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# Blood phobia and spider phobia: two specific phobias with different autonomic cardiac modulations

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**Abstract**

Cardiac reactions to two fear-related and one control film were compared in individuals high in spider or blood/injury fear. Twelve subjects in each phobic group were selected on the basis of their scores in the Spider or Mutilation Questionnaires and a semi-structured interview. Cardiac responses and self-reported affective ratings to the films were investigated. Sympathetic and parasympathetic cardiac influences were indexed by T-wave amplitude and respiratory sinus arrhythmia measured during film viewing. Basal parasympathetic cardiac control was also assessed during a paced breathing task. Results indicate differential autonomic modulation of cardiac responses for blood and spider phobics. Although each group reacted with marked cardiac activation to its feared stimulus, a sympathetic increase followed by withdrawal over time was found in blood phobics. Greater vagal tone at rest was present in blood phobics compared with spider phobics. 

*Keywords:* Blood phobia; Film stimuli; Heart rate; T-wave amplitude; Respiratory sinus arrhythmia

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## 1. Introduction

Specific phobia is defined as a marked, persistent and unreasonable fear evoked by the presence or anticipation of clearly discernible objects or situations. Typically, the extreme anxiety reaction induced by exposure to the fear-related stimulus leads to avoidance behavior which significantly interferes with the individual's functioning (American Psychiatric Association, 1994).

The somatic and autonomic changes associated with this non-adaptive emotional reaction play a considerable role in assessment of the disorder and treatment outcomes (Lang, 1971; Hugdahl, 1989). As an extreme fear response, phobia involves a marked global increase in sympathetic activity, together with the subjective experience of heightened arousal. These psychophysiological changes are consistent with general mobilization for avoidance or escape behavior. In particular, in response to threat, heart rate is expected to increase, so that cardiac acceleration has frequently been employed as an index of the defense reaction or rejection of stimulation in normal subjects (Graham and Clifton, 1966; Turpin, 1986), as well as a measure of fearfulness of the phobic object in phobic patients (Sartory, 1986; Hugdahl, 1989). Indeed, a strong positive linear relationship between HR changes and subjective fear ratings has been found at intense fear levels (Sartory et al., 1977).

Animal phobia (especially toward spiders or snakes) has often been considered in the literature as a prototypical specific phobia. There is considerable evidence that this category of phobic individuals shows increased sympathetic activity both during exposure to the phobic stimulus and during phobic imagery (e.g. Lang et al., 1970; Prigatano and Johnson, 1974; Fredrikson, 1981). Autonomic changes include heart rate and blood pressure increases, cephalic and peripheral vasoconstriction associated with increases in skeletal muscle blood flow, and augmented phasic and tonic electrodermal activity. Self-report measures indicate high subjective tension, whereas behavioral variables, as indexed by viewing times of phobic pictures (Hamm et al., 1997) or by in vivo behavioral tests (Prigatano and Johnson, 1974) suggest a marked tendency for avoidance/withdrawal.

Most studies exploring the psychophysiological response patterns in animal phobics have employed slides as phobic objects (Prigatano and Johnson, 1974; Geer, 1966; Hare and Blevings, 1975; Hamm et al., 1997), whereas tonic visual stimulations (e.g. films or videotapes) have rarely been used (Fredrikson et al., 1995). For both stimulus conditions, the resulting autonomic response pattern is consistent with a defense response and supports clear aversive motivational disposition.

In striking contrast with this typical reaction in animal phobics, a different, unique psychophysiological response to the feared stimulus is often observed in blood–injection–injury phobia. Blood phobics directly or indirectly exposed to blood, injuries or wound situations, typically display a diphasic cardiovascular response pattern. A first phase, involving heart rate and blood pressure increases, is immediately followed by a marked and dramatic drop in both variables. This