The Coordinate System of the Motion Aftereffect

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Background

Eye-, head- and body-movements can produce large-scale transitions of the visual input on the retina, but perception is notable for its spatiotemporal continuity. One way the visual system might achieve this is the creation of a detailed map in world coordinates—a spatiotopic representation. Here we tested whether the Motion Aftereffect has a spatiotopic component.

Why could that be the case?

- Higher-level areas integrate over larger areas
- Some spatiotopy in motion adaptation experiments (Ezzati et al., 2008; Wenderoth & Wiese, 2008)
- Spatiotopic motion integration (Mücher & Morrone, 2003).
- Motion-sensitive areas may encode in spatiotopic reference frames (d’Avossa et al., 2007; but see Gardner et al., 2007)

Procedure and Stimulus Design

Trial procedure

Test stimulus motion

Experimental conditions

Experiment 1: Retinotopy, Spatiotopy, and Nonspecificity

Individual data

Across subjects (nonspecific removed)

Conclusions

We found strong motion aftereffects when subjects were tested at retinotopic locations. The effects at spatiotopic locations were small and could be fully accounted for by nonspecific (not localized) adaptation. Focusing attention on the adaptation stimulus or away from it did not systematically alter these findings.

Our results lead us to conclude that motion adaptation occurs in a retinotopic frame of reference.

References

- Ezzati et al. (2008), Journal of Vision, 8, 10.
- Mücher et al. (2003), Nature Neuroscience, 6, 607-611.
- Morrone et al. (2008), Vision Research, 48, 1345-1351.