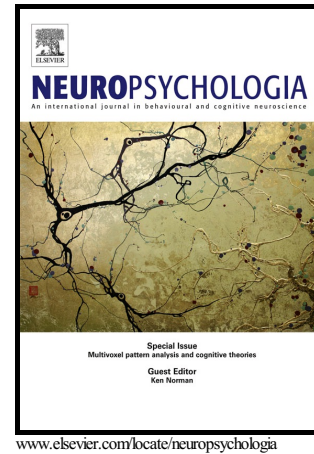


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## Time course of influence on the allocation of attentional resources caused by unconscious fearful faces

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### Abstract

Emotionally affective stimuli have priority in our visual processing even in the absence of conscious processing. However, the influence of unconscious emotional stimuli on our attentional resources remains unclear. Using the continuous flash suppression (CFS) paradigm, we concurrently recorded and analyzed visual event-related potential (ERP) components evoked by the images of suppressed fearful and neutral faces, and the steady-state visual evoked potential (SSVEP) elicited by dynamic Mondrian pictures. Fearful faces, relative to neutral faces, elicited larger late ERP components on parietal electrodes, indicating emotional expression processing without consciousness. More importantly, the presentation of a suppressed fearful face in the CFS resulted in a significantly greater decrease in SSVEP amplitude which started about 1 s to 1.2 s after the face images first appeared. This suggests that the time course of the attentional bias occurs at 1 s after the appearance of the fearful face and demonstrates that unconscious fearful faces may influence attentional resource allocation. Moreover, we proposed a new method that could eliminate the interaction of ERPs and SSVEPs when recorded concurrently.

**Keywords:** unconscious fearful face, attention, CFS, ERPs, SSVEPs.

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