



## Cognitive biases in childhood anxiety disorders: Do interpretive and judgment biases distinguish anxious youth from their non-anxious peers?☆

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### ABSTRACT

The purpose of this study was to compare interpretive biases (i.e., the tendency to interpret neutral stimuli in a negative way) and judgment biases (i.e., a lowered estimate of one's ability to cope with a threatening situation) in clinically anxious youth ( $n = 24$ ) with a demographically matched group of non-referred youth ( $n = 48$ ). Interpretive biases were assessed with the Children's Negative Cognitive Error Questionnaire (CNCEQ) and judgment biases were assessed with the Anxiety Control Questionnaire-child form (ACQ-C). Results indicated that (1) children in the clinic sample exhibited significantly more negative interpretive biases and less positive judgment biases relative to the control sample, (2) the ACQ-C demonstrated incremental validity over the CNCEQ in predicting diagnostic status, (3) the ACQ-C predicted diagnostic status while controlling for Generalized Anxiety Disorder symptoms and parent-reported internalizing and externalizing symptoms, (4) the relationship between the CNCEQ and diagnostic status was moderated by age and gender. Implications of the findings for theory and practice are discussed to highlight suggestions for future research and clinical practice.

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Anxiety disorders are among the most common forms of emotional problems in youth, with estimates as high as 20% (Albano, Chorpita, & Barlow, 1996; Costello, Egger, & Angold, 2004). Theoretical models of development and maintenance of anxiety problems in childhood have suggested a need to better understand the cognitive dimension of anxiety among youth anxiety disorders (Alfano, Beidel, & Turner, 2002; Chorpita & Barlow, 1998; Vasey & Dadds, 2001). Cognitive and information processing models focus on the way that youth process information including attention toward threatening stimuli, the recall of past experiences, the interpretation of stimuli and situations, and the judgment of coping ability (Beck, 1976; Chorpita & Barlow, 1998; Ellis, 1962; Vasey & Dadds, 2001; Weems & Stickle, 2005; Weems & Silverman, 2006).

Cognitive biases can be seen as broadly falling into one of four categories, namely, biased interpretation, biased judgment, biased memory and selective attention (see e.g., Vasey & MacLeod, 2001; Weems, Costa, Watts, Taylor, & Cannon, 2007; Weems & Watts, 2005). In this paper, the focus is on two types of cognitive biases—judgment biases (e.g., lowered estimates of the ability to control external threats and/or anxiety-related sensations) and

interpretation biases (e.g., catastrophizing, overgeneralizing). In particular, anxious children are theorized to *interpret* ambiguous stimuli, situations and past experiences in a negative way (Barrett, Rapee, Dadds, & Ryan, 1996; Bogels & Zigterman, 2000; Spence, Donovan, & Brechman-Toussaint, 1999), and to have lowered *judgments* of their ability to deal with threatening/negative events (e.g., see Chorpita & Barlow, 1998; Weems & Silverman, 2006).

In terms of interpretation biases, existing research has fairly consistently found that interpretive biases are correlated with anxiety symptoms in youth (Barrett et al., 1996; Chorpita, Albano, & Barlow, 1996; Epkins, 1996; Leitenberg, Yost, & Carroll-Wilson, 1986; Taghavi, Moradi, Neshat-Doost, Yule, & Dalgleish, 2000; Weems, Berman, Silverman, & Saavedra, 2001; Weems et al., 2007). The Children's Negative Cognitive Error Questionnaire (CNCEQ; Leitenberg et al., 1986) has been one of the most common ways to assess interpretation biases as cognitive errors—such as, catastrophizing (e.g., interpreting an event or situation in the worst possible manner) and overgeneralization (e.g., interpreting one negative event as indicative of all future similar events). Results from several studies have indicated that interpretive biases are significantly associated with self-reported anxiety symptoms (Epkins, 1996; Leitenberg et al., 1986; Weems et al., 2001, 2007). However, while there is some evidence that children meeting diagnostic criteria and non-anxious comparison youth do differ in interpretation biases using various methods (Barrett et al., 1996; Bogels & Zigterman, 2000; Spence et al., 1999) the ability of the CNCEQ to discriminate anxiety disordered youth from non-anxious youth has not yet been

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tested. Moreover, reviews of the literature have called for additional evidence that interpretive biases can serve to differentiate these youth from non-anxious youth (Alfano et al., 2002).

In terms of judgment biases, *control* involves a judgment of one's coping abilities and has often been used as a way to measure judgment biases (see Weems et al., 2007 for an expanded discussion of conceptual distinctions). Barlow's (1988, 2002) model of anxiety proposes that an individual's judgment that they lack control over external threats (i.e., events, objects, or situations that are fear producing) and/or negative, internal emotional and bodily reactions is a major part of why anxiety is a "problem." Weems, Silverman, Rapee, and Pina (2003) developed the Anxiety Control Questionnaire for Children (i.e., the ACQ-C modified version of the adult questionnaire ACQ; Rapee, Craske, Brown, & Barlow, 1996) to test Barlow's theory and found that clinically anxious children had lower perceived control over anxiety compared to non-anxious children. Additionally, the authors found that anxiety control beliefs predicted anxiety disorder status while controlling for another measure of control (i.e., the Nowicki-Strickland Locus of Control Scale (NSLOC; Nowicki & Strickland, 1973)). In another study, Weems et al. (2007) have found that judgment biases (measured by the ACQ-C) were significantly associated with self-reported anxiety levels while controlling for CNCEQ scores in a community sample of youth. However, the incremental validity of the ACQ-C and CNCEQ in predicting anxiety disorder status could not be assessed.

In sum, there is evidence to suggest that both interpretive biases (measured with the CNCEQ) and judgment biases (measured with the ACQ-C) are related to levels of self-reported anxiety symptoms in youth (Epkins, 1996; Leitenberg et al., 1986; Leung & Wong, 1998; Watts & Weems, 2006; Weems et al., 2001, 2003, 2007). However, it is unclear if CNCEQ scores and limited evidence that ACQ-C scores discriminate clinically anxious youth from non-anxious youth. Theoretically, the two are distinct cognitive features of anxiety disorders (Beck, 1976; Barlow, 2002; Weems & Watts, 2005) and evidence suggests that they each incrementally predict self-reported anxious symptoms in youth (Weems et al., 2007). However, research is needed to examine if CNCEQ scores and ACQ-C scores independently discriminate clinically anxious youth from non-anxious youth, as predicted by theory (Barlow, 2002; Beck, 1976; Weems & Watts, 2005).

Research has found evidence for age moderating the association between anxiety and CNCEQ scores (Weems et al., 2001). Research comparing youth meeting diagnostic criteria for anxiety disorders with non-referred youth may help clarify if (and how) age and gender influence the association between CNCEQ and ACQ-C scores and anxiety. Age and gender differences were examined in the original study in which the CNCEQ was developed (Leitenberg et al., 1986). While there were no differences for gender, younger children (fourth graders) scored significantly higher on the CNCEQ compared to both sixth graders and eighth graders. In addition, there is some evidence that age may play a role in the association between CNCEQ scores and anxiety. For example, Weems et al. (2001) examined whether age and gender moderated the association between interpretive biases (as measured by the CNCEQ) and anxiety (as measured by the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978)) and the State-Trait Anxiety Inventory for Children—Trait Version (STAIC-T; Spielberger, 1973). Overall, cognitive errors were more strongly related to anxiety levels in older youth. However, they did not find that gender moderated the link between self-reported anxiety and CNCEQ scores. Age and gender have not been found to moderate associations between the ACQ-C and anxiety.

It was hypothesized that (1) CNCEQ and ACQ-C scores will show that youth with anxiety disorders will have a greater tendency toward interpretive biases and lower perceived anxiety-related

**Table 1**  
Diagnoses of the clinic sample.

Clinic sample (n = 24)		
Anxiety disorder(s) only	3	(12.5%)
Anxiety and externalizing disorder(s)	11	(45.8%)
Anxiety and an affective disorder	1	(4.2%)
Anxiety and externalizing disorder(s) and an affective disorder	9	(37.5%)
Number of youth meeting diagnosis for:		
Generalized Anxiety Disorder	19	(79.2%)
Specific Phobia	16	(66.7%)
Social Phobia	14	(58.3%)
Separation Anxiety Disorder	11	(45.8%)
Obsessive-Compulsive Disorder	6	(25.0%)
Posttraumatic Stress Disorder	4	(16.7%)
Panic Disorder	2	(8.3%)
Agoraphobia	1	(4.2%)
Attention-Deficit/Hyperactivity Disorder	19	(79.2%)
Oppositional Defiant Disorder	6	(25.0%)
Conduct Disorder	0	
Dysthymia	7	(29.2%)
Major Depressive Disorder	3	(12.5%)

Note: Externalizing disorder(s) includes Attention-Deficit/Hyperactivity Disorder or Oppositional Defiant Disorder. Affective disorder includes Major Depressive Disorder or Dysthymia.

control (judgment biases) compared to the control sample. That is, youth meeting diagnostic criteria for anxiety disorders should, theoretically, have a significantly higher mean score on the CNCEQ and a significantly lower mean score on the ACQ-C relative to the control sample. It is also hypothesized that (2) CNCEQ scores and ACQ-C scores will each demonstrate incremental validity over each other in predicting diagnostic status given the theoretical uniqueness of the two constructs. Next, analyses tested if the CNCEQ and ACQ-C would predict diagnostic status beyond measures of general anxiety and externalizing symptoms to control for possible confounding of findings due to comorbidity patterns. Lastly, (4) analyses will test whether age and gender moderate the associations between diagnostic status and the two cognitive biases.

## 1. Method

### 1.1. Participants

Children in the clinic sample were referred from various sources including area schools and mental health clinics and from screenings conducted in the research laboratory. From this subject pool, 24 participants met criteria to comprise the anxiety disorder group. These children each met criteria for an anxiety disorder as assessed by the Anxiety Disorders Interview Schedule for DSM-IV (ADIS see below). That is, each diagnosed disorder is given a "Clinician Severity Rating," which is based on the interviewer's clinical judgment and the information obtained from the child and parent, and most of these youth (75%) have an anxiety disorder considered the most clinically "severe," relative to other diagnoses (Albano & Silverman, 1996). Six children (25%) had an anxiety disorder and an externalizing disorder with equal severity ratings.<sup>1</sup> Diagnoses of the clinic sample are delineated in Table 1. All but one child in the clinic sample had comorbid diagnoses. The average number of anxiety disorders met was 3. The first half of Table 1 classifies all clinic youth (n = 24) in terms of clusters of diagnoses (i.e., anxiety disorders, externalizing disorders, affective disorders). The second half

<sup>1</sup> These 6 youth did not differ from other youth in the clinic sample on any of the measures used in the present study (i.e., CNCEQ, ACQ-C, RCADS-GAD, CBCL internalizing and externalizing scales), and the pattern of results from the main analyses of the study remained the same if they were excluded from the analyses.

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