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Off on the wrong foot: Local features in biological motion

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Biological-motion perception consists of a number of different phenomena. They include global mechanisms that support the retrieval of the coherent shape of a walker, but also mechanisms which derive information from the local motion of its parts about facing direction and animacy, independent of the particular shape of the display. A large body of the literature on biological-motion perception is based on a synthetic stimulus generated by an algorithm published by James Cutting in 1978 (Perception 7 393 – 405). Here we show that this particular stimulus lacks a visual invariant inherent to the local motion of the feet of a natural walker, which in more realistic motion patterns indicates the facing direction of a walker independent of its shape. Comparing Cutting's walker to a walker derived from motion-captured data of real human walkers, we find no difference between the two displays in a detection task designed such that observers had to rely on global shape. In a direction discrimination task, however, in which only local motion was accessible to the observer, performance on Cutting's walker was at chance, while direction could still be retrieved from the stimuli derived from the real walker.