Is perceived locomotor space distorted to enhance motor control?

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Abstract: Perceptual accuracy is unnecessary for the control of action. For purposes of motor control, sensitivity is more important than accuracy: Systematic (i.e., stable) bias can be corrected for by calibration; variance cannot. Our experiments show that there is a systematic perceptual (i.e., in phenomenology) expansion of angular perceptual variables, such as surface orientation and gaze declination and that this angular expansion can account for a great deal of data concerning long-standing observations regarding the misperception of locomotor space – including pervasive evidence of egocentric distance underestimation. Angular expansion is an efficient coding scheme (like Huffman coding) that maintains greater sensitivity to deviations in angular variables most useful for action. Fitt's Law governing the speed of targeted action is related to perceived size rather than physical size, indicating a perceptual bottleneck for motor control. Angular expansion in perception is therefore an excellent strategy for enhancing motor control in locomotor space.