

# On the Sonority of Glottalized Sonorants

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LSA, Philadelphia  
 January 9-12, 1992

**0. Argument.** While glottalized sonorants are lower in sonority than plain sonorants, they still carry the feature [+son].

**1. Phonetics.** Stevens and Keyser (1989:93) note that the feature [+constricted glottis] results phonetically in lower sonority for sonorant consonants.

(1) “Constricting the glottis leads to glottal pulses for which the amplitude of the first harmonic is reduced relative to that for modal voicing, thereby weakening the sonorant character of the consonant. Sonorancy depends upon maintenance of the amplitude of the fundamental component through the consonantal interval into the adjacent vowel.”

**2. Kwakwala.** There is also phonological evidence from a number of languages that glottalized sonorants are lower in sonority than plain sonorants. For example, in Kwakwala glottalized sonorants pattern with obstruents in their moraic behavior. Stress is first heavy, otherwise last:

(2)	qá≥ sa	‘to walk’	(3)	bë xá	‘to cut’
	xé≥ mḥa	‘to weep’		mḥë k,ë lá	‘moon’
	÷ax, só≥ le	‘hellebore’		më cflë tá	‘to heal’

A vowel-sonorant rime counts as heavy, while a vowel-obstruent rime counts as light:

(4)	mḥë%on sa	‘to measure’	(5)	gas xá	‘to carry on fingers’
	së%ol yfla	‘to pick out’		të» cflá	‘to warm oneself’
	dʒë%om bë tëls	‘to bury in the ground’		max, cflá	‘to be ashamed’
	më xë%on xUënd	‘to strike edge’			

Glottalized sonorants pattern with the obstruents, i.e. they leave the syllable light:

(6) mël’ qá ‘to repair canoe’  
 k,ënfl xUá ‘clams are spoiled’  
 qënfl xá≥ we÷ ‘neck ring’

Minimal pairs based solely on glottalization:

(7) a. anfl qá ‘to put fire among’  
 án qa ‘to squeeze’  
 b. gUëmḥ xUá ‘to use the left hand’  
 gUë%om xUa ‘carrying wood in arms’  
 c. gUël’ qá ‘to wipe anus’  
 gUë%ol qa ‘to swim’

Bach (1978) takes this as evidence that glottalized sonorants are in fact obstruents, and that only sonorants count for stress. Zec (1988), however, shows that the Kwakwala data can be analyzed differently in a theory which permits a subset of segments to be classified as moraic: if only vowels and plain sonorants are assigned a mora in coda position, they alone will make a syllable heavy:

(8)	obstruents	<i>nonmoraiç</i>
	glottalized sonorants	<i>nonmoraiç</i>
	plain sonorants	<i>moraiç</i>
	vowels	<i>moraiç</i>

These distinctions are already necessary to account for the different behavior of segments in languages like English and Khalkha Mongolian. In English, both obstruents and sonorants pattern like long vowels in rendering a syllable heavy (*ató<ne>*, *repén<t>*, *robús<t>*). In Khalkha, on the other hand, no consonant adds to syllable weight. Stress is first heavy, otherwise initial; but only vowels are moraic (Street 1963, Hayes 1981):

- (9)
- |             |                       |
|-------------|-----------------------|
| bosgúul     | ‘fugitive’            |
| xoyërdugáar | ‘second’              |
| garáasaa    | ‘from one’s own hand’ |
| áli         | ‘which’               |
| xöʔätëbërë  | ‘leadership’          |

- (10)
- |            |               |                  |
|------------|---------------|------------------|
|            | ENGLISH       | KHALKHA          |
| obstruents | <i>moraic</i> | <i>nonmoraic</i> |
| sonorants  | <i>moraic</i> | <i>nonmoraic</i> |
| vowels     | <i>moraic</i> | <i>moraic</i>    |

Kwakwala simply represents an intermediate type where a subset of consonants are moraic, defined partly by the feature [constricted glottis]. There is no need to treat glottalized sonorants as [-son], since their behavior follows from the independently stated set of moraic consonants. While [constricted glottis] is relevant to the sonority hierarchy (cf. Levin 1985), this relevance need not be expressed via the feature [son].

**3. Gitksan.** Hunt (1991) argues that while in Gitksan glottalized glides are unable to head syllables, this does not require us to abandon the restrictive position that glides are identical to vowels in their features, including [-cons] and, of course, [+son]. Rather, it follows from the exclusion of [+cg] vowels from the class of syllabic segments.

- (11)
- |                    |                  |                    |
|--------------------|------------------|--------------------|
| obstruents         | <i>nonmoraic</i> | <i>nonsyllabic</i> |
| sonorants          | <i>moraic</i>    | <i>nonsyllabic</i> |
| glottalized vowels | <i>moraic</i>    | <i>nonsyllabic</i> |
| plain vowels       | <i>moraic</i>    | <i>syllabic</i>    |

Again, glottalization results in lower sonority, but this does not necessarily correspond to a difference in major class features.

**4. Kashaya** (Pomoan: northern California). An explanatory treatment of glottalized sonorants depends crucially on their being [+son]. There is a constraint in the language forbidding sonorants with distinctive laryngeal features in onset position. Cf. Yokuts where ‘glottalization shows a strong preference for syllable codas’ (Kingston 1985:352). There are two ways in which the constraint is enforced. Postlexically, any glottalized sonorant which syllabifies as an onset simply loses its glottalization. Lexically, a glottalized nasal in onset position becomes a voiced stop.

**Postlexical.** The Assertive clitic =÷ merges with a preceding obstruent or sonorant:

- (12)
- |    |             |   |             |                       |
|----|-------------|---|-------------|-----------------------|
| a. | sĒe÷et=÷    | → | sĒe÷étfl    | ‘it’s a basket’       |
|    | watUac=÷    | → | watŮácfl    | ‘it’s a frog’         |
|    | mihyoq=÷    | → | mihyóqfl    | ‘it’s a woodrat’      |
| b. | cflísĒkan=÷ | → | cflísĒkanfl | ‘it’s pretty’         |
|    | tŮ·olol=÷   | → | tŮ·olól’    | ‘it’s a chicken hawk’ |
|    | balay=÷     | → | baláyfl     | ‘it’s blood’          |

With the related clitic =÷e≥, resyllabification occurs. There is no change in glottalized obstruents, but glottalized sonorants lose their glottalization:

- (13) a. watŪac=÷e≥ mu → wa tŪa cflé≥ mu ‘that’s a frog’  
 ma≥cac=÷e≥ mu → ma≥ ca cflé≥ mu ‘that’s them’  
 sĒe÷et=÷e≥ mu → sĒe ÷e tflé≥ mu ‘that’s a basket’  
 b. cflísĒkan=÷e≥ mu → cflísĒ ka ne≥ mu ‘that’s pretty’  
 buhq·al=÷e≥ mu → buhq·a lé≥ mu ‘that’s a burden basket’  
 balay=÷e≥ mu → ba la yé≥ mu ‘that’s blood’

An underlyingly glottalized sonorant also loses its glottalization in onset position:

- (14) dolomḡ=÷e≥ mu → do lo mé≥ mu ‘that’s a wildcat’  
 manfl=÷e≥ mu → ma né≥ mu ‘that’s her’

This makes sense if [+son] and [+cg] cannot cooccur in the onset. Crucially, the glottalized sonorants must be [+son] to distinguish them from the obstruents in (13a).

**Lexical.** A glottalized nasal becomes a voiced stop in onset position. This Desonorization creates alternations for [nfl] and [d] (derivations simplified):

- (15) a. canfl-u → ca dú ‘look!’  
 canfl-p·i → cánfl p·i ‘if he sees’  
 b. nfluhlunfl-imḡi÷ → duh lu dí≥ bi÷ ‘start to pick it off’  
 nfluhlunfl-mḡa → duh lúnfl ba ‘having picked it off’  
 c. mahsanfl-un → mah sa dún ‘while taking it away’  
 mahsanfl-q· → mah sánflq· ‘must have taken it away’  
 d. ma≥nfl → mánfl ‘she’  
 ma≥nfl-al → ma≥dál ‘her’

For [mḡ] and [b] the rule expresses distributional facts only:

- (16) mḡa≥ mḡanfl → ba≥ bánfl ‘my father’s father’  
 mḡi÷ nfla → bi÷ dá ‘stream’  
 si mḡo → si bó ‘three’  
 q·a÷ mḡe → q·a÷ bé ‘rock’  
 mḡa÷ sflimḡ sflī → ba÷ sflímḡ sflī ‘chipmunk’  
 k·u numḡ → k·u númḡ ‘Bishop pine’  
 hemḡ qflo lo → hémḡ qflo lo ‘thimbleberry’

Again, this change is motivated by the ill-formedness of [+son, +cg] in the onset, although in this case the value of [son] is changed. Further, the voicing of the stop can be derived from the [+son] feature of the nasal. Naturally, under this analysis the glottalized nasals cannot be obstruents. The remaining changes to [-nasal] and [-cg] follow from independent restrictions (formulated as persistent rules: Myers 1991).

**Potential counterexample.** A coronal obstruent loses its place features before another coronal:

- (17) sihwatfl-ti → sihwá÷ti ‘about to sag’  
 sĒumḡilicfl-nflo → sĒubílí÷do ‘they say he looked’  
 nflahyut·-ye≥ → dahyúhye≥ ‘just broke it’  
 c·iwotŪ·-sĒe → c·iwóhsĒe ‘I wonder if he stirred it’

The glottalized nasal /nfl/ patterns with the obstruents in undergoing debuccalization:

- (18) canfl-ti → cá÷ti ‘about to look’  
 canfl-sĒe → cá÷sĒe ‘I wonder if he looked’  
 nflulunfl-taw → dulú÷taw ‘pick (berries)’

The plain nasal /n/, on the other hand, is unaffected by debuccalization:

(19)	sEuhwe≥n-ti	→	sEuhwentí	‘about to shake’
	mo÷on-ti	→	mo÷ónti	‘about to hit’
	cflihwín-sEe	→	cflihwínsEe	‘I wonder if it blazed up’

One might choose to capture this pattern by calling the glottalized sonorants [-son], but that destroys our analysis of the facts above. I suggest that the explanation for (18) lies not in a derivative notion of sonority but directly in the simple presence or absence of Laryngeal features. Due to a rule which aspirates plain stops in coda position, all obstruents which are eligible for debuccalization bear a laryngeal feature, and that feature determines whether the output is [h] or [÷]:

(20)	c·iwotU·sEe	→	c·iwotU·sEe	→	c·iwóhsEe	‘I wonder if he stirred it’
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Since aspiration does not apply to plain sonorants, they remain without distinctive laryngeal features. I adopt Clements’ (1985) proposal for Klamath that debuccalization is constrained to apply only to segments with a Laryngeal node: this prevents the creation of a representation which lacks both Laryngeal and Place specifications. Debuccalization applies to /nfl/ because it has a Laryngeal node, not because of its value for [sonorant].

**Conclusion.** Zec’s analysis of Kwakwala syllable weight shows that it is not necessary to treat glottalized sonorants as obstruents to account for that pattern. Hunt’s treatment of Gitksan makes it possible to maintain the theoretically preferable position that glides and vowels differ only in syllabicity, not in stricture features. The Kashaya data add to this evidence a case where it is not only possible or preferable, but in fact crucial that glottalized sonorants be treated as [+son].

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