

# The influence of local and global motion on perceived position Peter J. Kohler, Leif H. Harder and Peter U. Tse Department of Psychological and Brain Sciences, Dartmouth College, NH, USA

## BACKGROUND.

- > Motion can shift the perceived position of a briefly presented stationary flash<sup>1</sup>.
- > Local motion signals are ambiguous, and must be combined to create unambiguous global motion<sup>2</sup>.
- > Global motion processing takes  $\sim 150 \text{ms}^3$ .

## GOAL

Examine the influence of local and global motion on motion-induced position shifts over time.

# EXPERIMENT 1.

**Does global motion influence** motion-induced position shifts?

STINULUS (see demo).



- > Bistable moving diamond<sup>4</sup>.
- > Dots flashed at motion reversals are shifted in the direction of future motion<sup>5</sup>.
- > Local motion at the dot position does not vary between conditions.

### EXPERIMENT 2. Do local and global motion have different effects on position over time? STINULUS. (See demo). RESULTS. Discrete motion leads to mid-trajectory shift<sup>6</sup>.

We tested the position shift at 7 time points. Horizontal occluders  $\mathbf{O}$ Shif 5

Vertical motion



Subjects reported horizontal and vertical shifts on separate trials.



> Both local and global motion can influence perceived position.





### Vertical global motion



Congruent effects > at almost every time point.

Incongruent effects > begin at 282ms > drop off at 471-565 ms.

# CONCLUSIONS.

> both local and global motion contribute to motion-induced shifts in perceived position. > the effects of local and global motion follow distinct time courses as motion unfolds. > this suggests that local and global motion independently influence perceived position.

1. Whitney, D & Cavanagh, P (2000). Nat. Neuroscience 3, 954-959. 4. Lorenceau, J & Shiffrar, M (1992). Vision Res. 32, 263-273. 2. Nakayama, K & Silverman, GH (1988). *Vision Res*. 28, 739-746. 5. Anstis, S & Cavanagh, P (2011). *J. Vis.* 12(8) 7. 3. Pack, CC & Born, RT (2001). Nature 409,1040-1042. 6. Cai, RH & Schlag, J (2001). Invest. Ophth. & Vis. Sci. 42, S711.

Congruent = Consistent with global motion. Incongruent = Orthogonal to global motion.

### Horizontal global motion

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### **Effect of Congruency**

