effects. In previous studies, depressive symptoms have consistently been found to reduce PIB in individuals with and without ADHD (see Jiang & Johnston, 2014 for a review). In addition to replicating this well-established finding with regard to depressive symptoms, the present study suggests that anxiety symptoms also have a significant negative relationship with PIB. Previous studies examining the effect of ADHD on PIB have included fewer children with comorbid internalizing symptoms. For example, less than 5% of participants

with ADHD in the 2004 study conducted by Hoza et al. and only 11% of participants with ADHD in the 2002 study conducted by Hoza et al. displayed elevated depressive symptoms. Whereas in the present study, approximately one-third of participants with ADHD displayed elevated depressive symptoms and one-third displayed elevated anxiety symptoms. Thus, the relatively high rates of internalizing symptoms within our ADHD sample may have impacted mean PIB scores. Indeed, when depression and anxiety symptoms were accounted for in later analyses conducted in in the present study, the effect of ADHD status on academic PIB either became or approached significance.

Race/ethnicity. A second possible explanation of the smaller effect of ADHD on PIB in the present study is that participants in this study are demographically different in an important way from those included in previous studies. Specifically, the present study included a large proportion of racial/ethnic minority participants, with over 40% of participants with ADHD being racial or ethnic minorities. Previous studies have often included more homogenous samples of primarily white non-Hispanic participants, with the racial compositions of ADHD samples in many previous studies being near or greater than 90% white (Evangelista et al., 2008; Ohan and Johnston, 2011; Owens and Hoza, 2003). Findings of the present study revealed differences in PIB for white children with ADHD compared to racial/ethnic minority children with ADHD, whereby white children with ADHD displayed significantly greater PIB (See Figure 1). In fact, racial minority children with ADHD displayed a negative mean PIB score, suggesting these children may actually underestimate their competences, whereas white children with ADHD overestimate their competences. The larger proportion of racial/ethnic minority participants in the present study may have led to a lower mean PIB score within the ADHD

group than what has been demonstrated in previous studies that included primarily white participants.

Methodological. A third possible explanation for the smaller effect of ADHD on PIB in the present study is that this study was methodologically different in several ways from previous studies examining PIB in ADHD. While previous studies have often included clinic-referred or treatment-seeking ADHD samples (Hoza et al., 2002; Evangelista et al., 2008), only a small proportion of ADHD participants in the present study were recruited from a clinic. The remaining participants with ADHD were recruited from schools, pediatricians, and a research pool (which recruited from a variety of community sources). Thus, the ADHD sample in the present study may be less severely symptomatic or impaired compared to the samples of previous studies. Greater ADHD severity has been associated with greater PIB in previous studies (Evangelista et al., 2008). Thus low severity may be contributing to the lower PIB mean scores for the ADHD sample in the present study.

The present study utilized an online survey for data collection, whereas the majority of previous studies on PIB in ADHD have involved in-person lab visits with families. Given the association found between social desirability and PIB (Ohan and Johnston, 2011), and findings that social desirability is more likely to be induced in a social setting with an interviewer than when questionnaires are self-administered (Nederhof, 1985), the online, individually administered nature of the present study may have contributed to lower rates of PIB among children with ADHD in the present study.

Additionally, the large number of participants who received assistance from a parent in completing the survey may have impacted PIB scores. Although parents were instructed to be careful not to influence their children's responses, it is possible that having the parent present

resulted in children providing answers that were more similar to their parent's answers to competence questions. Again, this could be explained in terms of social desirability. Individuals are likely to respond more truthfully if they believe the truthfulness of their response can be detected (Nederhof, 1985). Thus, parent presence may have led children to provide more accurate estimates of their competence, which may have reduced PIB in children with ADHD in the present study.

Subjective vs. Objective Measure of PIB

One criticism of the way PIB has been calculated in past studies is that when parent or teacher report is used as the external measure of competence, the assumption is that parents and teachers are objective and therefore more accurate reporters of children's competence, when this may not be the case. Specifically, it has been suggested that when PIB is calculated this way, it may reflect not just a positive bias on the part of children, but also a negative bias on the part of adult reporters (Swanson et al., 2012). Supporting this notion, previous studies have found that when more objective external measures of competence are used in the calculation of PIB scores (e.g., sociometry data for social PIB, standardized test scores for academic PIB), PIB in children with ADHD is significantly reduced (Swanson et al., 2012; Chan and Martinussen, 2016). The present study examined how asking parents more objective questions about their child's social and academic competence (number of friendships and playdates, grades in school) differed from asking parents the subjective questions most commonly used in past studies, and found no difference between PIB computed one way versus the other. This suggests either that parents were equally accurate reporters when responding to more subjective and objective questions about their child's competence, or that parents were equally inaccurate in their responses to subjective and objective questions. While this may seem to contradict the findings from previous

studies comparing the use of subjective and objective measures in calculating PIB, it is important to note that asking parents more objective questions about their child's competence is not the same as using objective measures such as sociometry or academic achievement testing. The questions that were intended to more objectively measure competence in the present study still relied on parent report. This method invariance, with parent report being used for both subjective and objective scores, may explain why PIB scores calculated from these scores were so highly correlated.

Characteristics Hypothesized to be Associated with PIB

Gender. No significant effects of gender emerged for PIB in either academic or social domains. This was contrary to our hypothesis that male gender would be associated with greater PIB (Owens and Hoza, 2003). However, the limited number of females with ADHD in our sample may have limited our ability to detect any effect of gender. Previous findings with regard to gender have been mixed, with some studies finding that boys display a greater PIB than girls (Owens and Hoza, 2003; Steward et al., 2017), some finding no difference (McQuade et al., 2017), and others finding that girls display greater PIB in the academic domain (Hoza et al., 2004). Further investigation is needed to better understand if/how gender might be associated with PIB.

Age. With regard to age, previous studies have found that PIB is present not just among children with ADHD, but among individuals with ADHD of all ages (Fabiano et al., 2015; Jiang and Johnston, 2012; Prevatt et al., 2012; Steward et al., 2017; Volz-Sidiropoulou, Boecker, and Gauggel, 2016). One study, which examined PIB longitudinally found different developmental trajectories for children with and without ADHD (Hoza et al., 2010). Children with ADHD were found to display a significant social PIB in childhood, which peaks around 11 years old, then

decreases across adolescence. Children without ADHD, on the other hand, were found to have lower social PIB in childhood, which increases as they enter adolescence, likely due to the increasing importance of peer relationships at this stage of development (Hartup, 1992), and then levels off (Hoza et al., 2010). As such, the present study predicted there may be an effect of age on PIB that differed between children with and without ADHD, given that our age range spanned late childhood to early adolescence. However, we found no such effect of age. This may be explained by our limited ability to detect an effect of age, given the total sample size, and limited number of participants across represented ages. Alternatively, this could be due to the cross-sectional nature of our data. Further research, especially longitudinal in design, is needed to better understand how age is associated with PIB in children with and without ADHD.

Race/Ethnicity. The present study is the first to our knowledge to examine the effect of racial/ethnic minority status on PIB among children with ADHD. Findings revealed a significant interaction between ADHD status and racial/ethnic minority status for academic PIB, such that for children with ADHD, racial or ethnic minority status is associated with lower academic PIB, while for children without ADHD, racial or ethnic minority status is associated with greater academic PIB. The pattern seen here in children without ADHD is somewhat consistent with previous research showing that black children may provide greater overestimations of their social competence compared to white children (David and Kistner, 2000). The pattern seen in the present study for children with ADHD, however, is in the opposite direction from what might be expected. While white children with ADHD seem to display a PIB, minority children with ADHD do not.

One possible explanation for this finding stems from the fact that children from racial/ethnic minority backgrounds experience greater stigma than white children, including

race-related prejudice and discrimination, in school and other public settings (Miller, Nigg, and Miller, 2009). Given this, coupled with the negative association between perceived stigma for ADHD-related behaviors and PIB in the present study, greater perceived stigma among racial/ethnic minority children with ADHD could potentially explain the reduced PIB found in this group. Further investigation provided some support for this explanation within the present sample. Among children with ADHD, racial/ethnic minority children may have perceived greater stigma for their ADHD-related behaviors than white children. This may be associated with the finding from previous studies that others perceive ADHD-related behavior in black children to indicate that they are "bad" children, rather than that they have symptoms of ADHD (Bussing, Schoenberg, Rogers, Zima, and Angus, 1998). This perception of ADHD-related behaviors as implying the child is bad may result in greater perceived stigma for these behaviors among black children. It is possible that race-related differences in others' perceptions of ADHD, such as this, result in different experiences for racial minority children with ADHD compared to white children with ADHD, involving different transactional patterns with others around them, that may result in reduced PIB. Further research might seek to examine this dynamic process utilizing longitudinal design.

It is interesting that both ADHD status and racial/ethnic minority status have been found to be associated with overestimation of competence, separately. Yet, when these traits are combined, in racial/ethnic minority children with ADHD, they are associated with *under*estimation. Theories of intersectionality may help to explain this finding. Although the effects of ADHD and racial/ethnic minority status on PIB do not appear additive, it is possible that racial/ethnic minority children with ADHD are facing double jeopardy within the academic domain, or double discrimination based on their race and ADHD status. This double

discrimination may act to deplete the PIB that is typically found in ADHD. This would be similar to findings from previous studies that reveal having one stigmatized identity often results in a bolstering of self-esteem in response to discrimination, while having two stigmatized identities results in reduced self-esteem in response to discrimination (Wan-Ping Pak, Dion, and Dion, 1991). Intersectionality suggests that the experience of individuals with intersecting stigmatized identities cannot simply be reduced to the experience associated with each individual identity alone (Crenshaw, 1989). For example, the experience of being a black woman is thought to have a unique stigma that does not simply result from the prejudice associated with being black added to the prejudice associated with being a woman. Future research should consider how the intersecting identities of minority status and ADHD may impact perceived stigma and self-perception.

ADHD symptoms. Only inattentive symptoms of ADHD were associated with marginally greater PIB in the academic domain, and neither inattentive nor hyperactive/impulsive symptoms were associated with PIB in the social domain. This finding was unexpected, as it was hypothesized that hyperactive/impulsive symptoms, rather than inattentive symptoms would be associated with PIB. Previous studies have revealed mixed findings with regard to the effect of ADHD presentation on PIB, with some finding no differences based on symptom presentation (Swanson et al., 2012), and others finding that hyperactive/impulsive symptoms were more strongly associated with PIB (Owens and Hoza, 2003). The current findings present a third possibility, that inattentive symptoms are more strongly associated with PIB. Previous studies have found that children with ADHD tend to overestimate their competence most within the domains that are most impacted by their ADHD symptoms (Hoza et al. 2004). Given this, it makes sense that inattentive symptoms would be

associated with PIB specifically in the academic domain, as inattentive symptoms have been found to be more strongly associated with academic performance deficits than hyperactive/impulsive symptoms (Thorell, 2007).

Aggression. As hypothesized, aggression was associated with marginally greater PIB in the social domain in both children with and without ADHD. This is consistent with several previous studies examining the impact of aggression on PIB (see Jiang and Johnston, 2014 for a review). Aggression was not associated with PIB in the academic domain. The specificity of this effect to the social domain makes sense, as aggression has been found to have a strong impact on functioning within the social domain (Hinshaw and Melnick, 1995). Aggressive children may be more likely to receive negative feedback within the social domain, in the form of disapproval and rejection by peers (Hinshaw and Melnick, 1995), and thus may be more likely to feel the need to bolster themselves within this domain.

Internalizing symptoms. Also as hypothesized, depressive symptoms were associated with significantly reduced PIB in social domain and marginally reduced PIB in the academic domain. This is consistent with several previous studies examining the impact of depression on PIB (see Jiang and Johnston, 2014). Additionally, although not statistically significant, the present study found a small interaction effect, such that the negative relationship between depression and social PIB may be slightly stronger for children with ADHD, compared to children without ADHD (See Figure 2).

Similarly, anxiety was associated with significantly reduced PIB in the academic domain. This is the first study to our knowledge to examine the impact of anxiety symptoms on PIB, and findings were consistent with the hypothesis that anxiety would be similar to depression in its relationship with PIB. It is unsurprising that children with elevated anxiety would display a

reduced PIB, given that anxiety is associated with negative expectancies and low academic self-efficacy (Chansky and Kendall, 1997; Muris, 2002). As was the case for depression, there was a small but nonsignificant interaction effect, such that the negative relationship between anxiety and PIB may be slightly stronger for children with ADHD compared to children without ADHD. Comorbid internalizing symptoms seem to negate any of the positive effect that ADHD has on PIB.

To summarize, several participant characteristics were associated with academic and social PIB. Aggression was associated with marginally greater PIB in the social domain, inattention was associated with marginally greater PIB in the academic domain, depression was associated with significantly reduced PIB in the social domain and marginally reduced PIB in the academic domain, and anxiety was associated with significantly reduced PIB in the academic domain. Finally, for children with ADHD, racial/ethnic minority background was associated with significantly reduced academic PIB, whereas for children without ADHD, racial/ethnic minority background was associated with greater academic PIB. Understanding the impact of these participant characteristics is essential to understanding which children are most likely to display a PIB, and thus which children might be at risk for negative outcomes that have been found to be associated with PIB among children with ADHD (Hoza et al., 2010; Hoza et al., 2013; Jia et al., 2016; Kaiser et al., 2008; Linnea et al., 2012; Mikami et al., 2010; Ohan and Johnston, 2011; Swanson et al., 2012).

Perceived Stigma and PIB

The final aim of the present study was to test the self-protection theory of PIB in ADHD in a novel way, by examining the relationship between PIB and perceptions of stigma for ADHD-related behaviors. It was hypothesized that greater perceived stigma would be associated

with greater PIB, as children who perceive greater stigma for their ADHD-related behavior may be more likely to feel the need to protect themselves against the negative effects of this stigma by overestimating their competence to bolster their self-esteem. Findings did not support this hypothesis, and in fact showed the opposite effect. Perceived stigma was associated with significantly reduced PIB across both academic and social domains, in children with and without ADHD. Although not statistically significant, there was a small interaction effect, whereby the negative relationship between perceived stigma and PIB in the academic domain may be slightly weaker for children with ADHD than for children without ADHD (see Figure 3). This interaction effect is in opposition to those that were found for depression and anxiety, in which a stronger relationship existed among children with ADHD. It is possible that this interaction reflects that children with ADHD are self-protecting in response to stigma to some extent, as perceived stigma does not lead to the same degree of reduction in their PIB as it does for children without ADHD. However, the positive relationship between perceived stigma and PIB that was expected for children with ADHD did not emerge.

Although these findings do not provide evidence for the self-protection theory of PIB, these results do not necessarily fail to support the self-protection theory of PIB in ADHD either. Given that perceived stigma was measured via self-report, it is possible that children with ADHD underreported their perceptions of stigma for their ADHD-related behaviors for the same reason they tend to overestimate when reporting on their competence. There could be a similar self-protective function across both of these measures, as children with ADHD have been found not only to overestimate their competence in previous studies, but also to underreport negative characteristics about themselves, including their ADHD symptoms (Weiner et al., 2012). Failing to acknowledge stigma associated with ADHD-related behaviors (e.g. that their behavior is

annoying to others or gets them into trouble) may be self-protective in the same way as failing to acknowledge ADHD symptoms and impairment.

These findings suggest that other theories of PIB should be further considered and examined. While the cognitive immaturity and ignorance of incompetence theories have received limited support in previous studies, the deficits in executive functioning theory has received some support. This theory suggests that self-monitoring difficulties related to executive dysfunction may explain the PIB displayed by children with ADHD. Several previous studies have found support for this theory, finding a positive association between executive functioning deficits and PIB (Chan and Martinussen, 2016; Evangelista et al., 2008; McQuade et al. 2011; Owens and Hoza, 2003). Future studies might explore both the self-protection theory and the deficits in executive functioning theory, to better determine which is a better explanation for PIB in ADHD. For example, it could be interesting to examine error monitoring, which has been found to be impaired in children with ADHD (Wiersema, van der Meere, and Roeyers, 2005), in relation to PIB. It is possible that both self-monitoring difficulties and self-protective motivation contribute to the PIB in ADHD.

Limitations / Future Directions

The present study had a few notable strengths. First, the diversity of participants was a strength. Many previous studies examining PIB in ADHD have relied on clinical samples, and often children specifically seeking intensive treatment for behavioral problems (Hoza et al., 2002; Mikami et al., 2010). The present study recruited from not just a university clinic, but also a diverse research participant pool including non-clinical sources such as pediatricians, and schools. This resulted in a diverse community sample, which likely better reflects the general population of children with ADHD (Cohen and Cohen, 1984). The diversity of the children in

the present study also allowed for race/ethnicity differences in PIB to be examined for the first time. While the diversity of the present sample is clearly a strength, future studies should seek to recruit even larger numbers of racially and ethnically diverse participants, so that different racial groups can be examined separately. The racial ethnic minority group in the present sample included participants from a variety of backgrounds, including black/African American (n = 9), Hispanic/Latinx (n = 6), Asian (n = 2), American Indian (n = 3), and biracial (n = 5), Native Hawaiian/Pacific Islander (n = 1), Pakistani (n = 1). However, there were too few participants in each of these subgroups to examine them separately.

The present study was limited by small sample size, and associated low statistical power. While families of children without ADHD were easier to recruit, families of children with ADHD presented a challenge to recruitment. The small ADHD sample in the present study likely limited our ability to detect significant effects, and also may have caused some of our significant effects to appear larger than they truly are (i.e. type M error) (Gelman & Weakliem, 2009). Overall, this reduces confidence in the generalizability of the findings of the present study. Additionally, the sample included very few females with ADHD, which limited our ability to examine gender differences in PIB. Future studies could benefit from targeted recruitment of females with ADHD.

Despite including a large number of statistical analyses, the present study did not apply a correction for multiple testing. This decision was made in order to reduce type II error rates. Future studies should aim to recruit a larger sample, and to apply a correction for multiple testing in order to reduce type I error rates. Additionally, there were some sibling relationships within our data. It is possible that sibling cases are more similar to each other or less independent than other cases, given similar genetic influences, shared family environment, and shared reporter,

with the mother responding to the same survey questions for each child. The presence of sibling relationships was not corrected for in the present study. However, future studies should seek to account for such potential non-independence in the data (e.g. utilizing robust standard errors in GLM; Desai, Bryson, and Robinson, 2013).

The present study relied entirely upon self and parent report in an online survey. Future studies would benefit from including additional perspectives (e.g., teacher reports, peer reports), and objective competence measures (e.g., child performance on academic and social competence related tasks). The questions designed to more objectively measure social and academic competence in the present study may not have been as objective as desired, given that they relied on parent-report. Additionally, the reliability and validity of these items should be further examined (e.g. examining inter-rater reliability across different reporters, and examining construct validity by including additional measures of social and academic competence to compare this item to). Given that children's explicit reports of their competence and perceptions of stigma may reflect some social desirability bias or unwillingness to acknowledge their challenges (Ohan and Johnston, 2011), alternative methods such as implicit measures of self-perception and stigma, or more objective data regarding stigma (e.g., coded classroom observation of teacher and peer interactions with the child) should be utilized. These methods would reduce method invariance, and might allow for closer examination of the self-protection theory of PIB in ADHD, without being confounded by children with ADHD under or over reporting across a variety of self-report measures. A related limitation of the present study was the relatively large proportion of children who needed parental assistance to complete the survey. The presence of their parent may have influenced children's responses. Utilizing methods that would allow children to report on their perceptions of competence and stigma without

considering how their parent may evaluate their responses would be beneficial for understanding how children truly perceive themselves.

Clinical Implications

PIB is a clinically significant construct that has been related to a variety of negative outcomes, including increased aggression and conduct problems (Hoza et al., 2010; Jia et al., 2016; Kaiser et al., 2008), poor social functioning (Jia et al., 2016; Linnea et al., 2012), general impairment and maladjustment (Ohan & Johnston, 2011; Swanson et al., 2012), risky driving behavior (Hoza et al., 2013), and poor response to treatment for both children and adolescents with ADHD (Hennig et al., 2017; Mikami et al., 2010).

These findings, as well as findings from the present study, suggest that PIB should be assessed and addressed as part of treatment for youth with ADHD. What remains unclear, however, is how best to address PIB in order to reduce its impact on treatment. Different theories on the cause and function of PIB in ADHD suggest different solutions. The self-protection theory suggests that because children with ADHD have low competence across several domains of functioning and receive considerable negative feedback regarding their competence, PIB may be a coping mechanism by which these children can defend or protect themselves from feelings of inadequacy and low self-esteem (Diener and Milich, 1997). While an adults' or peers' natural response to youth displaying PIB might be to provide more negative feedback with regard to competence in order to bring down a child's self-perceptions to a more accurate level, the self-protection theory suggests that this may not be effective and may even strengthen their PIB (Emeh and Mikami, 2014). Alternatively, positive performance feedback has been found to reduce PIB among children with ADHD (Diener & Milich, 1997; Ohan & Johnston, 2002). This provides support for the integration of motivational interviewing (MI), which affirms client

strengths and enhances client motivation and self-efficacy for change, into interventions for youth with ADHD. Indeed, the use of MI has become a central component of some adolescent ADHD interventions (Sibley et al., 2016).

Alternatively, the deficits in executive functioning theory might suggest that PIB be addressed by increasing the self-monitoring skills of children with ADHD. Indeed, many ADHD interventions designed to target organizational, time management, and planning skills include self-monitoring components, such as teaching children to check in with themselves to determine how their plans are working (e.g. OST; Abikoff et al., 2013). The strategies for treatment suggested by the self-protection and deficits in executive functioning theories of PIB are not necessarily at odds with each other, and may both be beneficial for addressing PIB in children with ADHD.

The current findings with regard to race/ethnicity suggest that racial/ethnic minority children with ADHD may not present with the same PIB and optimistic thinking patterns that white children with ADHD often present with in treatment. Indeed, these findings suggest that racial/ethnic minority children might underestimate rather than overestimate their competence, and thus might actually present with more negative thought patterns that may need to be addressed in treatment, depending on their function. Knouse and Mitchell (2015) have proposed addressing overly optimistic thinking patterns in adults with ADHD by focusing on the function of thoughts rather than their content, and teaching clients to recognize and intervene in functionally problematic thinking patterns. Although this approach has not been translated to work with children, it may be a helpful way to consider addressing problematic thinking patterns, whether positive or negative.

Conclusions

The present study confirmed previous findings related to the impact of depressive symptoms and aggression on PIB in children with ADHD. These findings also added to our understanding of which children may be most likely to display a PIB with findings revealing the importance of inattention, race/ethnicity and anxiety symptoms. Finally, while the present study did not find support for the self-protection theory of PIB in ADHD, as hypothesized, findings did shed light on the impact of perceived stigma on PIB, and provided directions for future research.

Table 1. Participant Demographics (Full Sample)

Demographics	Control (N = 68)	ADHD (N = 22)	Hedges' *g*
Age (mean(SD))	10.63 (1.8)	10.64 (1.5)	.01
Gender (% female)	53%	9%***	
Race/Ethnicity (% white non-Hispanic)	74%	59%	
Recruitment Site (% Upstate)	94%	68%	
(% PSC)	6%	18%	
(% local schools/pediatricians)	0%	14%	
Parent Education (% less than HS)	1%	4%	
(% HS diploma/GED)	12%	9%	
(% some college)	19%	14%	
(% associates degree)	9%	14%	
(% bachelors degree)	19%	27%	
(% graduate degree)	40%	32%	
Parent Income (% < 25,000)	9%	18%	
(% 25,001-50,000)	24%	45%	
(% 50,001-75,000)	13%	9%	
(% 75,001-100,000)	26%	9%	
(% 100,001-150,000)	16%	14%	
(% 150,001-200,000)	6%	0%	
(% > 200,000)	6%	5%	
Conners Inattention	3.1 (2.7)	10.7 (2.7)***	2.81
Hyperactivity	3.9 (3.8)	11.1 (5.3)***	1.71
Learning Problems	2.2 (2.3)	5.8 (3.6)***	1.35
Executive Functioning	4.2 (2.6)	9.9 (2.9)***	2.13
Aggression	1.3 (2.2)	2.9 (3.7)~	0.61
Peer Relationships	2.0 (2.3)	5.8 (4.2)**	1.32
TRS Academic Competence	10.5 (2.0)	7.7 (2.9)***	1.25
Social Competence	9.6 (2.2)	7.6 (2.4)**	0.89
Objective Social Competence (z-score)	0.19 (.73)	-0.58 (.92)***	0.99
Objective Academic Competence (z-score)	0.28 (.74)	-0.85 (1.2)***	1.30
Child Perceived Stigma	4.7 (3.6)	7.0 (4.9)~	0.58
SPPC Academic Competence	19.2 (3.8)	15.5 (3.8)***	0.97
Social Competence	18.8 (4.0)	15.9 (5.7)*	0.65
Global Self-Worth	19.6 (4.1)	19.1 (4.9)	0.12
CDI Depressive Symptoms	3.7 (3.4)	5.3 (3.9)~	0.45
GAD Anxiety Symptoms	4.4 (4.5)	6.7 (5.4)~	0.49

Note: *** p < .001, ** p < .01, * p < .05, ~ p < .09

Table 2. Participant Demographics (Excluding Control Participants with Elevated ADHD Symptoms)

Demographics	Control (N = 53)	ADHD (N = 22)	Hedges' *g*
Age (mean(SD))	10.85 (1.7)	10.64 (1.5)	0.13
Gender (% female)	58%	9%***	
Race/Ethnicity (% white non-Hispanic)	74%	59%	
Recruitment Site (% Upstate)	96%	68%	
(% PSC)	4%	18%	
(% local schools/pediatricians)	0%	14%	
Parent Education (% less than HS)	0%	4%	
(% HS diploma/GED)	11%	9%	
(% some college)	17%	14%	
(% associates degree)	9%	14%	
(% bachelors degree)	19%	27%	
(% graduate degree)	43%	32%	
Parent Income (% < 25,000)	8%	18%	
(% 25,001-50,000)	26%	45%	
(% 50,001-75,000)	9%	9%	
(% 75,001-100,000)	28%	9%	
(% 100,001-150,000)	21%	14%	
(% 150,001-200,000)	4%	0%	
(% > 200,000)	4%	5%	
Conners Inattention	2.2 (1.9)	10.7 (2.7)***	3.93
Hyperactivity	2.4 (2.2)	11.1 (5.3)***	2.56
Learning Problems	1.8 (1.9)	5.8 (3.6)***	1.59
Executive Functioning	3.7 (2.3)	9.9 (2.9)***	2.49
Aggression	.98 (1.6)	2.9 (3.7)*	0.80
Peer Relationships	1.8 (2.0)	5.8 (4.2)***	1.56
TRS Academic Competence	10.8 (1.8)	7.7 (2.9)***	1.43
Social Competence	9.5 (2.3)	7.6 (2.4)**	0.82
Objective Social Competence (z-score)	0.21 (.74)	-0.58 (.92)***	0.99
Objective Academic Competence (z-score)	0.35 (.61)	-0.85 (1.2)***	1.46
Child Perceived Stigma	4.5 (3.2)	7.0 (4.9)*	0.66
SPPC Academic Competence	19.2 (3.9)	15.5 (3.8)**	0.96
Social Competence	18.8 (4.1)	15.9 (5.7)*	0.63
Global Self-Worth	19.7 (4.0)	19.1 (4.9)	0.14
CDI Depressive Symptoms	3.8 (3.0)	5.3 (3.9)~	0.46
GAD Anxiety Symptoms	4.2 (4.1)	6.7 (5.4)~	0.55

Note: *** p < .001, ** p < .01, * p < .05, ~ p < .09

Table 3. Participant Demographics (Including Only Gender and Age Matched Controls)

Demographics	Control (N = 22)	ADHD (N = 22)	Hedges' *g*
Age (mean(SD))	10.63 (1.6)	10.63 (1.5)	0.00
Gender (% female)	18%	9%	
Race/Ethnicity (% white non-Hispanic)	73%	59%	
Recruitment Site (% Upstate)	95%	68%	
(% PSC)	5%	18%	
(% local schools/pediatricians)	0%	14%	
Parent Education (% less than HS)	0%	4%	
(% HS diploma/GED)	14%	9%	
(% some college)	0%	14%	
(% associates degree)	9%	14%	
(% bachelors degree)	9%	27%	
(% graduate degree)	68%	32%	
Parent Income (% < 25,000)	4%	18%	
(% 25,001-50,000)	14%	45%	
(% 50,001-75,000)	14%	9%	
(% 75,001-100,000)	32%	9%	
(% 100,001-150,000)	27%	14%	
(% 150,001-200,000)	5%	0%	
(% > 200,000)	4%	5%	
Conners Inattention	1.8 (1.8)	10.7 (2.7)***	3.88
Hyperactivity	1.8 (2.2)	11.1 (5.3)***	2.29
Learning Problems	1.4 (1.7)	5.8 (3.6)***	1.56
Executive Functioning	2.9 (2.2)	9.9 (2.9)***	2.72
Aggression	1.1 (2.2)	2.9 (3.7)~	0.59
Peer Relationships	1.9 (2.4)	5.8 (4.2)**	1.14
TRS Academic Competence	11.0 (2.0)	7.7 (2.9)***	1.32
Social Competence	9.4 (2.7)	7.6 (2.4)*	0.70
Objective Social Competence (z-score)	0.22 (.76)	-0.58 (.92)**	0.95
Objective Academic Competence (z-score)	0.52 (.52)	-0.85 (1.2)***	1.48
Child Perceived Stigma	4.9 (3.1)	7.0 (4.9)	0.51
SPPC Academic Competence	19.8 4.2)	15.5 (3.8)**	1.07
Social Competence	18.9 (4.3)	15.9 (5.7)	0.59
Global Self-Worth	20.0 (4.2)	19.1 (4.9)	0.20
CDI Depressive Symptoms	3.9 (3.0)	5.3 (3.9)	0.40
GAD Anxiety Symptoms	5.0 (4.3)	6.7 (5.4)	0.35

Note: *** p < .001, ** p < .01, * p < .05, ~ p < .09

Table 4. ADHD Participant Demographics by Recruitment Site

	Upstate (N = 15)	PSC (N = 4)	Schools/ Pediatricians (N = 3)
Age (mean(SD))	10.7 (1.6)	11.0 (1.4)	9.7 (1.5)
Gender (% female)	7%	25%	0%
Race/Ethnicity (% white non-Hispanic)	67%	50%	33%
ADHD Medication	40%	75%	33%
Parent Education (% less than HS)	7%	0%	0%
(% HS diploma/GED)	13%	0%	0%
(% some college)	13%	0%	33%
(% associates degree)	20%	0%	0%
(% bachelors degree)	27%	50%	0%
(% graduate degree)	20%	50%	67%
Parent Income (% < 25,000)	27%	0%	0%
(% 25,001-50,000)	46%	50%	33%
(% 50,001-75,000)	13%	0%	0%
(% 75,001-100,000)	7%	0%	33%
(% 100,001-150,000)	7%	25%	33%
(% 150,001-200,000)	0%	0%	0%
(% > 200,000)	0%	25%	0%
Conners Inattention	$11.1\ (2.7)_{ab}$	$8.3\ (1.3)_{a}$	$12.3\ (2.5)_{b}$
Hyperactivity	11.5 (5.2)	8.3 (6.0)	13.3 (5.5)

Note: Subscripts label differences between groups. The difference in inattentive symptoms between participants recruited from the PSC and participants recruited from schools/pediatricians was significant, and the difference between PSC and Upstate was approaching significance.

Table 5. PIB z-scores among ADHD and Control participants (Restricted Control)

PIB	Control	ADHD	Hedges' g
Academic PIB - subjective	-0.17 (.85)	0.10 (.79)	0.32
Social PIB - subjective	-0.02 (.84)	0.11 (.89)	0.15
Academic PIB - objective	-0.16 (.82)	0.14 (.96)	0.35
Social PIB - objective	-0.06 (.94)	0.15 (1.02)	0.22

Table 6. PIB z-scores among ADHD and Control participants (Matched Control)

PIB	Control	ADHD	Hedges' g
Academic PIB - subjective	-0.08 (.92)	0.10 (.79)	0.21
Social PIB - subjective	0.06 (.89)	0.11 (.89)	0.06
Academic PIB - objective	-0.16 (.82)	0.14 (.96)	0.34
Social PIB - objective	-0.05 (.84)	0.15 (1.02)	0.21

Table 7. Gender predicting Social PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.105	.228	.061	.462	.646
Gender	.097	.209	.061	.462	.646
Step 2: Interaction Effects Model					
ADHD Status	.324	.582	.189	.556	.580
Gender	.129	.225	.082	.574	.568
ADHD Status*Gender	-.258	.633	-.146	-.408	.684

Note: Adjusted R square = -0.018 for Step 1 and -0.030 for Step 2. F = 0.377, p = .687 for Step 1, F = 0.304, p = .822 for Step 2.

Table 8. Gender predicting Academic PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.288	.218	.174	1.318	.192
Gender	-.064	.200	-.042	-.322	.749
Step 2: Interaction Effects Model					
ADHD Status	.286	.558	.173	.513	.610
Gender	-.065	.216	-.043	-.300	.765
ADHD Status*Gender	.002	.608	.001	.003	.998

Note: Adjusted R square = -.003 for Step 1 and -0.017 for Step 2. F = .908, p = .408 for Step 1, F = 0.597, p = .619 for Step 2.

Table 9. Gender predicting Social PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.144	.248	.092	.580	.565
Gender	-.194	.358	-.086	-.541	.592
Step 2: Interaction Effects Model					
ADHD Status	.057	.708	.036	.080	.937
Gender	-.229	.452	-.101	-.507	.615
ADHD Status*Gender	.100	.757	.063	.132	.896

Note: Adjusted R square = -0.036 for Step 1 and -0.062 for Step 2. F = 0.28, p = .758 for Step 1, F = 0.188, p = .904 for Step 2.

Table 10. Gender predicting Academic PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.283	.243	.180	1.161	.252
Gender	-.418	.351	-.184	-1.191	.241
Step 2: Interaction Effects Model					
ADHD Status	-.200	.690	-.127	-.289	.774
Gender	-.615	.440	-.271	-1.397	.170
ADHD Status*Gender	.552	.738	.348	.748	.459

Note: Adjusted R square = .011 for Step 1 and 0.000 for Step 2. F = 1.23, p = .303 for Step 1, F = 0.998, p = .404 for Step 2.

Table 11. Age predicting Social PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.162	.206	.094	.785	.435
Age	-.020	.058	-.042	-.354	.724
Step 2: Interaction Effects Model					
ADHD Status	.446	1.479	.258	.301	.764
Age	-.014	.066	-.030	-.216	.830
ADHD Status*Age	-.027	.138	-.166	-.194	.847

Note: Adjusted R square = -.017 for Step 1 and -.031 for Step 2. F = .398, p = .673 for Step 1, F = .274, p = .844 for Step 2.

Table 12. Age predicting Academic PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.277	.202	.162	1.375	.174
Age	-.043	.057	-.090	-.768	.445
Step 2: Interaction Effects Model					
ADHD Status	-1.071	1.442	-.625	-.743	.460
Age	-.073	.065	-.151	-1.126	.264
ADHD Status*Age	.127	.135	.792	.944	.348

Note: Adjusted R square = .009 for Step 1 and .008 for Step 2. F = 1.34, p = .269 for Step 1, F = 1.189, p = .320 for Step 2.

Table 13. Age predicting Social PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.124	.247	.079	.503	.617
Age	-.025	.082	-.048	-.303	.763
Step 2: Interaction Effects Model					
ADHD Status	.433	1.793	.276	.242	.810
Age	-.012	.112	-.023	-.106	.916
ADHD Status*Age	-.029	.168	-.199	-.174	.863

Note: Adjusted R square = -.041 for Step 1 and -.067 for Step 2. F = .179, p = .837 for Step 1, F = .126, p = .944 for Step 2.

Table 14. Age predicting Academic PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.242	.245	.154	.988	.329
Age	-.037	.082	-.071	-.454	.652
Step 2: Interaction Effects Model					
ADHD Status	-1.519	1.757	-.965	-.864	.393
Age	-.112	.110	-.213	-1.015	.316
ADHD Status*Age	.167	.165	1.134	1.012	.318

Note: Adjusted R square = -.019 for Step 1 and -.018 for Step 2. F = .609, p = .549 for Step 1, F = .747, p = .530 for Step 2.

Table 15. Race predicting Social PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.176	.209	.102	.842	.403
Race	-.012	.212	-.007	-.059	.953
Step 2: Interaction Effects Model					
ADHD Status	.223	.257	.129	.867	.389
Race	.037	.265	.021	.140	.889
ADHD Status*Race	-.142	.448	-.057	-.316	.753

Note: Adjusted R square = -.018 for Step 1 and -.032 for Step 2. F = .357, p = .701 for Step 1, F = .268, p = .848 for Step 2.

Table 16. Race predicting Academic PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.305	.205	.178	1.489	.141
Race	-.002	.208	-.001	-.010	.992
Step 2: Interaction Effects Model					
ADHD Status	.569	.246	.333	2.315	.024
Race	.278	.253	.160	1.099	.276
ADHD Status*Race	-.800	.428	-.324	-1.870	.066

Note: Adjusted R square = .004 for Step 1 and .038 for Step 2. F = 1.131, p = .329 for Step 1, F = 1.947, p = .130 for Step 2.

Table 17. Race predicting Social PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.125	.249	.079	.501	.619
Race	.024	.266	.014	.089	.929
Step 2: Interaction Effects Model					
ADHD Status	.213	.305	.136	.698	.489
Race	.169	.392	.101	.432	.668
ADHD Status*Race	-.274	.537	-.136	-.510	.613

Note: Adjusted R square = -.043 for Step 1 and -.063 for Step 2. F = .136, p = .873 for Step 1, F = .176, p = .912 for Step 2.

Table 18. Race predicting Academic PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.245	.247	.156	.990	.328
Race	.014	.264	.009	.055	.956
Step 2: Interaction Effects Model					
ADHD Status	.615	.286	.391	2.150	.038
Race	.623	.367	.371	1.698	.097
ADHD Status*Race	**-1.145**	**.503**	**-.566**	**-2.275**	**.028**

Note: Adjusted R square = -.024 for Step 1 and .073 for Step 2. F = .505, p = .608 for Step 1, F = 2.097, p = .116 for Step 2.

Table 19. Inattentive Symptoms predicting Social PIB (Full Sample)

	B	SE	Beta	t	p
Inattentive Symptoms	.010	.020	.052	.487	.628

Note: Adjusted R square = -.009; F = .237, p = .628.

Table 20. Inattentive Symptoms predicting Academic PIB (Full Sample)

	B	SE	Beta	t	p
Inattentive Symptoms	.036	.020	.194	1.830	.071

Note: Adjusted R square = 0.026; F = 3.348, p = .071.

Table 21. Hyperactive/Impulsive Symptoms predicting Social PIB (Full Sample)

	B	SE	Beta	t	p
Hyperactive/Impulsive Symptoms	.002	.016	.014	.130	.897

Note: Adjusted R square = -.012; F = .017, p = .897.

Table 22. Hyperactive/Impulsive Symptoms predicting Academic PIB (Full Sample)

	B	SE	Beta	t	p
Hyperactive/Impulsive Symptoms	.020	.016	.129	1.199	.234

Note: Adjusted R square = 0.05; F = 1.438, p = .234.

Table 23. Aggression predicting Social PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.029	.214	.017	.134	.894
Aggression	.070	.038	.229	1.848	.069
Step 2: Interaction Effects Model					
ADHD Status	.024	.213	.014	.112	.911
Aggression	.133	.065	.440	2.044	.045
ADHD Status*Aggression	-.095	.080	-.251	-1.196	.236

Note: Adjusted R square = .029 for Step 1 and .034 for Step 2. F = 2.058, p = .135 for Step 1, F = 1.857, p = .145 for Step 2.

Table 24. Aggression predicting Academic PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.278	.216	.162	1.291	.201
Aggression	.006	.038	.020	.160	.874
Step 2: Interaction Effects Model					
ADHD Status	.278	.217	.162	1.281	.204
Aggression	.009	.066	.029	.133	.895
ADHD Status*Aggression	-.004	.081	-.011	-.051	.960

Note: Adjusted R square = .001 for Step 1 and -.013 for Step 2. F = 1.049, p = .356 for Step 1, F = 0.690, p = .561 for Step 2.

Table 25. Aggression predicting Social PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	-.008	.249	-.005	-.034	.973
Aggression	.073	.040	.290	1.830	.075
Step 2: Interaction Effects Model					
ADHD Status	-.021	.245	-.014	-.087	.931
Aggression	.173	.077	.690	2.243	.031
ADHD Status*Aggression	-.135	.090	-.456	-1.508	.140

Note: Adjusted R square = .037 for Step 1 and .067 for Step 2. F = 1.818, p = .176 for Step 1, F = 2.009, p = .129 for Step 2.

Table 26. Aggression predicting Academic PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.235	.257	.149	.912	.367
Aggression	.006	.041	.025	.153	.879
Step 2: Interaction Effects Model					
ADHD Status	.234	.261	.149	.898	.375
Aggression	.011	.082	.043	.133	.895
ADHD Status*Aggression	-.006	.095	-.021	-.065	.948

Note: Adjusted R square = -.024 for Step 1 and -.050 for Step 2. F = .515, p = .601 for Step 1, F = .336, p = .799 for Step 2.

Table 27. Depression predicting Social PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.263	.202	.152	1.301	.197
Depression	**-.064**	**.028**	**-.271**	**-2.310**	**.024**
Step 2: Interaction Effects Model					
ADHD Status	.301	.204	.174	1.476	.145
Depression	-.037	.035	-.157	-1.038	.303
ADHD Status*Depression	-.067	.056	-.182	-1.191	.238

Note: Adjusted R square = .053 for Step 1 and .059 for Step 2. F = 3.027, p = .055 for Step 1, F = 2.502, p = .066 for Step 2.

Table 28. Depression predicting Academic PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.368	.201	.215	1.831	.071
Depression	-.052	.027	-.222	-1.893	.062
Step 2: Interaction Effects Model					
ADHD Status	.369	.205	.215	1.798	.077
Depression	-.051	.036	-.221	-1.444	.153
ADHD Status*Depression	-.001	.056	-.002	-.016	.987

Note: Adjusted R square = .050 for Step 1 and .036 for Step 2. F = 2.881, p = .063 for Step 1, F = 1.893, p = .139 for Step 2.

Table 29. Depression predicting Social PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.218	.243	.139	.900	.374
Depression	-.064	.035	-.284	-1.836	.074
Step 2: Interaction Effects Model					
ADHD Status	.248	.240	.158	1.034	.307
Depression	.001	.056	.004	.016	.988
ADHD Status*Depression	-.104	.071	-.366	-1.472	.149

Note: Adjusted R square = .038 for Step 1 and .065 for Step 2. F = 1.830, p = .174 for Step 1, F = 1.978, p = .133 for Step 2.

Table 30. Depression predicting Academic PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.311	.246	.197	1.263	.214
Depression	-.045	.035	-.200	-1.277	.209
Step 2: Interaction Effects Model					
ADHD Status	.316	.250	.201	1.265	.213
Depression	-.033	.058	-.147	-.571	.571
ADHD Status*Depression	-.019	.074	-.067	-.260	.796

Note: Adjusted R square = .016 for Step 1 and -.008 for Step 2. F = 1.339, p = .274 for Step 1, F = .894, p = .453 for Step 2.

Table 31. Anxiety predicting Social PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.226	.210	.131	1.079	.284
Anxiety	-.024	.021	-.139	-1.148	.255
Step 2: Interaction Effects Model					
ADHD Status	.266	.211	.154	1.263	.211
Anxiety	-.002	.027	-.011	-.073	.942
ADHD Status*Anxiety	-.054	.042	-.203	-1.283	.204

Note: Adjusted R square = .000 for Step 1 and .009 for Step 2. F = .999, p = .373 for Step 1, F = 1.221, p = .309 for Step 2.

Table 32. Anxiety predicting Academic PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	**.436**	**.196**	**.254**	**2.228**	**.029**
Anxiety	**-.060**	**.020**	**-.348**	**-3.052**	**.003**
Step 2: Interaction Effects Model					
ADHD Status	.453	.199	.264	2.281	.026
Anxiety	-.050	.025	-.292	-1.963	.054
ADHD Status*Anxiety	-.024	.040	-.089	-.597	.553

Note: Adjusted R square = .118 for Step 1 and .110 for Step 2. F = 5.83, p = .005 for Step 1, F = 3.97, p = .011 for Step 2.

Table 33. Anxiety predicting Social PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.179	.247	.114	.724	.473
Anxiety	-.031	.026	-.189	-1.200	.237
Step 2: Interaction Effects Model					
ADHD Status	.225	.248	.143	.906	.371
Anxiety	.007	.040	.042	.170	.866
ADHD Status*Anxiety	-.063	.052	-.302	-1.214	.232

Note: Adjusted R square = -.007 for Step 1 and .005 for Step 2. F = .857, p = .432 for Step 1, F = 1.070, p = .373 for Step 2.

Table 34. Anxiety predicting Academic PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.323	.240	.205	1.346	.186
Anxiety	-.046	.025	-.279	-1.830	.075
Step 2: Interaction Effects Model					
ADHD Status	.373	.240	.237	1.556	.128
Anxiety	-.004	.039	-.026	-.112	.912
ADHD Status*Anxiety	-.069	.050	-.331	-1.378	.176

Note: Adjusted R square = .055 for Step 1 and .076 for Step 2. F = 2.219, p = .122 for Step 1, F = 2.146, p = .110 for Step 2.

Table 35. Perceived Stigma predicting Social PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.295	.204	.171	1.450	.151
Perceived Stigma	**-.060**	**.024**	**-.290**	**-2.452**	**.017**
Step 2: Interaction Effects Model					
ADHD Status	.295	.206	.171	1.433	.156
Perceived Stigma	-.060	.033	-.292	-1.811	.074
ADHD Status*Perceived Stigma	.001	.049	.004	.026	.979

Note: Adjusted R square = .062 for Step 1 and .048 for Step 2. F = 3.369, p = .040 for Step 1, F = 2.214, p = .094 for Step 2.

Table 36. Perceived Stigma predicting Academic PIB (Restricted Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	**.415**	**.201**	**.242**	**2.069**	**.042**
Perceived Stigma	**-.058**	**.024**	**-.284**	**-2.426**	**.018**
Step 2: Interaction Effects Model					
ADHD Status	.396	.201	.231	1.972	.053
Perceived Stigma	-.085	.032	-.413	-2.610	.011
ADHD Status*Perceived Stigma	.058	.048	.190	1.208	.231

Note: Adjusted R square = .078 for Step 1 and .084 for Step 2. F = 4.067, p = .021 for Step 1, F = 3.215, p = .028 for Step 2.

Table 37. Perceived Stigma predicting Social PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.230	.242	.147	.952	.347
Perceived Stigma	-.060	.030	-.306	-1.986	.054
Step 2: Interaction Effects Model					
ADHD Status	.229	.245	.146	.937	.354
Perceived Stigma	-.062	.054	-.317	-1.145	.259
ADHD Status*Perceived Stigma	.003	.066	.013	.048	.962

Note: Adjusted R square = .051 for Step 1 and .026 for Step 2. F = 2.117, p = .134 for Step 1, F = 1.377, p = .264 for Step 2.

Table 38. Perceived Stigma predicting Academic PIB (Matched Control)

	B	SE	Beta	t	p
Step 1: Main Effects Model					
ADHD Status	.324	.245	.206	1.321	.194
Perceived Stigma	-.045	.031	-.229	-1.471	.149
Step 2: Interaction Effects Model					
ADHD Status	.315	.246	.200	1.282	.208
Perceived Stigma	-.085	.055	-.430	-1.550	.129
ADHD Status*Perceived Stigma	.058	.066	.242	.877	.386

Note: Adjusted R square = .028 for Step 1 and .023 for Step 2. F = 1.612, p = .212 for Step 1, F = 1.324, p = .280 for Step 2.

Table 39. Pearson correlations between major variables of interest

	1.	2.	3.	4.	5.	6.	7.
1. Academic PIB	--						
2. Social PIB	.199						
3. Conners Inattention	.194	.052					
4. Conners Hyperactive	.129	.014	.779**				
5. Conners Aggression	.069	.160	.333**	.474**			
6. CDI Depressive Symptoms	-.233*	-.192	.256*	.175	.257*		
7. GAD Anxiety Symptoms	-.314**	-.140	.250*	.264*	.395**	.706**	
8. Perceived Stigma	-.222*	-.260*	.385**	.386**	.251*	.474**	.520**

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

Figure 1. ADHD Status : Race/Ethnicity Interaction for Academic PIB

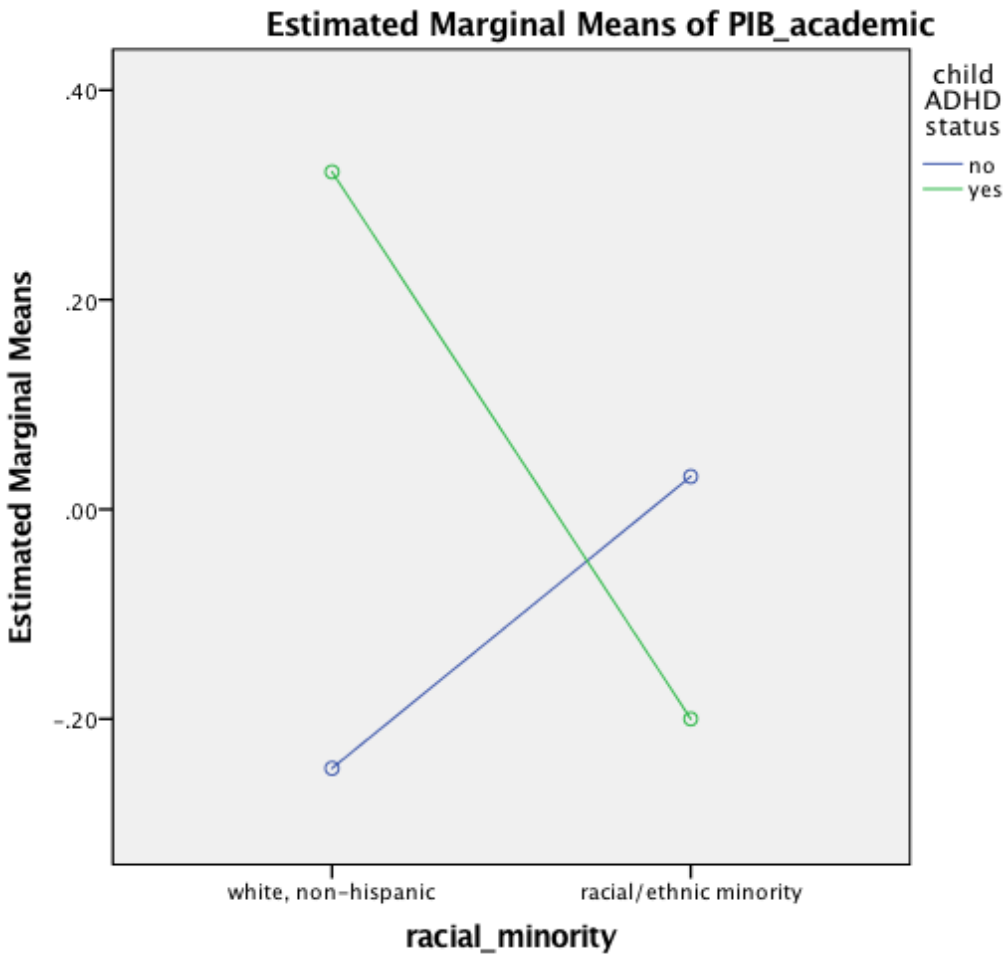


Figure 2. Relationship between depressive symptoms and social PIB for children with and without ADHD

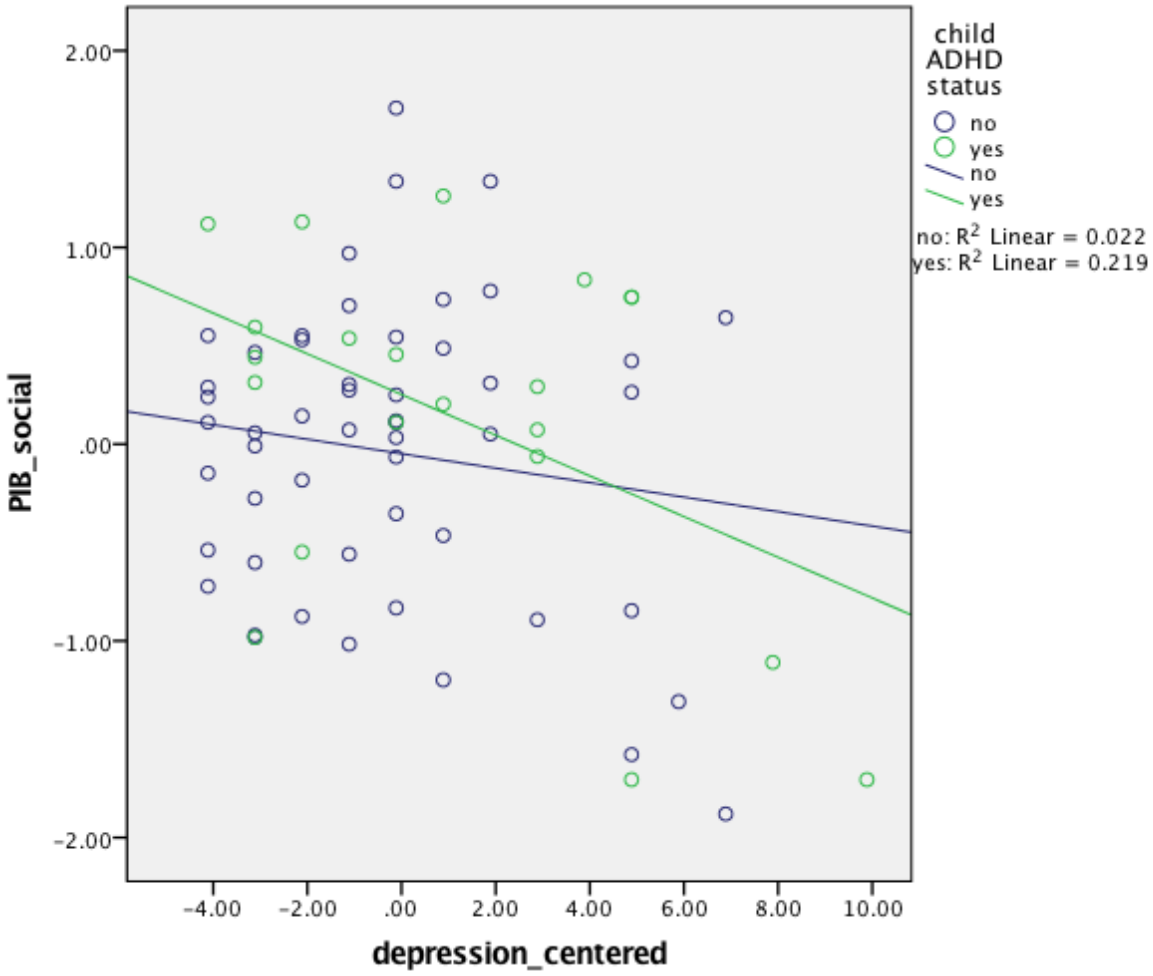
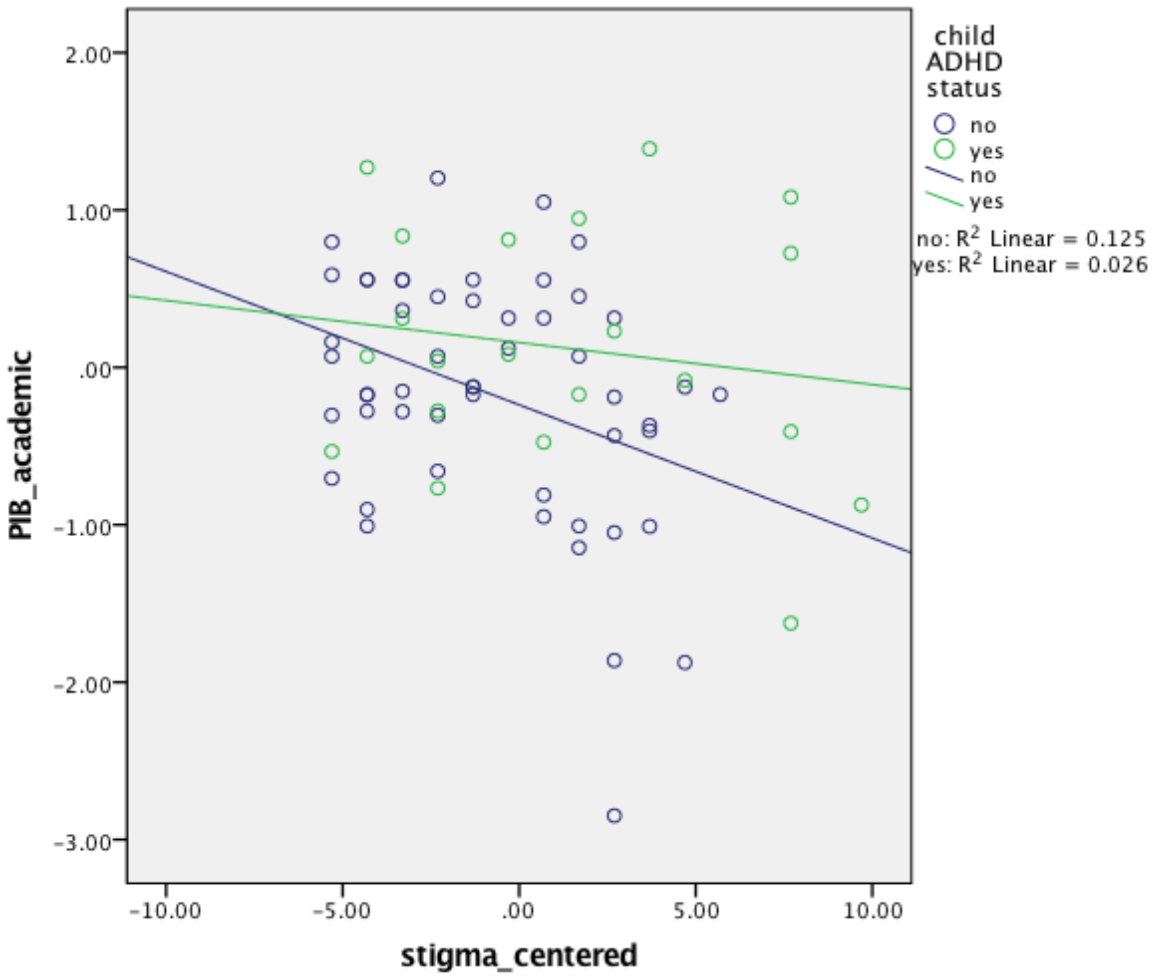


Figure 3. Relationship between perceived stigma and academic PIB in children with and without ADHD.



References

Abikoff, H. Gallagher, R., Wells, K. C., Murray, D. W., Huang, L., Lu, F., & Petkova, E. (2013). Remediating organizational functioning in children with ADHD: Immediate and long-term effects from a randomized controlled trial. *Journal of Consulting and Clinical Psychology, 81*(1), 113-128.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Bae, Y. (2012). Test review: Children's depression inventory 2 (CDI 2). *Journal of Psychoeducational Assessment, 30*(3), 304-308. https://doi.org/10.1177/0734282911426407

Barkley, R. A. (Ed.). (2014). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment*. New York, NY: Guilford Publications.

Biederman, J., Monuteaux, M. C., Mick, E., Spencer, T., Wilens, T. E., Silva, J. M., Snyder, L. E. & Faraone, S. V. (2006). Young adult outcome of attention deficit hyperactivity disorder: a controlled 10-year follow-up study. *Psychological Medicine*, *36*(02), 167-179. https://doi.org/10.1017/S0033291705006410

Biederman, J., Newcorn, J., & Sprich, S. (1991). Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders. *American Journal of Psychiatry, 148*, 564-577.

Bishara, A. J., Li, J., & Nash, T. (2017). Asymptotic confidence intervals for the Pearson correlation via skewness and kurtosis. *British Journal of Mathematical and Statistical Psychology, 71*(1), 167-185.

Bjorklund, D. F., & Green, B. L. (1992). The adaptive nature of cognitive immaturity. *American*

Psychologist, 47(1), 46-54. http://dx.doi.org/10.1037/0003-066X.47.1.46

Bourchtein, E., Langberg, J. M., Owens, J. S., Evans, S. W., & Perera, R. A. (2017). Is the positive illusory bias common in young adolescents with ADHD? A fresh look at prevalence and stability using latent profile and transition analyses. *Journal of Abnormal Child Psychology, 45*(6), 1063-1075. http://dx.doi.org/10.1007/s10802-016-0248-3

Bussing, R., Schoenberg, N. E., Rogers, K. M., Zima, B.T., Angus, S. (1998). Explanatory models of ADHD: Do they differ by ethnicity, child gender, or treatment status? *Journal of Emotional and Behavioral Disorders, 6*(4), 233-242.

Chan, T., & Martinussen, R. (2016). Positive illusions? The accuracy of academic self-appraisals in adolescents with ADHD. *Journal of Pediatric Psychology, 41*(7), 799-809. https://doi.org/10.1093/jpepsy/jsv116

Chansky, T. E. & Kendall, P. C. (1997). Social expectancies and self-perceptions in anxiety-disordered children. *Journal of Anxiety Disorders, 11*(4), 347-363

Cohen, P. & Cohen, J. (1985). The clinician's illusion. *Archives of General Psychiatry, 41*, 1178-1182

Conners, C. K. (2008). The Conners 3rd Edition (Conners 3). North Tonawanda: Multi-Health System.

Crenshaw, K. W. (1989). Demarginalising the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics. *University of Chicago Legal Forum, 140*, 139-167.

Crocker, J., & Major, B. (1989). Social stigma and self-esteem: The self-protective properties of stigma. *Psychological Review, 96*(4), 608-630. https://doi.org/10.1037/0033-295X.96.4.608

Cuffe, S. P., Moore, C. G., & McKeown, R. E. (2005). Prevalence and correlates of ADHD symptoms in the national health interview survey. *Journal of Attention Disorders, 9*(2), 392-401.

Cummings, C. M., Caporino, N. E., & Kendall, P. C. (2014). Comorbidity of anxiety and depression in children and adoelscents: 20 years after. *Psychological Bulletin, 140*(3), 816-845.

David, C. F., & Kistner, J. A. (2000). Do positive self-perceptions have a ‘‘dark side’’? Examination of the link between perceptual bias and aggression. *Journal of Abnormal Child Psychology*, *28*, 327–337. http://dx.doi.org/10.1023/A:1005164925300

Desai, M., Bryson, S. W., Robinson, T. (2013). On the use of robust estimators for standard errors in the presence of clustering when clustering membership is misspecified. *Contemporary Clinical Trials*, *34*(2), 248-256. https://doi.org/10.1016/j.cct.2012.11.006

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. http://dx.doi.org/10.1207/s15374424jccp2603_4

Emeh, C. C., & Mikami, A. Y. (2014). The influence of parent behaviors on positive illusory bias in children with ADHD. *Journal of Attention Disorders*, *18*(5), 456-465. https://doi.org/10.1177/1087054712441831

Emeh, C. C., Mikami, A. Y., & Teachman, B. A. (2015). Explicit and implicit positive illusory bias in children with ADHD. *Journal of Attention Disorders*. Advance online publication. https://doi.org/10.1177/1087054715612261

Evangelista, N. M., Owens, J. S., Golden, C. M., & Pelham Jr, W. E. (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. https://doi.org/10.1007/s10802-007-9210-8

Fabiano, G. A., Schatz, N. K., Hulme, K. F., Morris, K. L., Vujnovic, R. K., Willoughby, M. T., ... & Pelham, W. E. (2015). Positive bias in teenage drivers with ADHD within a simulated driving task. *Journal of Attention Disorders,* Advanced online publication. http://dx.doi.org/1087054715616186

Gelman, A., Weakliem, D. (2009). Of beauty, sex, and power: Statistical challenges in estimating small effects. *American Scientist, 97*, 310-316.

Gulliver, A., Griffiths, K. M., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: A systematic review. *BMC Psychiatry, 10*(1), 113. https://doi.org/10.1186/1471-244X-10-113

Harter, S. (2012) Self-Perception Profile for Children: Manual and Questionnaires. University of Denver.

Hartup, W. W. (1992). Friendships and their developmental significance. In H. McGurk (Ed.), *Childhood Social Development: Contemporary Perspectives* (pp. 175-205), Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.

Hennig, T., Schramm, S. A., & Linderkamp, F. (2017). Cross-Informant disagreement on behavioral symptoms in adolescent attention-deficit/hyperactivity disorder and its impact on treatment effects. *European Journal of Psychological Assessment*. Advance online publication. http://dx.doi.org/10.1027/1015-5759/a000446

Hinshaw, S. P. & Melnick, S. M. (1995). Peer relationships in boys with attention-deficit hyperactivity disorder with and without comorbid aggression. *Development and*

Psychopathology, 7(4), 627-647.

Hinshaw, S. P., & Stier, A. (2008). Stigma as related to mental disorders. *Annual Review of Clinical Psychology, 4*, 367-393. https://doi.org/10.1146/annurev.clinpsy.4.022007.141245

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. http://dx.doi.org/10.1037/0022-006X.69.2.271

Hoza, B., Pelham Jr, W. E., 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. http://dx.doi.org/10.1037/0021-843X.111.2.268

Hoza, B., Gerdes, A. C., Hinshaw, S. P., Arnold, L. E., Pelham Jr, W. E., Molina, B. S., Abikoff, H. B., Epstein, J. N., Greenhill, L. L., Hetchman, L., Odbert, C., Swanson, J. M., & Wigal, T. (2004). Self-perceptions of competence in children with ADHD and comparison children. *Journal of Consulting and Clinical Psychology, 72*(3), 382-391. http://dx.doi.org/10.1037/0022-006X.72.3.382

Hoza, B., Mrug, S., Gerdes, A. C., Hinshaw, S. P., Bukowski, W. M., Gold, J. A., & Arnold, L. E. (2005). What aspects of peer relationships are impaired in children with attention-deficit/hyperactivity disorder? *Journal of Consulting and Clinical Psychology*, *73*(3), 411–423. http://dx.doi.org/10.1037/0022-006X.73.3.411

Hoza, B., Murray-Close, D., Arnold, L. E., Hinshaw, S. P., & Hechtman, L. (2010). Time-dependent changes in positively biased self-perceptions of children with attention-

deficit/hyperactivity disorder: A developmental psychopathology perspective. *Development and Psychopathology, 22*(02), 375-390. https://doi.org/10.1017/S095457941000012X

Hoza, B., McQuade, J. D., Murray-Close, D., Shoulberg, E., Molina, B. S., Arnold, L. E., Swanson, J., & Hechtman, L. (2013). Does childhood positive self-perceptual bias mediate adolescent risky behavior in youth from the MTA study?. *Journal of Consulting and Clinical Psychology*, *81*(5), 846-858. http://dx.doi.org/10.1037/a0033536

Jerome, L., Habinski, L., & Segal, A. (2006). Attention-deficit/hyperactivity disorder (ADHD) and driving risk: a review of the literature and a methodological critique. *Current Psychiatry Reports*, *8*(5), 416-426. https://doi.org/10.1007/s11920-006-0045-8

Jia, M., Jiang, Y., & Mikami, A. Y. (2016). Positively biased self-perceptions in children with ADHD: Unique predictor of future maladjustment. *Journal of Abnormal Child Psychology, 44*(3), 575-586. https://doi.org/10.1007/s10802-015-0056-1

Jiang, Y., & Johnston, C. (2012). The relationship between ADHD symptoms and competence as reported by both self and others. *Journal of Attention Disorders*, *16*(5), 418-426. https://doi.org/10.1177/1087054710392541

Jiang, Y., & Johnston, C. (2014). Co-occurring aggressive and depressive symptoms as related to overestimations of competence in children with attention-deficit/hyperactivity disorder. *Clinical Child and Family Psychology Review*, *17*, 157-172. http://dx.doi.org/10.1007/s10567-013-0158-7

Kaidar, I., Wiener, J., & Tannock, R. (2003). The attributions of children with attention-deficit/hyperactivity disorder for their problem behaviours. *Journal of Attention Disorders, 6*, 99-109. https://doi.org/10.1177/108705470300600302

Kaiser, N. M., Hoza, B., Pelham, W. E., Gnagy, E., & Greiner, A. R. (2008). ADHD status and

degree of positive illusions moderational and mediational relations with actual behavior. *Journal of Attention Disorders*, *12*(3), 227-238. https://doi.org/10.1177/1087054708012003O1

Kao, G. S. & Thomas, H. M. (2010). Test review: C. Keith Conners, Conners 3rd edition, Toronto, Ontario, Canada: Multi-Health Systems, 2008. *Journal of Psychoeducational Assessment, 28*(6), 598-602. https://doi.org/10.1177/0734282909360011

Knouse, L. E. & Mitchell, J. T. (2015). Incautiously optimistic: Positively-valenced cognitive avoidance in adult ADHD. *Cognitive Behavioral Practice, 22*(2), 192-202.

Kovacs, M. (1992). *Children's depression inventory*. North Tonawanda, NY: Multi-Health System.

Lebowitz, M. S. (2016). Stigmatization of ADHD: A developmental review. *Journal of Attention Disorders, 20*(3), 199-205. https://doi.org/10.1177/1087054712475211

Linnea, K., Hoza, B., Tomb, M., & Kaiser, N. (2012). Does a positive bias relate to social behavior in children with ADHD?. *Behavior Therapy, 43*(4), 862-875. https://doi.org/10.1016/j.beth.2012.05.004

Lowe, B., Decker, O., Muller, S., Brahler, E., Schellberg, D., Herzog, W., Herzberg, P. Y. (2008). Validation and standardization of the generalized anxiety disorder screener (GAD-7) in the general population. *Medical Care, 46*(3), 266-274. https://doi.org/10.1097/MLR.0b013e318160d093

McQuade, J. D., Tomb, M., Hoza, B., Waschbusch, D. A., Hurt, E. A., & Vaughn, A. J. (2011). Cognitive deficits and positively biased self-perceptions in children with ADHD. *Journal of Abnormal Child Psychology, 39*(2), 307-319. http://dx.doi.org/10.1007/s10802-010-9453-7

McQuade, J. D., Vaughn, A. J., Hoza, B., Murray-Close, D., Molina, B. S., Arnold, L. E., & Hechtman, L. (2014). Perceived social acceptance and peer status differentially predict adjustment in youth with and without ADHD. *Journal of Attention Disorders, 18*(1), 31-43. https://doi.org/10.1177/1087054712437582

McQuade, J. D., Mendoza, S. A., Larsen, K. L., & Breaux, R. P. (2017). The Nature of Social Positive Illusory Bias: Reflection of Social Impairment, Self-Protective Motivation, or Poor Executive Functioning?. *Journal of Abnormal Child Psychology*, 1-12. https://doi.org/10.1007/s10802-016-0172-6

Mezulis, A. H., Abramson, L. Y., Hyde, J. S., & Hankin, B. L. (2004). Is there a universal positivity bias in attributions? A meta-analytic review of individual, developmental, and cultural differences in the self-serving attributional bias. *Psychological Bulletin*, *130*(5), 711-747. http://dx.doi.org/10.1037/0033-2909.130.5.711

Mikami, A. Y., Calhoun, C. D., & Abikoff, H. B. (2010). Positive illusory bias and response to behavioral treatment among children with attention-deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology*, *39*(3), 373-385. http://dx.doi.org/10.1080/15374411003691735

Mikami, A. Y., Griggs, M. S., Lerener, M. D., Emeh, C. C., Reuland, M. M., Jack, A., Anthony, M. R. (2013). A randomized trial of a classroom intervention to increase peers' social inclusion of children with attention-deficit/hyperactivity disorder. *Journal of Consulting and Clinical Psychology*, *81*(1), 100-112. http://dx.doi.org/10.1037/a0029654

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,* 11–28.

Miller, T. W., Nigg, J. T., Miller, R. L. (2009). Attention deficit hyperactivity disorder in African

American children: What can be concluded from the past ten years? *Clinical Psychology Review, 29*(1), 77-86.

Mojtabai, R., Olfson, M., Sampson, N. A., Jin, R., Druss, B., Wang, P. S., . . . Kessler, R. C. (2011). Barriers to mental health treatment: Results from the National COmorbidity Survey Replication. Psychological Medicine, 41(8), 1751-1761. https://doi.org/10.1017/S0033291710002291

Moretti, M. M., Fine, S., Haley, G., & Marriage, K. (1985). Childhood and adolescent depression: Child-report versus parent-report information. *Journal of the American Academy of Child Psychiatry, 24*(3), 298-302. https://doi.org/10.1016/S0002-7138(09)61090-6

Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and depression in a normal adolescent sample. *Personality and Individual Differences, 32*(2), 337-348.

Nederhof, A. (1985). Methods of coping with social desirability bias: A review. *European Journal of Social Psychology, 15*(3), 263-280.

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. http://dx.doi.org/10.1207/153744202753604502

Ohan, J. L., & Johnston, C. (2011). Positive illusions of social competence in girls with and without ADHD. *Journal of Abnormal Child Psychology*, *39*(4), 527-539. https://doi.org/10.1007/s10802-010-9484-0

Ohan, J. L., Visser, T. A. W., Moss, R. G., & Allen, N. (2013). Parents' stigmatizing attitudes toward psychiatric labels for ADHD and depression. *Psychiatric Services, 64*(12), 1270-

1273. https://doi.org/10.1176/appi.ps.201200578

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. http://dx.doi.org/10.1037/0022-006X.71.4.680

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. http://dx.doi.org/10.1007/s10567-007-0027-3

Polanczyk, G., de Lima, M. S., Horta, B. L., Biederman, J., & Rohde, L. A. (2007). The worldwide prevalence of ADHD: a systematic review and metaregression analysis. *American Journal of Psychiatry, 164*(6), 942-948. https://doi.org/10.1176/ajp.2007.164.6.942

Prevatt, F., Proctor, B., Best, L., Baker, L., Van Walker, J., Taylor, N. W. (2012). The positive illusory bias: Does it explain self-evaluations in college students with ADHD? *Journal of Attention Disorders, 16*(3), 235-243. https://doi.org/10.1177/1087054710392538

Sedikies, C. & Alicke, M. D. (2012). Self-enhancement and self-protection motives. In R. M. Ryan (Ed.) *The Oxford Handbook of Human Motivation* (pp. 303-322), New York, NY: Oxford University Press

Shaw, P., Eckstrand, K., Sharp, W., Blumenthal, J., Lerch, J. P., Greenstein, D., Clasen, L., Evans, A., Giedd, J., Rapoport, J. L. (2007). Attention-deficit/hyperactivity disorder is characterized by a delay in cortical maturation. *Proceedings of the National Academy of Sciences 104(49),* 19649-19654. http://doi.org/10.1073/pnas.0707741104

Sibley, M. H., Graziano, P. A., Kuriyan, A. B., Coxe, S., Pelham, W. E., Rodriguez, L., . . .

Ward, A. (2016). Parent–teen behavior therapy + motivational interviewing for adolescents with ADHD. *Journal of Consulting and Clinical Psychology, 84*(8), 699-712. http://dx.doi.org/10.1037/ccp0000106

Singh, I., Kendall, T., Taylor, C., Mears, A., Hollis, C., Batty, M., & Keenan, S. (2010). Young people's experience of ADHD and stimulant medication: A qualitative study for the NICE guideline. *Child and Adolescent Mental Health, 15*, 186-192. https://doi.org/10.1111/j.1475-3588.2010.00565.x

Spitzer, R. L., Kroenke, K., Williams, J. B. W., Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archive of Internal Medicine, 166*(10), 1092-1097. https://doi.org/10.1001/archinte.166.10.1092

Steward, K. A., Tan, A., Delgaty, L., Gonzales, M. M., Bunner, M. (2017). Self-awareness of executive functioning deficits in adolescents with ADHD. *Journal of Attention Disorders, 21*(4), 316-322. http://dx.doi.org/10.1177/1087054714530782

Swanson, E. N., Owens, E. B., & Hinshaw, S. P. (2012). Is the positive illusory bias illusory? Examining discrepant self-perceptions of competence in girls with ADHD. *Journal of Abnormal Child Psychology, 40*(6), 987-998. https://doi.org/10.1007/s10802-012-9615-x

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: a social psychological perspective on mental health. *Psychological Bulletin, 103*(2), 193-210. http://dx.doi.org/10.1037/0033-2909.103.2.193

Thorell, L. B. (2007). Do delay aversion and executive functioning deficits make distinct contributions to the functional impact of ADHD symptoms? A study of early academic skill deficits. *Journal of Child Psychology and Psychiatry, 48*, 1061-1070.

Volz-Sidiropoulou, E., Boecker, M., & Gauggel, S. (2016). The positive illusory bias in children

and adolescents with ADHD: Further evidence. *Journal of Attention Disorders, 20*(2), 178-186. https://doi.org/10.1177/1087054713489849

Wan-Ping Pak, A., Dion, K. L., & Dion, K. K. (1991). Social-psychological correlates of experienced discrimination: Test of the double jeopardy hypothesis. *Journal of Intercultural Relations, 15*, 243-254.

Whalen, C. K. (1989). Attention deficit and hyperactivity disorders. In T. H. Ollendick & M. Hersen (Eds.), *Handbook of child psychopathology* (2nd ed., pp. 131–169). New York, NY: Plenum Press.

Wiener, J., Malone, M., Varma, A., Markel, C., Biondic, D., Tannock, R., Humphries, T. (2012). Children's perceptions of their ADHD symptoms: Positive illusions, attributions, and stigma. *Canadian Journal of School Psychology, 27*(3), 217-242. https://doi.org/10.1177/0829573512451972

Wiersema, J. R., van der Meere, J. J., & Roeyers, H. (2005). ERP correlates of impaired error monitoring in children with ADHD. *Journal of Neural Transmission, 112*, 1417-1430.

Avery Brooke Albert
Vita

Contact:
313 Huntington Hall
Syracuse, NY 13244

Education:

Syracuse University 2016 – current
Department of Psychology, Clinical Psychology Ph.D. Program

Colgate University 2010 – 2014
Department of Psychology, Bachelor of Arts