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Detection of Motion Direction in Point Light Walkers by 6-month-olds

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Background and Aims: Biological motion can be conveyed through capturing videos of humans walking with point lights attached to their major joints, thus eliminating the appearance of mass, depth, bodily features. Studies consistently show that adult observers immediately identify biological motion displays as a human walking (Johansson, 1973). Additionally, for adults, scrambled biological motion which is completely devoid of structural information not only retains information about the direction of a walking human, but also is subject to a pronounced inversion effect such that the direction of inverted walkers is difficult to determine (Troje & Westhoff, 2006). Infants as young as 3-months of age are also sensitive to biological motion (e.g., Bertenthal et al., 1984; 1985); we tested here whether they can also detect the direction of walking, and if this is subject to an inversion effect.

Procedure: 6-month-old infants were habituated to movies of an upright (Experiment 1) or inverted (Experiment 2) point-light walker who walked as if on a treadmill (i.e., there was no actual displacement across the screen). For half of the infants, the walk was to the right, and for half the walk was to the left. In test, infants saw the familiar direction of walking on one trial, and the new direction on a second, with order counterbalanced. Looking time to each display was recorded and analyzed.

Results and Conclusions: When presented with an upright walker, infants were sensitive to a switch in the direction of walking from habituation to test. Infants looked longer at the new direction than the old in test trials (familiar direction $M=7.64s$, new direction $M=14.03s$; $t(19)=2.86$, $p=.01$). In contrast, when the walker was inverted, infants did not seem to notice the switch in direction, and looking times were equal across both trials (familiar direction $M=10.06s$, new direction $M=8.61s$; $t(18)=.510$, $p=.616$). Thus, young infants not only seem to recognize the difference between upright and inverted walkers and visually prefer the former (Bertenthal et al., 1984), but they also can detect the direction of motion of upright walkers. The detection of direction does not, however, extend to inverted walkers, suggesting the existence of an inversion effect.