

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

- **Article presentation** on Tu Mar 5
 - Check-in with **Group 2** members
 - Reminder: See presentation **assignment handout**, linked from [Daily syllabus](#) or [Links for assignments](#) web page
 - Reminder: A score of '5' on the self and peer evaluation form should be for something **really exceptional**
- 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

Padlet question:

- “Does phonics-based decoding actually help children understand the meaning of the word? Or is it only useful for learning pronunciation?”
 - Discussion?

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 different factors on two different days in class so far

1. Warm-up

Group discussion

- Take about 1 minute to write down one of the **research questions** from Juhasz, Gullick, & Shesler (2011) 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>]
 - [Article link](#) (open access)

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** → two different meanings

- *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 (that may be different between conditions)
- 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 (**A**nalysis **O**f **V**ariance)

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 can decide how to divide the discussion
- Individual slides due Mon 11:59pm
 - You might want to collaborate before that!

5. Some notes on presentations

- Reminders about presenting **results**
 - Data graphic: Parse and decode → **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

- **Group 2:** Article presentation
 - Use today's discussion to help you with the stage-setting parts of your presentation
- Everyone else:
 - Support your classmates by coming prepared for the discussion they will lead!
 - Do your best to **read** and **understand** :
 - Measurable RQs
 - Experiment design
 - Results and discussion