Common functional architecture for spatial attention and perceived location.

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How do we know where things are? Here we argue that one function of attention is to specify perceived location, and that this is based on the representations of attended targets by the eye movement system. This makes the eye movement map the “master map of locations” – for eye movements, for attention, and for perception and a plausible source of the capacity limits of attention. The standard explanation for perceived position has always been that each neuron responds only to a particular location on the retina so, after correcting for movements of our eyes and head, there should really be no problem. However, perceived location can deviate dramatically from retinal location, showing that this simple explanation cannot be true. These deviations arise when the visual system predicts where targets should be and in this case we see the predicted, not the retinal location. We have found behavioral evidence of attention benefits at these predicted locations and we now show that when targets are moving, they are seen ahead of their actual retinal location because they are seen at their predicted next location. These results suggest that a core function of visual attention is to provide the position code for attended targets and the errors of prediction then allow us to use position perception as a new tool for studying attention.

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