**Introduction**

- Episodic memory relies on a distributed network of regions in the brain, including cortical regions in the frontal and temporal cortices (Dickerson & Eichenbaum, 2009).
- Along with memory, research shows that cortical regions undergo great development in early childhood (Sur & Leamey, 2001).
- Previous studies have shown that neural pruning and myelination takes place during childhood development.
- However, little is known about how changes in cortical regions might relate to memory development during this time period.
- The present study aims to investigate associations between cortical thickness and performance on an episodic memory task.

**Methods**

**Participants**
- 200 children aged 4- to 8-years-old (M = 1.50, SD = 0.50, 100 females)
- Out of 200 children, 6 children did not undergo scanning and 1 child was identified as an outlier (3 SD from the mean).

**Memory Assessment**
- Children completed an Ordered Recall Task (Weintraub et al., 2008)
- 9 pictures with a common theme were presented one-by-one
- The pictures then were shuffled and re-presented
- Children were asked to reconstruct the sequence
- Variables used: All Adjacent Pairs

**IQ Assessment**
- Children were administered age-appropriate IQ tests (WISC and WPPSI).

**MRI Acquisition**
- High resolution (1mm³) T1-weighted anatomical brain images were obtained from a Siemens 3T scanner with a 32-channel coil
- Freesurfer v5.1 was used to calculate cortical thickness (Fischl, 2012).
- Boundary lines between CSF, gray matter, and white matter were reviewed for accuracy & manual edits were completed when necessary.

**Results: Age and Memory Associations**

- Bivariate correlations showed significant positive associations between Age and memory performance (r = .53, p < .001).

**Results: Cortical Thickness and Memory Associations**

- Associations between each ROI and memory were assessed via bivariate correlations.
  - SFC (r = -0.15, p < .05) and ACC (r = -.23, p < .001) showed negative associations with memory.

**Discussion**

- These results suggest that episodic memory is positively associated with age.
- Results also suggest that children with less gray matter in SFC performed better on the memory task.
  - This may reflect neural pruning and myelination that occurs during childhood.
- The results show that changes that occur in frontal regions, which are sometimes not thought of as "classical" memory regions, are also important for memory development.
- Future research should expand on these findings and study individual differences over time in children to better understand the extent of cortical thinning in various brain regions’ effect on memory.

**Acknowledgements**

We would like to thank the families for participating in the study and the UMD Neurocognitive Development Lab.

**References**

Purple = Superior Frontal Cortex
Light blue = Middle Frontal Cortex
Dark blue = Anterior Cingulate Cortex
Green = Middle Temporal Cortex
Yellow = Entorhinal Cortex