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# Inattention symptoms and the diagnosis of comorbid attention-deficit/hyperactivity disorder among youth with generalized anxiety disorder

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ABSTRACT

Generalized anxiety disorder (GAD) and attention-deficit/hyperactivity disorder (ADHD) commonly co-occur in childhood. Inattention symptoms can be hallmarks of both conditions, however assessment tools of inattention may not effectively distinguish between the two conditions. The present study used receiver operating characteristic (ROC) analyses to examine the high-end specificity of the Attention Problems Scale of the Child Behavior Checklist (CBCL) for detecting comorbid ADHD among youth with GAD ($N = 46$). Results support the utility of the Attention Problems Scale for accurately distinguishing between the two groups (AUC = .84, SE = .06). Specifically, a cut score of 63 achieved the most favorable values across diagnostic utility indices; 74% of GAD youth with ADHD scored above this cutoff and 91% of GAD youth without ADHD scored below this cutoff. Findings provide support for the use of the CBCL Attention Problems Scale to supplement diagnostic interviews and identify inattention associated with ADHD among GAD youth.



## 1. Introduction

Attention-deficit hyperactivity disorder (ADHD) is a highly debilitating condition that is frequently comorbid with multiple internalizing and externalizing disorders (e.g., Jensen et al., 2001). Roughly 7% of the U.S. child population has met diagnostic criteria for ADHD in the past year (Kessler et al., 2012), and affected youth are at risk for a host of negative sequelae, including reduced academic achievement, peer functioning, and overall quality of life (e.g., Hakkaart-van Roijen et al., 2007; Loe & Feldman, 2007; Murray-Close et al., 2010). Although the majority of work to date examining ADHD comorbidities has investigated dysfunction association with ADHD and other externalizing conditions, such as oppositional defiant disorder and conduct disorder (Khune, Schachar, & Tannock, 1997), recent work has specifically explored previously understudied and impairing heterotypic comorbidity patterns such as the co-occurrence of ADHD and anxiety problems (Jarrett & Ollendick, 2008; Jarrett, Wolff, Davis, Cowart, & Ollendick, 2012; Tannock, 2009).

Generalized anxiety disorder (GAD)—characterized by uncontrollable and interfering worry and related symptoms, and associated with considerable impairments in its own right (Comer et al., 2011)—is one of the most common anxiety conditions that co-occurs with ADHD in childhood and adolescence, with estimates indicating that these disorders co-occur in up to 15% of youth (Elia, Ambrosini, & Berrettini, 2008). Meta-analytic work by Willcutt et al. (2012) demonstrates that compared to healthy controls, children and adolescents with ADHD-Combined Subtype (ADHD-C) are 6.5 times more likely to meet criteria for comorbid GAD, while youth with the Inattentive (ADHD-I) and Hyperactive/Impulsive (ADHD-H/I) subtypes are also more likely to meet criteria for co-occurring GAD (OR = 3.5 and 4.2, respectively). Parallel comorbidity patterns have also been observed in the adult literature, with recent epidemiological studies indicating that 23% of adults with GAD suffer from comorbid ADHD (Van Ameringen, Mancini, Simpson, & Patterson, 2011). In addition, adults with GAD are more likely than adults with social phobia to have a childhood history of ADHD (Safren, Lanka, Otto, & Pollack, 2001), further supporting the specific comorbidity of these two conditions across the lifespan.

Despite evidence demonstrating the frequent co-occurrence of ADHD and GAD and unique associated impairments, much remains to be learned about the nature of this comorbidity pattern. Notably, there is some degree of overlap in the symptom criteria

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for both GAD and ADHD, including difficulties with inattention, problems concentrating, and restlessness (American Psychiatric Association, 2013). Such symptom overlap can increase the likelihood of misdiagnosing a child with ADHD when a diagnosis of GAD is indicated, and vice versa. With respect to inattention symptoms, it has been suggested that intrusive worries and hypervigilance to threat cues associated with GAD often manifest as symptoms of inattention (Jarrett & Ollendick, 2008), which can complicate differential diagnosis decisions. Recent evidence suggests that the mechanisms underlying symptoms of inattention differ between anxiety disorders and ADHD. For example, Weissman, Chu, Reddy, and Mohlman (2012) compared the performance of anxious, inattentive-impulsive, and typically developing children on several neurocognitive tasks assessing attentional processes. The authors found that inattentive-impulsive youth performed more poorly on tests of general attentional processes, as measured by the Conners' Continuous Performance Test (CPT-II), than anxious children and typically developing controls. In contrast, anxious youth showed greater attentional biases toward threat cues than inattentive-impulsive youth, as assessed by the Faces Dot Probe Task. Another recent study by Jarrett et al. (2012) compared the performance of youth with anxiety disorders only (ANX only), comorbid ADHD and anxiety disorders (ANX + ADHD), and ADHD only. Researchers found significant differences on CPT performance between groups, indicating that youth with ADHD only were significantly more impaired than groups with anxious profiles. Taken together, these findings suggest that although symptoms of inattention, broadly speaking, are hallmarks of both GAD and ADHD, some might argue that inattention in GAD may be functionally different than inattention in ADHD, given differences in neuropsychological correlates. These discrepancies provide preliminary support for distinct neurologic pathways in the etiology of attention difficulties between GAD and ADHD.

Accurate assessment is the critical first step in the design of indicated treatment planning. Given overlapping symptom presentations from a topographical perspective across GAD and ADHD, assessment tools that inform differential diagnosis, which in turn informs treatment planning among anxious youth, must be sensitive enough to distinguish inattention symptoms associated with ADHD from GAD-related inattention. Although structured and semi-structured diagnostic interviews, neuropsychological assessments, and behavioral observations can offer more comprehensive assessments of a child's differential clinical portrait, such assessment methods are time- and cost-intensive, and as such are used less frequently in clinical practice than self-administered symptom questionnaires (Pelham, Fabiano, & Massetti, 2005). Therefore it is crucial that screening measures widely used in clinical practice be empirically scrutinized with regard to their ability to distinguish between GAD- and ADHD-related attention problems.

The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) is one of the most widely used and well-supported parent-report measures of child psychopathology in clinical practice. The Attention Problems Scale—one of the eight CBCL clinical syndrome scales—purportedly assesses the presence of inattention symptoms frequently associated with ADHD. Research indicates that inattention as measured by the CBCL Attention Problems Scale is a continuously distributed phenomenon (Hudziak, Wadsworth, Heath, & Achenbach, 1999), and the Attention Problems scale has shown strong discriminating power for detecting ADHD in general samples (Chen, Faraone, Biederman, & Tsaung, 1994; Lampert, Polanczyk, Tramontina, Mardini, & Rohde, 2004).

Despite support for the CBCL Attention Problems Scale for detecting broad symptoms of inattention in non-anxious samples, research has yet to evaluate the performance of the Attention Problems Scale for detecting inattention among youth with GAD. Given the frequency with which the CBCL Attention Problems Scale is administered in the assessment of childhood psychopathology, in concert with concerns about the impact of diagnostic misattribution of inattention symptoms on treatment planning, research is needed to evaluate the "high-end specificity" (Kendall, Hollon, Beck, Hammen, & Ingram, 1987) of the Attention Problems Scale for detecting inattention associated with ADHD. High-end specificity refers to the evaluation of a measure's ability to differentiate between overlapping or neighboring symptom presentations in order to assess the extent to which high scores on the measure are associated exclusively with the diagnosis in question (see Kendall et al., 1987).

The present study examined the high-end specificity of the CBCL Attention Problems Scale for detecting inattention associated with comorbid ADHD among youth with GAD. We hypothesized that if the CBCL is able to accurately capture symptoms of inattention associated with ADHD, children with comorbid GAD and ADHD should score higher on the CBCL Attention Problems Scale relative to those children presenting with GAD only even though these latter youth also present with inattention. Further, in accordance with Matthey and Petrovski's (2002) guidelines for identifying a favorable cut score with diagnostic utility, we attempted to identify a *t*-score cutoff on the CBCL Attention Problems Scale that would sensitively classify at least 70% of "true" ADHD cases (as determined by structured diagnostic interviewing methods) as having inattention associated with ADHD, and would accurately classify at least 80% of GAD-only cases as not having inattention associated with ADHD.

## 2. Methods

### 2.1. Participants

Participants were 46 English-speaking youth diagnosed with GAD between the ages of 7 and 18 (54% female; $M_{Age}$ = 12.03 years, SD = 3.3) and their English-speaking mothers who presented for clinical services at an urban, university-based anxiety specialty clinic in New England. The clinic from which data were drawn excludes youth with thought disorders, pervasive developmental disorders, organic brain syndromes, intellectual disabilities, or current suicidal ideation from research. Participants were predominantly Caucasian/Non-Hispanic (80.4%). Families ranged in resources: 30.3% were at or below 300% of the national poverty line for their year (e.g., in 2007, $63,609 for a family of 4; $75,240 for a family of 5) whereas 21.2% of households earned at least 600% of the national poverty line at their year of assessment (e.g., in 2007, $127,218 for a family of 4; $150,480 for a family of 5). Parents of the majority of children were married or cohabitating (83.7%); 2.3% of children's parents were previously but no longer married, and 6.5% of parents reported being separated, widowed, or never married. The majority of participants (63.0%) were not taking psychotropic medications at the time of the assessment. Among those taking psychotropic medications, antidepressants were most common (*N* = 6), followed by stimulant medications (*N* = 5); 6 participants were taking multiple medications, as is common in outpatient samples (Comer, Olfson, & Mojtabai, 2010).

Participant diagnostic profiles were generated following formal semi-structured diagnostic interviews conducted with children and parents. GAD was the principal diagnosis or co-principal diagnosis for 25 participants (54.3%); for the remainder of the sample all GAD criteria were met with associated impairment, but another disorder presented with even greater severity. Comorbid diagnoses were common. Youth with GAD also met diagnostic criteria for the following disorders at clinical levels: ADHD (*N* = 23; 50.0%), social anxiety disorder (*N* = 14, 30.4%), specific phobia (*N* = 13, 28.3%), obsessive-compulsive disorder (*N* = 9, 19.6%), separation anxiety disorder (*N* = 7, 15.2%), major depressive disorder (*N* = 3, 6.5%), panic