The extent of the vertical meridian asymmetry

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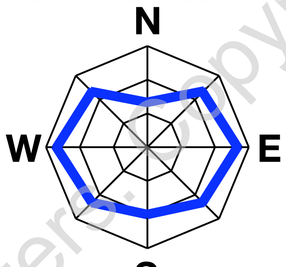
Introduction

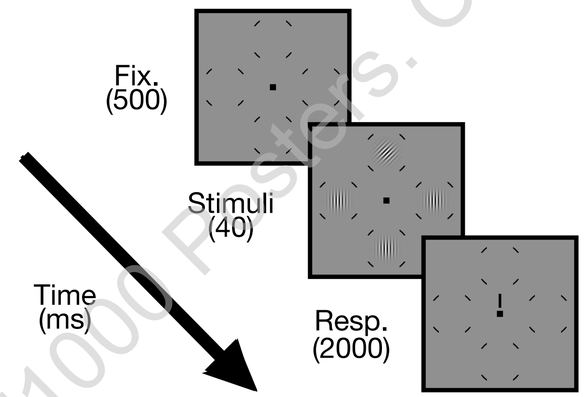
- Hemifield differences: higher sensitivity for lower than for upper visual field locations [e.g., 1-4]
- But, asymmetric performance is mainly observed when comparing the horizontal and vertical meridia [e.g., 5-9]



- VMA = N < S
- HVA = N&S < E&W

What is the angular extent of the vertical meridian asymmetry?

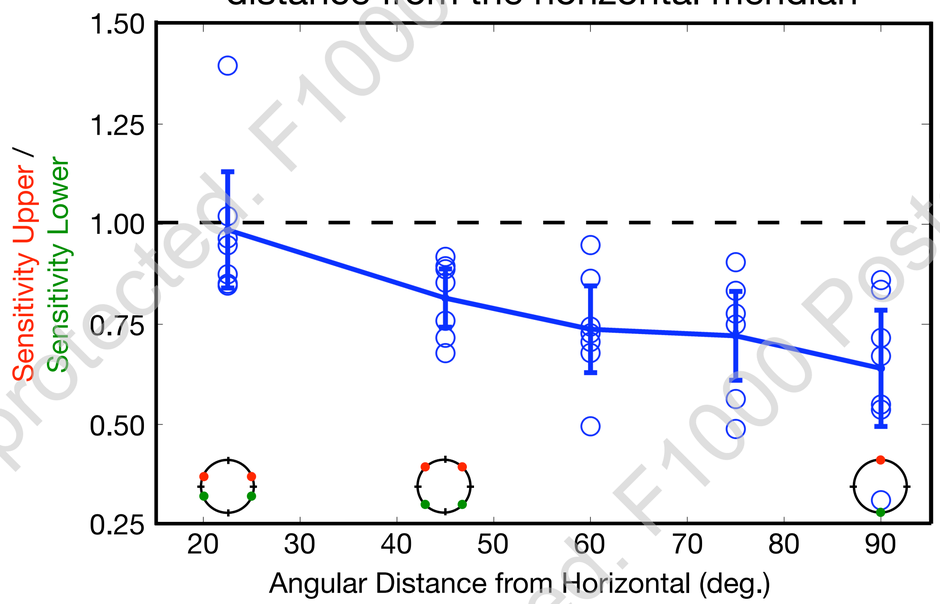
Methods



- Gabors: 6 cpd, 6° ecc., σ ≈ 1.07°
- 20 isoeccentric locations; 4/block
- Angular distance varied blockwise
- Orientation discrimination (±15°)
- Contrast thresholds via staircase
- Sensitivity = 1/Threshold

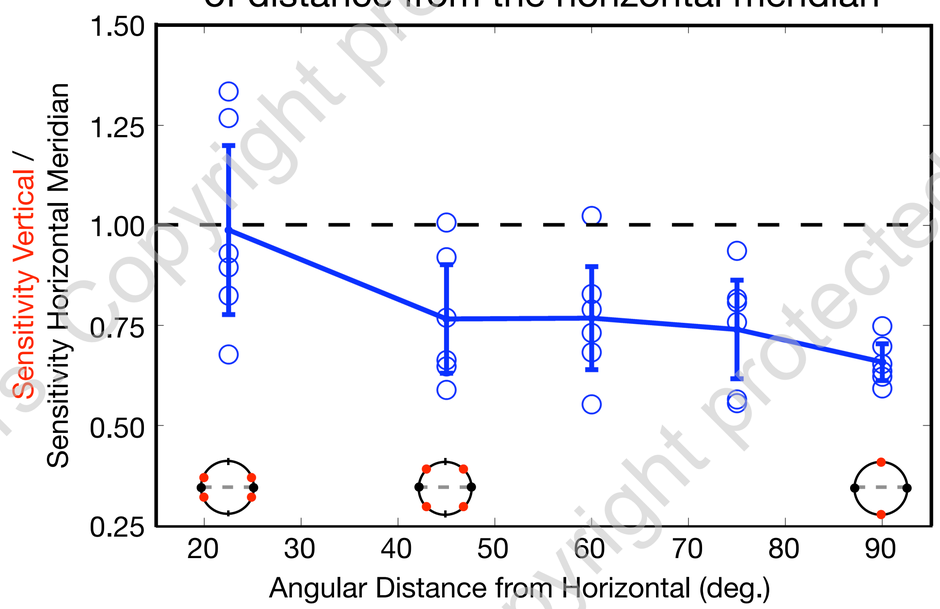
Results

Upper vs. lower asymmetry as a function of distance from the horizontal meridian



n = 7

Performance degradation as a function of distance from the horizontal meridian



Error Bars = ± 1 SEM

Conclusions

- The vertical meridian asymmetry decreases gradually
- Upper versus lower visual field asymmetries are mainly driven by the VMA
- The horizontal-vertical anisotropy does not extend beyond the vertical meridian
- These behavioral asymmetries may be related to known asymmetries at the level of the retina [10-11], LGN [12] and V1/V2 [13-14]
- Understanding sensitivity differences at isoeccentric locations is critical for experimental design and human factors applications

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