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Spatial Updating Based on Visually Signaled Self-motion in Virtual Reality

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Abstract

Spatial updating during self-motion can be effortless, however, in virtual reality if there are inconsistent cues about self-motion, spatial updating of egocentric representations of object locations usually relies on perceived scene motion or imagery of a spatial situation model. Strong presence and illusory self-motion with a quick onset are presumed necessary for effortless spatial updating if self-motion is signaled visually only. In the reported experiment, participants performed spatial updating compensating for visually signaled forward self-motion in a virtual scene presented in a head-mounted display. Higher visual detail in the scene improved performance only slightly. Overall, the result pattern suggests that participants did not experience illusory self-motion that could support effortless updating despite more favorable conditions than in a previous study. Several modifications to the experiment are discussed as further tests of conditions fostering effortless updating in virtual reality.