Spanish Lexical Stress Produced by Proficient Mandarin learners of Spanish

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Introduction

Successful L2 lexical stress learning [1]:

- ***Phonological* approaches**: similarities between L1 and L2, e.g., existence of lexical stress, stress assignment rules, etc.
- ***Phonetic* approaches**: functional relevance of a certain phonetic property is determinant,
  L1 Thai → L2 English stress, duration √ [2]
  L1 Korean → L2 English stress, duration x [3]

Spanish lexical stress

- Longer duration, higher pitch, greater intensity, and may affect vowel quality [4].
- Few research investigated the production of Spanish lexical stress by tonal language speakers, like Chinese, with mixed results.
  - Stressed syllable → Tone 2 [5]
  - Vowel quality not clear [6-7]

Research questions and hypotheses

- **RQ1***:* How do Chinese students encode Spanish lexical stress contrasts in speech production? → Relying more on pitch
- **RQ2**: Does lexical stress affect Spanish vowel quality differently in L1 and L2 speech production? → Yes.

Methods

Participants

- 10 **Chinese** speaking learners
  - Age: 27.3 yr (SD = 3.13)
  - AoA: >18 yr.
  - SA Spanish: 4.10 yr (SD = 1.2)
  - DELE: B2 or C1
- Late adult learners, advanced proficiency, intensive exposure L2.
- 6 **Spanish** natives (M_{age}=24.83, SD=1.94)

Speech production task

- **Text reading***: El viento norte y el sol*
  -162 vowels × 16 participants = 2592 tokens
- **Word reading**: 30 $C_1V_1C_2V_2$ real words
  - C_1V_1 is stressed or unstressed
  - C is always plosive, e.g., tápo vs. tapó
  - 30 words × 16 participants × 2 reps = 960 tokens

Acoustic measures

- Duration
- Pitch
- Intensity
- Vowel quality
  - Mid-point F1
  - Mid-point F2

Results

LMM analyses

- Stress (stressed vs. unstressed)
- Speaker (Chinese vs. Spanish)
- Vowel (only for F1 & F2)
- All possible interactions

Duration

- Text: Stress × Speaker, p = . 397
- **Word**: **Stress** × **Speaker**, p < .001

Pitch

- **Text & word**: **Stress** × **Speaker**, p < .001

Intensity

- **Text & word** : **Stress**, p < .001

F1

- **Text**: **Stress** × **Speaker** × **Vowel**, p = .012
  - Chinese: stressed /**e, i, o**/ more open
  - Spanish: stressed /**a, o**/ more open

F2

- **Text: Vowel** ×**Speaker**, p < .001
  - Learners' /**o**/ more backward than natives
- **Word : Vowel** ×**Speaker**, p = .040
  - Learners' /**u**/ more fronted than natives

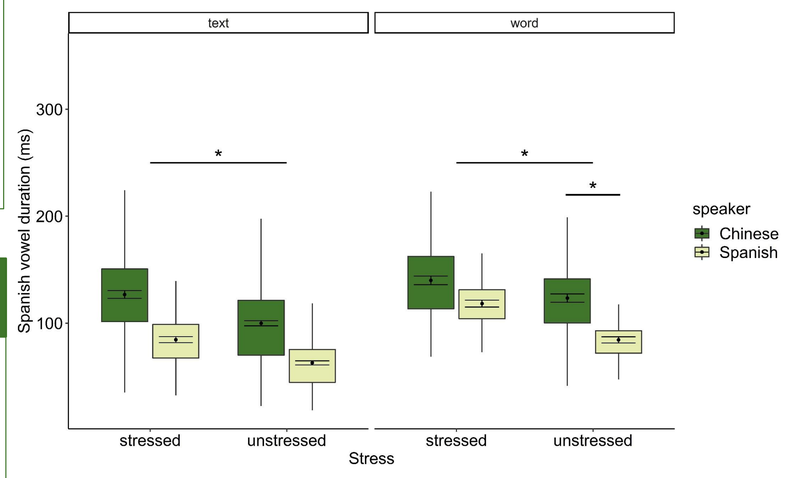

Figure 1. Duration

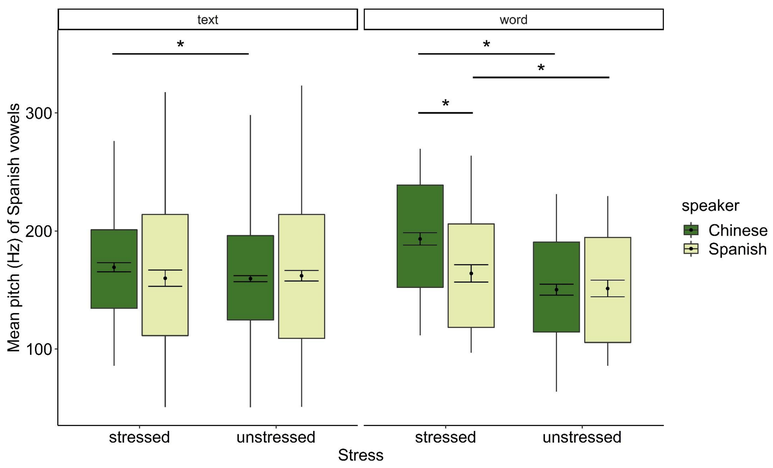

Figure 2. Pitch

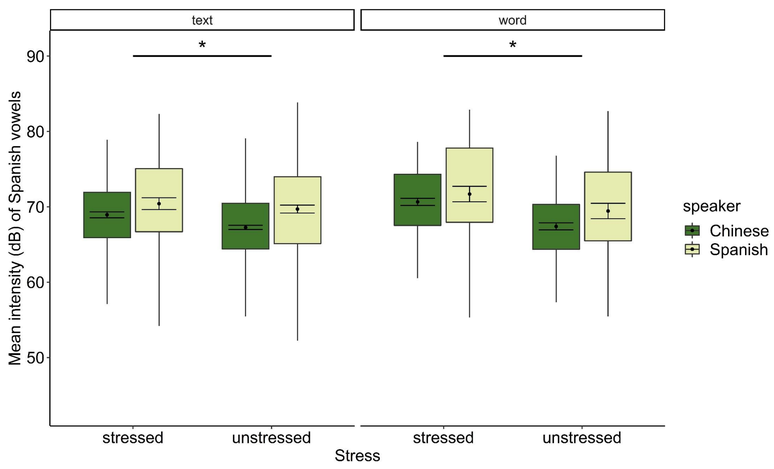

Figure 3. Intensity

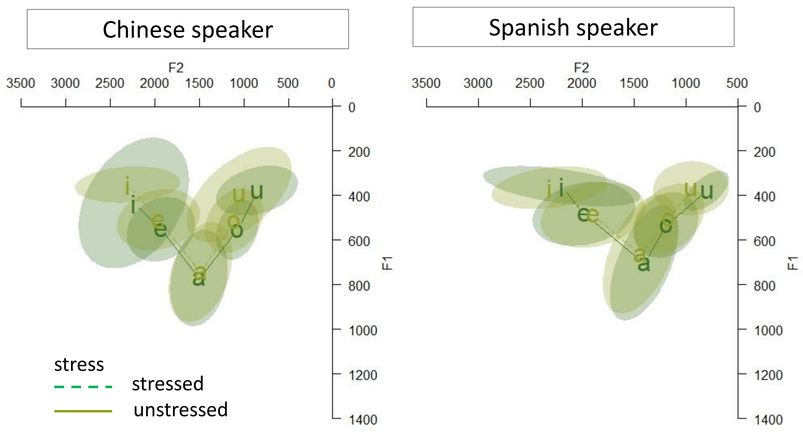

Figure 4. Vowel chart of texts by speaker and stress

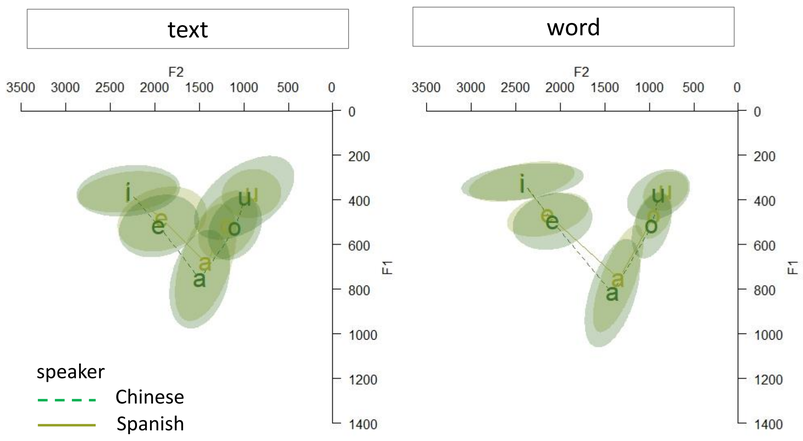

Figure 5. Vowel chart by text by speaker

Discussion

- **RQ1**: How do Chinese students encode Spanish lexical stress contrasts in speech production?
  - Increased duration, pitch, & intensity
  - **Pitch** is more important for Chinese students than for Spanish natives
  - L1 prosodic characteristics to L2
- **RQ2**: : Does lexical stress affect Spanish vowel quality differently in L1 and L2 speech production?
  - Lexical stress affects **vowel height**
  - Chinese students performed differently from Spanish natives, i.e., /**e, i**/ vs. /**a**/.
  - Chinese students centralized /**u**/ in isolated words, regardless of stress.
- **Conclusion**:
  - New evidence for the **phonetic approaches.** Chinese students prefer pitch more than duration or intensity to make lexical stress.
  - The seemingly easy Spanish vowels need more attention in teaching practice.

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