

## Examining information processing biases in spider phobia using the rapid serial visual presentation paradigm

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### Abstract

Empirical research has demonstrated the existence of attentional biases towards threat in anxiety disorders. Paradigms commonly used to assess attentional biases have failed to demonstrate consistent findings as well as reveal the specific features of attentional biases. The current study investigated the utility of the rapid serial visual presentation paradigm in assessing attentional biases among 40 undergraduate students with high spider phobia (SP) symptoms and 40 undergraduate students with low SP symptoms. Results revealed that across participants, threatening information was processed in a facilitated and automatic manner and resulted in an immediate (i.e., within 120 ms) attentional capture. Following immediate attentional capture, however, only high SP participants exhibited an attentional alertness towards subsequent stimuli following threat presentation. These results extend traditional attentional bias literature, and theoretical implications are discussed.

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Contemporary models of anxiety (e.g., Beck & Clark, 1997; Mogg & Bradley, 1998) posit cognitive biases towards threat. Additionally, these observed cognitive biases have been theorized to be a process by which anxiety disorders are maintained (Amir, Elias, Klumpp, & Przeworski, 2003; Mogg & Bradley, 1998). Cognitive biases have been observed in the domains of interpretation (Becker & Rinck, 2004; Brendle & Wenzel, 2004), memory (Coles & Heimberg, 2002; Sawchuk, Lohr, Lee, & Tolin, 1999), and particularly frequently in attention (e.g., Amir, Coles, & Foa, 2002).

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Attentional biases in anxiety have commonly been observed in empirical research using a modified Stroop task (Stroop, 1935). In this experiment, participants are presented with anxiety related words displayed in varying colors. Participants are asked to ignore the semantic content of the word and verbally report the color as fast as possible without sacrificing accuracy. Attentional biases are inferred from increased response latencies towards anxiety related words compared to response latencies towards neutral-valenced words. Attention is theorized to be immediately allocated to the threat stimulus, which interferes with the color-naming task and subsequently results in heightened response latencies (e.g., Bryant & Harvey, 1995). The attentional bias as demonstrated through higher response latencies in the Stroop task has been found across anxiety disorders, including posttraumatic stress disorder (PTSD; Bryant & Harvey, 1995; McNally, Kaspi, Bradley, & Zeitlin, 1990), generalized anxiety disorder (GAD; Becker, Rinck, Margraf, & Roth, 2001), social phobia (McNeil, Ries, Taylor, & Boone, 1995), snake phobia (Wikstrom, Lundh, Westerlund, & Hogman, 2004), and panic disorder (PD; Buckley, Blanchard, & Hickling, 2002). Additionally, research suggests that attentional biases identified in the Stroop task are towards threat stimuli relevant to the diagnoses, as opposed to threat in general (e.g., Becker et al., 2001), albeit inconsistently (e.g., Buckley et al., 2002).

Another common paradigm with which attentional biases are investigated is the dot-probe paradigm (MacLeod, Mathews, & Tata, 1986). In the original version of the task (MacLeod et al., 1986), two stimulus words are presented, one above the other, on a computer screen for 500 ms. Participants are asked to read the top word, thus necessitating attentional allocation to the top word and not the bottom word. A probe then replaces either the top or bottom word and the participants are instructed to press a key as soon as they detect the presence of the probe. Attentional biases are inferred from faster response times towards probes replacing threat words compared to probes replacing other word types. Later versions of the task (e.g., Koster, Crombez, Verschuere, & De Houwer, 2004; Mogg, Bradley, Bono, & Painter, 1997) do not require the participant to read the top word and instead the participant determines in which location, top or bottom, the probe occurs. Research using versions of this paradigm have also identified attentional biases across anxiety disorders, including PD (e.g., Horenstein & Segui, 1997), GAD (e.g., Bradley, Mogg, White, Groom, & de Bono, 1999), social phobia (e.g., Pishyar, Harris, & Menzies, 2004), and PTSD (e.g., Bryant & Harvey, 1997).

The Stroop and dot-probe literature support the existence of attentional biases. Researchers have more recently begun to investigate the specific features of attentional biases. Using the Stroop task and other cognitive measures, researchers have attempted to distinguish between automatic and strategic processing, and also to differentiate facilitated attention to threatening stimuli versus difficulty in disengagement from threatening stimuli.

The studies mentioned thus far have used the unmasked Stroop task, in which the stimuli appear continuously until the participants respond. The masked Stroop task, however, presents the stimulus word quickly (e.g., 20 ms) and is backwardly masked by another stimulus in order to preclude conscious and strategic semantic processing. Buckley et al. (2002) hypothesized that the masked Stroop task exclusively assesses automatic processing; the unmasked condition, however, presents the stimulus word for an extended period of time, which allows both initial automatic processing and further semantic and strategic processing. Assessing Stroop task performance in the masked versus unmasked condition has been one avenue through which strategic versus automatic processing has been investigated. This line of research has yielded equivocal results. Some studies have found strategic, but not automatic processing, in snake phobia (e.g., Wikstrom et al., 2004), social phobia (e.g., Amir et al., 2002), PTSD (e.g., Bryant & Harvey, 1995), and PD (Buckley et al., 2002). In contrast, some studies have found both

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