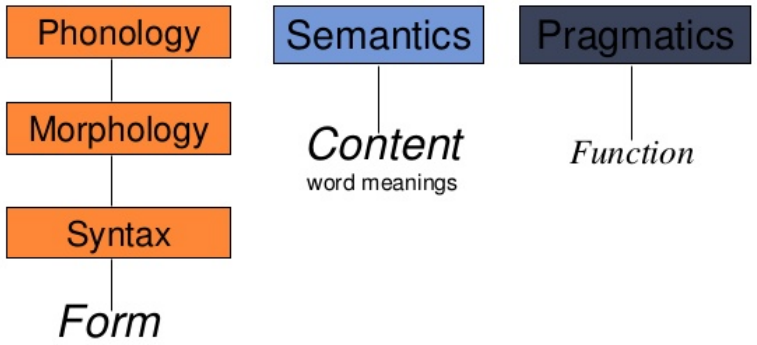
H-126 Recitation 5:
Reading & Language Development

t  day's Section

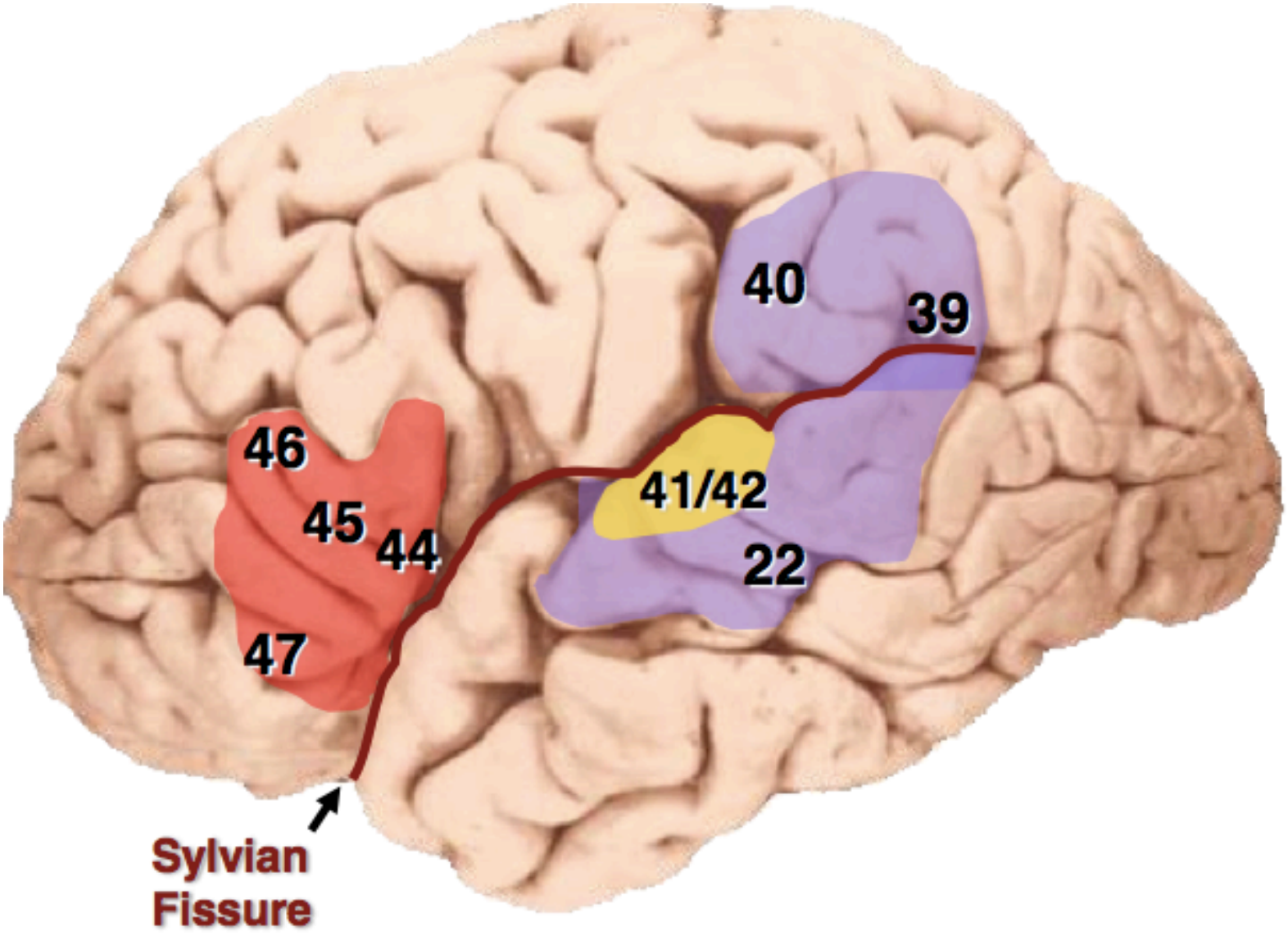
- Logistics: No class next week!
- Review of the readings/content ~20 mins
- Discussion about topics in reading ~10 mins
- Neuromyths activity ~ 15 mins
- Questions ~5 mins

Language and Reading Development

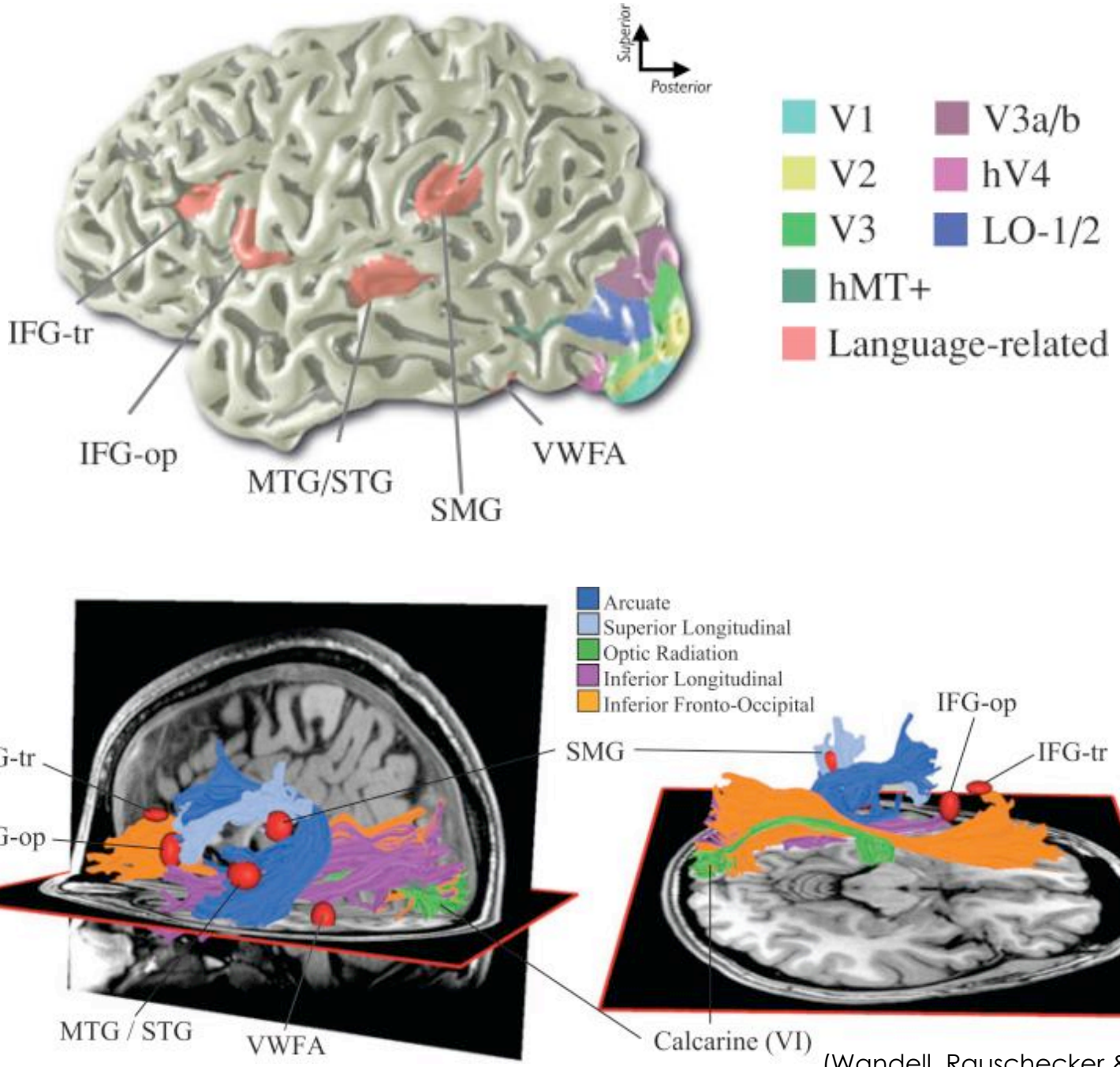
- Which brain regions are associated with language processing?
  - LSTG (BA 22), LIFG (BA 44 & 45), AG, etc. (see diagram next slide)
- Define these components and how they're involved in reading:
  - phonological
  - morphological
  - semantic / lexical
  - syntactic
  - orthographic



- What factors predict reading ability before instruction?
  - phonological awareness, speech perception, rapid automatized naming, letter name knowledge, vocabulary, verbal short-term memory, home literacy environment (library visits, child's reading interest, number of books in the home, etc.)



Broca's Area
Wernicke's Area
Auditory Cortex
Brodmann's numbers



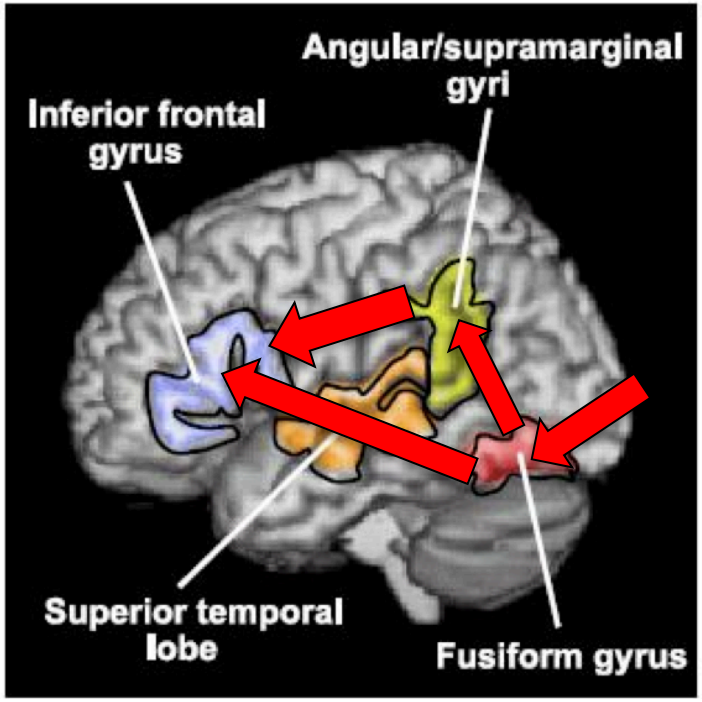
(Wandell, Rauschecker & Yeatman, 2012)

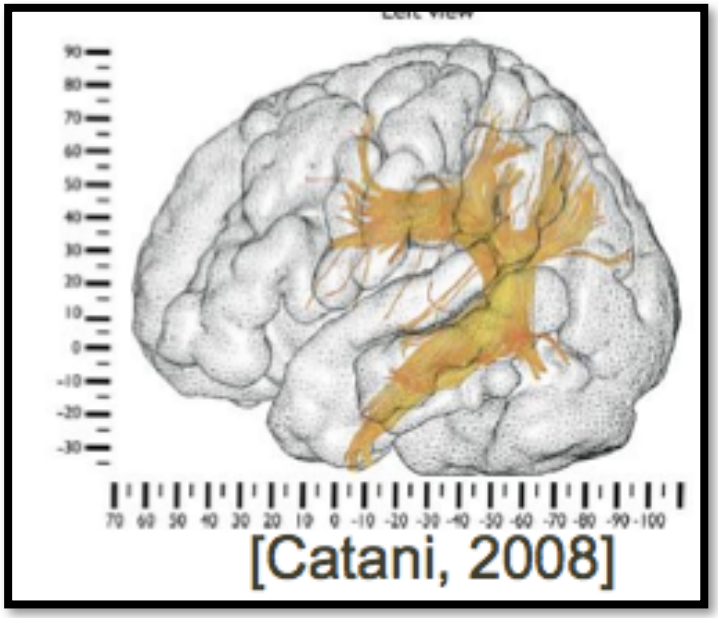
Reading in the typical brain

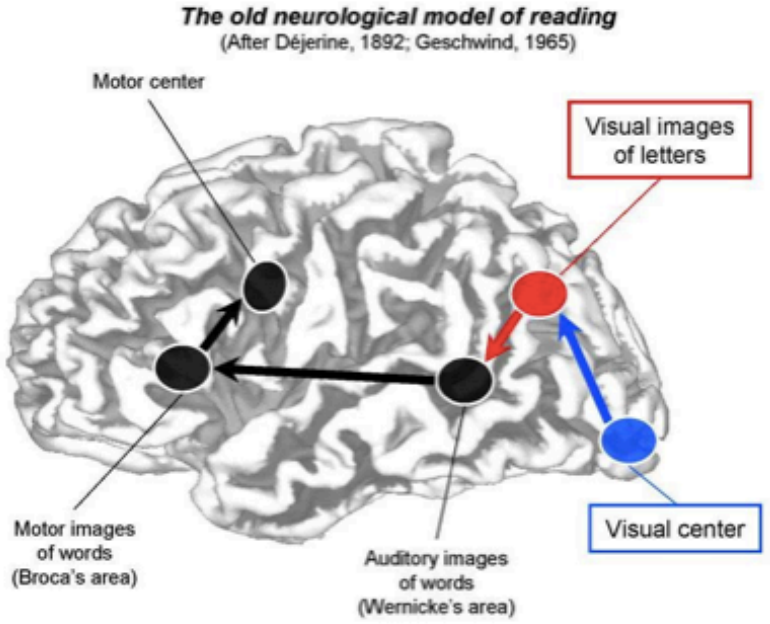
- Is reading an innate skill?
  - NO! "We were not born to read" (Wolf, 2007, p. 3)
    - Reading invented ~3200 BCE
    - "Reading brain exploited older neuronal pathways originally designed for vision and connecting vision to conceptual and linguistic functions" (p. 12).

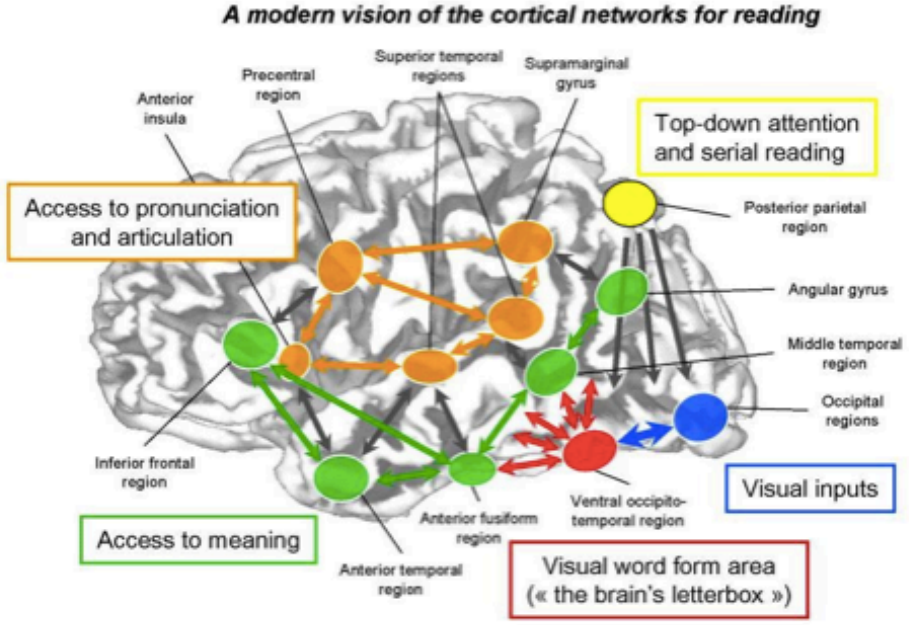
- What is the brain region known to be associated with visual reading?
  - VWFA/Left OT (Dehaene, 2009)
  - "Recycled" brain region specializing in identifying graphemes
    - Only activates in response to graphemes if subjects are literate
    - Discovered through neuropsych work (Mr. C), replicated numerous times using fMRI, PET, MEG, etc.

- Is the VWFA the only brain region involved in reading?
  - NO! "Effective interconnection" among regions associated w/language and visual processing" (Dehaene, 2009)→SMG/AG, STG, IFG, and FG









(Dehaene, 2009)

Discussion Questions

- How might reading development differ by the language spoken (e.g., phonemic/syllabic structure)?
- How might reading development differ by the writing system for that language (e.g., orthographic depth, spelling regularity).
- Given what you know about brain development, at what age/grade would it be ideal to start to teach reading?

Neuromyths Challenge

- Take a few minutes for this quiz: https://testmybrain.org/launch/neuromyths.html

- Relevance to educational neuroscience

- Macdonald, K., Germine, L., Anderson, A., Christodoulou, J., & McGrath, L.M. (2017). Dispelling the myth: Training in education or neuroscience decreases but does not eliminate beliefs in neuromyths. *Frontiers in Psychology*. DOI: 10.3389/fpsyg.2017.01314
  - "These findings suggest that training in education and neuroscience can help reduce but does not eliminate belief in neuromyths."
  - The two most commonly endorsed neuromyths across all groups were related to learning styles and dyslexia.

Questions?

References

Dehaene, S. (2009). *Reading in the brain: The new science of how we read*. New York, NY: Penguin.

Wandell, B. A., Rauschecker, A. M., & Yeatman, J. D. (2012). Learning to see words. *Annual Review of Psychology, 63,* 31-53.

Wolf, M. (2007). Proust and the Squid. New York, NY: Harper & Perennial.