Characterizing cortical responses to faces and scenes in infant ventral temporal cortex.

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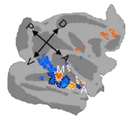
Background

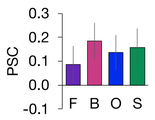
- Adults have cortical areas that respond selectively to categories such as faces, bodies, objects, and scenes (Kanwisher, 2010).

When does selectivity emerge?

- Infants prefer faces and spend more time looking at faces than other objects (Farroni et al., 2005; Fausey et al, 2016).
- Infant neuroimaging experiments have failed to find face selective responses in primate infants (Livingstone et al., 2017; Deen et al., 2017).

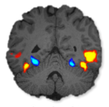


Macaque infants
n=3

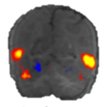


Human Infants
n=6

- Cortical responses to faces (face>scene) and scenes (scene>face) are in similar areas in infants & adults (Deen et al., 2017).



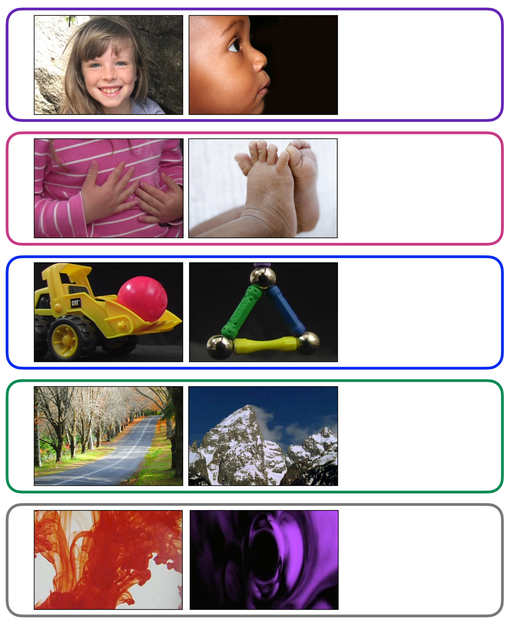
Adult



Infant

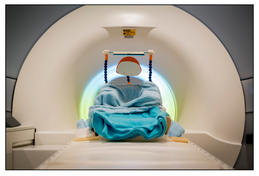
How are behavioral face preferences supported by the infant brain? Do infants have selective responses for any category?

Stimuli



Colorful videos played continuously. Blocks were 18s long with 2.7-3s videos.

Infant fMRI data collection

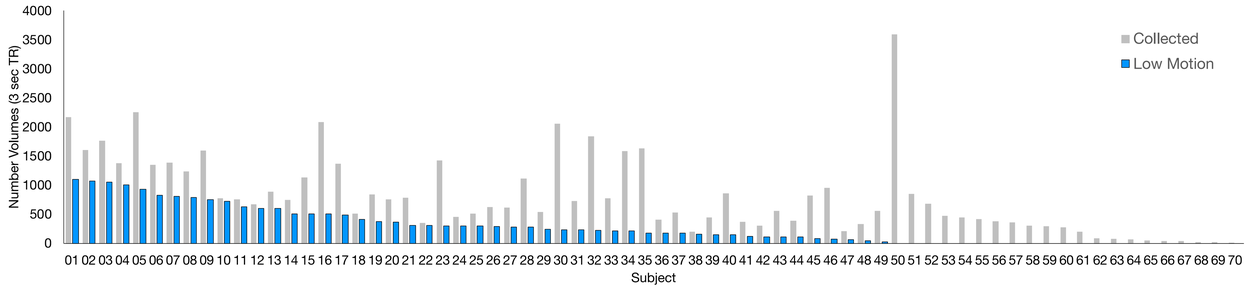


Special infant coil for awake infant fMRI.

Scanner buddy and parent with infant.

New coil and better acquisition sequence

Flexible design for infant headphones.



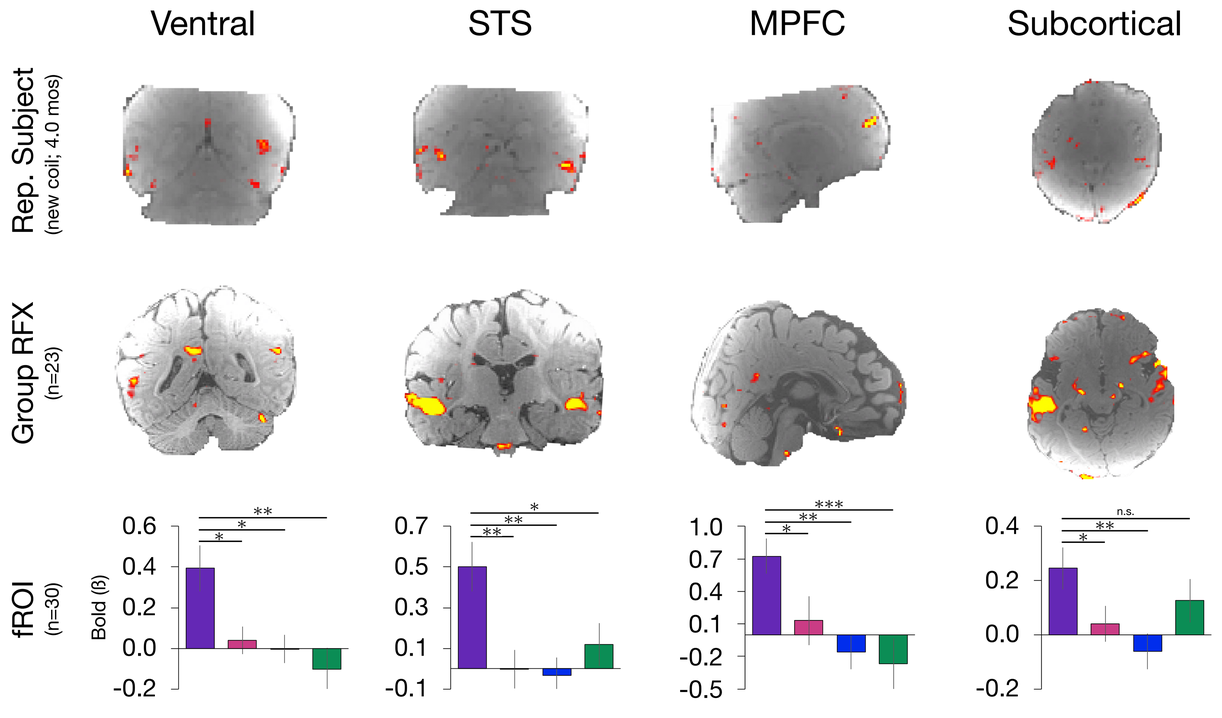
Subject Inclusion

- Recruited: 86 subjects 2.1-11.9 months mean age = 5.2m; 41 female; 42 new coil
- RFX: 49 subjects 2.1-9.7 months mean age = 5.1m; 24 female; 23 new coil
- fROI: 30 subjects 2.5-9.4 months mean=4.9m; 11 female; 16 new coil

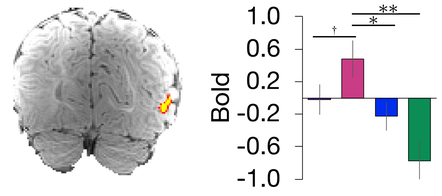
Data Inclusion

- High motion volumes (>0.5 mm or degrees of motion) are removed to create “subruns”
- Subruns minimum 24 consecutive volumes
- Minimum 96 volumes for group random effects
- Minimum 2 subruns with 96 volumes for fROI

Face selective responses in the infant brain

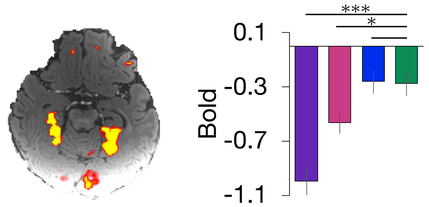


Bodies



Body selectivity in infant lateral occipital cortex. New coil group RFX n=23; fROI n=30.

Scenes



Infant ventral scene preferences lack selectivity. New coil group RFX n=23; fROI n=30.

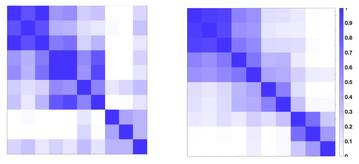
Discussion

- We found the first evidence of face selective responses in the infant brain.
- We did not find selective response for other categories.

Future Directions

What is the role of top-down connections in the development of category-selectivity?

What is the representational space of infant cortex?



Acknowledgements

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