

Research Questions

- How do English and Korean speakers differ in their use of prosody for ambiguity resolution?
- How does this difference relate to the prosodic systems of the two languages?

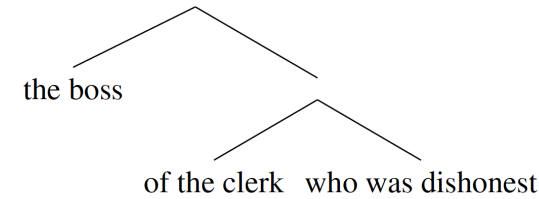
Background

- **English** has intonational prosody consisting of pitch accents (associated with most prominent lexical items), phrasal tones, and boundary tones (Pierrehumbert 1980).
- **Korean** intonational prosody is a combination of phrase-level tonal patterns and boundary tones (Jun 1996).
- **The presence/absence of word prominence/lexical pitch accents** leads to differences in prosodic marking of comparable information structure such as focus in English and Korean (Athanasopoulou & Vogel 2016).

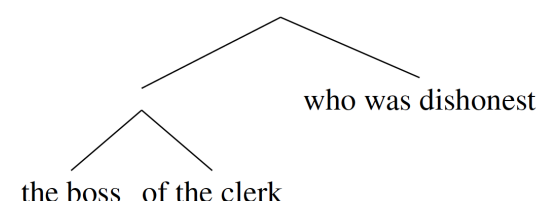
Relative Clause (RC) Attachment Ambiguity

(1) English: [the boss]_{NP1} [of the clerk]_{NP2} [who was dishonest]_{RC}

a. Low attachment: 'the boss of the dishonest clerk'

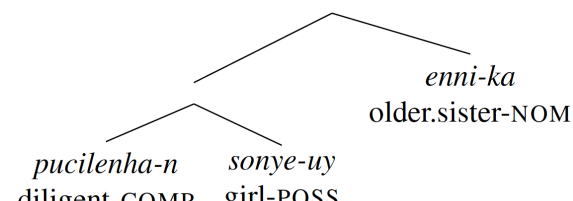


b. High attachment: 'the dishonest boss of the clerk'

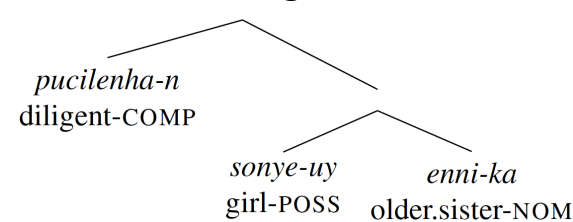


(2) Korean: [pucilenha-n]_{RC} [sonye-uy]_{NP1} [enni-ka]_{NP2}
Diligent-COMP girl-POSS older.sister-NOM

a. Low attachment: 'the older sister of the diligent girl'



b. High attachment: 'the diligent older sister of the girl'



Predictions

- English may use both word prominence (greater pitch, intensity on a word) and boundary phenomena to resolve ambiguity.
- Korean will use only boundary phenomena (word lengthening, pause) to resolve ambiguity.

Production Experiment

- 10 English speakers & 10 Korean speakers attending Stony Brook University
- Participants produced sentences with RC attachment ambiguity in their native language, as prompted by the slides.

Jennifer blackmailed the boss of the clerk who was dishonest.

→ (a) It was **the boss** who was dishonest.

→ (b) It was **the clerk** who was dishonest.

부지런한 소녀의 언니가 점심을 먹고 있다.

→ (a) 부지런한 사람이 **소녀**인 경우

→ (b) 부지런한 사람이 **언니**인 경우

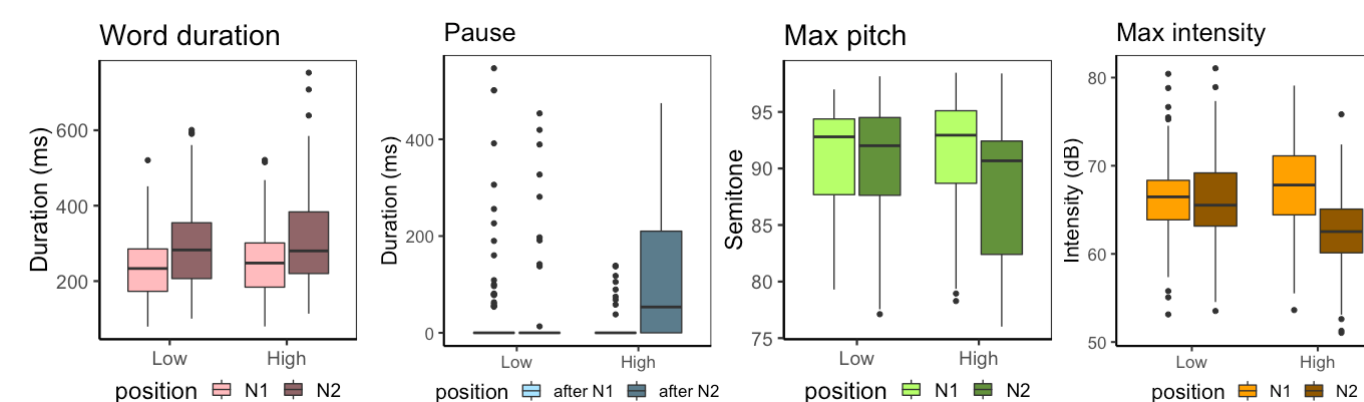
- 12 sentences * 2 readings (Low/High) * 10 speakers = 240 utterances
- 17 utterances were excluded due to repetition or wrong production of words

Analysis

- Acoustic measurements
 - Duration of words and pauses in ms
 - Maximum and mean pitch in Hz; converted semitones to control for individual variation ($12 \log_2 F_0 / F_{ref}$, reference level = 1Hz)
 - Maximum and mean intensity in dB
- Statistical analysis
 - Differences in measurements across conditions and across words were statistically analyzed by mixed-effects regression models using the *lmer()* function from the lme4 package (Bates & Maechler 2009) in R (R Development Core Team 2011).

English Results

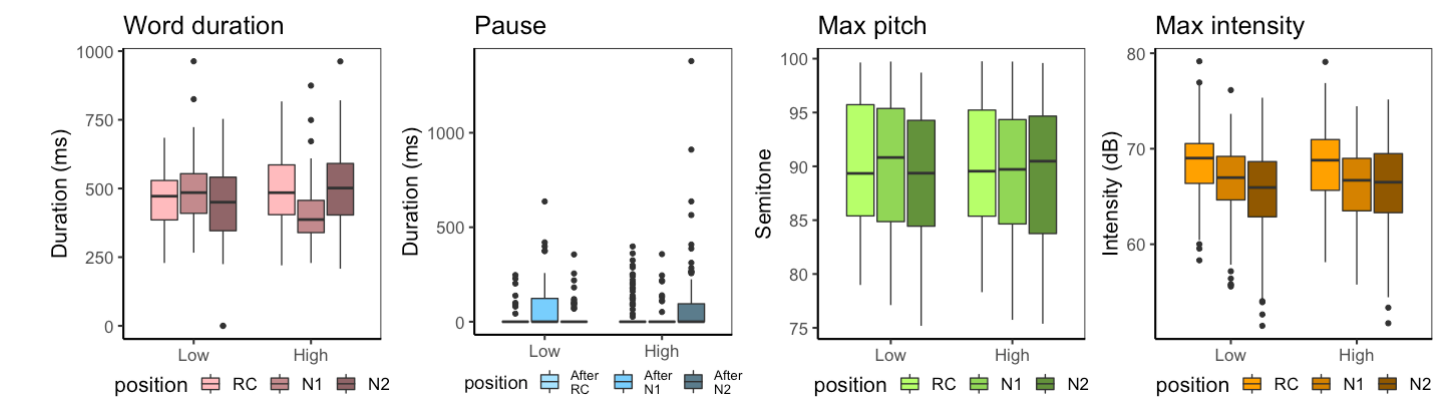
- Low: *the boss (of the clerk who was dishonest)*
- High: *(the boss of the clerk) who was dishonest*



| | Low NP1 (NP2 RC) | High (NP1 NP2) RC | Interaction condition:position |
|-----------|-----------------------|------------------------|-----------------------------------|
| Duration | | | - |
| Pause | pause*** | pause*** | *** |
| Pitch | higher** | higher*** | *** |
| Intensity | louder*** | louder*** | *** |

Korean Results

- Low: (*pucilenha-n*_{RC} *sonye-uy*_{NP1}) *enni-ka*_{NP2}
- High: *pucilenha-n*_{RC} (*sonye-uy*_{NP1} *enni-ka*_{NP2})
diligent-COMP girl-POSS older.sister-NOM



| | Low (RC NP1) NP2 | High (NP1 NP2) RC | Interaction condition:position |
|-----------|-----------------------|------------------------|-----------------------------------|
| Duration | longer*** | longer*** | *** |
| pause | | pause*** | *** |
| pitch | | | - |
| intensity | | louder** | - |

Discussion & Conclusion

- **English:** Ambiguity was resolved by **the combination of word prominence as well as boundary marking**. Words were produced with greater prominence (pitch, intensity) when it is modified by the relative clause. A boundary of a larger constituent was marked by pause.
- **Korean:** Disambiguation mainly relied on **boundary phenomena**. A boundary of a larger constituent was marked by a lengthening of pre-boundary word and pause. The maximum intensity of N2 was in many cases associated with the last syllable of word, which is always a case marker (e.g., NOM), suggesting that it was also functioning as a boundary marker.
- The presence/absence of stress in languages leads to different ways of using prosody to resolve syntactic ambiguity.

References

- Athanasopoulou, A., & Vogel, I. (2016). *The Acoustic Manifestation of Prominence in Stressless Languages*. Paper presented at the 17th Annual Conference of the International Speech Communication Association, San Francisco, CA.
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- R Development Core Team. (2011). *R: A language and environment for statistical computing*. Vienna: R Foundation for Statistical Computing. Online: <http://www.R-project.org>.