

Guttural Semi-Transparency

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Studies of transparent gutturals in vowel copy harmony have had important ramifications for theories of segment and syllable structure (McCarthy 1994, Rose 1996, Hall 2006). The class of gutturals typically consists of laryngeals, pharyngeals and uvular fricatives. This paper focuses on guttural ‘semi-transparency’, namely, patterns that display transguttural copy harmony where gutturals show some interaction with vowels in the process. Key properties are that (i) gutturals can influence the quality of the vowels that assimilate across them, and (ii) laryngeal and supralaryngeal gutturals may pattern differently within a language with respect to transparency and influence on vowel quality. We argue that guttural semi-transparency is best understood in terms of the phonetics of gutturals, which informs the phonological analysis.

The potential for gutturals to influence neighboring vowels is well-known. Under focus here is their capacity to do so even when they do not block vowel copy across them. In Jibbāli (Semitic, Hayward et al. 1988), vowels flanking a guttural are identical (1a). Gutturals cause neighboring unround vowels to lower (1b). The lowered quality is present in both vowels in VGV copy sequences (1c) (G = guttural).

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| (1) | a. | /j-deħɔs/ | → | jɪdɔ ^h ħɔs | ‘annoy somebody’ IPFV |
| | | no harmony: /j-fek’ɔr/ | → | jɪfɛ ^l k’ɔr | ‘become poor’ IPFV |
| | b. | /j-ɪdɔl/ | → | jǎɪ ^l dɔl | ‘carry on one’s back’ 3MS.SBJV |
| | c. | /deħes/ | → | da ^h ħas | ‘annoy somebody’ PRF |

Laryngeal and supralaryngeal gutturals can show different degrees of transparency and interaction with vowels. In Gitksan (Tsimshianic, Yamane-Tanaka 2007), copy harmony to an unstressed inserted vowel regularly operates across a laryngeal (2a), but it vacillates across a supralaryngeal guttural (uvular) (2b). Elsewhere harmony does not occur, e.g. [‘wagi^l’j] ‘my (man’s) brother’.

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| (2) | a. | sɪ ^l seʔɛ ^l ’j | ‘my feet’ | t ^h saʔa ^l ’j | ‘my eyes (face)’ |
| | b. | bɛɪ ^l χɛ ^l ’j ~ bɛɪ ^h χa ^l ’j | ‘my lungs’ | | |

In Jibbāli, supralaryngeal gutturals cause lowering and backing of a neighboring unround vowel to [a] (1b–c). However, [h] – the only phonemic laryngeal – causes lowering without backing: /leheθ/ → [lɛ^hħeθ] ‘pant’ PRF.

We propose that semi-transparency of gutturals is related to their articulation. Gutturals lack contact on the upper surface of the vocal tract and involve lesser jaw control than nonguttural (oral) consonants (Goldstein 1994, Lee 1994), which facilitates cross-guttural vowel copy. Among the gutturals, laryngeals impose the least jaw and lingual control, but they can influence vowels through synergistic relations, as can other gutturals (Moisek 2013). The generally weaker interference of laryngeals with vocalic articulations is consistent with the patterns of guttural differentiation.

The phonetics of gutturals informs the phonological analysis. Nonguttural (oral) consonants (O) exhibit greater influence on vowels’ articulation in the oral cavity (superior to oropharynx) than supralaryngeal gutturals (G^S), which in turn do so more than laryngeal gutturals (G^L). This forms the basis for a harmonic ordering that gives rise to the constraint hierarchy in (3a), where V_x’s represent identical vowels with shared specification overlapping the consonant. (Further subcategorization in O obtains coronal transparency; Paradis & Prunet 1989.) The harmony-driver is expressed as a sequential prohibition in (3b) (Pulleyblank 2002), with participation of the consonant in harmony enforced by locality (Ní Chiosáin & Padgett 2001). On the other hand, gutturals’ post-velar articulations and their synergies favor lowering and backing of vowels in their context, as enforced in the phonology by constraints like those in (3c).

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| (3) | a. | *V _x OV _x >> *V _x G ^S V _x >> *V _x G ^L V _x | Features of V _x are continuous in the sequence. |
| | b. | *V _x CV _y | V _x ≠ V _y in quality, C = any consonant. |

c. *V_[-low]/G, *V_[+high]/G, *V_[-back]/G

An overview of the typological predictions is given in (4). The harmony driver (in bold) is assumed to dominate faithfulness and markedness constraints for the assimilating vowel qualities in these patterns. It is noteworthy that copy harmony frequently targets vowels that are inserted, affixal or short, contexts where faithfulness to vowel quality is exempt or less strictly enforced.

(4)	Ranking	Pattern	Ex. Language
Copy harmony	*V_xCV_y >> *V _x OV _x >> *V _x G ^S V _x >> *V _x G ^L V _x	V copy across all Cs	Servigliano dialect
	*V _x OV _x >> *V_xCV_y >> *V _x G ^S V _x >> *V _x G ^L V _x	V copy across all Gs	Jibbāli
	*V _x OV _x >> *V _x G ^S V _x >> *V_xCV_y >> *V _x G ^L V _x	V copy across G ^L 's only	Gitksan (nonvacillating)
Vowel lowering	*V_[-low]/G >> Faith	Vs are low adjacent to G	Jibbāli
	*V_[+high]G >> Faith	Vs are [-high] before G	Tiberian Hebrew (short Vs)

Vacillating harmony across uvulars in Gitksan is obtained by variable ranking of *V_xG^SV_x and *V_xCV_y. Transguttural vowel assimilation and lowering may both be enforced, as in Jibbāli. For Jibbāli, lowered vowels back to [a] next to gutturals except [h] via the constraint *V_[-back]/G^S.

Guttural semi-transparency is challenging for accounts where gutturals behave as transparent to vowel copy by virtue of lack of specification or lesser markedness. If gutturals lack the spreading node in copy harmony and are thus skipped (McCarthy 1994, Rose 1996), then the guttural's influence on vowel quality is unexpected, or multiple features that affect vowel height are required, located in different places in the geometry. An alternative treats [pharyngeal] as the least marked place feature and best able to cooccur with vowel place (Gafos & Lombardi 1999). Yet a scale based in place-markedness does not predict gutturals' effect on vowel height, as triggering of assimilation is diagnostic of a marked feature value (de Lacy 2006). Also, the potentially distinct behavior of laryngeals escapes the place-markedness account, since [pharyngeal] is posited to be present in all gutturals (Lombardi 2001).

An alternative articulatorily-informed account considers at least some copy vowels to be intrusive gestures; they do not form phonological segments or a syllable nucleus (Hall 2006). Yet this approach is not sufficient for the range of guttural transparency phenomena, because not all copy vowels can be considered intrusive. Some affected vowels are underlying rather than inserted, as in Jibbāli, and some affected inserted vowels show evidence of phonological visibility (Iraqw, van der Hulst & Mous 1992; Tiberian Hebrew, Prince 1975). In Iraqw, an inserted vowel that is usually realized as [i(:)] may be tone-bearing and alternate in length (5a), indicating that it is phonologically visible and syllabic, and hence not an intrusive gesture. This vowel undergoes copy harmony across a guttural (5b).

- (5) a. a: xaʃi:t 'she kept quiet' a: xaʃi:t 'he kept quiet'
b. tuʃu:m 'uproot' DUR ufaħa:m 'blow' DUR

In sum, gutturals can show semi-transparency effects, with the potential to affect vowel quality and for laryngeal and supralaryngeal gutturals to behave differently. The phonetics of gutturals sheds light on these patterns. A phonological analysis informed by the production of gutturals makes better-fitting typological predictions than previous accounts.

Selected references: Hayward, K. et al. 1988. Vowels in Jibbāli verbs. *BSOAS* 51, 240-50. :: Hulst, H. van der & M. Mous. 1992. Transparent consonants. *Ling. in the Netherlands 1992*, 101-12. :: Yamane-Tanaka, N. 2007. K in conflation theory. *On'in Kenkyuu*, 10, 39-48.