

Adaptation to human locomotion speed

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Abstract

Visual judgments of human movement play an important role in social interactions, but relatively little is known about how retinal motion signals are used to estimate human movement speed. We report a new effect which demonstrates that these judgments are subject to modification by exposure to dynamic images. Participants viewed videos of real scenes depicting either groups of figures walking along a High Street or contestants running in the London Marathon. When video playback was speeded up or slowed down slightly relative to natural speed, participants could readily report whether the figures in each video appeared to be moving unnaturally quickly or slowly. However after adapting to slowed-down walking, natural walking speed appeared too fast, and after adapting to speeded-up walking, natural walking speed appeared too slow. Corresponding effects were found for running videos. Adaptation to natural-speed playback had no effect on apparent locomotion speed. These effects are quite different in a number of respects from those previously reported in studies of retinal velocity adaptation using simple patterns such as gratings. Unlike the stimuli used in most previous studies our videos contained a range of speeds and directions due to the unpredictability of natural scenes. Walkers and runners moved in different directions at different speeds, and at varying distances from the camera. Participants also engaged in free viewing rather than fixation. Furthermore over the range of retinal velocities our stimuli contained, adaptation to simple moving patterns causes a significant reduction in apparent velocity at all test velocities, including at the adapting velocity. Our data are consistent with the operation of a qualitatively different process in judgements of locomotion speed in natural scenes.

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