Acoustic correlates of penultimate and final stress in Yami

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Speech Prosody 2024 (Leiden, Netherlands)

Background

Yami (Tao) language

- Austronesian > Malayo-Polynesian > Batanic (Philippine-type)
- Spoken on Orchid Island (Lanyu), Taiwan
- Severely endangered (~1,200 speakers)
  (Lai & Gooden 2022)

Word prosody in Yami

- No empirical study yet
- Described as stress language
  (Rau & Dong 2006, 2018; Lai & Gooden 2016; 2018; 2022)
  - **Final** stress: most content words
  - **Penultimate** stress: stative verbs
- Contrastive, but largely predictable, e.g.:

Penultimate	Final
/ˈma.ta/ ‘raw, uncooked’	/maˈta/ ‘eye’

Map created with *lingtypology* package in R (Moroz 2017)

Stress & language documentation

- Prosody often neglected
- Impressionistic judgments of words in isolation
  - Word & phrase levels conflated
- Some languages re-analyzed from stress to intonation

Research Questions

Is there acoustic evidence for stress in Yami with two distinct categories?

Hypothesis

- Stressed syllables will show higher observed values for **F0, duration,** and/or **intensity** than unstressed syllables

	Penultimate syllable	Final syllable
Stative verbs (putative *penultimate* stress)	Higher	Lower
Other word classes (putative *final* stress)	Lower	Higher

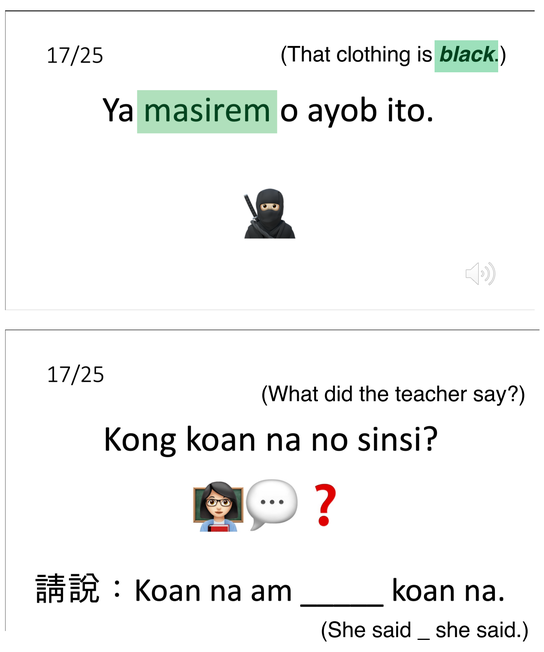
Methods

Target words

- 25 **trisyllabic** words: 12 nouns vs. 13 stative verbs
- Balanced for vowel quality & syllabic structure

Experimental procedure

1. Stimuli with audio
2. Green flash for target word
3. Prompt
4. Carrier sentence, 2x



Fieldwork & participants

- September 2023 on Orchid Island
- 5 participants (4 female, 1 male; ages 58-72)
- All bilingual in Yami & Mandarin Chinese

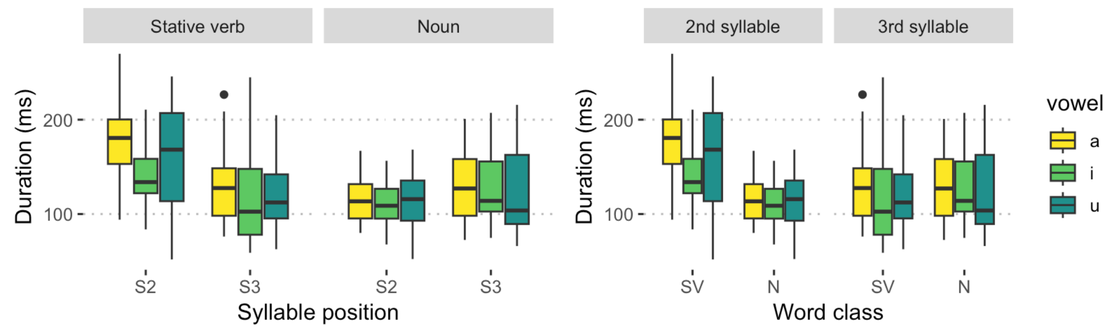
Analysis

- 2nd & 3rd vowels of target words in CV syllables
- *n* = 430 (43 vowels (23 penult; 20 final) x 2 repetitions x 5 speakers)
- Duration, max & mean intensity, max & mean F0 w/ VoiceSauce
  (Shue et al. 2012)

Results

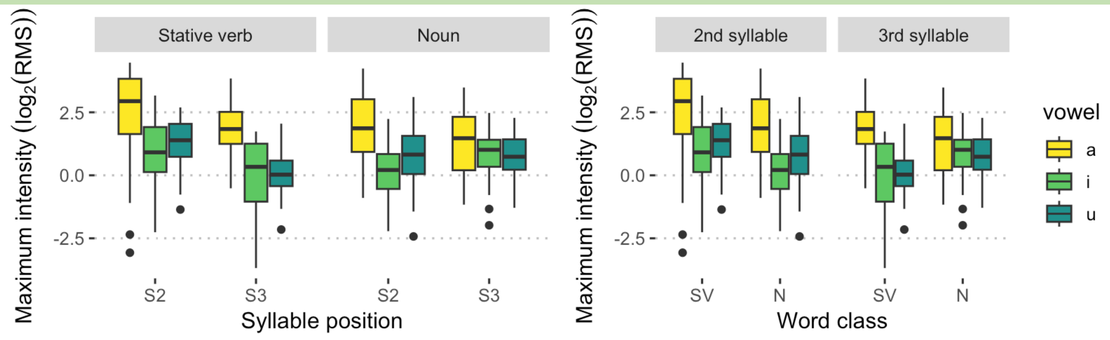
Linear mixed-effects models
Predictors (fixed effects): (1) Word class (SV, N); (2) Syllable Position (S2, S3); (3) Vowel (a, i, u)
Random effects: (1) Speaker, (2) Word

Duration



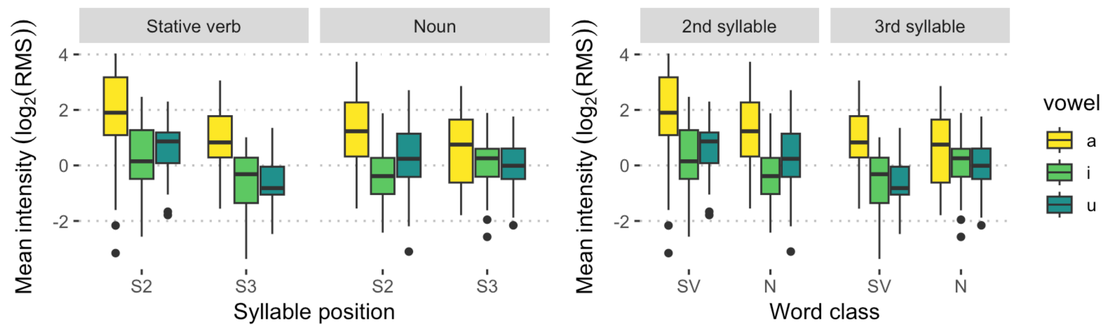
SV: S2 > S3 | N: S2 = S3 | S2: SV > N | S3: SV = N

Maximum intensity



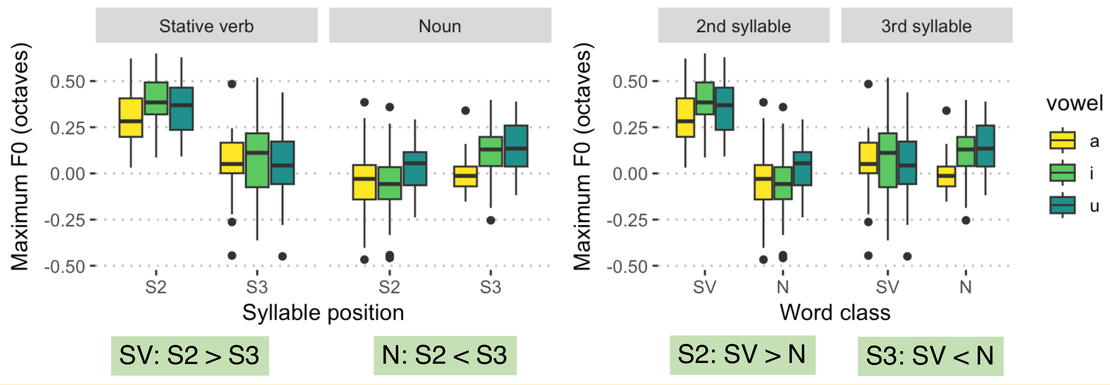
SV: S2 > S3 | N: S2 < S3 (/i/) | S2: SV > N (/a/, /i/) | S3: SV < N (/i/)

Mean intensity



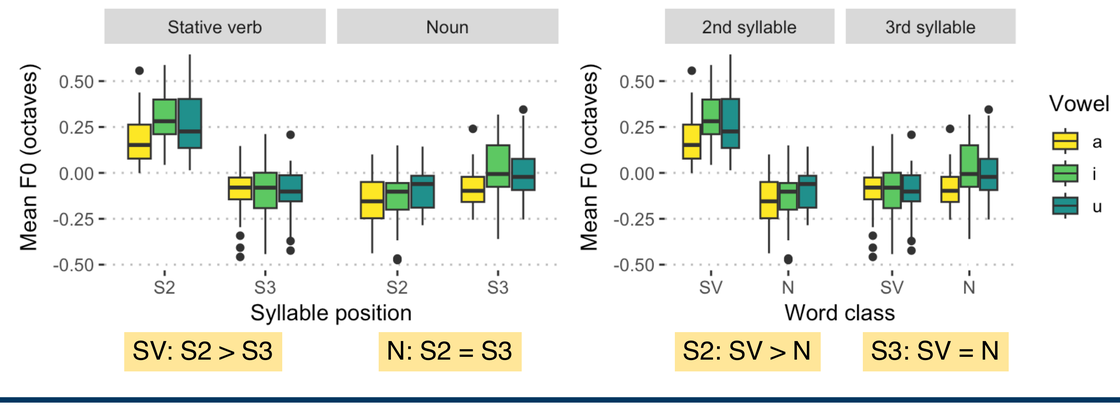
SV: S2 > S3 | N: S2 = S3 | S2: SV = N | S3: SV = N

Maximum F0



SV: S2 > S3 | N: S2 < S3 | S2: SV > N | S3: SV < N

Mean F0



SV: S2 > S3 | N: S2 = S3 | S2: SV > N | S3: SV = N

Conclusion

	Duration	Max Int	Mean Int	Max F0	Mean F0
Penultimate stress	✅ ✅	✅ ✅*	✅ ❌	✅ ✅	✅ ✅
Final stress	❌ ❌	✅* ✅*	❌ ❌	✅ ❌	❌ ❌

- Robust support for penultimate stress on stative verbs
- Weak support for final stress on nouns
- Final = boundary tone instead?
  - Higher max F0 (but not mean F0) = HL rather than HH?
- Future research: phrase-final vs. medial; focus effects

Acknowledgements: Thank you to the Yami speakers who participated in this study & especially to my teacher Si Vagyatan (Ma Yueh-Chin) for recording the stimuli and checking all aspects of the experimental design with me. Thank you to Argyro Katsika, Matthew Gordon, Stefan Gries, Marianne Mithun, Eric Campbell, Lina Hou, Jaime Pérez González, Guillem Belmar, Sherry Chien, Catherine Scanlon, Cooper Bedin, Alonso Vásquez Aguilar, Jordan Douglas-Tavani, and James Yee for feedback at all stages of this research. This work was funded by a Short-Term Research Grant from the Center of Taiwan Studies at the UCSB Department of East Asian Languages and Cultural Studies.