Effects of prosodic focus on discourse processing by native speakers versus second language learners

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...in collaboration with:

- Amber Camp, Hannah Rohde & Theres Grüter
Contrastive prosody

• **Increases attention** to the focused phrase (e.g., Cutler & Foss 1977; Fraundorf et al 2010)
• Affects syntactic parsing (e.g., Schafer et al 1996)
• Facilitates **processing of alternatives** (e.g., Dahan et al 2002; Ito & Speer 2008)
  • *Hang the green drum.*
  • *Now hang the BLUE$^{L+H^*}$ drum...*
• **Primes alternatives** (“contrast associates”) (e.g., Braun & Tagliapietra 2010; Husband & Ferreira, 2015)
  • *The INFLAMMATION$^{H^*}$ was caused by a BACTERIA$^{!H^*L}$*  
  → primes *virus*, which contrasts with *bacteria*
Suprasegmentals and second language learners (L2ers)

• Humans begin adapting to their native-language suprasegmental system prenatally
• L2 perception of suprasegmentals is shaped by the L1 system (e.g., L1 intonation affects L2 lexical tone perception)
• Suprasegmentals are widely perceived to be challenging for L2ers, in production and perception
  • Yet the acquisition of L2 prosody/intonation is understudied
  • Even though it is valuable to both basic and applied questions

• This talk: Contrastive prosodic focus and pronoun reference in American English
Prosodic focus involves multiple levels of representation

...who...? discourse/information structure, QUD
{Marianna, Beth} alternative sets
[Marianna]F syntactic marking
L+H* presence/type of pitch accent
MariANna f0, duration

• A learner must identify sets of acoustic cues and make appropriate mappings to higher-level linguistic distinctions
• As researchers, we need to tease apart processing/learning at different levels
• E.g., is prosodic prominence (e.g., expanded f0) detected without it being appropriately mapped to contrastive focus and the highlighting of alternatives?
Prosodic focus and pronoun reference: 2 experiments

Both experiments:

• Native speakers of American English vs.
• Japanese-native and Korean-native learners of English

• “Story continuation” task
• Manipulation of prosodic focus
Today’s key question: L1 vs. L2

• Assuming effects of prosodic focus in L1ers: will native-Japanese and native-Korean L2ers of English demonstrate similar effects?

• Both Japanese and Korean use prosodic prominence (e.g., expanded f0) to mark contrastive focus
  ➢ Predict at least basic “prominence” effects in L2ers

• Both differ from English in their intonational phonology
  • English has multiple types of pitch accents; J/K do not

• Numerous other differences between J/K and English
  • Morphological focus markers, use of pronouns, scrambling...
  ➢ Predict more L1/L2 differences for “higher-level” decisions

Not in today’s talk: Other potential processing differences between L1ers & L2ers; L2 difficulty with pronouns
# Exp1 participants

<table>
<thead>
<tr>
<th></th>
<th>Age (in years)</th>
<th>Versant English Test(^1) (overall score, range 20-80)</th>
<th>Self-rated English proficiency (out of 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L1-English (n=47)</strong></td>
<td>23 (18-40)</td>
<td>--</td>
<td>9.6 (8-10)</td>
</tr>
<tr>
<td><strong>L2-English (n=45)</strong></td>
<td>27 (19-65)</td>
<td>53 (36-80)</td>
<td>6.3 (2-9)</td>
</tr>
<tr>
<td><strong>L1-Japanese (n=24)</strong></td>
<td>26 (19-48)</td>
<td>49 (36-62)</td>
<td>6.0 (3-8)</td>
</tr>
<tr>
<td><strong>L1-Korean (n=21)</strong></td>
<td>28 (21-65)</td>
<td>57 (38-80)</td>
<td>6.6 (2-9)</td>
</tr>
</tbody>
</table>
## Exp2 participants

<table>
<thead>
<tr>
<th></th>
<th>Age (in years)</th>
<th>Versant English Test(^1) (overall score, range 20-80)</th>
<th>Self-rated English proficiency (out of 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L1-English</strong></td>
<td>25 (18-66)</td>
<td>--</td>
<td>9.6 (6-10)</td>
</tr>
<tr>
<td>(n=56)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>L2-English</strong></td>
<td>30 (19-56)</td>
<td>52 (36-74)</td>
<td>6.2 (1-9)</td>
</tr>
<tr>
<td>(n=48)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1-Japanese</td>
<td>35 (20-56)</td>
<td>50 (37-70)</td>
<td>5.7 (1-8)</td>
</tr>
<tr>
<td>(n=23)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>L1-Korean</td>
<td>25 (19-48)</td>
<td>53 (36-74)</td>
<td>6.6 (3-9)</td>
</tr>
<tr>
<td>(n=25)</td>
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</tbody>
</table>
Task: Story continuation

- Participants **hear** a sentence from a story
- Then see/hear the beginning of the next sentence:
  - **Exp1**: See a pronoun prompt
  - **Exp2**: Hear a pronoun + adverb
- Then **type continuations**
- **Two independent annotators** code the continuations for:
  - Referent of the target pronoun
  - Coherence relation (= how the 2 sentences connect; e.g., explanation, resulting action, etc.)
Exp1: Prosodic focus on a potential antecedent

Source Focus:

\textit{BRENDA}_{Source} fed \textit{Anne}_{Goal} a bowl of soup. She...

Goal Focus:

\textit{Brenda}_{Source} fed \textit{ANNE}_{Goal} a bowl of soup. She...

...then had some herself. \hspace{1cm} \text{She = Brenda} \rightarrow \text{Source ref.}

...drank the soup and wanted more. \hspace{1cm} \text{She = Anne} \rightarrow \text{Goal ref.}

Source/Goal = role in a transfer-of-possession event
Additional manipulation not discussed here: \textit{fed/was feeding}
Exp1 stimuli

Source Focus:
*BRENDA* fed Anne a bowl of soup. (She __)

Goal Focus:
*Brenda* fed *ANNE* a bowl of soup. (She __)
She ...

wanted to make her happy.
Exp1: Prosodic focus draws reference, for L1ers & L2ers

- Black: Means, 95% conf. intervals; Teal: Density of participant means
- Significant effect of prosodic focus in each group
  - L1: $b=1.0, z=4.3, p<.001$; L2: $b=0.8, z=3.9, p<.001$ (n.s. Grp*Foc)
  - Increased reference to prominent/focused antecedent

• Logistic MEMs
• Centered fixed effects
• RE & p values via model comparison
• isSource $\sim$ GrpCtr AspCtr * FocCtr + (1+FocCtr |Sub) + (1+FocCtr |Itm)
Exp2: Prosodic focus on the target pronoun

Unstressed pronoun:
David$_{Source}$ served Paul$_{Goal}$ a pint of beer. He obviously...

Stressed pronoun:
David$_{Source}$ served Paul$_{Goal}$ a pint of beer. HE obviously...

...wanted to make him feel welcomed. He = David $\rightarrow$ Source ref.
...never had a beer before. He = Paul $\rightarrow$ Goal ref.

Additional manipulation not discussed here: served/was serving
Exp2 stimuli

David served Paul a pint of beer.

Unstressed pronoun:  
He obviously ___

Stressed pronoun:  
HE obviously ___
Exp1 vs. Exp2: Comparison...

- Superficially similar:
  - L+H* L-H% prosodic manipulation
  - Interpretation of target pronoun; Source/Goal are the dominant choices

**Source focus:**

*David*<sub>Source</sub> served...

**Stressed pronoun:**

*He* obviously ___
... and contrast

Exp1
• L+H* L-H% on an earlier referent (e.g., David) →
• Referent is prominent (and contrastively focused) →
• Select as antecedent
  ➢ Prosodic focus draws reference

Exp2
• L+H* L-H% on target pronoun (e.g., HE) →
• Pronoun is prominent (and contrastively focused) →
• Identify preferred referent for unstressed pronoun →
• Select contrasting referent as antecedent for stressed pn
  ➢ Prosodic focus on pronoun predicted to reduce Source ref.
Exp2: Pronoun stress affects reference for L1ers but not L2ers

- Black: Means, 95% conf. intervals; Yellow: Density of participant means
- Significant prosodic focus * group interaction ($b=-.8$, $z=-3.5$, $p<.001$)
  - L1: FocCtr: $b=0.88$, $z=5.6$, $p<.001$; L2: FocCtr: n.s.; AspCtr*FocCtr: $b=0.3$, $z=2.0$, $p<.05$
  - Pronoun stress reduces Source reference for L1ers, but is n.s. for L2ers

- Logistic MEMs
- Centered fixed effects
- RE & p values via model comparison
- isSource ~ GrpCtr AspCtr * FocCtr + (1|Sub) + (1|Itm)
Conclusions

• L2ers used prosodic cues as effectively as the L1ers in Exp1, but showed a non-sig. effect of acoustically similar prosody in Exp2.
• L2ers do not seem to have difficulty with prosody across the board.
• Even when L2 performance seems native-like, L1ers and L2ers might differ in the linguistic forms they construct:
  • In Exp1, L1ers could draw on semantic/pragmatic distinctions; L2ers may have responded primarily to lower-level distinctions in salience.
• L2 difficulty can have multiple causes, because multiple mappings must be acquired.
• Intonation and affective prosody are present in all languages, with language-specific patterns. All learners need to map out these form-meaning connections and distinguish them from other contrasts in the language; there’s more cross-linguistic work to be done on intonation.
Thanks to all of you... and

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Slides from Q&A
Exp 1 vs. Exp2

Prosodic focus location

Target pronoun stress

Prop. of Source reference

Source Goal Source Goal

Prop. of Source reference

Unstressed Stressed Unstressed Stressed
Work in progress...

- **Eyetracking** (visual world paradigm)
  - to evaluate *anticipatory* looks to the Source / Goal before hearing a continuation / the pronoun
References


