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Attentional bias toward school-related academic and social threat among test-anxious undergraduate students

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ABSTRACT

Anxiety in the context of school is a complex and prevalent problem, often characterized by fear of negative academic (i.e., test anxiety) and social evaluation. Despite evidence that attentional biases contribute to the etiology and maintenance of anxiety, biased attention toward school-related threat remains understudied. Undergraduate participants ($N = 211$) completed a dot-probe paradigm assessing attentional bias toward two types of school threat stimuli: academic (e.g., failed test) and social (e.g., social exclusion) threat images. High test-anxious participants displayed an attentional bias toward academic threat, though this pattern was more pronounced among test-anxious females compared to test-anxious males. Low test-anxious participants, regardless of gender, directed attention away from threat stimuli. Attentional biases toward school threat were uniquely linked to test anxiety, and not a function of elevated general anxiety or depression symptoms. Findings provide a vital step in research efforts considering attentional biases as maladaptive cognitive processes in test anxiety.

1. Introduction

School anxiety is characterized by unpleasant and distressing thoughts, somatic complaints, and behavioral symptoms that occur in the context of school (García-Fernández, Inglés, Martínez Monteagudo, & Redondo, 2008; Kearney, 2008). Martínez-Monteagudo, Inglés, Trianes, and García-Fernández (2011) describe school anxiety as comprising several domains of academic and interpersonal distress, such as fears pertaining to academic performance (e.g., failing tests or falling behind on assignments), negative teacher evaluations, and peer relationships (e.g., social exclusion, peer rejection).

Though more commonly studied in younger school children, research suggests that anxiety is also a prevalent and disabling mental health concern among college students (American College Health Association, [ACHA], 2010; Center for Collegiate Mental Health, [CCMH], 2016; Dixon & Robinson Kurpius, 2008). According to the American College Health Association's National College Health Assessment (ACHA, 2010), 18.3% of college students reported anxiety as a factor affecting their academic performance; approximately 20% (21.7% of females; 16.8% of males) also reported having felt "overwhelming anxiety" in the last 12 months. Indeed, emerging adulthood is often marked by elevated stress and anxiety as college students are granted increased autonomy (Arnett, 2000) while also facing new academic (e.g., increased workload) and social (e.g., making new friends, living with peers rather than parents) demands (e.g., Beiter et al., 2015; Hudd et al., 2000; Hunt & Eisenberg, 2010; Rosenthal & Schreiner, 2000; Szafranski, Barrera, & Norton, 2012).

1.1. Anxiety and attentional biases

A large body of literature has established that attentional bias to threat is a cognitive mechanism involved in both the etiology and maintenance of anxiety, including social and generalized anxiety (e.g., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007; Cisler & Koster, 2010; Van Bockstaele et al., 2013). In the most basic sense, an attentional bias refers to a propensity to orient attention toward threat cues. For example, individuals with social anxiety display attentional biases toward threatening social cues, such as faces expressing disgust or contempt (Amir, Najmi, Bomyea, & Burns, 2010). Similarly, those with generalized anxiety disorder exhibit hypervigilance toward an array of aversive stimuli, such as threatening words and images of angry faces (Mogg & Bradley, 2005). Individuals with anxiety disorders not only display a preferential allocation of attention toward threatening stimuli but may also have difficulty disengaging from those threatening cues once their attention has been captured (Amir, Elias, Klumpp, & Przeworski, 2003).

Attentional biases reflect a cognitive vulnerability for intrusive and distressing thoughts, rumination, and worry (Hayes, Hirsch, &

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Mathews, 2010), which perpetuate anxiety in a mutually maintaining way (Van Bockstaele et al., 2013). Attentional biases also frequently result in maladaptive coping strategies and avoidant behaviors that reinforce anxiety and prolong disability (Amir, Weber, Beard, Bomyea, & Taylor, 2008; Hayes et al., 2010). Some research suggests that anxiety symptoms may remit when attentional biases are targeted in treatment, such as through attention bias modification interventions (e.g., Amir et al., 2008; Eldar, Ricon, & Bar-Haim, 2008), highlighting the importance of investigating attentional biases as a potential avenue for developing treatments for anxiety spectrum problems, such as school-related anxiety.

1.2. Attentional biases in test anxiety

Examining attentional bias toward school-related threat holds promise for increasing our understanding of the cognitive underpinnings of school anxiety, in general, and test anxiety, more specifically. For example, test anxiety is viewed as a situation-specific form of school anxiety involving worrisome thoughts about test performance and other evaluative assessment situations (Putwain, 2008; Wren & Benson, 2004). Research on attentional bias in test anxiety has shown that, compared to low test-anxious college students, high test-anxious college students assigned to a high performance-evaluation threat condition show an attentional bias toward threat words (e.g., exam, failure, and incorrect) specific to test anxiety (Putwain, Langdale, Woods, & Nicholson, 2011). Indeed, test anxiety is characterized by a tendency to view evaluative situations in general, and *test* situations in particular, as personally threatening; however, this evaluative fear is often driven by social concerns that are similar to those of individuals with social anxiety (Beidel & Turner, 1988; Zeidner, 1998). Thus, fear of negative evaluation is a key component of both test anxiety and the broader construct of school anxiety, which comprises both academic performance and social-evaluative concerns in the context of school (Martínez-Monteagudo et al., 2011).

A necessary first step in determining whether attentional biases toward school-related threatening stimuli predispose individuals to anxiety is to establish whether such biases exist in a healthy population. Specifically, if a non-clinical sample reporting relatively high levels of test anxiety demonstrates an attentional bias toward school-related threat—most notably, threatening stimuli pertaining to *academic performance* (e.g., failing tests)—then it may indicate a latent predisposition toward anxiety. This would be akin to attentional biases in non-clinically anxious individuals representing a latent vulnerability that is shared with clinical anxiety.

1.3. Experimental methods for measuring attentional biases

One of the most commonly used experimental paradigms for evaluating attentional biases is the dot-probe detection task (MacLeod, Mathews, & Tata, 1986). The behavioral task itself is rather simple. Participants view two stimuli (e.g., one threatening word or image, and one neutral word or image) that are simultaneously presented in two locations (e.g., left and right visual field) on a computer screen. Immediately afterward, a (dot) probe appears in the location previously occupied by either the threatening or neutral stimuli. Participants are asked to indicate, as fast as they can, what location the dot appears (typically by pressing a corresponding key on a keyboard). If one is hypervigilant to a particular threatening stimulus, then one's attention will be drawn to the location of the threatening stimulus. It follows that if the threatening stimulus (e.g., image) was in the same location in which the dot subsequently appears (i.e., spatial congruence), then one's response time in detecting the location of that dot will be facilitated. Faster response times are thought to indicate that attention was directed to the location occupied by the threatening stimulus. Thus, anxiety related attentional biases are often defined as quicker response times for detecting dots that spatially overlap with threatening stimuli, as compared to response times for detecting dots that are preceded by neutral stimuli (e.g., Koster, Crombez, Verschuere, & De Houwer, 2004). The dot-probe detection task has been used to evaluate attentional biases to anxiety-provoking words, images, and social cues (e.g., facial expressions; Bradley, Mogg, Falla, & Hamilton, 1998; Pishyar, Harris, & Menzies, 2004; Waters, Mogg, Bradley, & Pine, 2008), all of which ostensibly reflect the types of threatening stimuli that anxious individuals experience in daily life.

1.4. The present study

Despite considerable evidence of elevated rates of both general school anxiety and test anxiety (e.g., CCMH, 2016; Hunt & Eisenberg, 2010), attentional biases to school-related threat remain poorly understood. It is conceivable that biased attention toward school-related threat may maintain and/or exacerbate distorted thoughts about school (e.g., Maric, Heyne, de Heus, van Widenfelt, & Westenberg, 2012) and have detrimental effects on academic performance (Cassady & Johnson, 2002; Rana & Mahmood, 2010; Szafranski et al., 2012). Our overarching question was whether test anxiety is associated with an attentional bias toward school-related threat. The present study builds upon previous research on attentional bias toward threat words (e.g., Putwain et al., 2011; Scrimin, Moscardino, Altoè, & Mason, 2017) by examining biased attention toward a broader range of school threat in test anxiety. Specifically, we investigated school-related attentional biases toward threatening academic and social images, as well as neutral school images, using a novel variant of the dot-probe detection task. We chose to use *pictorial* rather than word stimuli given research suggesting that pictures possess greater ecological validity in terms of their ability to quickly capture complex anxiety-laden academic and social scenarios relative to single words (Flaisch et al., 2015; Richter, Ech, Straube, Miltner, & Weiss, 2010). We hypothesized that individuals high in test anxiety would display an attentional bias toward school-related threat stimuli relative to those low in test anxiety. Further, it was hypothesized that high test-anxious participants would exhibit the strongest attentional bias toward *academic* threat images (e.g., image of an exam with a failing grade) relative to *social* threat images (e.g., image of students ostracizing a peer at school); and would not display an attentional bias toward neutral (non-threat) school images (e.g., empty classroom). Finally, given gender differences in the symptom presentation and prevalence of anxiety (e.g., McLean, Asnaani, Litz, & Hofmann, 2011), we also aimed to explore whether patterns of attentional bias toward school-related threat differed between males and females.

2. Materials and methods

2.1. Design

A mixed-factorial design was employed to examine school-related attentional bias in test- anxious individuals. Test anxiety and gender were the between-subjects factors while school image type was the within-subjects factor. Image-dot congruency (whether the dot probe replaced the threatening or neutral stimulus) was a within-subjects factor when reaction times were the dependent variable (see Section 2.4 for a detailed description of how attentional biases were operational defined for statistical analysis).

2.2. Participants and procedure

Participants included 211 undergraduate students (58.8% female, 69.4% Caucasian) who participated in a larger study investigating relationships among various cognitive and emotional factors and school-related anxiety. The research study took place at a large Midwestern university in the United States. The majority of participants were in their first year of college (age range = 18–24 years, M = 19.05,