Some recent work ...

Structural and functional correlates of vocabulary knowledge
Richardson et al. (in press) Journal of Cognitive Neuroscience

- Cross-sectional lifespan trajectory 7 to 75 years
- Structure and function
  - Functional tasks: listening to and reading sentences and words
  - Vocabulary task: British Picture Vocabulary Scale - II (BPVS-II)

Correlation between vocabulary and activation

- Functional activation processing sentences and words
- Correlation between vocabulary knowledge and brain activation for sentences and words
Structural analysis

- pSMG Region of Interest (ROI): Significant positive correlation between vocabulary score and grey matter density in adolescents only, the pSMG was not detected across lifespan.

Structural and functional analyses across lifespan

Vocabulary and brain structure: lifespan trajectories
Could the age effects account for different trajectories in temporal and parietal regions across lifespan?

Results Summary

- **3 Regions:**
  - **pSMG:** structural adolescents only (no functional activation in pSMG)
  - **pT-P:** structural and functional across lifespan
  - **pSTS:** structural and functional across lifespan

- **Contrasting temporal and parietal effects**
  - *Explanation?*
    - the effects in temporal and parietal areas are driven by different modes of learning

- **left pT-P area** is linked to syntactic and semantic processing
- the **pSTS** interfaces between semantic associations and speech production
  - Increased functional activation and grey matter density in the temporal regions for those with high vocabulary may reflect learning by context.
- **left pSMG** is only active during tasks that involve word learning rather than passive tasks, and correlated with grey matter in adult bilinguals and teenage monolinguals
  - Learning by lexical or conceptual equivalents