Local motion versus global shape in biological motion: A cueing eye movement task

Masahiro Hirai1,2, & Daniel R. Saunders1, & Nikolaus F. Troje1,2
1Department of Psychology, Queen’s University, Kingston, Canada 2School of Computing, Queen’s University, Kingston, Canada 3Japan Society for the Promotion of Science

INTRODUCTION
- Directional information from point-light walker (PLW) displays can be obtained from:
  - the overall, motion-mediated shape of the figure
  - the local motion of the feet
- Conflicting findings are reported regarding incongruency effects:
  - local motion induces an incongruency effect
  - local motion does not induce an incongruency effect
- Previous eye movement studies revealed that social cues such as gaze and head orientation control the focus of attention in the voluntary eye movement task.

Here we investigated how the two sources of directionality contained in PLWs affect the saccade latency and accuracy in the voluntary eye movement task.

DISCUSSION
- Local feet motion cues have a significant effect on overt attention when they retain their familiar, predictable location within the display.
- When incongruent with the cued side, the direction of the feet increased saccade latencies and induced more errors.
- The current findings resolve previous conflicting findings regarding an incongruency effect for the local motion of the feet.

○ Flanker task:
  - incongruency effect observed only for coherent PLW
  - for scrambled PLW, location of each dot was changed by trial

○ Simon task:
  - incongruency effect was observed for both coherent and scrambled PLW
  - for scrambled PLW, the point-lights were always displaced to the same locations, and the feet point-lights were nearly kept in their original place

METHODS
- Participants
  - 16 naive observers (Exp.1), 12 naive observers (Exp.2,3)
- Stimuli
  - PLWs were presented in sagittal or frontal view
- Design factors
  - Coherency (Exp.1,2) / Direction (Exp.3)
  - Exp.1 (coherent or scrambled PLW)
  - Exp.2 (coherent or scrambled all but feet PLW)
  - Exp.3 (coherent forward or backward PLW)
- Stimulus Color Onset Asynchrony (SCOA: 200ms or 500ms)
- Congruency (congruent, neutral, or incongruent)
- Task
  - Saccade to either left or right target square when the color of point-lights changes from white to green or red

RESULTS

- Exp.1
  - Saccade latency
  - Accuracy

- Exp.2
  - Saccade latency
  - Accuracy

- Exp.3
  - Saccade latency
  - Accuracy

- Experimental procedure

Data Analysis
- The first saccade was detected automatically using a velocity criterion of 30°/s. A trial with saccadic latencies below 80 ms or more than 3 S.D. above the mean was discarded.

References