

Attentional Field Model Does Not Explain Task-Dependent Spatial Representation in Human Ventral Temporal Cortex

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Presentation Abstract Summary One influential theory of attention is to regard it as a spotlight. Accordingly, previous studies have proposed the concept of an attentional field (AF), which describes the distribution of attentional resources over 2D visual space. In the present study, we tested the merits of the AF model in characterizing the effect of attention on spatial representation in human ventral temporal cortex (VTC). We mathematically implemented the AF as a 2D Gaussian that is multiplied with a bottom-up 2D Gaussian describing stimulus-driven responses. We evaluated whether this model accurately accounts for an existing dataset that includes cortical responses in VTC to position-varied face stimuli under different attentional tasks (Kay et al., 2015). Surprisingly, we found that the AF model does not satisfactorily account for the attentional effects in the data. Moreover, simpler, phenomenological models outperformed the AF model. These results suggest that although the AF is theoretically compelling, it does not accurately predict attentional effects in VTC, at least in its current mathematical form.

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