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Body-centric and world-centric components of the large-scale horizontal-vertical illusion

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Abstract: In the classic horizontal vertical illusion (HVI), vertical lines appear 5-6% longer than horizontal lines. However, in outdoor scenes vertical poles of several meters appear as much as 25% longer than frontal ground extents. This large-scale HVI is consistent with angular scale expansion theory (Durgin & Li, 2011). It is known that the classic HVI is yoked to the reference frame of the eye itself, such that the illusion reverses when the observer is on his or her side. In a series of experiments conducted both in real outdoor spaces and in immersive virtual environments we examined how the large-scale HVI was affected by reorienting the observer, and found that the large scale HVI was reduced, but not reversed. The amount of reduction was quantitatively consistent with a retinotopic contribution of the classical HVI (6%). Most of the large-scale HVI is world-centric.