

Adolescents' and adults' sensitivity differs around the visual field

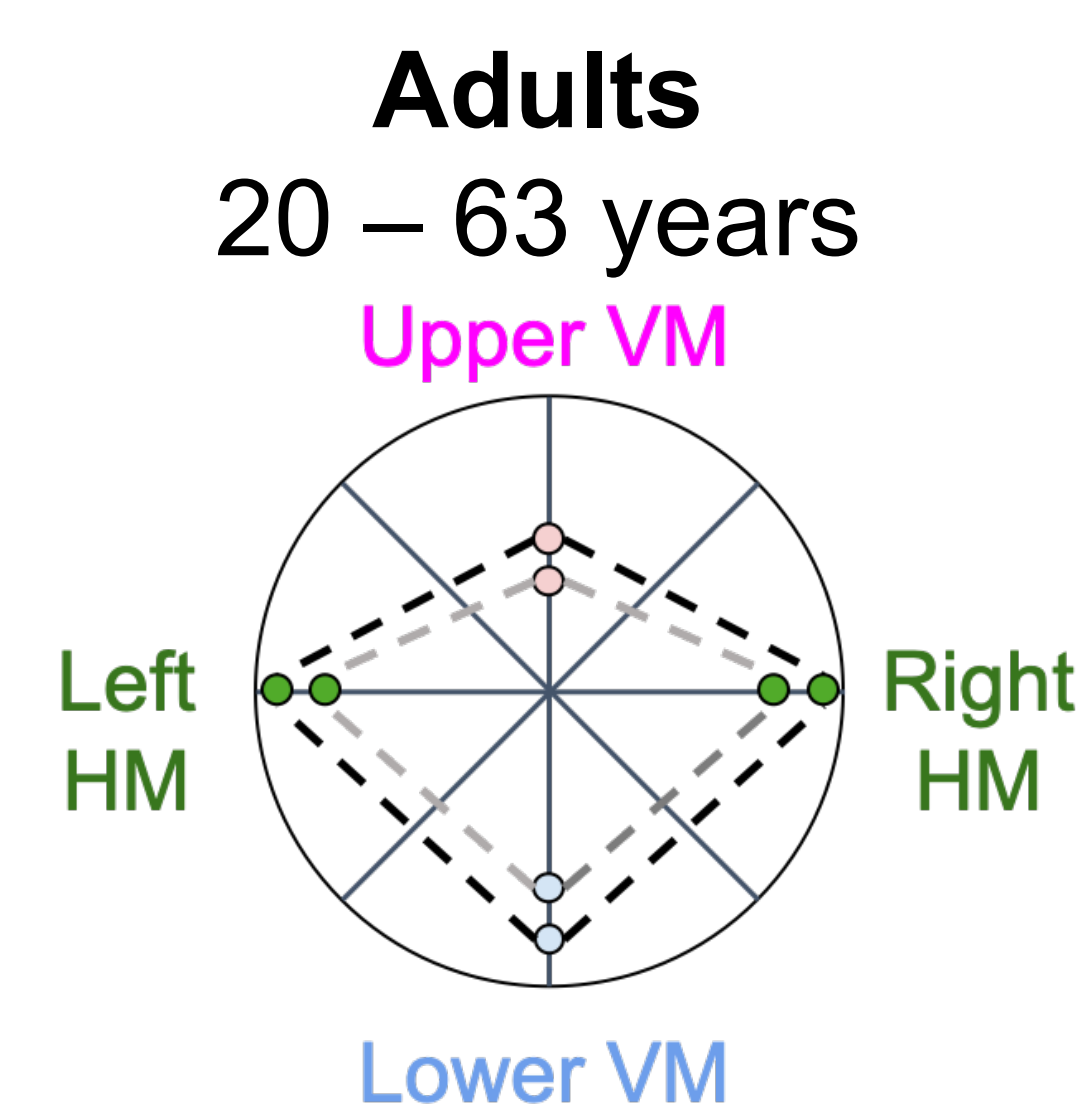
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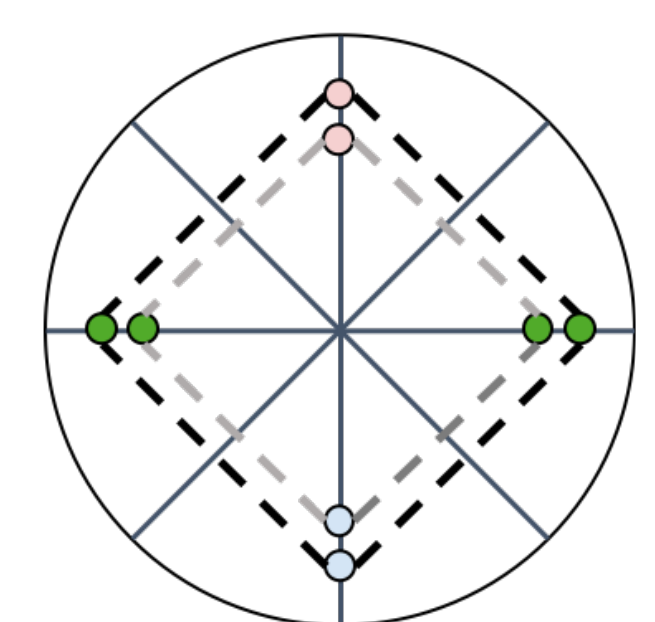


Background

- Perceptual performance decreases with eccentricity¹⁻² and differs across isoeccentric locations.³⁻⁷
- The adult visual performance field is characterized by a horizontal-vertical anisotropy (HVA) and a vertical meridian asymmetry (VMA).³⁻⁷
- Exogenous^{4,5} and endogenous⁷ covert attention boosts performance to a similar degree at isoeccentric locations, preserving performance field shape.
- These asymmetries are absent in young children.⁸



Children
6 – 10 years



Adolescents
13 – 17 years



Questions

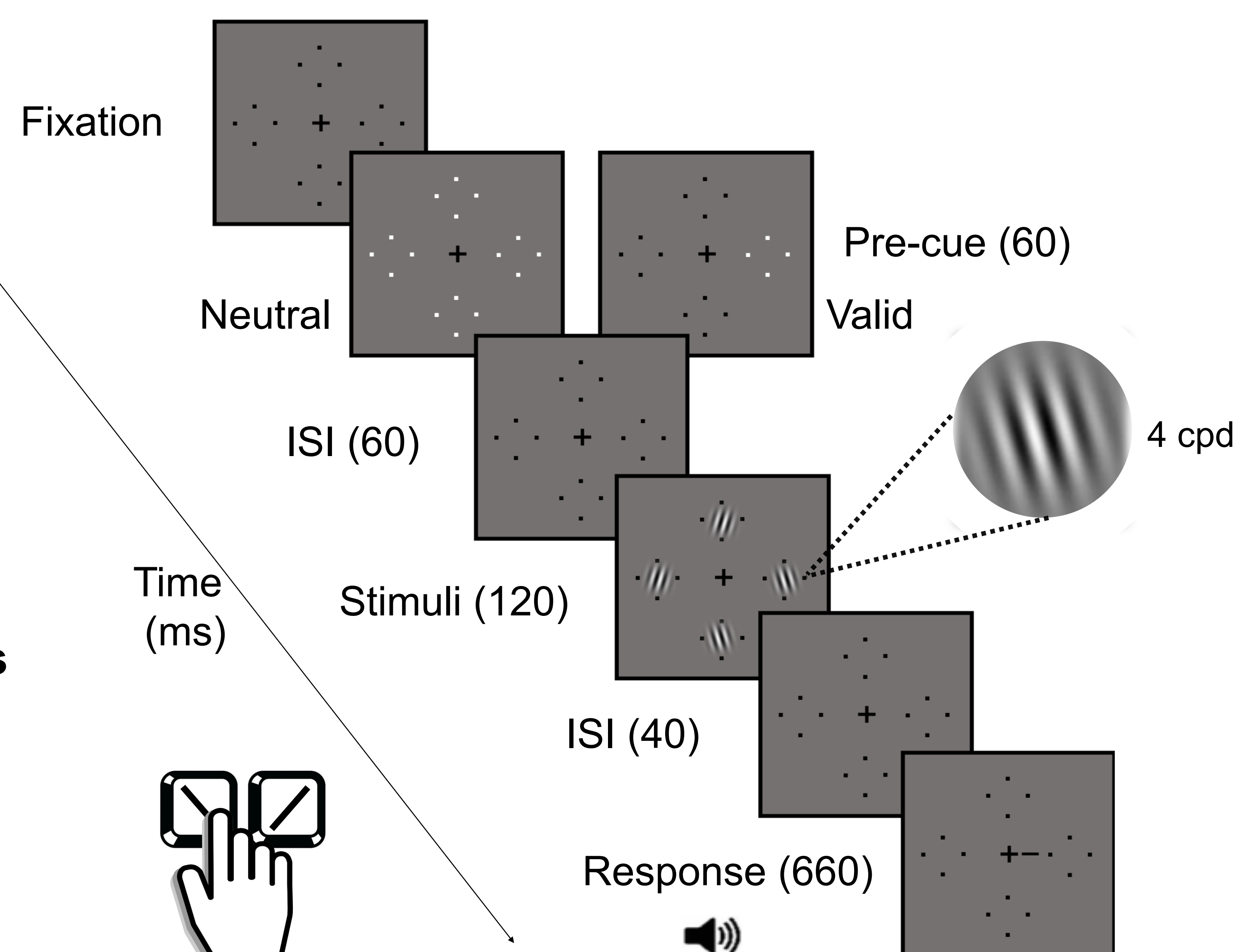
When during adolescence do the visual field asymmetries present in adulthood (HVA/VMA) emerge?

Does covert exogenous spatial attention modify the shape of the adolescents' performance fields?

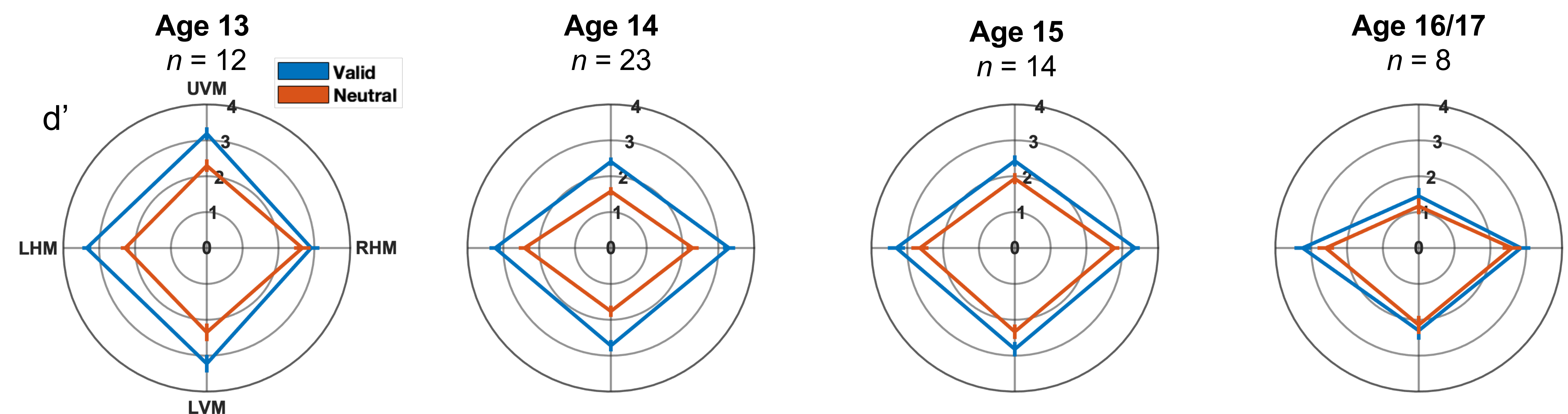
Task: 2-AFC orientation discrimination

Adults
 $n = 25$
20-63 years
 $\mu = 29.4$
 $\sigma = 14.1$

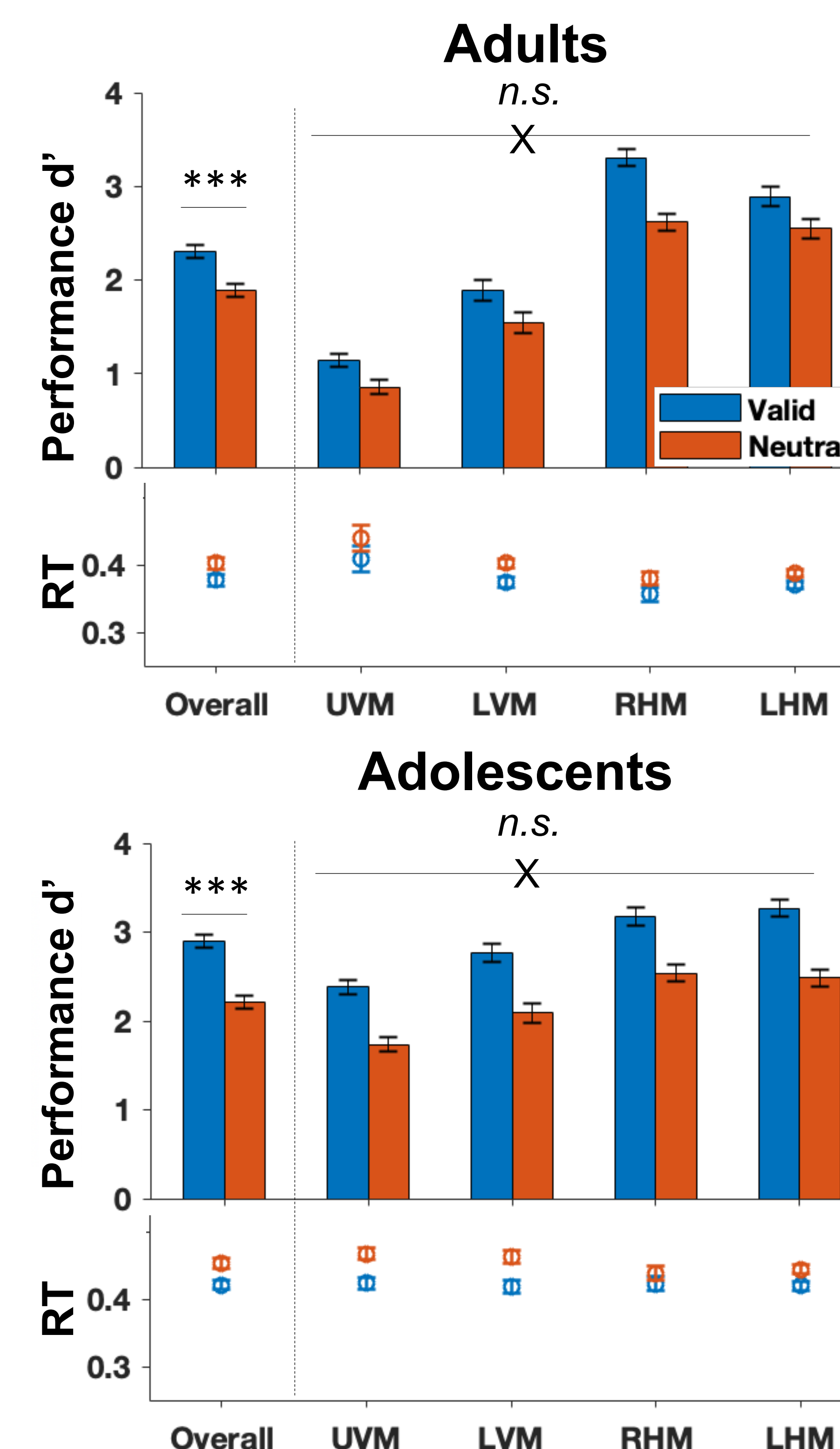
Adolescents
 $n = 57$
13-17 years
 $\mu = 14.8$
 $\sigma = 0.9$



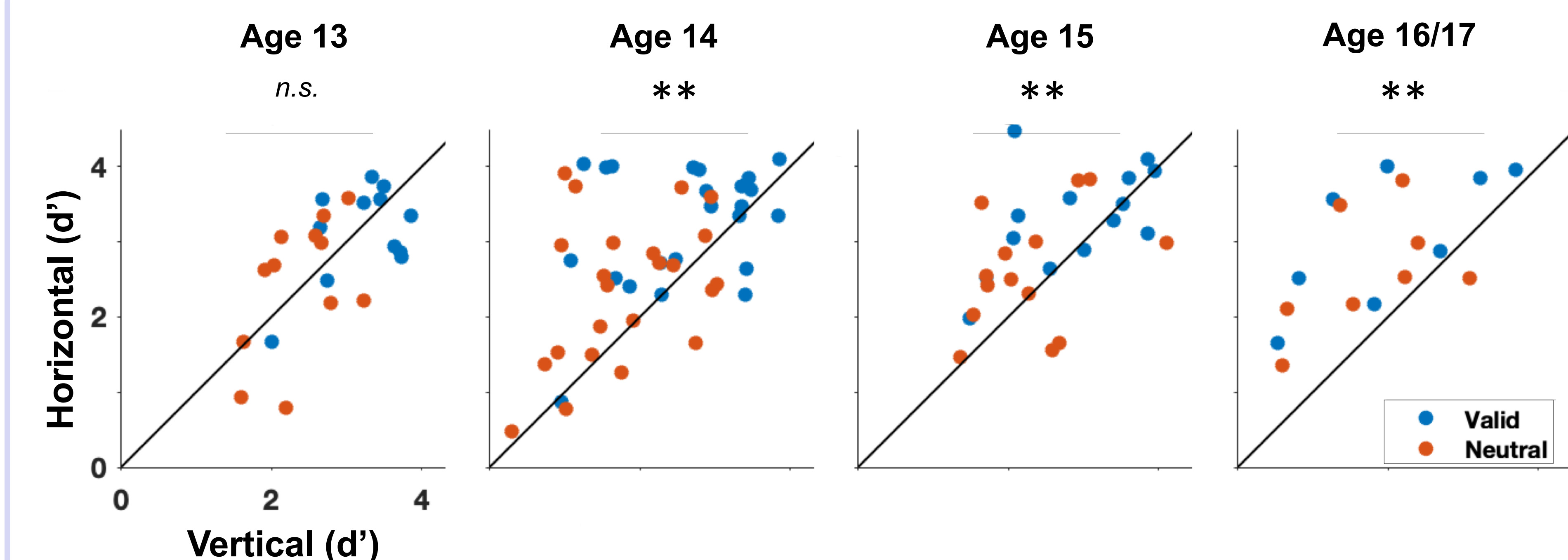
Results: Performance asymmetries develop gradually



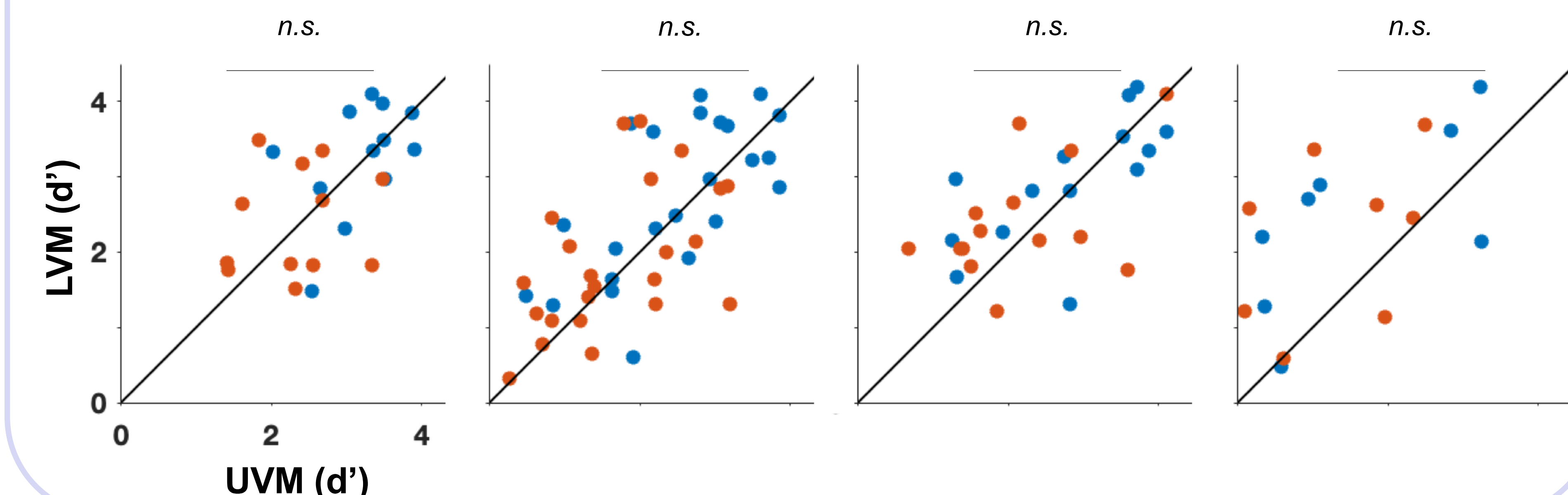
Results: HVA emerges before VMA



Horizontal - vertical meridian anisotropy (HVA)



Vertical meridian asymmetry (VMA)



Conclusions

- The visual field asymmetries (HVA and VMA) emerge gradually during adolescence, with the HVA emerging before VMA (preliminary conclusion, COVID-19 has precluded more data collection).
- In adolescents, like in adults, covert spatial attention boosts performance to a similar degree across cardinal locations.

References

- [1] Strasburger, Rentschler & Jüttner (2011). *JoV*.
- [2] Anton-Erxleben & Carrasco (2013). *Nat Rev Neurosci*.
- [3] Mackeben (1999). *Spatial Vision*.
- [4] Carrasco, Talgar & Cameron (2001). *Spatial Vision*.
- [5] Cameron, Tal & Carrasco (2002). *Vis Res*.
- [6] Abrams, Nizam & Carrasco (2012). *Vis Res*.
- [7] Purokayastha, Roberts & Carrasco, *VSS poster 2019*.
- [8] Ho, Mahon & Carrasco (2003). *JoV*.

For other presentations on Performance Fields, see talk 543 and posters 116, 1524, and 270.

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