

# The Blind Exchange Hemispheric Synchrony for long-range Functional Connectivity in V1



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- Long-range functional connectivity is decreased between V1 and the sensory cortices in the blind (Yu, et al 2008; Bedny, et al 2011)
- Intrinsic functional connectivity both within and between right/left early visual areas (V1-V3) reflects retinotopy in the sighted (Heinzle, et al 2011)
- We compared the resting correlation structure in V1 between hemispheres in the sighted and blind
- We related individual subject differences in hemispheric synchrony to long-range changes in functional connectivity

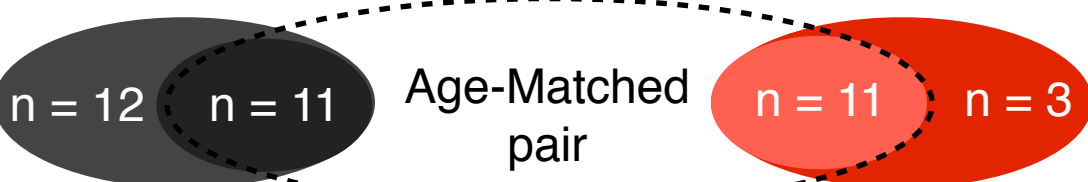
## Methods

### Scans

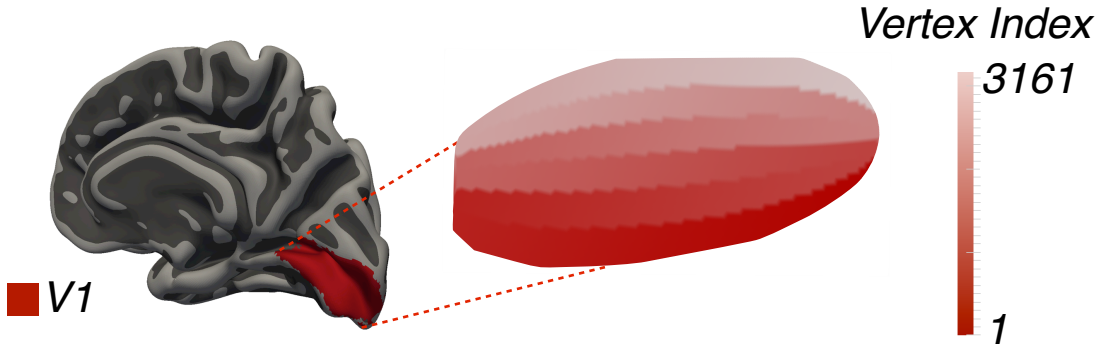
3T, 3x3x3 voxels, 3sec TR, eyes closed in total darkness for 7.5-8 minutes(150-160TRs)

### Subjects

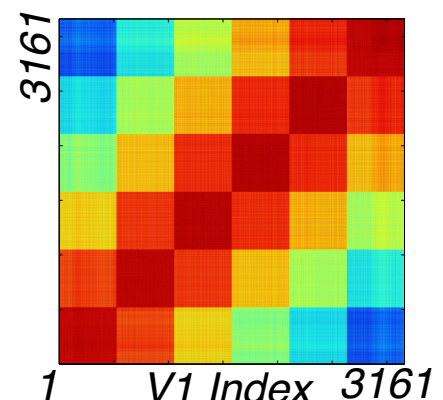
#### Sighted



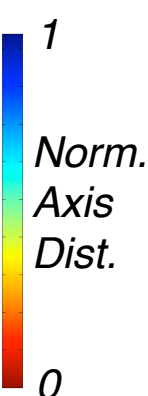
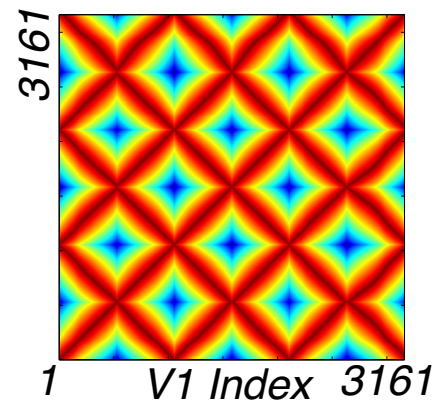
### V1 Positional Index



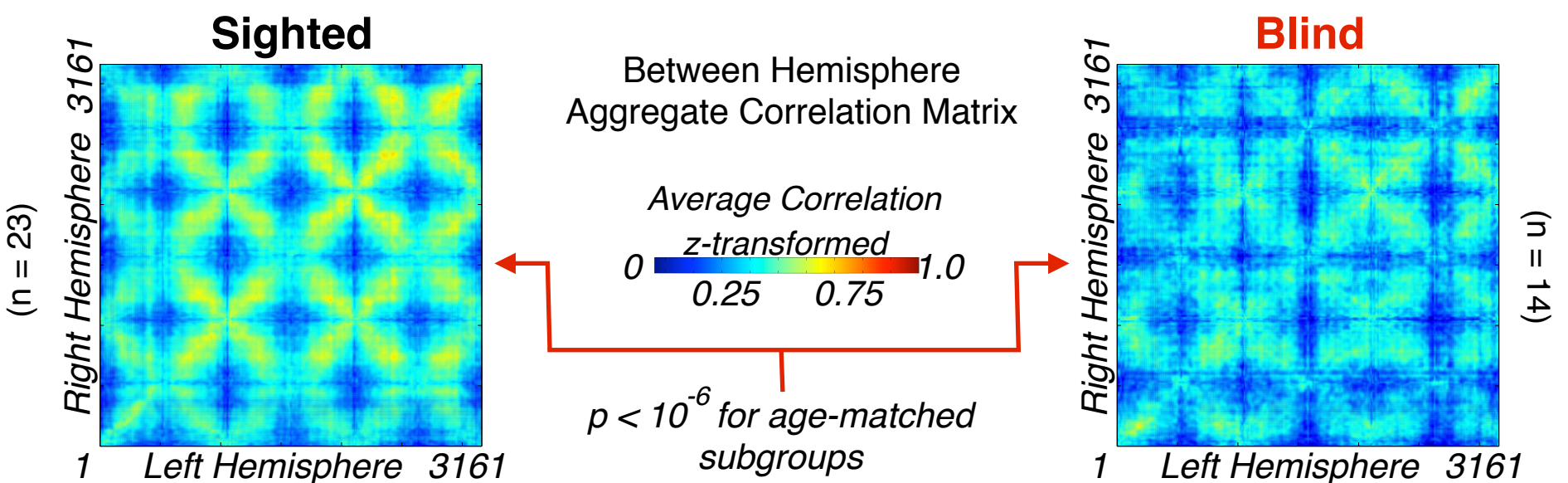
### Angle (Minor Axis) Difference Matrix



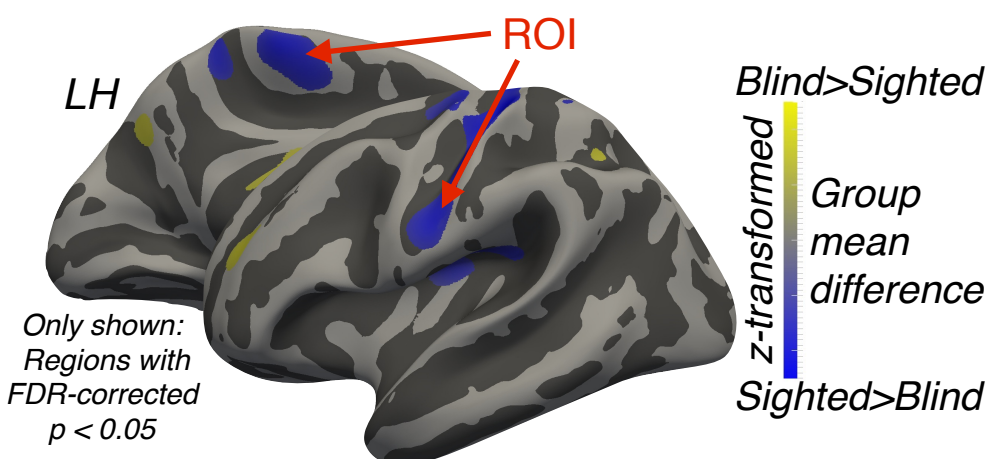
### Eccentricity (Major Axis) Difference Matrix



*Inter-hemisphere correlation is decreased in the blind*

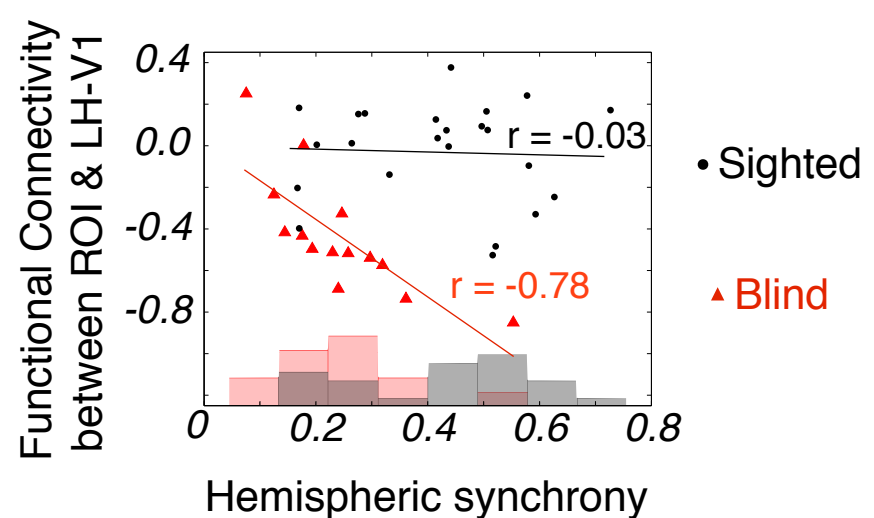


*V1 is anti-correlated with sensory cortex in the blind*



Whole-Brain Connectivity: LH V1

*Hemispheric Synchrony (HS) anti-correlates with Long-Range Functional Connectivity in the Blind*



## Discussion

- Inter-hemispheric correlations reflect retinotopy
- This structure is present, but reduced, in blindness
- The greater the loss of hemispheric synchrony in blindness, the greater the long-range connectivity of left striate with other sensory cortices
- This exchange of local for distant function connection may underly the altered, cross-modal functional properties of striate cortex in blindness

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Bedny M, et al. (2011) Proc Natl Acad Sci USA. 108(11): 4429-34  
Heinzle J, et al. (2011) Neuroimage. 56(3): 1426-36.  
Van Dijk KR, et al. (2011) Neuroimage. 59(1): 431-8.  
Yu C, et al. (2008) Hum Brain Mapp. 29(5): 533-43.

