Audiovisual integration directing attention to the temporal dynamics of biological motion

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People are adept at recognizing biological motion portrayed by a handful of dots (Johansson, 1973). Visual processing of biological motion is influenced by accompanying information from different sensory modalities (Arrighi et al., 2009; Saygin et al., 2008; Thomas & Shiffrar, 2010) or neighboring biological motion (Ikeda et al., 2013; Thornton et al., 2004). In this study, we investigated the interaction between the two by manipulating 1) the temporal synchrony between visual and auditory information of the biological walkers and 2) the congruency of gait direction between target and flanker walkers. Participants performed a 2-AFC gait direction discrimination (right vs left) of a central target walker flanked by two peripheral point-light figures walking out-of-phase relative to the central figure. There were four audio-visual synchrony conditions: three conditions in which an electronic "beep" onset was synchronous with either the footsteps of the target ("target match"), the flankers ("flanker match"), or between those two ("mismatch"); and a condition with no sound. To ensure sufficient exposure to the audio-visual synchrony, the flankers and sound were presented for two gait cycles prior to the onset of the central target, which had a gait direction either congruent or incongruent with the flankers. We found statistically significant main effects of sound and congruency on RT. Specifically, participants were slower to report the target gait direction when the timing of the auditory cue matched or was slightly offset (mismatched) from the steps of the task-irrelevant flankers, and RTs were slower on trials with incongruent target and flanker gait direction. Pairwise comparisons revealed significant effects of congruency only when the audio timing matched the target gait or was not presented, but not in the other two conditions. These results suggest bimodal temporal integration directs attention to temporal dynamics of biological motion, mitigating the interference of spatially proximal neighboring motion.

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