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Childhood ADHD and Negative Self-Statements: Important Differences Associated With Subtype and Anxiety Symptoms

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The current study examined the role negative self-statements have on the comorbidity between anxious symptomatology and ADHD-combined presentation (ADHD-C) and ADHD-predominantly inattentive (ADHD-I). A total of 114 children and adolescents with ADHD (*M* age = 10.15; SD = 2.30; range = 7–16) from a clinic-referred sample were grouped based on a semistructured diagnostic interview and consensus approach (ADHD-C, *n* = 62; ADHD-I, *n* = 52). Negative self-statements were measured using the Children's Automatic Thoughts Scale and the total score from the Multidimensional Anxiety Scale for Children was used to measure anxious symptomatology. Findings indicated youth diagnosed with ADHD-C, compared to those diagnosed with ADHD-I, had more frequent personal failure (Cohen's *d* = .40) and hostile intent negative self-statements (Cohen's *d* = .47). The association of ADHD subtype and negative self-statements was moderated by anxiety; negative self-statements of personal failure were highest in anxious ADHD-C children (β = .31). A second sample of 137 children and adolescents (*M* age = 10.61; SD = 2.26; range = 7–16) from a larger clinic-referred sample was utilized to replicate our results dimensionally. Results indicated that both hyperactivity/impulsivity (β = .23, $p < .01$) and the interaction of hyperactivity/impulsivity and anxiety (β = .17, $p < .05$) were significant predictors of negative self-statements regarding personal failure, while holding child age, child gender, oppositional symptoms, and inattention constant. In all, negative self-statements should be considered in the treatment and assessment of ADHD with particular attention paid to ADHD subtype and internalizing comorbidity.

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Attention-deficit/hyperactivity disorder (ADHD) is a neuropsychiatric developmental disorder characterized by inattention, impulsivity, and hyperactivity (American Psychiatric Association, 2013). ADHD emerges in childhood, affecting anywhere between 5% and 11% of children (American Psychiatric Association, 2013; Center for Disease Control, 2011; Mangeot, 2001). Childhood ADHD is impairing and associated with impairment in academic achievement (Wilson & Marcotte, 1996), family interaction, peer relationships (DuPaul, McGoey, Eckert, & VanBrakle, 2001), self-esteem (Harpin, Mazzone, Raynaud, Kahle, & Hodgkins, 2016), and health-related quality of life (Klassen, Miller, & Fine, 2004). Moreover, ADHD is commonly comorbid with externalizing as well as internalizing disorders (Jensen et al., 2001). In particular, ADHD with comorbid anxiety is associated with lower self-esteem (Brown, 2000) and more stressful life events (Brown, 2000; Pliszka, Carlson, & Swanson, 1999). Although children with noncomorbid ADHD and anxiety have been shown to have similar levels of worry (Perrin & Last, 1997), research has yet to fully explore other types of maladaptive thoughts, such as negative self-statements or automatic thoughts, in children with ADHD and comorbid anxiety.

Anxiety and ADHD

Like ADHD, child anxiety disorders are also highly prevalent, with estimates ranging from 3% to 32% depending on the disorders included, sample, methodology, and time period (Cartwright-Hatton,

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McNicol, & Doubleday, 2006; Merikangas et al., 2010). Anxiety disorders in childhood and adolescence can cause psychosocial impairment, and, if left untreated, predict increased risk for other mental disorders and substance use problems in adulthood (Kendall, Safford, Flannery-Schroeder, & Webb, 2004; Pine, Cohen, Gurley, Brook, & Ma, 1998; Silverman & Treffers, 2001). Overall, childhood anxiety has a moderate to high impact on functioning (Demyttenaere et al., 2004) with the largest impact being on the child's family processes (i.e., increased discord with parents and siblings; Ezpeleta, Keeler, Erkanli, Costello, Angold, 2001). Moreover, research has found that anxiety disorders also affect children's functioning in peer relations, school, and recreation (e.g., Davis, Ollendick, & Nebel-Schwalm, 2008; Essau, Conradt, & Petermann, 2000; Strauss, Frame, & Forehand, 1987). Longitudinal research suggests that the functioning of children with anxiety disorders continues to decrease from childhood into early adulthood (Caspi, Elder, & Bem, 1988; Last, Hansen, & Franco, 1997; Woodward & Fergusson, 2001).

Overall, ADHD is highly comorbid with anxiety disorders in childhood (for reviews, see Jarrett & Ollendick, 2008, and Schatz & Rostain, 2006), with 30% to 40% of clinically referred children with ADHD meeting criteria for a comorbid internalizing disorder (MTA Cooperative Group, 1999; Tannock, 2009). There is some evidence that the prevalence of ADHD and comorbid anxiety, specifically, is as high as 50% (Mancini, Van Ameringen, Oakman, & Figueiredo, 1999), with 27% meeting criteria for more than one anxiety disorder (Spencer, Biederman, & Wilens, 1999). The low frequency of ADHD without a comorbid diagnosis has led some researchers to support distinct comorbid diagnostic subtypes of ADHD (Barkley, 2006; Jensen et al., 2001).

PHENOTYPIC DIFFERENCES IN YOUTH WITH ADHD AND COMORBID ANXIETY

Pliszka et al. (1999) suggested that children with ADHD and comorbid anxiety are phenotypically different from those without the comorbid presentation. However, as Tannock (2009) notes, the effects of ADHD and comorbid anxiety on ADHD symptomatology have been inconsistent. For example, although there is some evidence that the presence of anxiety is associated with greater inattention relative to impulsivity (Jensen et al., 2001; Newcorn et al., 2001), this has not always been found (Abikoff et al., 2002; Davis et al., 2008; Vloet, Konrad, Herpetz-Dahlmann, Polier, & Gunther, 2010). Similarly, some researchers have found that ADHD and comorbid anxiety improves response inhibition (Manassis, Tannock, & Barbosa, 2000; Oosterlaan, 1998; Pliszka, 1992; Pliszka, Hatch, Borcherding, & Rogeness, 1993; Yurtbaşı et al., 2015), but a meta-analysis of clinical literature did not find evidence for this association (Oosterlaan & Sergeant, 1998). As well, some researchers have found ADHD with comorbid anxiety is associated with greater ADHD severity (Tsang et al., 2015), whereas others have not (Jarrett et al., 2016). These discrepancies may reflect differences in community versus clinical samples or inconsistencies in how the research groups are measuring inattention, impulsivity, and symptom severity (e.g., self-report, performance measures, parent reports, etc.). However, research on increased working memory deficits (Jarrett, Wolff, Davis, Cowart, & Ollendick, 2016; Pliszka, 1989; Skirbekk, Hansen, Oerbeck, & Kristensen, 2011; Tannock, Ickowicz, & Schachar, 1995) and reduced emotion recognition (Manassis et al., 2000; Manassis, Tannock, Young, & Francis-John, 2007) in children with ADHD and comorbid anxiety has been more consistent.

NEGATIVE SELF-STATEMENTS IN YOUTH

Differences in maladaptive cognitions, such as negative self-statements, have seldom been explored in children with ADHD and comorbid anxiety. However, negative self-statements have been found to be a critical factor in the development and maintenance of mood dysregulation in children, with changes in cognition seen as vital for treatment (Beck, 1967; Kendall, 1984; Kendall & MacDonald, 1993; Rapee, Wignall, Hudson, & Schniering, 2000; Treadwell & Kendall, 1996). Drawing on Beck's theory, negative emotional states typically involve self-statements (i.e., internal dialogue) that often have particular themes (Beck, 1967, 1976). This internal dialogue can involve voluntary cognitions, automatic thoughts, self-statements, and images. Beck, Brown, Steer, Eidelson, and Riskind (1987) posited that negative self-statements, or automatic thoughts, are crucial in delineating affective states. Further, it is suggested that each disorder is characterized by self-statements with unique cognitive content. As well, Beck's cognitive theory hypothesizes that negative self-statements reflect content of maladaptive schemas (Beck, 1967, 1996). For instance, anxiety is thought to be associated with thoughts of perceived vulnerability, physical or psychological threat. In contrast, depression is associated with negative self-statements of negativity, personal loss and failure (Beck, 1967, 1976; Beck, Rush, Shaw, & Emery, 1979). Negative self-statements underlying conduct problems likely correspond to perceptions of being wronged, and provide the justification for aggressive behavior (Beck, 1999). Cognitive theorists have translated this model to youth, which is described in more detail below.

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Although there is some evidence that children with anxiety and children with ADHD have similar levels of worry (Perrin & Last, 1997), maladaptive cognitions, such as negative self-statements or automatic thoughts, in anxious children has been understudied overall (e.g., Davis, May, & Whiting, 2011) and research has yet to explore negative self-statements in children with ADHD. Given the high comorbidity between ADHD and anxiety, the relationship between clinical presentation and negative self-statements have important implications for the treatment of anxiety disorders and ADHD in youth.

It is well known that anxious children exhibit elevated levels of negative self-statements and negative beliefs (e.g., Beck, 2005; Schniering & Rapee, 2002). Specifically, there is a strong association between child anxiety and elevated levels of negative self-statements (Hogendoorn et al., 2010). Typically, anxious children have significantly more negative self-statements compared to positive self-statements (e.g., "My future looks bright"; Hogendoorn et al., 2010; Schwartz & Garamoni, 1989). Moreover, as hypothesized by Beck and colleagues (i.e., Beck, 1967, 1976, 1999; Beck, Rush, Shaw, & Emery, 1979), negative self-statements are able to discriminate between children with anxiety disorders and those that are typically developing (Schniering & Rapee, 2002). Further, the content of one's negative self-statements are able to discriminate between anxiety, depression, and behavioral disorders in children (Schniering & Rapee, 2002) as well as differentiate various anxiety disorders. Specifically, negative self-statements related to social threat and personal failure tend to be more related to parent-reported internalizing behaviors, whereas negative self-statements regarding hostile intent are more related to parent reported externalizing behaviors (Schniering & Lyneham, 2007). Notably, the assessment of negative self-statements (i.e., Children's Automatic Thoughts Scale; Schniering & Rapee, 2002; Negative Affect Self-Statement Questionnaire; Ronan, Kendall, & Rowe, 1994) has been validated in children as young as 7 years old.

MALADAPTIVE COGNITIONS AND ADHD IN ADULTS

Research has yet to examine negative self-statements in children or adults with ADHD. However, research has consistently demonstrated a relationship between ADHD and ADHD symptomatology in adulthood and other types of maladaptive cognitions, such as worry and intrusive thoughts. For example, higher levels of impulsivity in nonclinical young adults (Gay, Schmidt, & Van der Linden, 2011) and Chinese adolescents (Li & Chen, 2007) has been linked to elevated levels of worry and reduced general thought control. These findings have been extended to clinical samples of adults, with elevated levels of impulsivity being associated with more intrusive thoughts (Aidman, & Kollaras-Mitsinikos, 2006; Ettelt et al., 2007). Similarly, one study has demonstrated young adults with ADHD have more intrusive thoughts and worry; in a sample of college students, Abramovitch and Schweiger (2009) found that those diagnosed with ADHD had significantly higher ratings on a number of intrusive thought scales and three worry scales. Mitchell, Benson, Knouse, Kimbrel, and Anastopoulus (2013) extended this finding, demonstrating adults with ADHD had more intrusive thoughts than nonclinical participants when controlling for comorbid depression; however, the effects of comorbid anxiety have yet to be explored.

Maladaptive cognitions in adults with ADHD fit nicely with a cognitive-behavioral model of adult ADHD (CBT for ADHD; Safren et al., 2004). For example, CBT for ADHD includes modules typically found in behavioral treatment of ADHD (i.e., organization and planning, procrastination, coping with distractibility, anger management, and communication skills), as well as a module aimed at reducing maladaptive cognitions: cognitive restructuring. CBT for ADHD has growing support. For instance, there is longitudinal evidence that negative self-concept is associated with changes in anxious and depressive symptoms that longitudinally mediated the association between prior academic achievement and later levels of impairment (Eddy et al., 2015). As such, youth with ADHD may have increased rates of maladaptive cognitions (e.g., Aidman & Kollaras-Mitsinikos, 2006; Ettelt et al., 2007; Gay et al., 2011) and eventually anxiety and/or depression as a result, at least partially, of their experience with repeated failures and impairment. Given previous literature linking ADHD-combined presentation, when compared to ADHD-predominately inattentive, with elevated levels of psychopathology (e.g., Morgan, Hynd, Riccio, & Hall, 1996), it may be expected that youth with ADHD-combined presentation will have more negative self-statements when compared to those with ADHD-predominantly inattentive.

INHIBITORY CONTROL AND NEGATIVE SELF-STATEMENTS

From a different theoretical viewpoint, the behavioral-disinhibition theory of ADHD may also lend support for this notion. There is extensive research focusing on motor response inhibition deficits in children with ADHD; however, little research has examined the maladaptive cognitions that may result from reduced inhibitory control (for a review see Lijffijt, Kenemans, Verbaten, & van Engeland, 2005; Nigg, 2000). Typically, response inhibition is defined as the ability to inhibit a motor response (Aron & Poldrack, 2005).

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Given that it has been hypothesized that there may be reduced cognitive inhibition (e.g., increased negative self-statements) in individuals with ADHD (e.g., Nigg, 2000), it is unsurprising that inhibitory control has been shown to moderate negative self-statements (Gorlin & Teachman, 2015). Currently, it is unknown if children with impaired inhibition, and elevated levels of hyperactivity/impulsivity, show reduced cognitive inhibition, and therefore, more negative self-statements. Although these perspectives (i.e., cognitive-behavioral and behavioral-disinhibition) provide theoretical rationale for exploring this important topic, a specific test of these theoretical hypotheses is beyond the scope of the current study.

IMPLICATIONS

To date, research has yet to examine the role negative self-statements have in children with ADHD. The current paper looks to fill this critical gap in the literature, which has important theoretical, assessment, and treatment implications. For instance, there is evidence for the efficacy of both psychopharmacological and behavioral treatments for ADHD in youth (e.g., Multimodal Treatment Study; MTA Cooperative Group, 1999), with cognitive-behavioral treatments for youth with ADHD generally considered to be unsupported and ineffective treatments (for a review see Abikoff, 1991; Waschbusch & Hill, 2003; cf. Hinshaw, 2006). However, many of these treatment studies have used outcome measures focused on academic and behavioral functioning. Therefore, the present study has the potential to influence future studies to examine the efficacy of CBT of ADHD utilizing anxiety and negative self-statement outcome measures.

CURRENT STUDY

Research has consistently demonstrated a relationship between impulsivity and other types of maladaptive cognitions in adults, we therefore first examined whether youth diagnosed with predominantly inattentive ADHD (ADHD-I) differ in their levels of negative self-statements when compared to children diagnosed with ADHD-combined presentation (ADHD-C). With such high comorbidity with anxiety, and strong linkages between anxiety and negative self-statements, we then explore the relationship among negative self-statements, an ADHD diagnosis, and anxiety symptomatology. In line with previous adult literature relating impulsivity with maladaptive cognitions (Aidman, & Kollaras-Mitsinikos, 2006; Ettelt et al., 2007; Gay et al., 2011; Li & Chen, 2007), we hypothesized that children with ADHD-C would have more frequent negative self-statements than children with ADHD-I. We hypothesized that there would be an interaction between having an ADHD diagnosis and anxious symptomatology. Specifically, given the findings by Schniering and Lyneham (2007) relating anxiety and negative self-statements, and the relationship between impulsivity and maladaptive cognitions in adult populations (Aidman, & Kollaras-Mitsinikos, 2006; Ettelt et al., 2007; Gay et al., 2011; Li & Chen, 2007), we predicted that youth diagnosed with ADHD-C, but not ADHD-I, with elevated levels of anxiety would have more frequent negative self-statements regarding social threat and personal failure.

Method

PARTICIPANTS

From an original dataset of 401 children and adolescents, 240 were excluded because they did not meet criteria for a diagnosis of ADHD-I or ADHD-C ($n = 161$) and another 47 were excluded because they had not been administered the measures of interest ($N = 114$). The final sample of 114 participants consisted of two groups: youth diagnosed with either ADHD-I ($n = 52$; 45.61%) or ADHD-C ($n = 62$; 54.39%). Children with ADHD predominantly hyperactive/impulsive were excluded due to their low frequency ($n = 16$). The subsample of 114 youth was between 7 and 16 years of age ($M = 10.15$, $SD = 2.30$; Table 1). The sample was predominantly male ($n = 66$; 57.89%) and Caucasian ($n = 88$; 77.19%). The two groups did not significantly differ on age, $t(109) = -0.30$, $p = .77$, or race, $\chi^2 (1) = 1.01$, $p = .31$. Groups did differ on gender, $\chi^2 (1) = 4.08$, $p < .05$, with the ADHD-C group having significantly more males than the ADHD-I group (Table 1).

For the children in the ADHD-I group ($n = 52$), the following comorbid *DSM-IV* internalizing and externalizing diagnoses were present: specific phobias ($n = 21$; 40.38%), social anxiety disorder ($n = 16$; 30.77%), separation anxiety disorder ($n = 5$; 9.62%), generalized anxiety disorder ($n = 12$; 23.08%), obsessive-compulsive disorder ($n = 3$; 5.77%), oppositional defiant disorder ($n = 4$; 7.69%), conduct disorder ($n = 0$; 0%), major depressive disorder ($n = 2$; 3.17%), and dysthymia ($n = 1$; 1.92%).

For the children in the ADHD-C group ($n = 62$), the following comorbid *DSM-IV* internalizing and externalizing diagnoses were present: specific phobias ($n = 19$; 30.15%), social anxiety disorder ($n = 13$; 20.63%), separation anxiety disorder ($n = 14$; 22.22%), generalized anxiety disorder ($n = 21$; 33.33%), obsessive-compulsive disorder ($n = 4$; 6.35%), oppositional defiant disorder ($n = 17$; 26.98%), conduct disorder ($n = 1$; 1.59%), major depressive disorder ($n = 2$; 3.17%), and dysthymia ($n = 2$; 3.17%). Groups significantly differed in the severity of their oppositional symptoms (i.e.,

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Table 1
Demographic Information

Groups/Samples		ADHD-I	ADHD-C	Diagnostic Group Total	Second Sample
	n	52	62	114	137
	%	45.61	54.39	100.00	100.00
M (SD)		10.13 (2.55)	10.16 (2.08)	10.15 (2.30)	10.61 (2.26)
Female	*n*	25	21	48	55
	%	48.08	33.87	42.11	40.15
Male	*n*	27	41	66	82
	%	51.92	66.13	57.89	59.85
White	*n*	38	50	88	116
(Non-Hispanic)	%	73.08	80.65	77.19	84.67
Black	*n*	8	6	14	16
	%	15.38	9.68	12.28	11.68
Mixed Race/Other	*n*	1	1	2	5
	%	1.92	1.61	1.75	3.65
Public School	*n*	20	23	52	53
	%	38.5	37.1	45.6	38.7
Private School	*n*	29	36	56	75
	%	55.8	58.1	49.1	54.7
Home Schooled	*n*	3	3	6	9
	%	5.7	4.8	5.3	6.6
Anxiety	*n*	33	39	72	90
	%	63.46	61.90	62.61	65.69
Depression	*n*	3	4	7	4
	%	5.77	6.35	6.09	2.92
Externalizing	*n*	4	18	22	20
	%	7.69	28.57	19.13	14.60
ADHD-I	*n*	52	0	52	25
	%	100	0	45.61	18.25
ADHD-C	*n*	0	62	62	35
	%	0	100	54.39	25.55

Oppositional subscale of the Conners' Parent Rating Scale), $t(75) = 2.53$, $p < .05$; however, oppositional behavior was not significantly correlated with any of the subscales of the Children's Automatic Thoughts Scale subscales (p's > .05). As expected, groups also significantly differed in the severity of their hyperactivity/impulsivity (i.e., Hyperactivity/Impulsivity subscale of the Conners' Parent Rating Scale), $t(73) = 5.46$, $p < .01$. Groups did not differ in their severity of inattention, $t(104) = .11$, $p > .05$ (i.e., inattention subscale of the Child-Behavior Checklist).

The ADHD-I group was compared to the ADHD-C group on the prevalence of anxiety disorders. There were no differences between groups on the number of specific phobia, χ^2 (1) = 1.31, $p = .25$, social anxiety disorder, χ^2 (1) = 1.55, $p = .21$, separation anxiety disorder, χ^2 (1) = 3.28, $p = .07$, and generalized anxiety disorder, χ^2 (1) = 1.47, $p = .23$, diagnoses. Groups did not differ on the severity of their overall anxiety symptomatology, $t(92) = 1.36$, $p > .05$ (i.e., Total Score of the Multidimensional Anxiety Scale for Children). Both groups had similar rates of clinically diagnosed mood disorders (i.e., major depressive disorder or dysthymia): ADHD-I = 3 of 52 (5.77%) and ADHD-C = 4 of 62 (6.45%). The low base rate of depression precluded a statistical test of these group differences. The groups did differ on the number of externalizing disorders (i.e., oppositional defiant disorder or conduct disorder), χ^2 (1) = 8.03, $p > .01$, with ADHD-C being significantly more likely to be diagnosed with oppositional defiant disorder.

A second subsample was also collected from the original dataset of 401 children and adolescents for analyses that included continuous measures of inattention, hyperactivity/impulsivity, oppositional behavior, and anxiety. From these 401 youth, 264 were excluded because they had not been administered the measures of interest (N = 137). The subsample of 137 youth was between 7 and 15 years of age (M = 10.61, SD = 2.26; Table 1), predominantly male (n = 82; 59.85%), and Caucasian (n = 116; 84.67%).

MEASURES

Anxiety Disorder Interview Schedule for DSM-IV: Child and Parent Versions (ADIS-IV-C/P)

The ADIS-IV-C/P (Silverman & Albano, 1996) are complimentary, semistructured parent and child

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interviews allowing for a comprehensive assessment of childhood psychopathology and interference. The interviews are validated for children ages 7 to 16 years of age and based on *DSM-IV-TR* criteria (American Psychiatric Association, 2000). Interviewees rate symptoms and interference on a 9-point scale from 0 (*none*) to 8 (*very severe*), with a rating of 4 being considered clinically significant (Silverman & Albano, 1996). Interrater reliability for child-reported symptoms is good to excellent (k = 0.72–0.91) and interrater reliability for parent-reported symptoms is considered excellent (k = 0.78–0.86; Silverman, Saavedra, & Pina, 2001). ADIS-C/P ADHD modules directly correspond to the DSM-IV-TR criteria for ADHD including requiring six or more symptoms present in the past 6 months in one or more domains and associated impairment. As well, the ADIS-C/P ADHD modules have demonstrated concurrent and convergent validity (Jarrett, Wolff, & Ollendick, 2007). Clinical psychology doctoral students, blind to purposes of the study, conducted the interviews. Interrater reliability in this clinic was k = 1.00.

Children's Automatic Thoughts Scale (CATS)

The CATS (Schniering & Rapee, 2002) contains 40 items referring to negative beliefs in the domains of social threat (e.g., "Kids will think that I am stupid"), physical threat (e.g., "I am going to have an accident"), personal failure (e.g., "I can't do anything right"), and hostility (e.g., "I have the right to take revenge on people if they deserve it"). Children report the frequency with which they have experienced various negative self-statements during the past week using a 5-point Likert-type scale (0 = *not at all* to 4 = *all the time*). Scores on items are summed to yield a score for each domain and a total score for the full scale. Psychometric evaluations of the CATS have demonstrated that the scale is reliable in terms of internal consistency and test-retest stability (Schniering & Rapee, 2002). Moreover, the CATS has demonstrated internal, criterion, and convergent validity in clinical and nonclinical youth aged 7 to 14 (Micco & Ehrenreich, 2009). Specifically, the physical threat subscale significantly correlated with self-reported generalized anxiety and separation anxiety, and the social threat and personal failure subscales significantly correlated with self-reported social anxiety and major depression, while controlling for age, sex, and clinical status. As well, the four-factor structure correlates positively with measures of internalizing and externalizing psychopathology, and differentiates reasonably well between children and adolescents aged 6 to 17 with various types of psychological disorders (Schniering & Lyneham, 2007). In the current study, the physical threat (Cronbach's α = 0.85), social threat (Cronbach's α = 0.88), personal failure (Cronbach's α = 0.89), and hostile intent (Cronbach's α = 0.81) subscales had good reliability.

Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001)

The CBCL is a 113-item parent-report screening measure for emotional and behavioral problems in children between the ages of 6 and 16 years of age. Computer scoring provides eight empirically derived syndrome scales (i.e., Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention problems, Rule-Breaking Behavior, and Aggressive Behavior). The current study utilized the Attention Problems subscale, which had a Cronbach's α of .84.

Conners' Parent Rating Scales—Revised: Short Form (CPRS-R-S)

The CPRS-R-S (Conners, 1997) is a 27-item parent report of their child's ADHD symptomatology. The CPRS-R-S has four subscales: oppositional subscale, cognitive problems, hyperactive/impulsive and ADHD Index. Psychometric properties of the revised scale appear adequate as demonstrated by good internal reliability coefficients, high test-retest reliability and effective discriminative power (Conners, Sitarenios, Parker, & Epstein, 1998). The current study utilizes the hyperactivity/impulsivity and oppositional subscale, which had a Cronbach's α of .89 and .93, respectively.

Multidimensional Anxiety Scale for Children (MASC)

The MASC (March, 1998) is a 45-item child self-report questionnaire for symptoms of anxiety. Total scores range from 0 to 120, with high scores indicating greater childhood anxiety. The four empirically derived factor index scores are Social Anxiety, Separation Anxiety, Harm Avoidance, and Physical Symptoms. The MASC has shown good internal consistency ratings from .70 to .83 and Cronbach's alpha ranging from .74 to .85 (March, 1998). Further, the MASC has demonstrated good convergent validity (Baldwin & Dadds, 2007), good concurrent validity (Rynn et al., 2006), adequate divergent validity, and good test-retest reliability (March, Parker, Sullivan, Stallings, & Conners, 1997). The Cronbach's alpha of the MASC total score in the current study was found to be well within the acceptable range (Cronbach's α = .89).

DATA COLLECTION

Youth and their parent(s) presented at an outpatient, community clinic in a large, southern university for either a psychoeducational assessment or treatment (for treatment instruments were completed as part of

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the intake process prior to intervention). Children were referrals from community pediatricians, schools, mental health professionals, and self-referrals. Therapists were trained doctoral student clinicians practicing under the supervision of a licensed psychologist with more than 15 years experience. Therapists had been trained on administering and rating the ADIS-IV-C/P. Examiners first participated in a half-day training workshop conducted by the third author. In addition, examiners signed up for at least two semesters of the third author's clinical practicum and attended weekly 3-hour supervision meetings where cases, diagnoses, and ADIS ratings were discussed. Following participation in the workshop, examiners were required to observe 2 to 3 ADIS interviews conducted by senior examiners and rate their own interviews independently; following the interviews, feedback was given and any discrepancies were discussed. After observing several interviews, examiners-in-training then conducted 2 to 3 interviews themselves while a senior examiner observed them; similarly, after the interviews, feedback was given and any discrepancies were discussed. After this training process, an examiner was allowed to conduct interviews independently and present cases during weekly supervision. One clinician interviewed the parent(s) and administered parent measures, while the second clinician separately and independently completed the child diagnostic interview. All children taking stimulant medication were asked to not take stimulant medication on the day of assessment following consultation with their prescribers. Families all agreed to let their de-identified data be used for research purposes. No specific inclusion criteria were used for assessment participation. Institutional Review Board approval, child assent, and parent consent were obtained prior to the start of their first session. Psychoeducational testing lasted for three, 2–3 hour sessions, beginning with the ADIS-IV-C/P. Data were collected over approximately 10 years.

For the purpose of this study, clinically significant ADHD diagnoses were established using a consensus team meeting based on the ADIS-C/P interview, parent-, and teacher-reported ADHD symptoms on the Conners' Parent Rating Scales–Revised: Short Form (CPRS-R-S) and the Conner' Teacher Rating Scales–Revised: Short Form (CTRS-R-S), respectively. Parent- and teacher-reported ADHD symptomatology was used to supplement ADIS-P findings as they provide norm-referenced data on youths' ADHD symptomatology. A consensus approach was used given the critical role parent- and teacher-reported ADHD symptoms have in the diagnosis of ADHD (Jarrett et al., 2007; Pelham, Fabiano, & Massetti, 2005). The ADHD module has demonstrated evidence of concurrent and convergent validity (Jarrett et al., 2007). Further, informant agreement between the ADIS-P and the ADIS-C on the ADHD module does not improve the interview's diagnostic validity (Jarrett et al., 2007). In terms of the ADIS-C/P, a diagnosis was considered if the clinician's severity rating was 4 or higher on a 0–8 rating scale, as recommended by Silverman and Albano (1996). During consensus team meeting, this information was taken in concert with clinically significant scores on the CPRS-R-S and CTRS-R-S (i.e., T-score $\geq$ 70), as outlined by the CPRS-R-S and CTRS-R-S User Manual (Conners, 1997). As well, when delineating ADHD-C, ADHD-I, and ADHD–predominantly hyperactive/impulsive, diagnostic criteria on the ADIS-C/P, and clinically significant scores on symptom subscales were utilized, as outlined by research on the evidence-based assessment of ADHD in children and adolescents (Pelham et al., 2005).

Results

MISSING DATA, NORMALITY, AND DESCRIPTIVE STATISTICS

There was very little missing data. In each analysis, for participants administered the relevant measures, missing data (<5% of the total samples) was found to be missing at random (i.e., missing data was unrelated to the dependent variables in the analyses), and therefore deletion was list-wise for group analyses, given the statistical technique used, and pair-wise for dimensional analyses. Normality was examined through kurtosis and skewness values, as well as visual inspection of histograms. CATS subscales demonstrated significant negative skewness, therefore a natural-log transformation was applied to all subscales (see Table 2; Tabachnick & Fidell, 2013). Following transformation, CATS subscales were approximately normally distributed. All other continuous variables had skewness and kurtosis values within acceptable limits. Pearson correlations, means, and standard deviations of all measured variables are presented in Table 3.

Table 2
Scores on the Children's Automatic Thoughts Scale (CATS) for ADHD-I and ADHD-C Groups

CATS Subscale	ADHD-I Mean (SD)	ADHD-C Mean (SD)	Cohen's d
Physical Threat	1.00 (0.96)	1.09 (1.11)	.09
Social Threat	0.88 (0.97)	1.28 (1.21)	.36
Personal Failure	0.70 (0.84)	1.08 (1.06)*	.40
Hostile Intent	1.67 (0.98)	2.11 (0.91)*	.47

Note. * Difference between groups, $p < .05$; See text for full results of t-tests; natural log transformation was applied to all CATS subscales.

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Table 3
Pearson Correlations, Means, and Standard Deviations of Measured Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	*M*	*SD*
1. Physical Threat	1.0								4.01	6.33
2. Social Threat	.77*	1.0							4.68	7.10
3. Personal Failure	.77*	.67*	1.0						3.13	5.48
4. Hostile Intent	.59*	.55*	.59*	1.0					8.56	7.18
5. Attention Problems	.03	.00	.03	-.02	1.0				63.93	10.32
6. Hyperactivity/Impulsivity	-.10	.00	-.08	.09	.44*	1.0			66.18	14.49
7. Oppositional	-.03	.00	.09	.13	.45*	.55*	1.0		59.99	14.45
8. MASC Total Score	.48*	.49*	.49*	.37*	00	-.12	-.03	1.0	46.72	13.16

Note. * $p < .05$; N = 137; Physical Threat, Social Threat, Personal Failure, and Hostile Intent = subscales of the Children's Automatic Thoughts Scale (CATS), prior to natural log transformation; Attention Problems = subscale of Child Behavior Checklist (CBCL); Hyperactivity/Impulsivity and Oppositional = subscales of the *Conners' Parent Rating Scales—Revised: Short Form (CPRS-R-S);* MASC Total Score = *Multidimensional Anxiety Scale for Children (MASC)* Total Score;

ADHD DIAGNOSTIC SUBTYPES AND NEGATIVE SELF-STATEMENTS

A MANCOVA was conducted to determine whether ADHD-I and ADHD-C groups differed in their frequency of negative self-statements on the CATS while controlling for familywise Type I error (Tabachnick & Fidell, 2013). A natural log transformation was used on CATS scores given their high degree of skew; all transformed scores had acceptable levels of skew. Age and gender were included as covariates and a robust test statistic (i.e., Pillai's Trace) was used to compare groups. A significant difference was found between scores from ADHD inattentive and combined subtype children on a multivariate composite of all four CATS subscales, Pillai's Trace = .09, $F(4, 107) = 2.61$, $p = .04$. Independent samples *t*-tests were then conducted to determine whether individual subscale scores differed between diagnostic groups. The ADHD-C group had a significantly higher frequency of negative self-statements than the ADHD-I group on the personal failures, $t(112 = 2.20$, $p = .04)$ and hostile intent subscales, $t(112) = 2.48$, $p = .02$. ADHD-C and ADHD-I groups did not differ in their frequency of negative self-statements on the physical threat, $t(112) = 0.41$, $p = .68$, and social threat subscales, $t(112) = 1.95$, $p = .05$. Scale means on the CATS for both groups can be found in Table 2.

ADHD DIAGNOSTIC SUBTYPES, ANXIETY, AND NEGATIVE SELF-STATEMENTS

Given more frequent negative self-statements found in the ADHD-C group vs. ADHD-I group, and prior work establishing the association between anxiety and negative self-statements, we examined the relative association of ADHD subtype and anxiety with negative self-statements in separate multiple regression models. Anxiety symptoms (as measured by the MASC total score), and the covariates of child age and gender were entered in the first step of separate hierarchical regression models predicting different types of negative self-statements. In the second step, we examined whether ADHD subtype and/or the interaction of ADHD subtype and anxiety explained incremental variance. To maintain consistency with the prior analysis, natural log transformed values of the CATS were used. All continuous variables were centered prior to being entered into the analyses. For physical threat, $F(3, 90) = 10.36$, $p < .001$, Adjusted $R^2 = .26$, social threat, $F(3, 90) = 11.77$, $p < .001$, Adjusted $R^2 = .26$, and hostile intent, $F(3, 90) = 11.96$, $p < .001$, Adjusted $R^2 = .23$, anxiety was the only significant predictor, with higher anxiety predicting more frequent negative self-statements ($\beta = .45$, $p < .001$; $\beta = .53$; $\beta = .49$, all $p < .001$, respectively). For personal failure, $F(5, 88) = 8.33$, $p < .01$, Adjusted $R^2 = .28$, the interaction of anxiety and ADHD subtype ($\beta = .27$, $p < .05$) predicted incremental variance beyond anxiety and ADHD subtype alone, $F(2, 88) = 3.37$, $p = .04$, R^2 Change = .05. A simple slopes analysis showed that the relationship of anxiety to negative self-statements was significant in both the ADHD-I and ADHD-C groups; however, the magnitude of the relationship significantly differed in the ADHD-C group ($\beta = .58$, $p < .001$) than the ADHD-I group ($\beta = .37$ $p < .001$). See Figure 1.

ADHD SYMPTOM DIMENSIONS AND NEGATIVE SELF-STATEMENTS

Given the results found for ADHD subtype, negative self-statements, and anxiety, we examined the same associations using dimensional measures of ADHD symptoms (i.e., inattention and hyperactivity/impulsivity). Here, a larger dataset including children with and without ADHD diagnoses was used in order to conduct these dimensional analyses using a fuller representation of both normal and elevated ADHD

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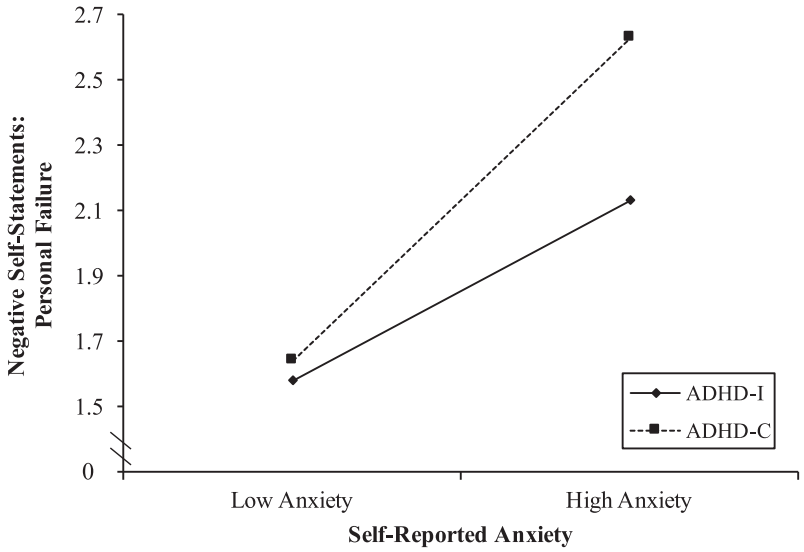

FIGURE 1 Interaction between ADHD-I/C, Anxious Symptomatology, and Negative Self-Statements Related to Personal Failure

symptoms. To maintain consistency with the prior analysis, natural log transformed values of the CATS were used. Child age, child gender, and mother-reported child oppositional symptoms (as measured by the CPRS-R-S oppositional subscale) and anxiety symptoms (as measured by the MASC total score) were included in step 1 of separate hierarchical regression models predicting different types of negative self-statements. Given the stronger link between oppositional symptoms and hyperactivity/impulsivity, when compared to inattention (Burns & Walsh, 2002), as well is the relationship between oppositional symptoms and some CATS domains (Schniering & Lyneham, 2007), oppositional symptoms were included as a covariate. Further, total anxiety symptoms were included given the well-established relationship between anxiety and more frequent negative self-statements (e.g., Schniering & Lyneham, 2007). In step 2, both ADHD symptoms (i.e., hyperactivity/impulsivity as measured by the CPRS-R-S hyperactivity/impulsivity subscale and inattention as measured by the CBCL attention problems subscale) and their interaction with anxiety were entered. The latter provides a test as to whether anxiety moderates the association between ADHD symptoms and negative self-statements. All continuous variables were centered prior to being entered into the analyses. For physical threat, $F(4,132) = 12.14$, $p < .01$, Adjusted $R^2 = .25$, social threat, $F(4, 132) = 6.36$, $p < .01$, Adjusted $R^2 = .25$, and hostile intent, $F(4, 132) = 4.86$, $p < .01$, Adjusted $R^2 = .18$, anxiety was the only significant predictor, with higher anxiety predicting more frequent negative self-statements ($\beta = .50$, $p < .01$; $\beta = .49$, $p < .01$,

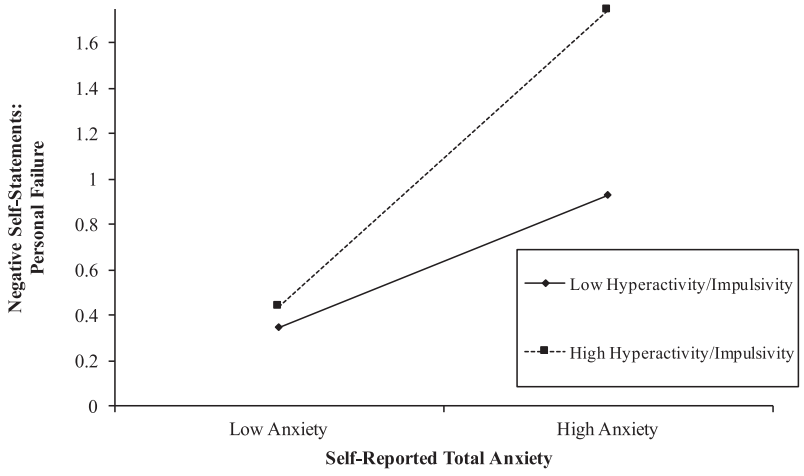

FIGURE 2 Interaction between Hyperactivity/Impulsivity, Anxious Symptomatology, and Negative Self-Statements Related to Personal Failure

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β = .33, $p < .001$, respectively). For personal failure, $F(8, 128) = 11.34$, $p < .01$, Adjusted $R^2 = .38$, ADHD symptoms and the interaction of ADHD symptoms and anxiety predicted incremental variance, $F(4, 128) = 3.34$, $p = .01$, R^2 Change = .06, specifically both hyperactivity/impulsivity (β = .23, $p < .01$) and the interaction of hyperactivity/impulsivity and anxiety (β = .17, $p < .05$) were significant predictors. Anxiety (β = .43, $p < .01$), oppositional symptoms (β = .35, $p < .01$), and gender (β = .20, $p < .01$) also remained significant predictors in that analysis, with girls endorsing more negative self-statements than boys. A simple slopes analysis showed that the relationship of anxiety to negative self-statements was significant in both the ADHD-I and ADHD-C groups; however, the magnitude of the relationship significantly differed in the ADHD-C group (β = .65, $p < .001$) than the ADHD-I group (β = .29, $p < .001$). See Figure 2.

Discussion

The purpose of this study was three-fold. First, we looked to examine the differences in negative self-statements between children diagnosed with ADHD-C and ADHD-I. Second, we then explored whether anxious symptomatology interacts with a diagnosis of ADHD-C to predict two types of negative self-statements: personal failure and social threat. We hypothesized that a group of youth with clinical levels of hyperactivity/impulsivity (i.e., diagnosed as ADHD-C) would have elevated levels of negative self-statements when compared to a group diagnosed with ADHD-I. Additionally, in a secondary analysis, we hypothesized that youth's anxious symptomatology would interact with a youth's diagnosis of ADHD-C to predict negative self-statements regarding social threat and personal failure. Finally, we aimed to replicate these results dimensionally (i.e., hyperactivity/impulsivity) while holding a number of covariates constant (i.e., child's age, gender, oppositional behavior, and inattention).

In regards to cognitive phenotypic differences between youth diagnosed with ADHD-C and ADHD-I, there was support found for our hypothesis; youth diagnosed with ADHD-C had more frequent negative self-statements regarding personal failure and hostile intent when compared to youth diagnosed with ADHD-I. Notably, scores on the CATS in the current study were found to be similar to those found in large community samples (Hogendoorn et al., 2010) but lower than clinical samples of treatment-seeking youth meeting criteria for an anxiety disorder (Schniering & Lyneham, 2007). This finding extends previous literature in adult samples with ADHD (Abramovitch & Schweiger, 2009; Mitchell et al., 2013) to a clinical sample of youth on two fronts. First, our study provides support for the relationship between ADHD and negative self-statements in a clinical sample of youth. Additionally, our findings suggest that negative self-statements, at least in youth, are more related to being diagnosed with ADHD-C, as opposed to ADHD-I, at least based on the results of a parent interview. This cognitive phenotypic difference between those with different ADHD subtypes is supported by a growing symptom literature, albeit in adults. Clinical samples of adults with elevated impulsivity have been shown to report more maladaptive cognitions (Aidman, & Kollaras-Mitsinikos, 2006; Ettelt et al., 2007). Furthermore, this relationship has been extended to nonclinical samples of young adults (Gay et al., 2011) and Chinese adolescents (Li & Chen, 2007). These findings in nonclinical samples are notable, providing evidence that the relationship between impulsivity and maladaptive cognitions, specifically negative self-statements, is not likely related to a common comorbidity that would likely accompany a clinical sample with elevated levels of impulsivity (e.g., substance abuse, oppositional defiant disorder, etc.). It is possible that individuals predisposed to having elevated levels of impulsivity have an inhibition deficit that extends to the cognitive domain.

There is extensive support for a behavior-inhibition-deficit explanation for ADHD-C (Barkley, 1997; Collings, 2003; Quay, 1997). Typically, response inhibition is defined as the ability to inhibit a motor response (Aron & Poldrack, 2005). However, some have hypothesized that there may be reduced cognitive inhibition in individuals with ADHD-C as well (e.g., Nigg, 2000). Given that negative self-statements are associated with reduced inhibitory control (Gorlin & Teachman, 2015), our study provides a preliminary first step in providing some evidence that youth with ADHD-C may have both behavioral and cognitive (i.e., thought) inhibition deficits. However, the current study could not completely control for common comorbidity in ADHD-C (versus ADHD-I) nor delineate hyperactivity and impulsivity symptomatology, which greatly reduces our ability to provide support for a cognitive-disinhibition theory. It is equally plausible that other theories of ADHD (i.e., cognitive-behavioral perspective) provide explanatory power for our results. Nevertheless, given the dearth of literature examining cognitive dysfunction (e.g., worry, negative self-statements, automatic thoughts, etc.) in ADHD, more research is needed examining this important topic as it has strong diagnostic and treatment implications.

There was partial support for our second hypothesis. Our results provided evidence for an interaction between anxious symptomatology and a diagnosis of

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ADHD-C, where youth with high anxiety and a diagnosis of ADHD-C, but not ADHD-I, had elevated levels of negative self-statements regarding personal failure. In contrast to our hypothesis, this interaction with negative self-statements related to social threat was not significant. These findings were then replicated with a second subsample of youth with a continuous measure of hyperactivity/impulsivity, while controlling for common confounds (i.e., child's age, gender, oppositional behavior, and inattention). To our knowledge, this is the first study to date to examine the relationship between cognitive differences in ADHD-C, ADHD-I, and anxious symptomatology. This finding provides support for a distinct cognitive difference in youth diagnosed with ADHD-C and ADHD-I depending on youths' level of anxious symptomatology.

Negative self-statements related to personal failure focus on self-statements regarding feeling inefficient. There is extensive research on ADHD and impairment in a number of domains (e.g., academic achievement, family interaction, peer relationships, etc.), with the majority of research not finding differences in impairment between ADHD-C and ADHD-I (Milich, Balentine, & Lynam, 2001). However, as Nigg (2000) noted, youth diagnosed with ADHD-C have increased levels of disinhibition when compared to youth diagnosed with ADHD-I. Additionally, Epstein, Goldberg, Conners and March (1997) found that self-reported cognitive anxiety (e.g., worry) is associated with decreased response inhibition, where physiological anxiety was associated with enhanced response inhibition. Taken together, and in light of our findings, this supports the notion that youth diagnosed with ADHD-C who have elevated levels of anxious symptomatology may struggle to inhibit thoughts related to their levels of inefficacy that is not seen in ADHD-I. Conversely, it is also possible that youth with ADHD-C may have elevated levels of psychopathology and impairment that lead to increased levels of maladaptive cognitions, when compared to those with ADHD-I. The replication of these results with dimensionally measured hyperactivity/impulsivity (while holding oppositional behavior and inattention constant) suggests the former may be more likely, though both explanations are plausible.

In line with findings by Schniering and Lyneham (2007), negative self-statements regarding hostile intent were significantly predicted by an ADHD diagnosis and anxious symptomatology but not the interaction of anxious symptoms and an ADHD diagnosis. This finding provides support for the possibility of differentiating ADHD and comorbid anxiety from ADHD without comorbid anxiety based on the content of youths' negative self-statements. The hostile intent subscale involves vindictive negative self-statements (e.g., "I have the right to take revenge on people if they deserve it" and "I won't let anyone get away with picking on me") and negative self-statements regarding victimization (e.g., "People always try and get me into trouble" and "Most people are against me"). With the high comorbidity between ADHD and externalizing disorders (i.e., oppositional defiant disorder and conduct disorder), future research should look to examine whether hostile intent negative self-statements are related to comorbid externalizing disorders. For example, it may be hypothesized that there is a bidirectional relationship between the proposed reduction in cognitive inhibition and the well-established behavioral inhibition found in individuals with elevated levels of impulsivity. For instance, hyperactive/impulsive youth may "act out" partially due to an inability to behaviorally inhibit that, taken with a cognitive inhibition deficit, leads to negative self-statements related to feeling of victimized (e.g., "Most people are against me"). Moreover, if their reduced cognitive inhibition leads to vindictive negative self-statements (e.g., "Bad people deserve to get punished"), they may then be more inclined to act in a manner that is in congruence with these thoughts (e.g., get revenge) as their behavioral inhibition is also diminished. In all, more research is needed on the content of negative self-statements and ADHD with particular attention paid to comorbidity with internalizing and externalizing symptoms.

The current findings also have implications for the treatment of ADHD in youth. The most influential treatment study of ADHD has been the Multimodal Treatment Study of children with ADHD study (MTA Cooperative Group, 1999). Overall, the results suggested that medication management significantly decreased ADHD symptoms compared to behavioral programs alone. Moreover, combined medication and behavioral treatment did not prove advantageous to medication management or behavioral treatment alone. Cognitive-behavioral treatments (CBT) for youth with ADHD, in general, are considered by some to be unsupported and ineffective treatments (for a review see Abikoff, 1991; Waschbusch & Hill, 2003; cf. Hinshaw, 2006). However, many of these treatment studies have used outcome measures focused on academic and behavioral functioning. Measures of cognitive functioning tend to include measures of cognitive tempo, planning, sustained attention, and working memory (Toplak, Connors, Shuster, Knezevic, & Parks, 2008). Given the high levels of comorbidity between ADHD and internalizing symptoms, it is surprising internalizing symptoms are seldom included as treatment outcome measure. As well, the presence of anxiety in the

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MTA Study frequently interacted with other variables in relation to treatment response (Jensen et al., 2001). The current study, along with a growing adult literature, suggests future studies examining the efficacy of CBT of ADHD should begin including outcome measures regarding internalizing symptoms.

This shift would mirror the cognitive-behavioral model of adult ADHD (Safren et al., 2004), which has growing support. For example, Eddy and colleagues (2015) provided longitudinal evidence that negative self-concept was associated with changes in anxious and depressive symptoms that longitudinally mediated the association between prior academic achievement and later levels of impairment. Overall, their results provide support for the validity of the cognitive-behavioral model of adult ADHD and highlight the importance of examining internalizing symptoms and cognitive dysfunction (e.g., negative self-statements, worry, negative self-concept, etc.) when examining the long-term impairment and treatment of ADHD.

As with all research, the current study does have limitations. We had a relatively small, largely Caucasian, clinical sample and performed multiple statistical procedures within that same sample. In addition, the sample included families seeking services at a university-based clinic, which may further limit the extent to which the sample is representative of the larger population. Thus, further replication is needed in a larger, more diverse sample. We also did not have access to information regarding medication use in our sample; therefore, the effects medication has on these relationships could not be examined. Our study relied on a diagnostic interview to inform the presence of an ADHD diagnosis, though the results were replicated using dimensional measures of inattention and hyperactivity/impulsivity. Nevertheless, the relationship between these specific symptom domains and negative self-statements, in our diagnostic analyses, were not explored. Moreover, the current study did not include youth diagnosed with ADHD–predominantly hyperactive/impulsive. Similarly, we did not explore the effect oppositional symptoms had on these relationships in our diagnostic analyses. This decision was made because of the loss of participants that would have occurred had oppositional symptoms been included as a covariate in the diagnostic analyses. As well, given the cross-sectional nature of the study, temporal sequencing cannot be inferred. The current study suggests that there is a relationship between ADHD presentation and negative self-statements that is moderated by youth's level of anxiety; however, research has also demonstrated that anxiety can be detrimental to attentional control (Eysenck, Derakshan, Santos, & Calvo, 2007), therefore future research should continue to explore the functional connection between these constructs. Furthermore, future studies should look to replicate our findings utilizing dimensional ADHD-symptom level variables with attention paid to comorbid externalizing disorders. Finally, our sample had a broad age range, which means that the youth in the sample are in different stages of cognitive development; though we believe it is an important first step to demonstrate that a relationship between negative self-statements, ADHD, and anxiety exists in all youth, future research should examine how this relationship varies across development. Despite these limitations, our study provides evidence for cognitive phenotypic differences between ADHD-C and ADHD-I and an interaction with anxious symptomatology that future research should continue to delineate.

Overall, more research is needed on ADHD and negative self-statements, and general maladaptive cognitions (e.g., worry). Specifically, an examination of worry, self-beliefs, and self-concept is warranted. Given that this is the first study to examine negative self-statements in children with ADHD, researchers should look to replicate these findings. Particular attention should be paid to the high comorbidity within ADHD as well as the cognitive differences within ADHD subtypes. The current study did not examine youth diagnosed with ADHD–predominantly hyperactive/impulsive, and given our findings, future research should examine whether our findings translate to this population. As well, researchers may wish to examine the effect oppositional behavior has on the relationship between ADHD-C and negative self-statements regarding hostile intent. Finally, working memory has been consistently found to be more impaired in youth with ADHD and comorbid anxiety; thus, research on ADHD and comorbid anxiety, working memory, and maladaptive cognitions may prove fruitful.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

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