Today’s outline

• Research paper
• Course evaluation
• Altmann Chapters 12 & 14
  – Aphasia
  – Dyslexia

Research paper

• This week: bringing together all the pieces from your long outline.
• Review paper should have a thesis statement too!
• Add in comments and your thoughts about the findings. Have you noticed something wrong with the methodology or argument? Be critical (constructively).
• Focus on your thesis and talk about it, not around it and branch off too far…
Causes of Brain Damage

- Head injury
- Stroke
  - Hemorrhagic stroke
  - Ischemic stroke

http://www.massgeneral.org/vascularcenter/page.asp?id=stroke

Left vs. Right Hemisphere

- Damage to the LH generally impairs language
- Damage to the RH does not necessarily impair language. Patients may show emotional deficit instead.
- But recall Hickok & Poppel’s (2007) proposal on the dual-route to language processing → Language may not be processed in one hemisphere!

Symptoms ≠ Diagnosis

- Symptom is not a direct reflection of distinct disorder
- Failure to produce the word “tiger” could be because:
  - Failure to recognize the animal (conceptual)
  - Failure to utter the word (motoric)
- Classify symptoms according to components of language
Spoken vs. Written deficits

- Aphasia: deficits in spoken language
- Dyslexia: deficits in written language
  - Could affect both reception and expression
  - Often act as co-morbidity
  - Both forms are syndromes, i.e., they compose of distinct symptoms that can be formed into subtypes

Failure to understand

- Pure word deafness (spoken language)
  - Auditory perception intact
  - Failure to connect sound to meaning
- Pure word blindness (written language)
  - Visual perception intact
  - Failure to connect symbol to meaning

Aphasia: The Brain (Revisit)

http://thebrain.mcgill.ca/flash/i/i_10/i_10_cr/i_10_cr_lan/i_10_cr_lan.html
Types of Aphasia (Lichtheim, 1885)

- Broca’s aphasia
- Wernicke’s aphasia
- Transcortical motor aphasia
- Transcortical sensory aphasia
- Conduction aphasia
- Global aphasia
- Isolation of the language zone

Characteristics of Subtypes

<table>
<thead>
<tr>
<th>Subtypes</th>
<th>Fluency</th>
<th>Repetition</th>
<th>Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Broca’s</td>
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<tr>
<td>Wernicke’s</td>
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<td>Trans. Motor</td>
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<td>Global</td>
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<tr>
<td>Isolation of language</td>
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</tbody>
</table>

Dyslexia

- First described in British Medical Journal by Pringle-Morgan in 1896
- Current definition from National Child Health and Human Development:
  - Language-based learning disability
  - Insufficient phonological processing at word-decoding level
  - Not related to general developmental disabilities or sensory impairment
  - Show problems in spelling and writing
## Types of Dyslexia

- **Types**
  - Deep: problems with function words, but not nouns
  - Phonological: fail GPC
  - Surface: can’t say irregular words

- **Etiology**
  - Acquired: Originated in the brain
  - Developmental: Originated in childhood (brain + genetics??)

## Symptoms in reading

- Use small sight vocabulary
- Made visual errors
  - Read saucer as supper
  - Read thirsty as twenty
- Fail to sound out letter sounds → fail to recognize the grapheme-phoneme-correspondence (GPC)
- Successful reading relies on context, substituting semantically acceptable words

## Symptoms in Spelling

<table>
<thead>
<tr>
<th>Target</th>
<th>Age 8</th>
<th>Age 10</th>
<th>Age 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Umbrella</td>
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<td>Unbrl</td>
<td>Unberfler</td>
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<td>reafriestmint</td>
<td>refreshment</td>
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</tbody>
</table>
How do they read?

- Through wholistic visual approach
- Caik \(\rightarrow\) Cake
- Klown \(\rightarrow\) Clown
- But cannot read kaik or kloun
- Semantic priming:
  - Tomato \(\rightarrow\) sawce
  - Cough \(\rightarrow\) snease
- Build up visual memory of words along with semantic context

Etiology: Genetics

- Orton (1925) first proposed language problems run in families
- 1950’s Halgen found 88% of 300 learning disabled children had similar problems in the families
- Recently, heritability of dyslexia is found to be around 50% (Colorado twin studies)
- Short arm in chromosome 6 and 15

Etiology: Neurological basis

- Planum temporale
- Left fusiform gyrus
- Temporo-parietal junction
- Magnocellular pathway for early visual system

Planum Temporale

- Close to the Wernicke's area
- Believed to be involved in pitch processing
- Normal readers have a bigger left PT
- Dyslexic Ss have symmetrical left and right PT

Temporo-Parietal Junction

- Dyslexia as a syndrome caused by deficits in a neurological network

What is language?