

Phonological Degrees of Labiality: Evidence from Karata

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INTRODUCTION

Karata (*k'ir̄i mač'i*, Russian *karatinskij jazyk*): Nakh-Daghestanian family, ca. 10,000 speakers, 8 villages, North-West Daghestan, Russia.

BACKGROUND INFORMATION

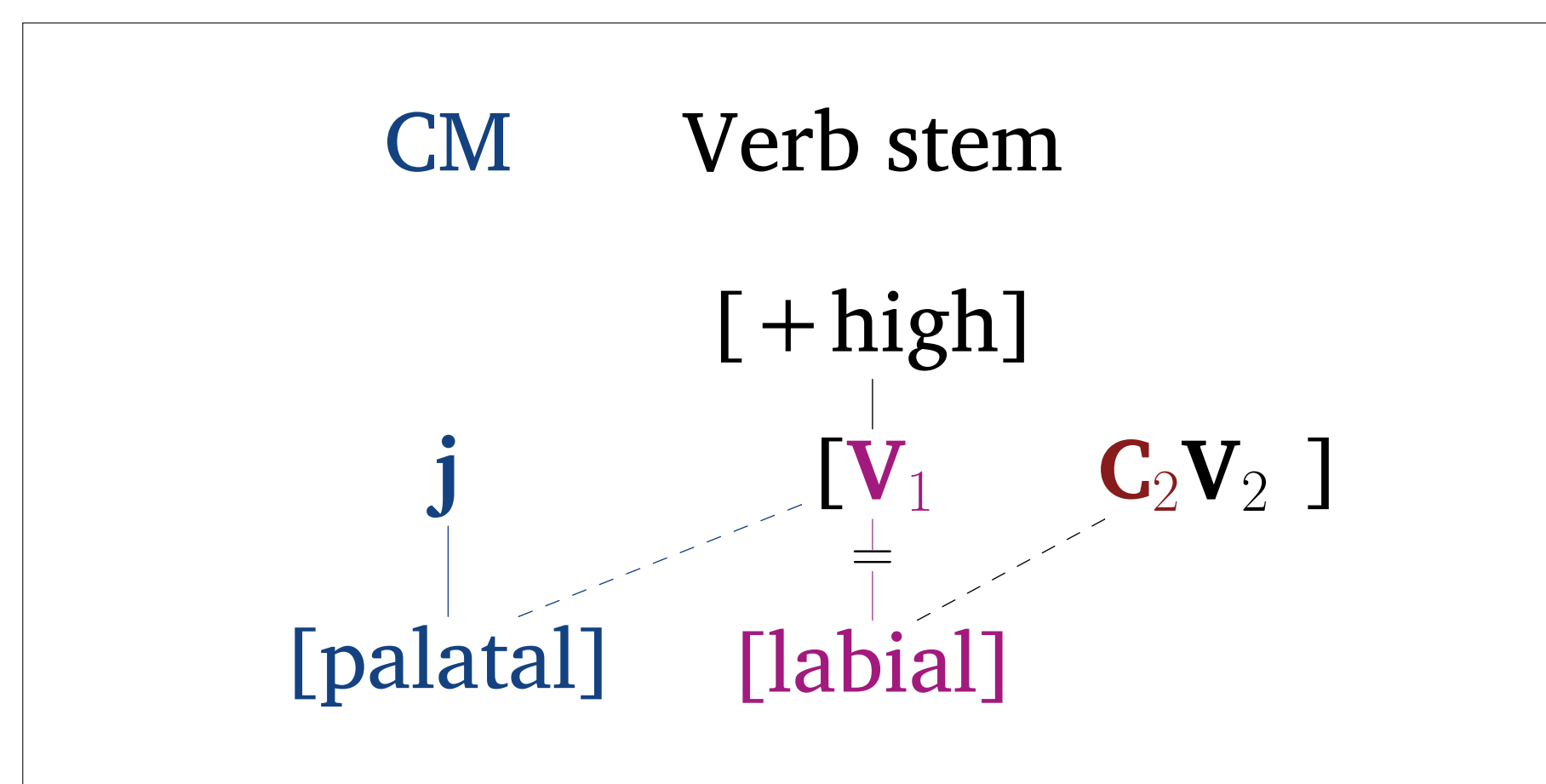
- 86 phonemic C (46 non-labialized C & 40 labialized C)
- 5 V (with long x nasal counterparts)
- Phonotactic constraints:
 - no [round V + labialized C] sequence ($*uC^w$)
 - no consecutive labialized onsets ($*C^wC^w$)
- The UR of the verb stem is apparent with the singular Neutral Class Marker *b-* (This is the only CM that does not neutralize the following V contrast).
- Underlyingly non-labialized C's undergo a process of labialization

CONSONANT LABIALIZATION

- In Karata verbs, a stem C must be labialized when both following conditions are met:
 - the preceding V is **underlyingly round and high**
 - this V becomes unround as a result of assimilation to a preceding CM: Fem.CM *j-*, H.pl.CM *b(a)-* or nH.pl.CM *r(a)-*

✓ *b-utʃãɬa* N-wash
 ✓ *b-oʃãɬa* N-appear

j-itʃãɬa F-wash
j-eʃãɬa F-appear



high	i	u
mid	e	o
low	a	

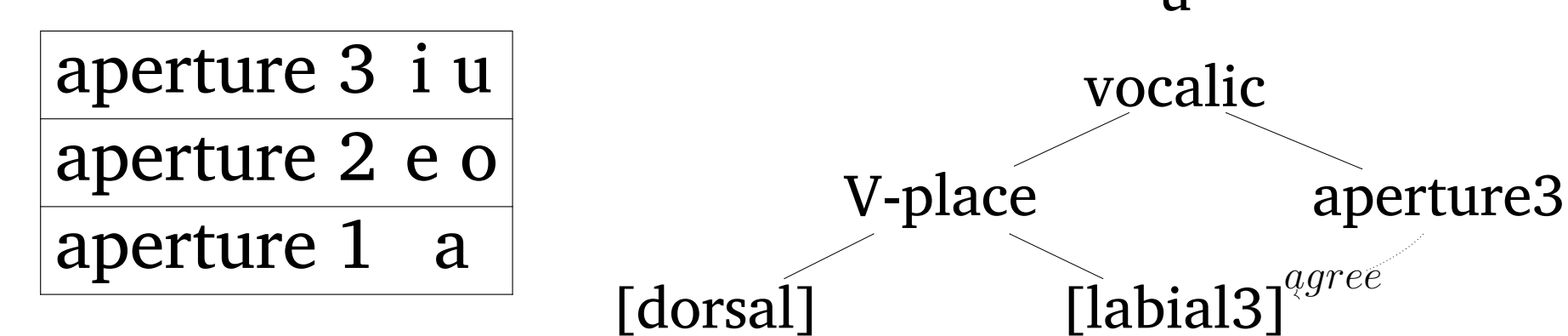
- high/round V₁ → C labialization**
 - /j + utʃãɬa/ → jitʃãɬa* 'wash'
 - /j + utʃãɬa/ → jitʃãɬa* 'open'
 - /j + utaɬa/ → jitʃãɬa* 'untie'
 - /j + uʃãɬa/ → jitʃãɬa* 'share'
- No labialization**
 - /j + oʃãɬa/ → jeʃãɬa* 'thrust'
 - /j + oqãɬa/ → jeqãɬa* 'remove'
 - /j + oʃãɬa/ → jeʃãɬa* 'appear'
 - /j + oʃãɬa/ → jeʃãɬa* 'warm up'

- \bar{C} = fortis consonant
- fortis = distinctive feature used across all art. places
- phonetic realization contingent on the type of C that realizes it

ASSUMPTIONS

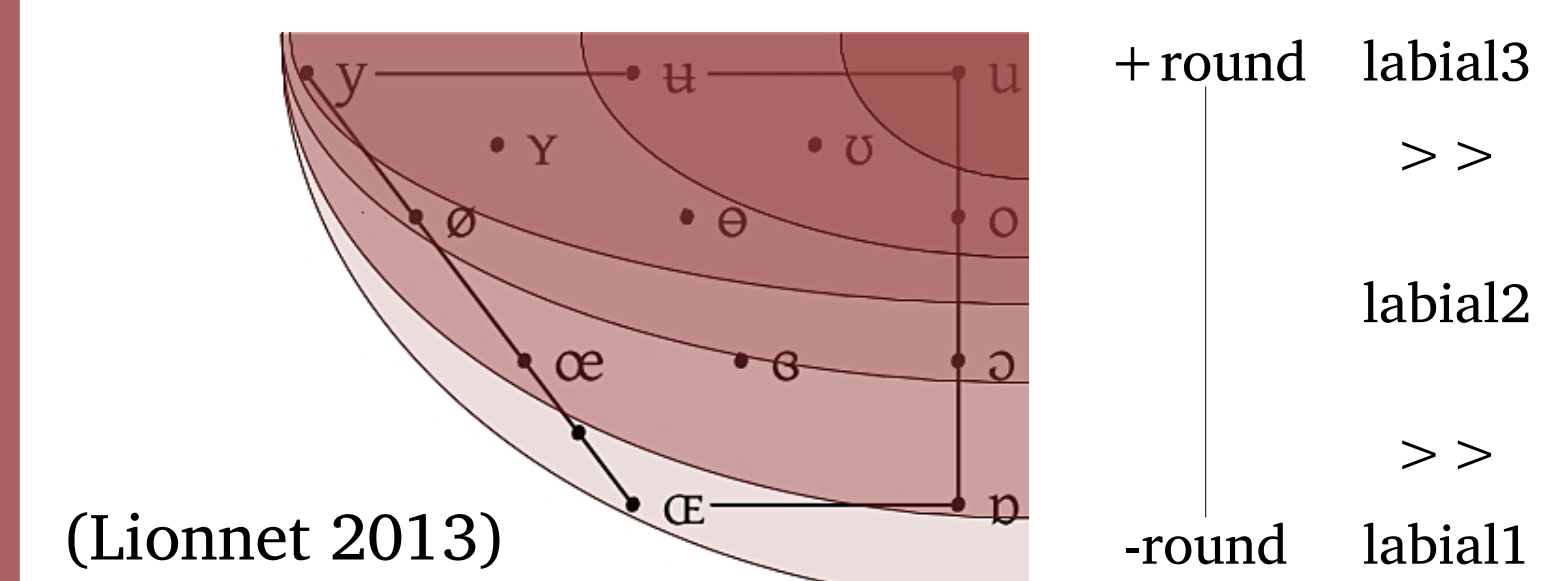
VOWEL APERTURE

- V height is defined in terms of degrees of aperture (Clements and Hume 1995)
- 'Aperture' refers to the degree to which the oral cavity is open/close



LABIALITY DEGREES AND SCALE

- There are degrees of rounding too.
- In this language (and others), if a V has a [labial] feature, it agrees in degree with the aperture node of the same V.
- Height and backness = rounding enhancement



- The roundedness scale maps vowel height to labiality degree.
- 'The faithfulness constraints are naturally ranked so that a more prominent member of the scale demands more faithfulness.' (Gnanadesikan 1997)

EVIDENCE FOR LABIALITY DEGREES

- **Articulatory evidence (Linker 1982):** the rounding gesture of a high vowel is more extreme than the rounding gesture of a non-high vowel.
- **Perceptual evidence (Terbeek 1977):** high rounded vowels are perceived as more rounded than non-high rounded vowels.
- **Typology (Maddieson 1984):** the lower the rounded vowel, the rarer it is.
- **Contrastive labiality gestures:**
 - Swedish: 2 high front round V [y, u], [ʊ] is not as protruded (Linker 1982)
 - Assamese: 2 low back round V [a, ɔ] (Ladefoged et al. 1996)

SKETCH OF THE ANALYSIS

- When [labial3] and [labial2] are delinked as a result of assimilation, there is markedness pressure for delinked features to delete.
- But there is more pressure to keep [labial3] than the other [labial x] features.
- It is better to re-associate [labial3] to another segment than to delete it.

ANALYSIS

CONSTRAINTS

- **Anti-mismatch constraint**
 - *aperture_α Assign a violation for every output rootnode which is linked to an aperture node and a labial feature which disagree in value.
- **Assimilation constraint**
 - *O N Assign a violation for every output onset-nucleus sequence if their V-place nodes are not the same.
- ***FLOAT** Assign a violation for every feature that is floating in the output (Wolf 2007).
- **MAX [labial3] >> MAX [labial2]**
 - MAX[labx] Assign a violation for every [labialx] feature that is not present in the output.
- **Anti-labialization constraint**
 - IdentOI[labx] Assign a violation for every link between a [labialx] feature and a segment in the output that is not in the input.

ANALYSIS (SIMPLIFIED)

	/j-ʉ̄/ [lab3]	*O _α N _{-OPLACE}	Max[labial3]	*Float	*ap _α /labial _{-α}	IdentOI[labialx]	Max[labial2]
a	jɬ̄ ^w [lab3]					*	
b	jiɬ̄ [lab3]			*W		L	
c	jiɬ̄ [lab3]		*W			L	
d	juɬ̄ [lab3]			*W		L	

	/j-ʉ̄̄/ [lab2]	*O _α N _{-OPLACE}	Max[labial3]	*Float	*ap _α /labial _{-α}	IdentOI[labialx]	Max[labial2]
a	jɬ̄̄ ^w [lab2]					*W	L
b	jeɬ̄̄ [lab2]			*W		L	
c	jeɬ̄̄ [lab2]					*	
d	joɬ̄̄ [lab2]			*W		L	

ANTICIPATING QUESTIONS

- Phonology can access gradient subphonemic information
- Is this information phonetic or phonological?

Claim: it is phonological.

Karata and languages with parasitic rounding harmony have phonologized phonetic reflexes.

- The degree of rounding is predictable from V height: is it necessary to have degrees of rounding on [labial]?
 - On the surface, rounding is **not** on V anymore so we can't refer to V height
 - If at an intermediate level [labial] is linked to both V C, then it's a case of opaque spreading
 - Why not just stipulate that [+high] V trigger opaque spreading?
 - At an intermediate level of the derivation, we would need /uC^w/ to win
 - But this won't happen because $*uC^w$ is undominated
- (see Pasquereau 2013 for more details)

PREDICTIONS

ROUNDING HARMONY

- Parasitic rounding harmony

Anti-mismatch >> Extend(labialx)

- Yawelmani Yokuts (Yokutsan): high-high low-low
- Kachin Khakass (Turkic): high-high

labial degrees are contrastive

- Cross-height rounding harmony

Extend(labialx) >> Anti-mismatch

- Turkish: low/high-high
- Yakut (Turkic): low-low/high high-high

labial degrees are not contrastive

(data and EXTEND from Kaun 1997)

VOWEL COALESCENCE

- In Yoruba (Niger-Congo), under coalescence, the rounding of a high vowel is preserved but not that of a mid-vowel: /u + i/ → [u] BUT /o + e/ → [e] (Casali 1996)

APERTURE/LABIAL MISMATCHES

- In languages where $*ap_{\alpha}/lab_{-\alpha}$ is low ranked, mismatches are allowed (e.g. cross-height rounding harmony)
- Is the lip gesture different from a round vowel with matching *aperture* and *labiality* degrees?

CONCLUSION

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- Karata consonant labialization
 - [labialx] features agree in value with V aperture
 - there is more faithfulness to keep [labial3] in the output
- Karata has phonologized distinctions that are traditionally considered purely phonetic
- This helps understand phenomena of parasitic rounding harmony
- Future research:
 - Is the labial gesture on a V whose rounding results from harmony different from the gesture on a V which is underlyingly round?
 - Do processes of V coalescence bear out the fixed-ranking of faithfulness to [labialx]?

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