

Research Questions

- Do L1-English and L1-Mandarin speakers differ in producing English corrective focus intonation?
- How does the production of English focus prosody by Mandarin speakers change over time?

Background

Focus realization	English	Mandarin
In-focus expansion	✓ Pitch accent aligned with stressed syllable of focused word; focus associated with pitch peak, greater intensity, longer duration (Pierrehumbert & Hirschberg 1990)	✓ Varies with lexical tone; cues include expanded pitch range, greater intensity, longer duration (Xu 1999, Ouyang & Kaiser 2015)
Post-focus compression	✓ Substantial decline of F0 and intensity following the stressed syllable of the focused word (Xu & Xu 2005)	✓ Reduced pitch range and intensity may be found, depending on tonal context (Chen 2010)

- In English, realization of corrective focus is dependent on the position of word stress, while in Mandarin, the word is the anchor for focus expansion.
- Previous work indicates Mandarin learners of English may have difficulty producing English-like focus prosody (Chen, Robb, Gilbert, & Lerman 2001, Chen 2015).
- Post-focus compression does not transfer across languages in general (Chen, Xu, & Guion-Anderson 2014, Wu & Chung 2011, Xu 2011).

Methods

Participants:

- 57 Mandarin speakers (MS), graduate students in US (19F, 38M); mean age at start 24.6 (20-38), mean age of acquisition: 9.4 (4-16).
- 18 undergraduate native speakers of English (ES; 11F, 7M).

Procedure:

- Mandarin speakers participated in 5 recordings over a period of 2 years. Time 1 = first month in US, Time 2 = after first semester, Time 5 = after 4 semesters.
- English speakers participated once.
- Corrective focus was elicited by having participants read aloud 8 short paragraphs and answer questions:

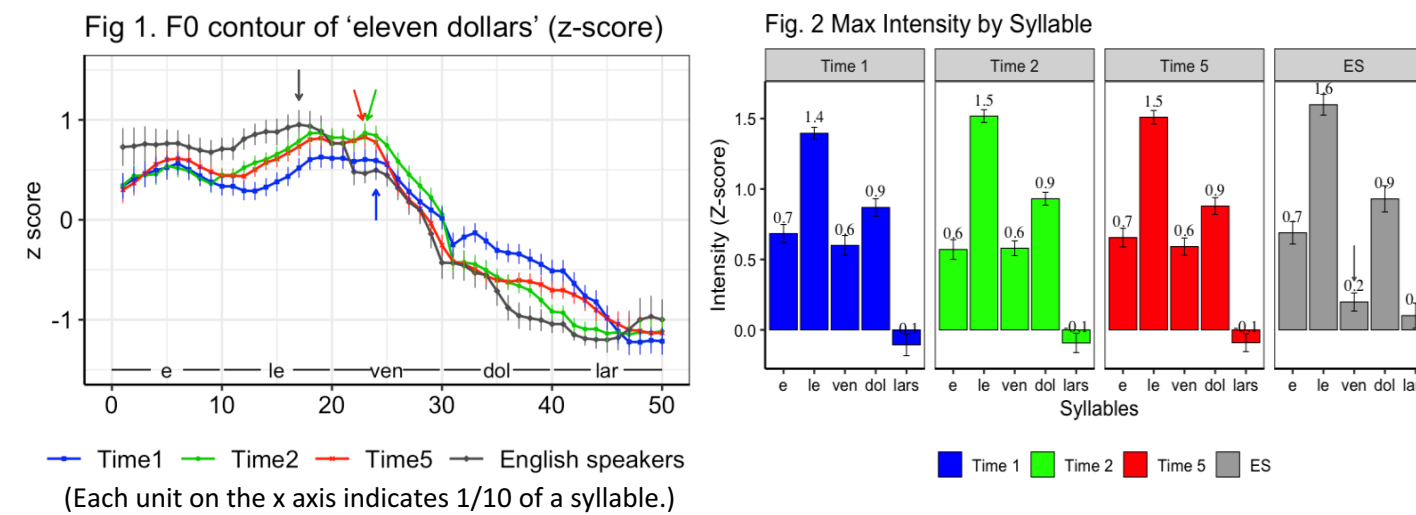
1. One advantage of attending Stony Brook is that it is close to New York City.
2. There are several ways to travel to New York City from our campus.
3. If you don't want to worry about traffic on the roads, you can take the train.
4. But the price of a train ticket is twenty dollars, while a bus ticket is only eleven dollars.



Q: Did you say the price of a bus ticket is fifteen dollars?
A: No, I said the price of a bus ticket is eleven dollars.

- Target phrase (underlined) was hand-segmented into syllables.
- Pitch and intensity contours were generated using Python/Praat scripts (pitch: pYAAPT (Zahorian & Hu, 2008); intensity: ProsodyPro (Xu 2013)).
- F0 and intensity (dB) values were normalized per participant and per recording session in order to see changes within the target phrase.

'Eleven dollars': F0 and Intensity



Differences between ES and MS:

- Pitch peak: ES had a pitch peak on the stressed syllable of the focused word (LE), but MS had a later pitch peak at all 3 time points (indicated by the arrows in Fig. 1).
- Intensity drop: within the focused word, ES had a larger intensity drop from the stressed syllable (LE) to the post-stress syllable (ven) (indicated by the arrow in Fig. 2) than MS at all 3 time points.

MS changes over time:

- Pitch drop: At all time points, MS had a smaller F0 drop than ES from the stressed syllable of the focused word (LE) to the stressed syllable of the post-focus word (dol). However, the MS drop from LE to dol was closer to the native speaker pattern at later time points.

Interim Summary

- Over time, Mandarin speakers showed a larger (more native-like) drop in F0 from focused to post-focus word.
- However, MS showed little change over time in the location of the focus pitch peak, which was consistently later for MS than for ES.

Possible explanations

- MS failure to align the pitch peak with the stressed syllable in 'eleven' is due to inability to hear English stress (Archibald 1997) - i.e., MS are 'stress-deaf' (Peperkamp & Dupoux 2002).
- MS simply align the pitch peak with the end of the focused word, regardless of stress position.

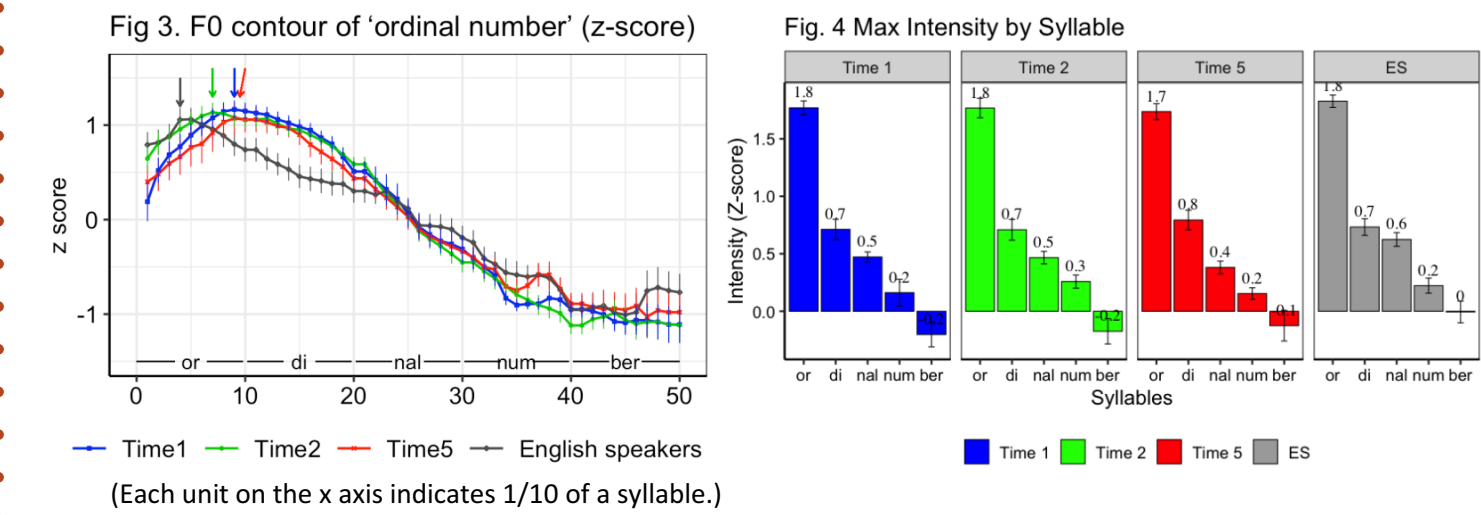
Test: Compare MS pitch/intensity patterns for focused words with antepenultimate stress.

1. Some English learners may find it hard to understand the difference between cardinal and ordinal numbers.
2. Cardinal numbers are used for counting, such as the four in "four apples".
3. When we talk about dates and the orders of things, we use ordinal numbers.
4. Ordinal numbers have a suffix, usually 'th', after the number.
5. An example of an ordinal number is the fourth in "the fourth of July".



Q: Did you say "fourth" is a cardinal number?
A: No, I said "fourth" is an ordinal number.

'Ordinal number': F0 and Intensity



- For MS (as for ES), the location of pitch and intensity peaks was clearly different for 'ordinal' vs. 'eleven', indicating that MS were able to hear the stress difference.
- Regardless of stress position, the MS pitch peak was still later than that of the ES.
- MS misalignment of the focus pitch peak did not change over time.
- Similar delays in the alignment of a pitch peak have been shown for MS productions of English list intonation (Lu & Kim 2016).

Discussion & Conclusion

- Failure to master native-like pitch accent alignment has been noted among L2 speakers in a variety of languages:
 - L2 English by L1 Spanish and L1 Japanese (Graham & Post 2018)
 - L2 Greek by L1 Dutch speakers (Mennen 2004)
 - L2 Dutch by L1 Northern Chinese speakers (He et al. 2011)
- MS misalignment is most likely due not to L1-inspired stress deafness but instead to incomplete mastery of the complex orchestration of the prosodic and segmental structure of a new language.

References

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