

Spatial Heterogeneity in Localization Biases Predicts Crowding Performance

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Introduction

Crowding: interference from clutter on object identification in the periphery

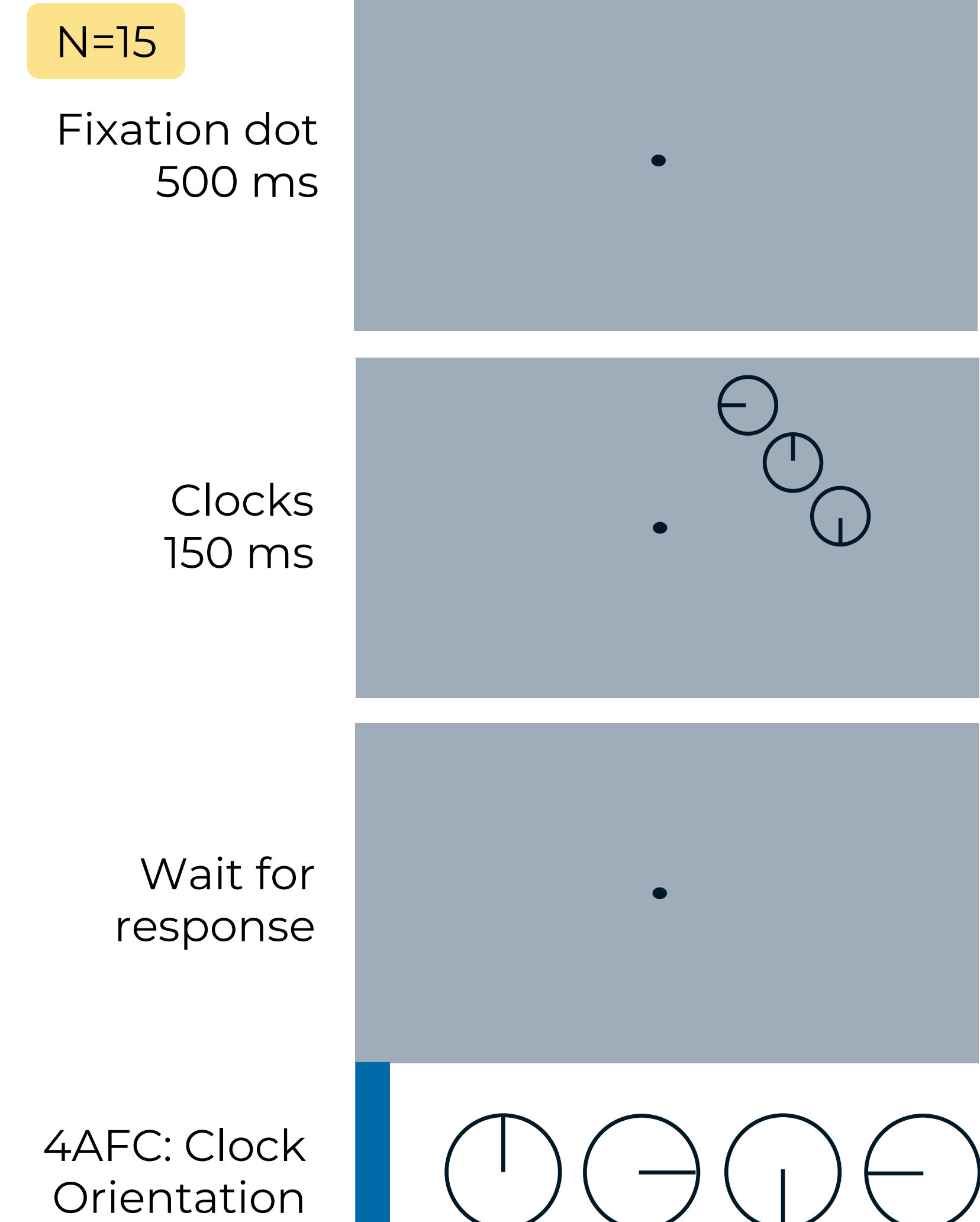
D + RDP

Previous work has shown large idiosyncratic biases in perceived position¹, with perceptual compression and expansion in different areas of the visual field².

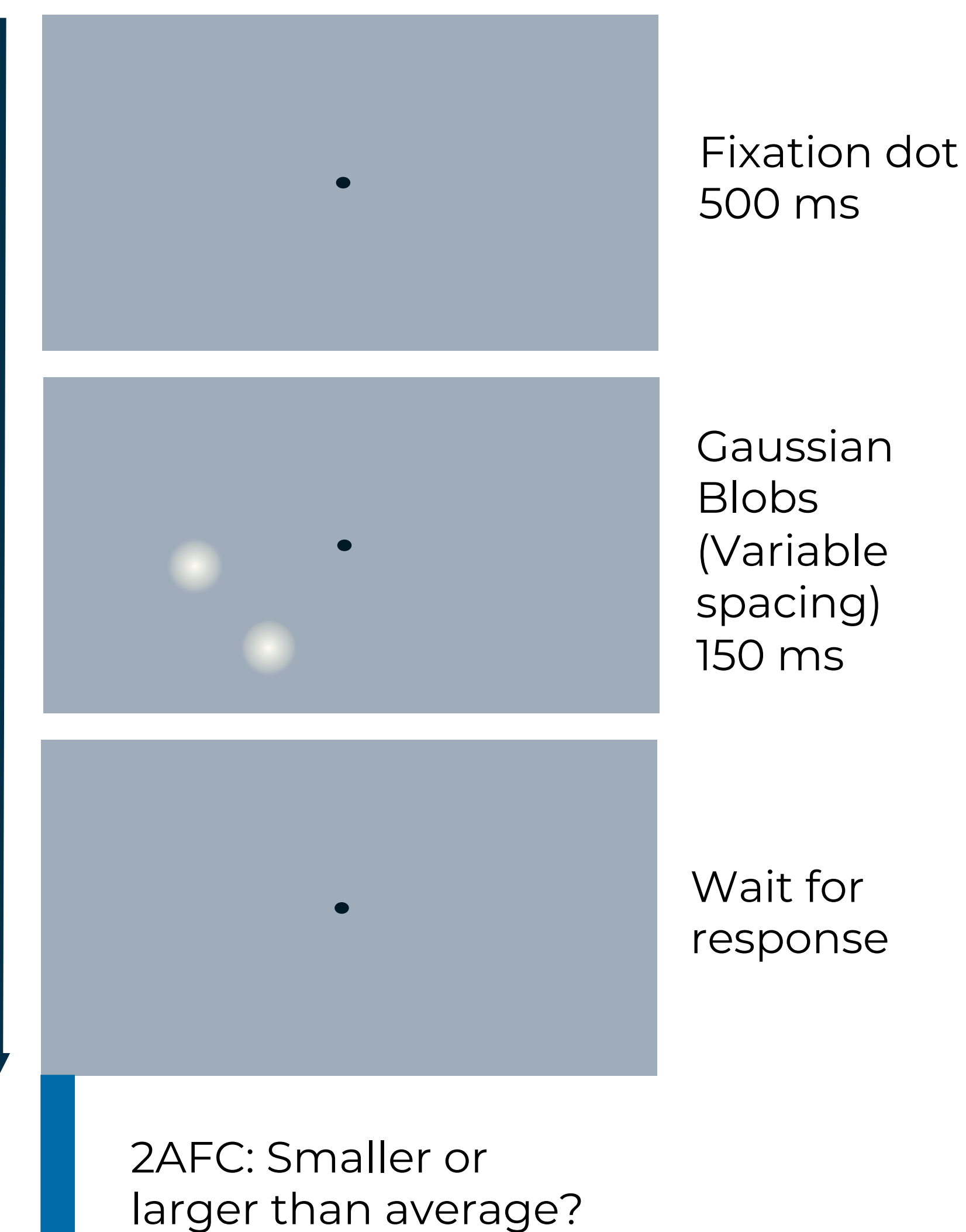
Q: Do idiosyncrasies in perceived spacing across the visual field contribute to individual differences in crowding?

Methods

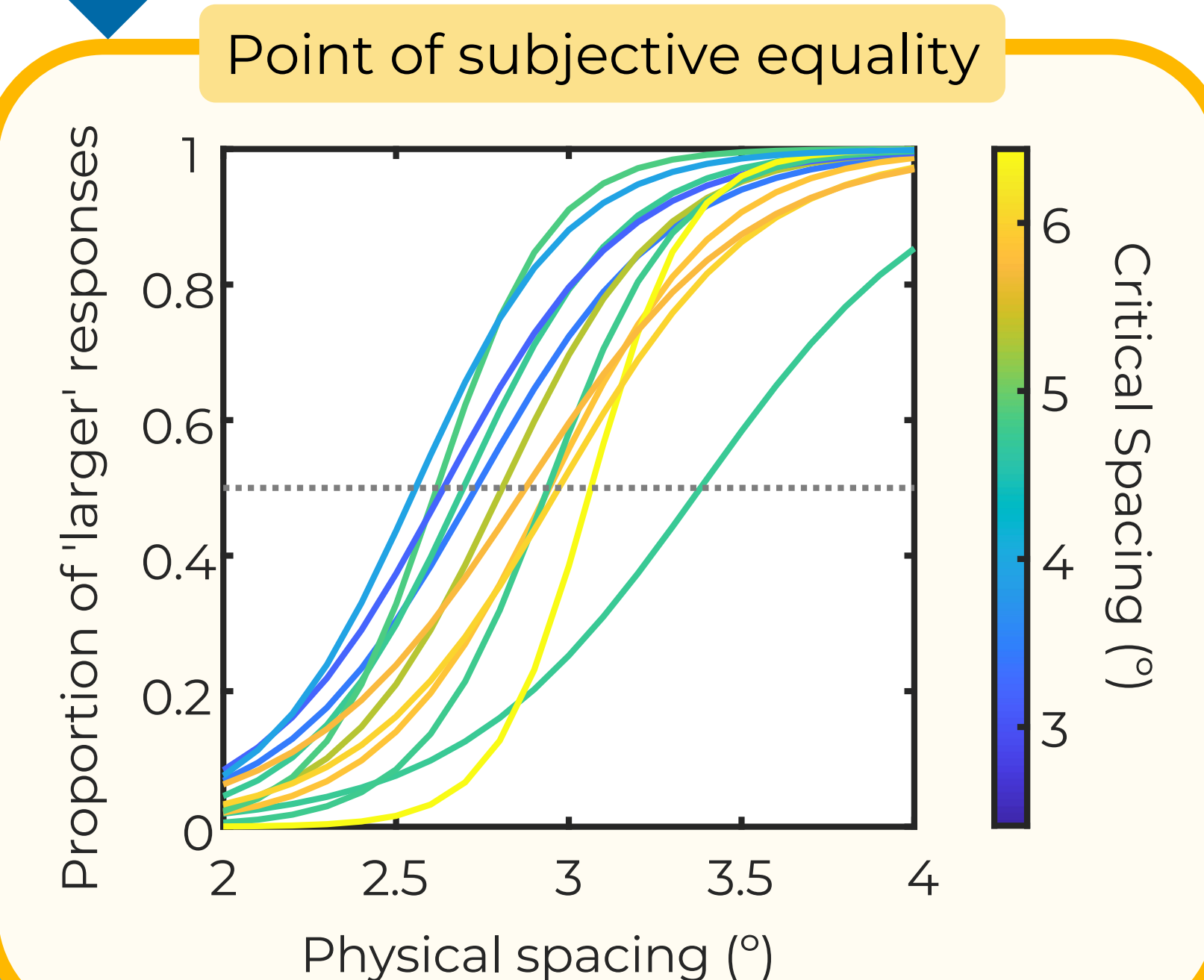
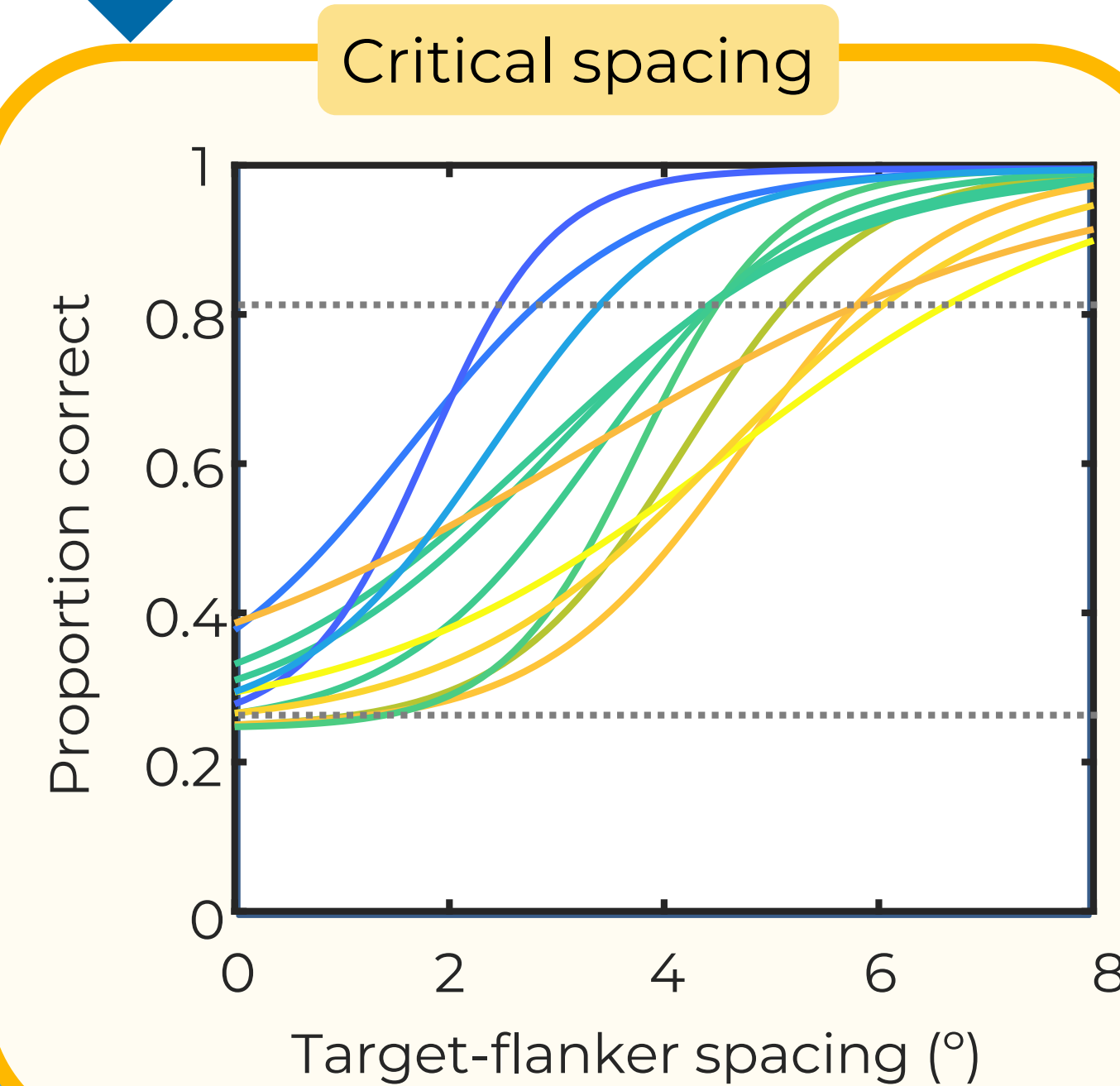
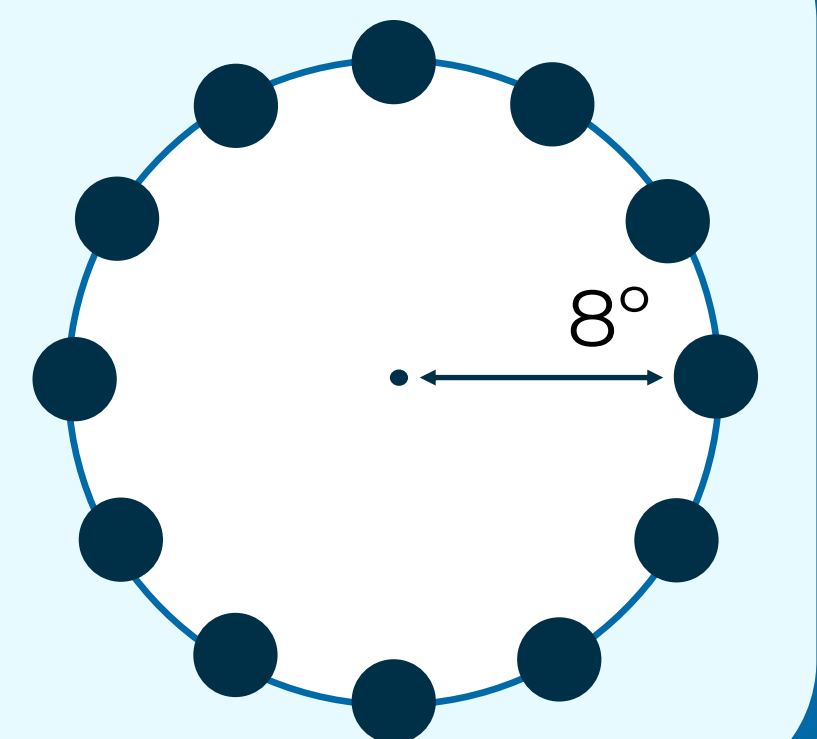
Crowding Task



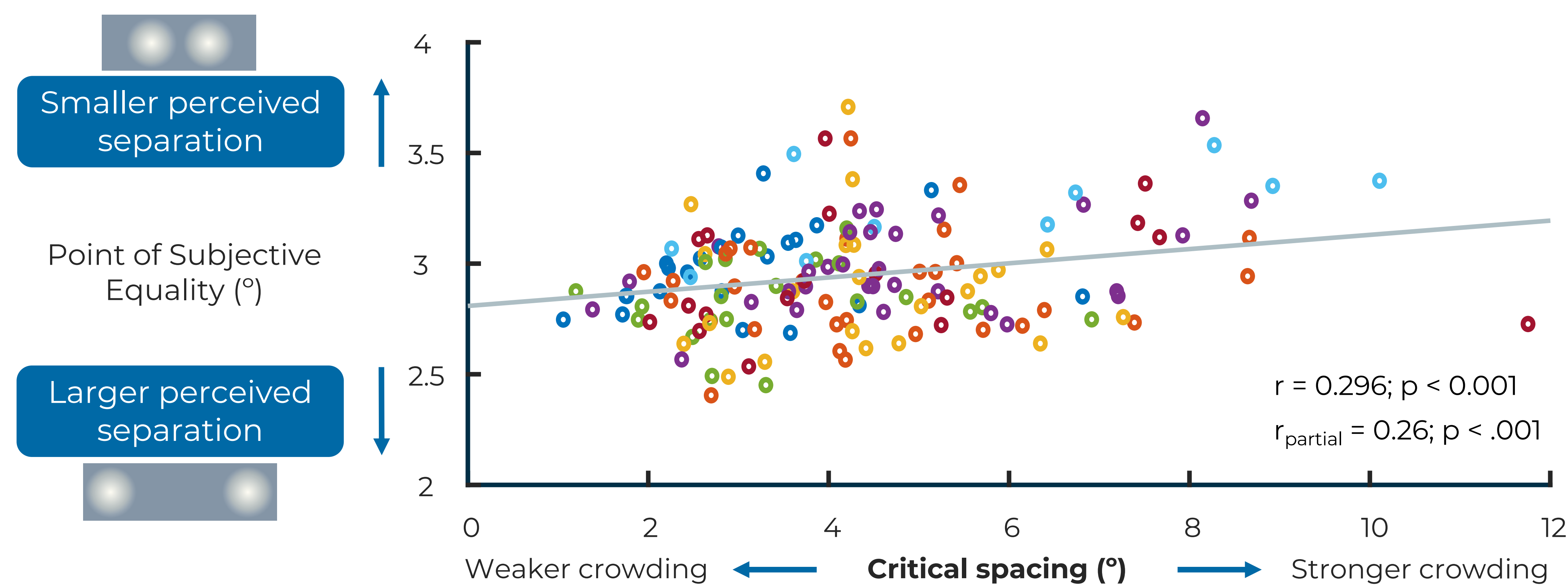
Perceived Spacing Task



Stimulus Locations



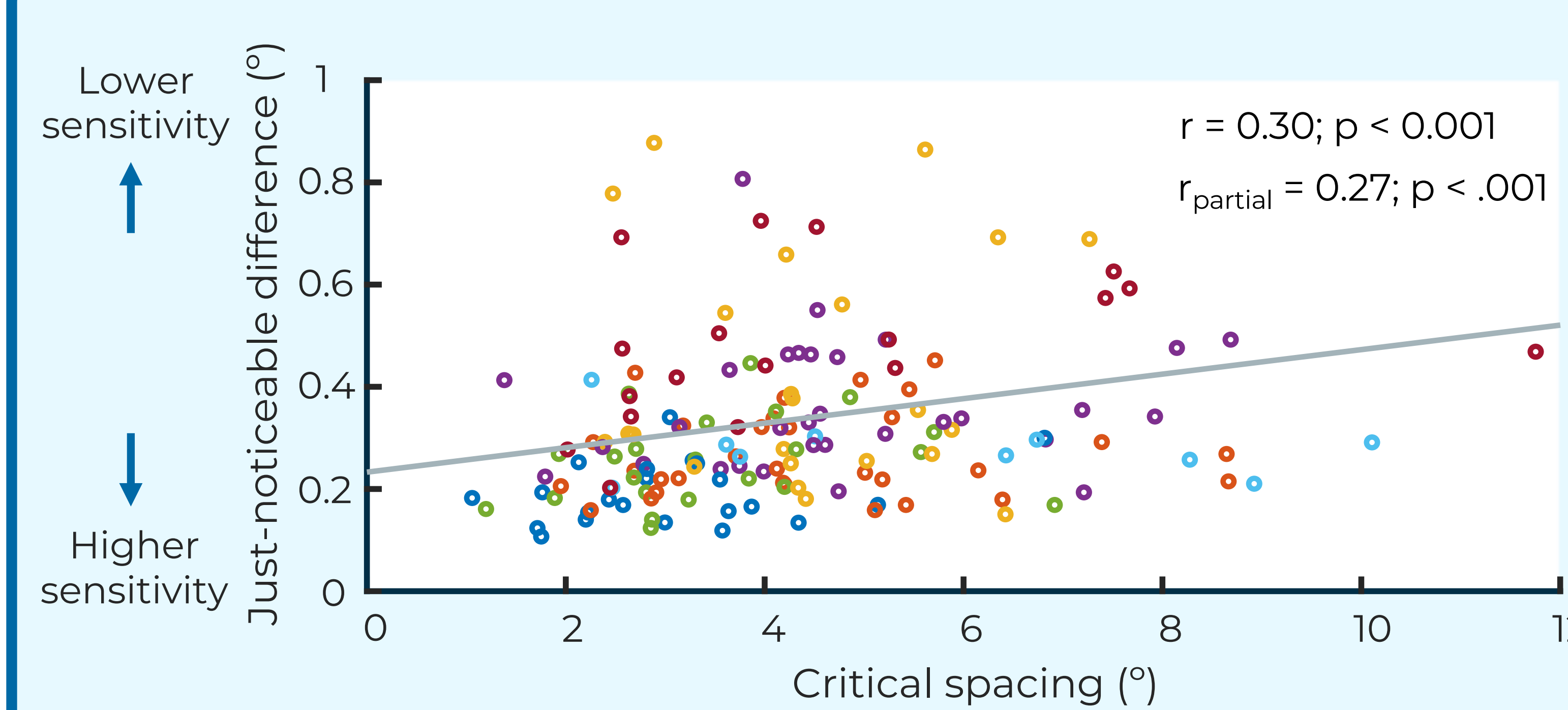
Results



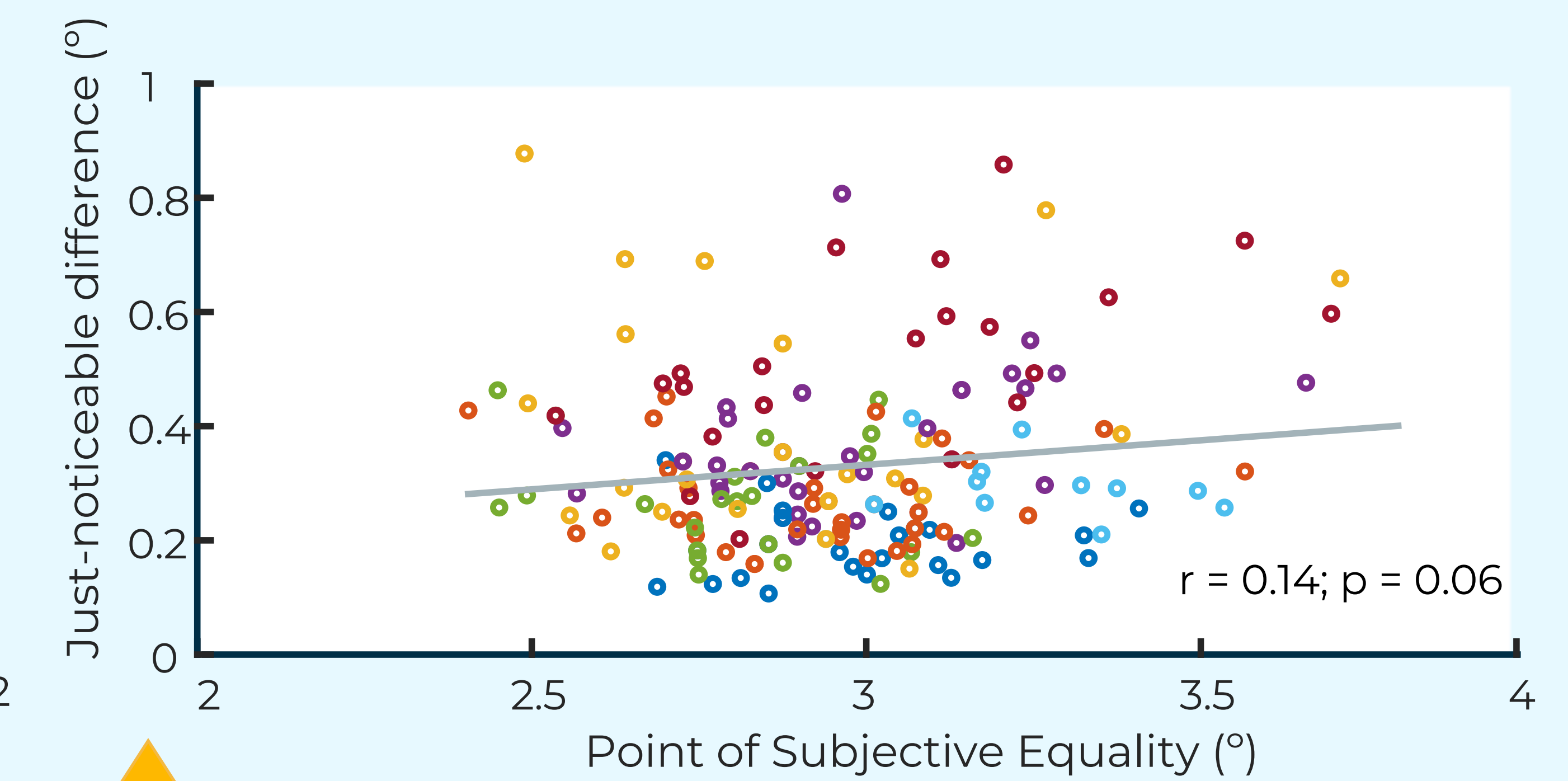
Idiosyncratic biases in perceived spacing contribute to variation in crowding

Larger perceived spacing linked to weaker crowding^{3,4}

Sensitivity also contributes to crowding strength⁵



Sensitivity and bias are weakly related



Partial correlations controlling for each measure show independent contributions of JND and PSE to crowding

Conclusions

- Individual differences in perceived spacing at different visual field locations propagate to crowding
- Idiosyncratic perceptual **biases** and **sensitivity** independently contribute to variation in crowding

References

- A. Kosovicheva, D. Whitney, *Curr. Biol.* 27, (2017).
- Z. Wang, Y. Murai, D. Whitney, *Proc. R. Soc. B.* 287, (2020)
- S. C. Dakin, J. A. Greenwood, T. A. Carlson, P. J. Bex, *J. Vis.* 11, (2011).
- G. W. Maus, J. Fischer, D. Whitney, *PLoS One*, 6, (2011).
- J. A. Greenwood, M. Szinte, B. Sayim, P. Cavanagh, *Proc. Natl. Acad. Sci.* 114, (2017).