

The effect of walking speed on the sensitivity to curved walking in an immersive Virtual Environment

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People are relatively insensitive to the curvature of their walking trajectory [Kallie et al., 2007, JEP:HPP, 33(1), 183-200]. This is exploited in the 'Redirected Walking' technique which is used in Virtual Reality to extend the borders of Virtual Environments (VE) beyond the size of the physical walking area [Steinicke et al., 2009, Journal of Virtual Reality and Broadcasting, 6(2009)]. One method is to slowly rotate the VE while the user is aiming to walk a straight path, inducing him/her to unknowingly walk on a curved trajectory. We tested whether the sensitivity to curvature depends on walking speed. Participants followed a virtual sphere in a VE, which moved on a straight path. During walking, the entire visual scene was rotated, creating a curved real-world trajectory (radius 20-200m). Walking speed was 0.75, 1.0, or 1.25 m/s. Participants indicated whether their physical walking path curved to the left or right. Discrimination thresholds were estimated by fitting a psychometric function to the proportion of trials in which the trajectory was reported to curve to the left. Curvature thresholds were found to be higher for slow walking. This suggests that the effectiveness of the redirected walking technique depends on walking speed.