Today's topic:

- **Pre-presentation discussion: AoA effects in skilled readers**

Background:

- Juhasz, Gullick, & Shesler (2011), "The effects of age-of-acquisition on ambiguity resolution…"

0. Course info and announcements

- **Group 1** individual slides will be due **Th Oct 10** by 11:59pm (Canvas Assignments)
  - Reminder: See presentation **assignment handout**, linked from Daily syllabus or Links for assignments web page
  - Slide formatting does not have to be consistent across group members at this phase
  - You are encouraged to workshop your slides with group members — share feedback!

- Any questions or comments?

0. Key points today

- Quick background review
  - Decoding vs. comprehension
  - Fixation duration
- Article background and key concepts
  - Age of acquisition (of words)
  - Lexical ambiguity / effects in text processing
- Big-picture research questions
- Statistical analysis
- Some notes on presentations

1. Warm-up

- Review: The **"simple view" of reading**

  R = ***D*** × ***C*** | **Reading** is the product of (written-symbol) **decoding** and (spoken-language) **comprehension**

  - Decoding known vs. unknown words?
  - What are some factors besides letters and sounds we might expect to matter in reading?

Gough, Philip B., and William E. Tunmer. 1986. Decoding, reading, and reading disability. *Remedial and Special Education* 7 (1): 6–10. [link]

Hoover, Wesley A., and Philip B. Gough. 1990. The simple view of reading. *Reading and Writing* 2 (2): 127–160. [link]

1. Warm-up

Group discussion

Take a sheet of paper and write quick answers to these:

- Review: Why are researchers interested in **duration of fixation** on words during reading?
  - Hint: Fixation duration measures …

- What are some **factors** that are known to affect fixation duration on a word?
  - Hint: We've talked about a few different factors in previous class discussions

1. Warm-up

Group discussion

- Take about 1 minute to write down one of the **research questions** from Juhasz, Gullick, & Shesler (2011) — try to do this without looking at the article
  - **Either a big-picture or a measurable RQ**

1. Warm-up

- Review: Why are researchers interested in **duration of fixation** on words during reading?
  - Fixation duration measures **processing time**

- What are some **factors** that are known to affect fixation duration on a word?
  - From Rayner et al (2012) chapter on eye movement:
    - The **frequency** of the word
    - Letter shape info from **parafoveal preview**
  - From Rayner et al (2005) research article:
    - Homophone and orthographic **priming**

2. Background and key concepts

- Juhasz, Barbara J., Margaret M. Gullick, & Leah W. Shesler. 2011. The effects of age-of-acquisition on ambiguity resolution: Evidence from eye movements. *Journal of Eye Movement Research*, 4(1): 4, 1–14. [https://doi.org/10.16910/jemr.4.1.4]
  - UNC link

2. Background and key concepts

- What is **age of acquisition (AoA)** of a lexical item?
  - How was AoA determined for the words in the experiments in this article?
  - Any concerns about this methodology?
  - Why do you think the researchers thought this approach was reasonable?

2. Background and key concepts

- Some past experiments have seemed to show **AoA effects** on processing time
  - Is it **early** AoA or **late** AoA words that are apparently processed more quickly?
  - What factor do we have to control for in order to distinguish it from AoA effects?
  - Why do Juhasz et al. (2011) argue that we need more information to understand how AoA effects work?

2. Background and key concepts

- Processing **advantage** for **early** AoA words
- Early AoA words tend to be high **frequency** — need to control for frequency
- Why we need to know more
  - Earlier experiment where early/late AoA words were controlled for frequency: still differed in
    - **meaning**
    - **spelling**
    - **phonology**

    So, where does the AoA advantage come from?

2. Background and key concepts

How/why does AoA affect processing?

- **Semantic locus hypothesis**
  - Words acquired *earlier* may develop **semantic** connections to *more* words and concepts
  - This would make it likely for them to become activated in many situations/contexts

2. Background and key concepts

How/why does AoA affect processing?

- **Network plasticity hypothesis**
  - Plasticity = ability to change (of the neural system)
  - Words acquired earlier may be better encoded in the lexicon (Q: what does 'better' mean?)
    - Predicted to affect **all levels** of lexical representation: meaning, phonology, orthography, etc.

2. Background and key concepts

- We talked earlier about **structural ambiguity**

  Ingrid saw the Martian with a telescope

  - Two possible **structures** corresponding to the same string of words → two different meanings

- Is this the same kind of **ambiguity** discussed by Juhasz et al. (2011)?

2. Background and key concepts

- **Lexical ambiguity**
  - Two possible **lexical entries** corresponding to the same **form** → <u>two different meanings</u>
    - *Lexical entry:* Word/morpheme stored in the mental lexicon
    - *Form:* Phonology (sound) and/or orthography (writing), depending on how the word is encountered

2. Background and key concepts

- Consider this lexically ambiguous noun: *bank*
  - What lexical entries correspond to this form?

2. Background and key concepts

- Consider this lexically ambiguous noun: *bank*
  - What lexical entries correspond to this form?

- Which of these are **disambiguating** contexts?
  - Disambiguating region: **Precedes** or **follows**?

a. I knew how to spell bank when I was six.

b. The helicopter landed on the bank to airlift the patient.

c. They cashed some checks at the bank after lunch.

d. We couldn't see the bank of the river through the fog.

2. Background and key concepts

- From the article: What is the difference between…?
  - **biased** ambiguous words
  - **balanced** ambiguous words

2. Background and key concepts

- Past results on **processing time** / ambiguous words
  - *Sentence:* neutral + AMBIG + disambiguating
    - BALANCED vs. control word?
    - BIASED vs. control word?
    - Disambiguating region vs. post-target for control?
    - BIASED:disambig/SUB vs. BALANCED:disambig?
  - *Sentence:* disambiguating + AMBIG + …
    - BALANCED vs. control word?
    - BIASED vs. control word if disambig/DOM?
    - BIASED vs. control word if disambig/SUB? (surprising?)

2. Background and key concepts

- Past results on **processing time** / ambiguous words
  - *Sentence:* neutral + AMBIG + disambiguating
    - BALANCED **>** control word
    - BIASED **=** control word
    - Disambiguating region **>** post-target for control
    - BIASED:disambig/SUB **>** BALANCED:disambig
  - *Sentence:* disambiguating + AMBIG + …
    - BALANCED **=** control word
    - BIASED **=** control word if disambig/DOM
    - BIASED **>** control word if disambig/SUB
- When are ambiguous words *not* so hard to process?

2. Background and key concepts

- *Not* so hard to process
  - Biased/dominant in neutral context
  - Balanced in disambig context
  - Biased/dominant in disambig context

  What **factors** seem to give processing a **boost**?

- Compare — *harder* to process
  - Balanced in neutral context
  - Biased/subordinate in neutral context
  - Biased/subordinate in disambig context (!)

2. Background and key concepts

- *Not* so hard to process
  - Biased/dominant, neutral context | **frequency**
  - Balanced, disambig context | **context**
  - Biased/dominant, disambig context | **(both?)**

  What **factors** seem to give processing a **boost**?

- Compare — *harder* to process
  - Balanced in neutral context
  - Biased/subordinate in neutral context
  - Biased/subordinate in disambig context (!)

3. Research questions

Discussion

- **Big-picture research questions**?

4. Data processing and statistical analysis

- What are **outliers**?
  - Why are they a concern?
  - Can we ignore (‘remove”) them?

4. Data processing and statistical analysis

- Statistical analysis in this paper
  (Juhasz et al. 2011: 5; emphasis added)
  - "Paired-sample t-tests were used to analyze dependent measures on the ambiguous word in the early-acquired meaning condition and the late-acquired meaning condition."
    - **t-test**
    - **dependent measures**

4. Data processing and statistical analysis

- Statistical analysis in this paper
  (Juhasz et al. 2011: 5; emphasis added)
  - "Paired-sample t-tests were used to analyze dependent measures on the ambiguous word in the early-acquired meaning condition and the late-acquired meaning condition."
    - **t-test** — are means in groups same/different?
    - **dependent measures** — the measured values

- If you're interested, see VassarStats for more on t-tests

4. Data processing and statistical analysis

- Statistical analysis in this paper
  (Juhasz et al. 2011: 5; emphasis added)
  - "Analyses were computed by participants (t_1) and by items (t_2)."
    - **by participants** —
    - **by items** —

4. Data processing and statistical analysis

- Statistical analysis in this paper
  (Juhasz et al. 2011: 5; emphasis added)
  - "Analyses were computed by participants (t_1) and by items (t_2)."
    - **by participants** — A significant result means the results should generalize to the (relevant) population
    - **by items** — A significant result means the results should generalize to other (relevant) words

4. Data processing and statistical analysis

- Statistical analysis in this paper
  (Juhasz et al. 2011: 8; emphasis added)
  - "The data from the two experiments was combined into a 2 x 2 ANOVA, with the first factor being [...] and the second factor being [...]."
  - **ANOVA —**
    - **main effect:**
    - **interaction:**

4. Data processing and statistical analysis

- Statistical analysis in this paper
  (Juhasz et al. 2011: 8; emphasis added)
  - "The data from the two experiments was combined into a 2 x 2 ANOVA, with the first factor being [...] and the second factor being [...]."
  - **ANOVA** — are means in groups with multiple crossed factors same/different?
    - **main effect:** this predictor matters when the categories of the other predictor are combined
    - **interaction:** the effect of one predictor differs based on the value of the other

4. Data processing and statistical analysis

- **ANOVA** analyses are frequently observed in psycholinguistics research papers
  - Here is an example: "Understanding Interaction Effects in Statistics", by Jim Frost

- If you're interested, see VassarStats for more on ANOVA (**An**alysis **O**f **Va**riance)

5. Some notes on presentations

- Some opportunities to collaborate
  - Activity leader: check in with person whose section you want to put an activity in
  - Work together where needed to link results to research questions
  - If multiple experiments use same / similar materials, the two Design presenters should decide how to divide the discussion

- Individual slides due Th Oct 10, 11:59pm
  - You might want to collaborate before that!

5. Some notes on presentations

- Reminders about presenting **results**
  - Data graphic: Parse and interpret → **talk** about the graphic (not just words on screen)
  - When summarizing results, be clear about what was statistically significant (and, if relevant, what was not)

6. For next time

- Pre-presentation discussion for **Group 2** article
  - Use today's discussion as a model for how to read the article and prepare for discussion
  - Use the pre-presentation discussion preparation handout to focus on key points