

Neuropsychology of phobic reaction to snakes

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The snake is a psychologically very strong stimulus that triggers intense fear in a large part of the population and at the same time causes one of the most common specific phobias. According to an evolutionary hypothesis, universal snake fear is a result of selection pressures, because during evolution of the mankind, venomous snakes presented a deadly threat. Previous psychological research has therefore used the snake as a prototypical trigger of fear. However, snakes as a group are very variable in terms of morphology, colour, toxicity, and behaviour. In this dissertation, I have adopted several tools to verify the hypothesis that some species of snakes may elicit disgust rather than fear. The whole work is divided into four consecutive studies: 1) psychodiagnostics of fear of snakes and disgust using standard scales, 2) rating of snake images according to fear and disgust, 3) measurement of physiological response and 4) measurement of neural activation using fMRI. A different sample of subjects was studied in each of the four parts, however, men and women aged 18 or older with varying levels of fear of snakes and disgust propensity were included. They were mostly healthy subjects, only the fMRI experiment also included people with snake and spider phobia. The results of individual studies show that 1) fear of snakes in the Czech population is comparable to other countries; 2) 2.6% of people might be considered having snake phobia based on their score; 3) the snake is rated as the most frightening within reptiles and other animals; 4) two distinct groups of snakes can be distinguished based on whether they trigger mostly fear (vipers) or disgust (blind snakes), these two groups differ in body shape, colour, head size, toxicity, and behaviour; 5) fear of vipers is universal across different cultures; 6) both groups of snakes trigger a distinct physiological response as fear-eliciting snakes trigger a stronger galvanic skin response and a faster heart rate; 7) both groups of snakes also elicit a different neural response as fear-eliciting snakes trigger significantly stronger activation in the primary visual cortex and adjacent areas responsible for visual processing and sustained motivated attention. To conclude, humans even without any knowledge of snakes demonstrate an impressive ability to recognize and specifically respond emotionally to dangerous species of venomous snakes.

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