Effects of fear-relevant stimuli on attention: integrating gaze data with subliminal exposure

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Abstract

The phenomenon of an attentional bias has been found for threatening stimuli, such as snakes, when presented simultaneously with neutral stimuli. This priority attentional bias effect regarding snakes has been shown through reaction time- or response accuracy-based paradigms. Many studies suggested a preattentive attentional capture of threatening stimuli based on inferences from reaction time data, which might as well be caused by the same rather slow elaborated cognitive processing for threatening stimuli as for neutral stimuli, but more strong motor preparation for source of potential threat. To overcome this ambiguity in the outcomes from reaction time data, eye movements recording can be an alternative approach. The aim of the present study was to examine exogenous spatial attentional orienting when snakes were competing subliminally with neutral stimuli while presenting a video clip. In a free-viewing task, the eye movements of 50 female volunteers were continuously recorded. Twenty trials with subliminal pairs of images (1/60 s duration) were presented while a video was displayed for 4 minutes. The results revealed that the proportion of ocular saccades into the areas where snakes were presented was higher in comparison to control stimuli immediately after the subliminal presentation. A facilitating effect for the fear of snakes was found, which is in line with the assumption that a predisposition to fear has an effect on ocular and attentional behavior, which may act as a vulnerability factor for developing anxiety disorders. The integration between subliminal exposure in video and gaze tracking has showed to be a reliable methodology to detected ban attentional orientation bias toward threat while watching videos, contributing to potential clinical applications with respect to assessment and their use as a desensitization technique to overcome specific phobias.

Index Terms— eye movements, gaze tracking, snakes, attentional orienting, subliminal exposure