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## Preattentive bias for snake words in snake phobia?

Jenny Wikström<sup>a,\*</sup>, Lars-Gunnar Lundh<sup>b</sup>, Joakim Westerlund<sup>a</sup>,  
Lennart Högman<sup>a</sup>

<sup>a</sup> Department of Psychology, Stockholm University, Stockholm, Sweden

<sup>b</sup> Department of Psychology, University of Lund, Lund, Sweden

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### Abstract

Stroop interference and skin conductance responses (SCRs) for words related to snakes, spiders, flowers, and mushrooms were studied in a group of women ( $n = 40$ ) with snake phobia who were randomised to a stress or no-stress condition. The 21 low-stress snake phobics showed Stroop interference for unmasked (but not for masked) snake words, compared with 21 age- and sex-matched controls. Stroop interference was not significantly different between high-stress and low-stress snake phobics. No support for stronger SCRs for masked snake words was found in snake phobics in a lexical decision task with masked presentations of the same words. The lack of a masked Stroop interference in snake phobics suggests a possible difference in cognitive–emotional mechanisms underlying specific phobia vs. other anxiety disorders that deserves further investigation.

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### 1. Introduction

Several lines of research exist concerning preattentive mechanisms involved in anxiety and anxiety disorders. Cognitive approaches in experimental psychopathology have mostly relied on indirect behavioural measures of information-processing as for example reaction time, whereas behaviourally oriented theorists have focused on measures of physiological arousal like skin conductance responses (Öhman, 1997; Öhman & Soares, 1994). This study aimed at combining

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\* Corresponding author. Department of Clinical Neurosciences, Karolinska Institute, Psychology Section, Karolinska Hospital, SE-171 76 Stockholm, Sweden; Tel.: +46-8-517 750 740, fax: +46-8-30 72 98.

*E-mail address:* jenny.wikstrom@cns.ki.se (J. Wikström).

these two approaches by studying information processing, as well as physical arousal for masked threat stimuli in individuals suffering from snake phobia. Theories propose that attentional, as well as preattentive biases for threatening information are contributing to and/or maintaining a range of anxiety disorders (Williams, Watts, MacLeod, & Mathews, 1997). One common method in this area is the emotional Stroop paradigm (for an overview, see Williams, Mathews, & MacLeod, 1996; Williams, Watts, MacLeod & Mathews, 1997).

In the computer-based emotional Stroop task, the participant is required to report the colour of a word that appears on a computer screen as fast as possible, while ignoring the meaning of the word. Words with threatening content have been shown to increase colour-naming latencies in anxious individuals and this so called ‘Stroop interference’ is presumed to reflect an automatic tendency to attend to (or an inability to let go of) threatening information. Preattentive Stroop interference involving masked words has been shown in clinical anxiety patients with different diagnoses (Bradley, Mogg, Millar, & White, 1995; Harvey, Bryant, & Rapee, 1996; Lundh, Wikström, Westerlund, & Öst, 1999; Mogg, Bradley, Millar, & White, 1995; Mogg, Bradley, Williams, & Mathews, 1993), as well as having associations with trait anxiety in non-clinical samples (MacLeod and Hagan, 1992; MacLeod and Rutherford, 1992; Mogg, Kentish, & Bradley, 1993; van Honk, Tuiten, van den Hout, Putman, de Haan & Stam, 2001).

With regard to specific phobias, to our knowledge only one study has so far found Stroop interference for *masked* threat words. This was found with regard to spider words in spider phobics (van den Hout, Tenney, Huygens, & de Jong, 1997), whereas negative results have also been reported in one study (Thorpe & Salkovskis, 1997). Non-masked Stroop interference, on the other hand, has reliably been shown in spider phobic adults (Kindt & Brosschot, 1997; Kindt & Brosschot, 1998; Thorpe & Salkovskis, 1997), as well as in children suffering from spider phobia (Kindt, Bierman, & Brosschot, 1997; Kindt & Brosschot, 1999), although children’s Stroop interference failed to differentiate between phobic and non-phobic controls in these studies. In summary, the evidence of Stroop interference involving individuals suffering from specific phobia using unmasked presentation of words seems consistent, while the results with regard to *masked* Stroop interference for threat words in this population are still inconclusive and need further investigation.

### 1.1. Skin conductance responses to masked stimuli

In another line of research, threatening *pictorial* stimuli that were shown at a preattentive level of awareness have been shown to elicit skin conductance responses in spider- and snake-fearful students (Öhman and Soares, 1994; but see also Mayer, Merckelbach, & de Jong, 1999, with comments by Öhman, 1999). This preconscious fear response is thought of as genetically ‘prepared’ through evolution in a way that enables fear conditioning for certain classes of aversive stimuli (angry faces, snakes, spiders) even in the absence of conscious awareness of the stimuli and being advantageous for surviving in life-threatening situations (for a review, see Öhman, 1997). Öhman’s model concerning fear and anxiety implies that only a limited range of threatening stimuli may be physiologically arousing when exposed at a level below conscious awareness. Because it can be argued that reading is a learned skill entering rather late in human development (both ontogenetically and phylogenetically), it might be expected that threatening linguistic stimuli are less likely to evoke autonomic responses at a preattentive level.

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