Spatial Cognition

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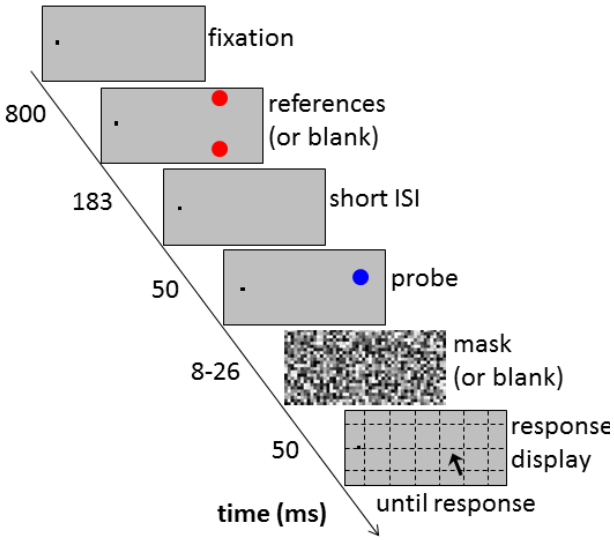
The spatial profile of mask-induced compression for perception and action

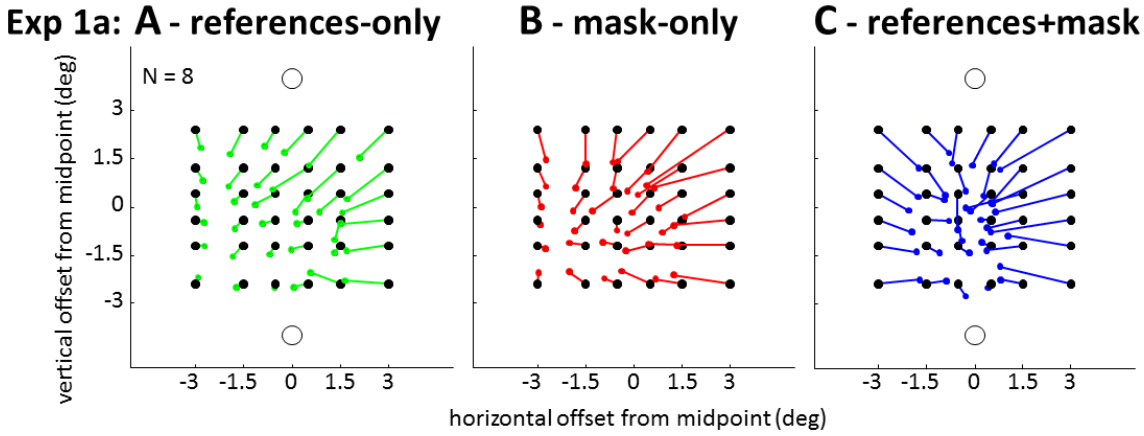
Born S, Zimmermann E, Cavanagh P (in press). The spatial profile of mask-induced compression for perception and action. *Vision Research*.

Stimuli briefly flashed just before a saccade are perceived closer to the saccade target, a phenomenon known as saccadic compression of space.



Experimental procedure. Red dots represent the references, the blue dot the probe. Participants had to localize the probe at the end of a trial by a mouse click.

We have recently demonstrated that similar mislocalizations of flashed stimuli can be observed in the absence of saccades: Brief probes were attracted towards a visual reference when followed by a mask. To examine the spatial profile of this new phenomenon of masked-induced compression, here we used a pair of references that draw the probe into the gap between them. Strong compression was found when we masked the probe and presented it following a reference pair, whereas little or no compression occurred for the probe without the reference pair or without the mask. When the two references were arranged vertically, horizontal mislocalizations prevailed. That is, probes presented to the left or right of the vertically arranged references were "drawn in" to be seen aligned with the references.



Results. Actual (black dots) vs. perceived (colored dots) probe location for the 36 tested locations. Scaling of horizontal and vertical probe offsets is with respect to the midpoint between the two references (illustrated by the large open circles). Negative values: probes more foveal/below, positive values: probes more peripheral/above the midpoint. In this notation, fixation was at -12 deg. In panel C (references+mask), the responses converge from both sides towards the reference axis = horizontal compression.

In contrast, when we arranged the two references horizontally, we found vertical compression for stimuli presented above or below the references. Finally, when participants were to indicate the perceived probe location by making an eye movement towards it, saccade landing positions were compressed in a similar fashion as perceptual judgments, confirming the robustness of mask-induced compression. Our findings challenge pure oculomotor accounts of saccadic compression of space that assume a vital role for saccade-specific signals such as corollary discharge or the updating of eye position. Instead, we suggest that saccade- and mask-induced compression both reflect how the visual system deals with disruptions.