A prominence analysis of the Northern Mam weight hierarchy

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1 Introduction

- Mam (iso: mam) is a Mayan language spoken in Guatemala
- Three dialect areas: Northern, Western, and Southern (e.g. Pérez Vail 2004).
  - All areas assign stress differently.
  - Todos Santos Mam (henceforth Mam), is a Northern Mam dialect.

- Northern Mam stress assignment is sensitive to the following weight hierarchy:
  \[ \text{VV} > \text{Vʔ} > \text{VC} > \text{V} \]
- Typologically unusual; coda type does not usually affect weight.

Goals: 1) analyze Mam stress within the prominence framework (Ryan 2019, 2020); 2) show that Mam’s ranking of \( Vʔ > VC \) results from language-specific phonetic realization of \( Vʔ \).

2 Mam stress assignment

- Stress is placed on the heaviest rime type.

(1) \( \text{VV} > \text{Vʔ} \)
\[
\begin{array}{l}
\text{VV} \quad [\text{kʊʔ. waːj}] & \text{ku’waal ‘child’} \\
\text{VV.C} \quad [\text{ʔaɪ.ʔaːn}] & \text{aai’a’n ‘robs’}
\end{array}
\]

(2) \( \text{Vʔ} > \text{VC} \)
\[
\begin{array}{l}
\text{Vʔ.C} \quad [\text{xɪʔ.ɡæ’ɛx}] & \text{ji’tx’aq ‘thin person’} \\
\text{V.C} \quad [\text{ʔax. bɛʔ}] & \text{ajb’e’ ‘wants’}
\end{array}
\]

(3) \( \text{VC} > \text{V} \)
\[
\begin{array}{l}
\text{V.C} \quad [\text{maː satʰ}] & \text{masat ‘deer’} \\
\text{VC.V} \quad [\text{ʔox.ɡe}] & \text{ojtə ‘after’}
\end{array}
\]

- Otherwise, stress is rightmost, but never falls on a final light syllable.
\[
\begin{array}{l}
\text{VC.V} \quad [\text{ʔax. laɡ}] & \text{ajfən ‘rests’} \\
\text{VC.V} \quad [\text{maːnaːq}] & \text{manmaq ‘big’} \\
\text{V.V} \quad [\text{meː.ɡe}] & \text{meb’a ‘orphan’} \\
\text{V.V} \quad [\text{ɡɛɾ.ɡe}] & \text{shbiq’a ‘naked’}
\end{array}
\]

3 Theories of ternary weight: coercion vs. prominence

- Two frameworks for analyzing \( \text{VV} > \text{VC} > \text{V} \) weight scales: contextual coda moraicty (a.k.a. coercion; e.g. Morén 2000) or vowel prominence (Ryan 2019, 2020).

- Coercion: \( \text{VV} \) is always bimoraic, \( \text{VC} \) is only bimoraic if stressed (in OT: WEIGHT-TO-STRESS >> WEIGHT-BY-POSITION). \( \text{V} \)’s “yield up” mora to \( \text{V} \) if present.

- Vowel prominence (Ryan 2019): Stress is attracted to perceptually salient syllables.
  - Enforced using VV-TO-MAIN, which is perceptually grounded (vowels are most perceptually salient, long vowels are even more salient).
  - Handles both pathologies.

- Mam is amenable to coercion or prominence, but phonetic data supports Ryan’s vowel-prominence constraints.

4 Placing Mam within the prominence framework

An acoustic study of a speaker of Todos Santos Mam

- Methodology: wordlist reading (128 items x 3 reps = 384 tokens)
- Measures: duration, fo (10 timepoints), H1*-H2*, H1*-A2*.

- Mixed effects models: measure - LENGTH + vowel + onsetPlace + codaPlace + (1|stimulus)

Key finding: \( /\text{Vʔ}\) is more acoustically prominent than \( V(C) \), in terms of vowel duration.

- realized as glottalized vowel, with duration intermediate between \( VV \) and \( V(C) \).

\[ /\text{Vʔ}/ \text{ duration is intermediate between } V \text{ and } VV. \]

\[ /\text{Vʔ}/ \text{ is realized as a glottalized vowel with no } [\text{ʔ}] \text{ release} \]

5 An OT analysis of Mam stress

- To Ryan’s class of perceptually grounded constrains (e.g. VV-TO-MAIN), add Vʔ-TO-MAIN
  - Penalizes Vʔ syllables lacking primary stress.
  - Rooted in language-specific acoustic evidence.
  - The ranking VV-TO-MAIN >> Vʔ-TO-MAIN falls out from the relative prominence of VV and Vʔ syllables.

(1) \( \text{VV} > \text{Vʔ} \)

\[
\begin{array}{c|c|c|c|c}
\text{align-R} & \text{VV-TO-MAIN} & \text{WT} & \text{Vʔ-TO-MAIN} \\
\hline
\text{a.} & \text{ʔkʊʔ. waːj} & \text{*} & \text{*} & \text{*} \\
\text{b.} & \text{ʔkʊʔ. waːj} & \text{!} & \text{*} & \text{*}
\end{array}
\]

(2) \( \text{Vʔ} > \text{VC} \)

\[
\begin{array}{c|c|c|c|c}
\text{align-R} & \text{VV-TO-MAIN} & \text{WT} & \text{Vʔ-TO-MAIN} \\
\hline
\text{a.} & \text{ʔxɪʔ.ɡæ’ɛx} & \text{*} & \text{*} & \text{*} \\
\text{b.} & \text{ʔxɪʔ.ɡæ’ɛx} & \text{!} & \text{*} & \text{*}
\end{array}
\]

(3) Else, stress on rightmost heavy

\[
\begin{array}{c|c|c|c|c}
\text{align-R} & \text{VV-TO-MAIN} & \text{WT} & \text{Vʔ-TO-MAIN} \\
\hline
\text{a.} & \text{ʔman. maːq} & \text{*} & \text{*} & \text{*} \\
\text{b.} & \text{ʔman. maːq} & \text{!} & \text{*} & \text{*}
\end{array}
\]

A crosslinguistic outlook

- Language-specific weight hierarchies fall out from language-specific phonetic realizations.
- Some languages (e.g. Hupa; Gordon 2005) have a weight hierarchy \( \text{Vʔ} < \text{V} \) (reverse of Mam).
  - Likely reduced or “checked” syllables.
  - Realization of glottal rimes varies cross-linguistically, and can affect their ranking within a language’s prominence hierarchy

References