Stride Length and Step Rate Influence Egocentric Distance Perception

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Abstract: Prior research has demonstrated that effort (i.e., metabolic cost; e.g., Proffitt, Stefanucci, Banton, & Epstein 2003) influence egocentric distance perception. Effort also increases with walking speed (Givoni & Goldman, 1971) and distance perception has also been shown to increase with walking speed (White, 2008), suggesting walking speed influence may be attributed to the effort involved in walking. Similarly, the energy efficiency of walking decreases when walking at a faster rate or greater stride length than what is preferred for a given walking speed (Holt, Jeng, Ratcliffe, Hamill, 1995). Using a Treadmill Virtual-Reality Environment, the influence of walking parameters stride length (with a constant step rate) and step rate (with a constant walking speed) on distance perception were investigated under a walking speed manipulation. Perceived distance increased with increased stride length and decreased step rate, providing additional evidence that egocentric distance reports may be linked to the effort entailed in walking.