Patterns of deglottalisation in Tsimshianic[*]

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This paper provides an overview of the patterns of deglottalisation in the languages of the Tsimshianic family. Deglottalisation is an active process in reduplication, but it affects different segments in different prosodic contexts across the various languages. The typology of patterns present in the language family suggests that glottalised obstruents and sonorants should be treated differently phonologically.

1   Introduction

The Tsimshianic languages, which include Coast Tsimshian, Nisgha, and Gitksan[1], display rich patterns of deglottalisation in reduplicative contexts. The primary goal of this paper is to identify a pattern across the entire language family. While individual patterns of deglottalisation have been noted by researchers working on each particular language, the present work seeks to bring these patterns together for comparative and contrastive purposes. This type of comparative evidence from reduplication in the Tsimshianic languages shows that glottalised obstruents and glottalised sonorants exhibit a synchronic, and potentially diachronic asymmetry. The typology of deglottalisation processes in the family, most likely due to diachronic pressures, illustrates how glottalised sonorants and obstruents are variably targeted. This pattern of variation provides evidence for a scalar view of markedness (Prince & Smolensky 1993, deLacy 2004), whereby constraints are ordered according to a markedness hierarchy. Furthermore, additional evidence from these languages supports Maddieson's (1984) implicational hierarchy, whereby glottalised sonorants are more marked than glottalised obstruents.

There is a process of reduplication in Tsimshianic which is one of many ways for morphologically marking plurals or plural agreement (for the particulars, see Sasama 1995 for Coast Tsimshian, Rigsby 1986 for Gitksan, and Tarpent 1983, 1987 for Nisgha). There are several different plural allomorphs, though only the reduplicative ones will be discussed here. These include a

[1] It has been argued by Dunn (1979) that Southern Tsimshian constitutes a separate language in the family, although it is not discussed here due to scarcity of data.

C_1VC_2 reduplicant, and a C_1V reduplicant, as well as various other reduplicants with fixed segments, and an unproductive infix. There are further complications involved in plural reduplication, such as the quality of vowels, lenition, and fixed segmentism, however, these phenomena are irrelevant to the issue at hand and will not be further dealt with.

All three languages have glottalised obstruents and glottalised sonorants in their inventories, and these segments appear in both prevocalic and postvocalic positions. In all three languages, there is a process of deglottalisation which neutralizes glottalised consonants in the reduplicant. In C_2 position, deglottalisation is invariant and affects both obstruents and sonorants. C_1 position exhibits more variation. Coast Tsimshian displays no deglottalisation in this position; in Nisgha deglottalisation affects only sonorants, and in Gitksan it affects both obstruents and sonorants.

The paper is structured as follows: §2 illustrates the regular distribution of glottalised consonants within the word. Next, the deglottalisation facts are presented. Since the behavior of C_2 is relatively invariant, it will be dealt with first (§3), followed by the variant behavior of C_1 (§4). §5 provides a discussion of the patterns found in Tsimshianic, and presents arguments for viewing glottalised sonorants as more marked than glottalised obstruents.

2   Regular distribution of glottalised consonants

Glottalised consonants in the Tsimshianic languages occur fairly freely in word-initial position, (non-word-initial) onset position, coda position, and word-finally. Data from Gitksan is presented below. Data are either from Hindle & Rigsby (1973) and re-elicited, or are original forms from fieldwork sessions.

(1) Glottalised obstruents in word-initial position

t'is	'to be big, large'
t^s'imilix	'beaver'
q'alaan'	'behind, in back of'
t^l'ook'	'mud'

(2) Glottalised obstruents in (non-initial) onset position

m'oot'ixs	'breast'
masq'ajaaj'	'bullhead'
χt^s'aj'	'be thick (as a board)'

(3) Glottalised obstruents in coda position

hat^s'	'to bite'
t'im boq'	'buttocks'
hat'	'marten'

(4) Glottalised sonorants in word-initial position

n'aχ	'bait'

w'een	'fisher'
m'as	'to grow up (pl)'
j'ans	'leaf, grass, weeds'
*l	no forms

(5) Glottalised sonorants in (non-initial) onset position

lil'igit	'feast'
tˢ'uw'in	'end, tip, point'
sj'un	'glacier'
dam'as	'to hug (trans)'
naχn'i or laχn'i	'to hear'

(6) Glottalised sonorants in coda position

maaj'	'berries, fruit'
ligil'	'eyebrow'
t'eel't	'to be fast'
ɢanaaw'	'frog'
daaw'ł	'to leave (sg)'
dim'łxʷ	'to look after'

The most striking prohibition in these languages is the lack of [l'] in word initial position. This potentially accidental gap is also found in Coast Tsimshian (where there is one exceptional form in Dunn 1995) and Nisgha (one exceptional form noted in Tarpent 1987). To my knowledge, this gap was originally pointed out by Krauss and Leer (1981). While it is not crucial for understanding the deglottalisation facts to be addressed (it merely rules out reduplicants with [l'] in onset position), it will be important for discussion pertaining to the marked status of glottalised sonorants.

3   Coda deglottalisation

In Coast Tsimshian, Nisgha, and Gitksan, deglottalisation affects obstruents and sonorants in the C_2 position. Ultimately this consonantal slot will always amount to being a syllable coda, as there is a requirement of the base that it have an initial onset. This deglottalisation effect is illustrated below for each language[2], where obstruents are shown in the (a) examples and sonorants in the (b) examples.

(7) Gitksan Coda glottalisation
a.   hit'   hit-hit'   'scar, to heal'

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[2] Unless otherwise noted, data from Coast Tsimshian is from Sasama (1995) and data from Nisgha is from Tarpent (1983). Numbers in parentheses indicate page numbers where data is found. There is some variation among transcriptions for the different languages, although the differences are not crucial to the points being made in this paper. The reader is referred to the original sources for explanation of transcriptions.

	hit'	hat-hit'	'stick, adhere to'	
b.	bal'	bil-bal'	'feel'	
	ɬi-bal'	ɬi-bil-bal'	'rub, massage (trans.)	
	haw'	haw-haw'	'go home'	(Hunt 1993:161)

(8) Nisgha Coda deglottalisation

a.	hít'	hat-hít'	'to stick'	(138)
	tík'	tix-tík'	'to feel silly, shy' (Shaw 1987:302)	
b.	tám'	tim-tám'	'to press sthg'	(137)
	qín'	qan-qín' '(sg) to chew, to chew sthg'		(137)
	ts'ál'	ts'il-ts'ál'	'face, (pair of) eyes'	(137)

(9) Coast Tsimshian Coda deglottalisation

a.	ʔá:p'aq	ʔap-ʔá:p'aq	'to remember'	(86)
	sí:p'ən	səp-sí:p'ən	'to love'	(86)
	wá:q'	wax-wá:q'	'to dig'	(86)
	qó:jp'a	qap-qó:jp'a	'bright'	(86)
	qó:jt'əks	qat-qó:jt'əks	'to arrive'	(86)
	ɬájk'a	ɬək-ɬájk'a	'scar'	(86)
	hat'axk	hat-hat'axk	'bad, spoiled'	(82)
b.	k'ám'əl	k'əm-k'ám'əl	'to pinch'	(86)

In each case, deglottalisation can be shown to affect both the obstruent and sonorant series. While the pattern for C_2 is invariant across the language family, this can be contrasted with the pattern for C_1, illustrated in the next section.

Since there are many languages which have glottalised obstruents but not glottalised sonorants, it will be assumed that there are two separate paradigmatic markedness constraints governing each type, *CG/SON and *CG/OBS, the definitions of which are modified from Howe & Pulleyblank (2001):

(10) *CG/SON

Specifications of the feature [constricted glottis] are prohibited on [sonorant] segments

(11) *CG/OBS

Specifications of the feature [constricted glottis] are prohibited on [-sonorant] segments

While there is no evidence at present to force this distinction, data from the next section will deem it necessary. Thus, for the time being both constraints will be collapsed into one: *CG. To this we can add the relevant faithfulness constraints:

92

(12) MAX-IO(CG)
> Every occurrence of [constricted glottis] in the input has a
> correspondent in the output

(13) MAX-BR(CG)
> Every occurrence of [constricted glottis] in the base has a
> correspondent in the reduplicant

     In order for both the glottalised obstruents and sonorants to surface in
their normal distributions, the faithfulness constraint MAX-IO(CG) must
dominate both markedness constraints. However, to correctly derive the surface
patterns in the reduplicants (in which deglottalisation occurs), *CG must
dominate MAX-BR(CG).

(14) Ranking deriving coda deglottalisation
> MAX-IO(CG) » *CG » MAX-BR(CG)

(15) Tableau for Emergence of the Unmarked Effect

RED+hit'	MAX-IO(CG)	*CG	MAX-BR(CG)
a.☞ hit-hit'		*	*
b. hit'-hit'		**!	
c. hit-hit	*!		

     This ranking derives the classic Emergence of the Unmarked type of effect
(McCarthy & Prince 1994). While deletion of glottalised segments is banned in
the mapping from input to base (enforced by the ranking of MAX-IO(CG) »*CG)[3],
deletion of glottalised segments in reduplicants is allowed by the domination of
MAX-BR(CG) by the markedness constraint *CG. In the next section we will see
how patterns of onset deglottalisation require the separate *CG/SON and *CG/OBS
constraints, and how these constraints need to be individually interleaved with
faithfulness constraints.
     Importantly, this section has presented an analysis for the pattern of
coda deglottalisation, a pattern which seems to be present across all languages of
the family. From this point, it now becomes relevant to treat the remaining
pattern, that of onset (or C_1) deglottalisation, within each individual language.

4   Onset deglottalisation

     The C_1, or onset pattern can be shown to be the diachronic development
from Coast Tsimshian at one extreme (the more conservative), to Gitksan at the
other (the more innovative). Potentially in between lies Nisgha. This pattern

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[3] This relatively high ranking of MAX-IO(CG) prevents overapplication or backcopying
effects in the base, as well as dissimilatory processes similar to Grassman's Law. There
is a process of glottal dissimilation in Gitksan that affects sonorants in connected speech
contexts over a word boundary (see Rigsby 1986:182), though this process will not be
elaborated on here.

will be explained for each language, moving from Coast Tsimshian to Gitksan, then addressing the Nisgha data.

4.1   Coast Tsimshian

In Coast Tsimshian, consonants in the onset of a reduplicant are never deglottalised[4]. This is true of both obstruents (as seen in 16a) as well as sonorants (16b).

(16) Coast Tsimshian retention of glottalisation

a.	p'ó:	p'ək-p'ó:	'broken'	(84)
	t'ó:q	t'ax-t'ó:q	'to suck'	(84)
	c'ó:	c'ək-c'ó:	'to skin (animals)'	(84)
	k'ʷá:n'	k'ʷət-k'ʷá:n'	'to lose'	(91)
	k'ʷás	k'ʷìs-k'ʷás	'to break (trans.)'	(Dunn 1970:52)
	q'á:	q'a-q'á:	'wound'	(91)
b.[5]	w'á:	w'ət-w'á:	'to find'	(91)
	w'ó	w'u-w'ó	'quest (noun)'	(Dunn 1970:54)
	m'ák	m'ək-m'ák	'to catch (on a net)'	(84)
	j'aq	j'á:-jaq	'to hang'	(95)

In sum, deglottalisation does not affect the onset of a reduplicant in Coast Tsimshian.

Given the original ranking established above, only a slight modification need be made to account for this pattern. A positional faithfulness constraint (Beckman 1997a,b) which mandates faithfulness to the syllable onset of reduplicants must be added to the ranking:

(17) MAX-BRσONS(CG)
Occurrences of [constricted glottis] in the base have correspondents in the reduplicant syllable onset

Thus, a constraint such as MAX-BRσONS (CG) must be undominated, outranking the markedness constraint *CG, as well as the non special variant MAX-BR(CG).

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[4] Sasama (1995:87) identifies only 2 words which deglottalize in this position – *kʲilám*, *k̓ilkʲilám* 'to give' and *q'ó:lq, qalq'ó:lq* 'dull'. Sasama attributes these exceptions to optionality in some words in being pronounced as ejectives or as plain stops. Sasama even cites a varied pronunciation of the first example as *kʲilkʲilám* or as *k̓ilk̓ilám*.

[5] There are some discrepancies in many of the Coast Tsimshian forms available. For instance, there are forms in Dunn (1995) which show both retention and deletion of glottalisation on sonorants:

'yuuta	yik-'yuuta	'man'	
'yuutk	'yik-'yuutk	'carry around the neck'	(pg. 17)

There appear to be no such exceptions in Sasama's (1995) data. This may be an indication of idiolectal variation, of sound change in progress, etc.

For comparative purposes, *CG will now be broken down into its component constraints *CG/SON and *CG/OBS, although there is no evidence at this point in Coast Tsimshian to suggest that they are crucially ranked with respect to each other.

(18) MAX-IO(CG), MAX-BRσONS (CG) » *CG/SON, *CG/OBS » MAX-BR(CG)

(19)

/red + q'á:/	MAX-IO(CG)	MAX-BRσONS (CG)	*CG/SON	*CG/OBS	MAX-BR(CG)
a. ☞ q'a-q'á:				**	
b. qa-q'á:		*!		*	*
c. q'a-qá:	*!			*	
d. qa-qá:	*!				

The tableau above illustrates how this works for the obstruents, and the pattern for the sonorants is identical. Next we see how the relative ranking of MAX-BRσONS(CG) must change as data from Nisgha and Gitksan are considered.

4.2   Nisgha

Similar to the Coast Tsimshian case, deglottalisation in Nisgha does not affect obstruents. This is illustrated below.

(20) Nisgha retention of glottalisation on obstruents
t'ám	t'im-t'ám	'to carve, depict, write sthg'	(148)
k'án	k'in-k'án	'to put sthg somewhere'	(149)
t'ál	t'il-t'ál	'to split sthg in two'	(149)
q'úts	q'as-q'úts	'to cut sthg'	(143)

In contrast to Coast Tsimshian, however, Nisgha exhibits deglottalisation of sonorants in this position:

(21) Nisgha sonorant deglottalisation
m'át'in	mit-m'át'in	'to pull apart, loosen sthg soft'	(136)
m'ál	mil-m'ál	'to fasten, button sthg'	(136)
w'átkw	wit-w'átkw	'to be found'	(137)

Here we see an interesting pattern emerge: in a language with both glottalised obstruents and sonorants, an asymmetry has developed in a position which tends towards unmarkedness (McCarthy & Prince 1994) – the reduplicant. This indicates that within the glottalised series, the sonorants are more marked than the obstruents.

At this point a bit of caution should be exercised, as the available data is not entirely consistent within subtypes of reduplication. Tarpent (1983),

perhaps the most authoritative work on reduplication in Nisgha, posits two relevant rules of deglottalisation. The first rule applies to all consonants in the onset of partially reduplicated forms, while the second[6] applies only to sonorants in the onset of fully reduplicated forms. Thus we will put aside the partially-reduplicated forms when contrasting the obstruent and sonorant series, since they seem to behave the same. Suffice it to say that the differential behavior of reduplicative forms is an extremely interesting pattern that indeed warrants further research.

      The difference in ranking between Coast Tsimshian and Nisgha lies in the relative position of MAX-BRσONS(CG). In order to derive the asymmetry between the glottalised obstruents and sonorants, MAX-BRσONS(CG) must be ranked between the two markedness constraints. By ranking MAX-BRσONS(CG) above *CG/OBS but below *CG/SON, this allows the obstruent series to retain their glottalisation in reduplicant onsets, but prohibits sonorant glottalisation in the same position. Thus, the ranking for the Nisgha pattern must be the following:

(22) MAX-IO(CG) » *CG/SON » MAX-BRσONS(CG) » *CG/OBS » MAX-BR(CG)

The tableaux below illustrate how this ranking works with both glottalised obstruents (23) and glottalised sonorants (24).

(23) Nisgha glottalised obstruents in reduplication

/red + t'ám/	MAX-IO(CG)	*CG/SON	MAXBRσONS (CG)	*CG/OBS	MAX-BR(CG)
a. ☞t'im-t'am				**	
b. tim-t'am			*!	*	*
c. t'im-tam	*!			*	
d. tim-tam	*!				

(24) Nisgha glottalised sonorants in reduplication

/red + m'ál/	MAX-IO(CG)	*CG/SON	MAXBRσONS (CG)	*CG/OBS	MAX-BR(CG)
a. m'il-m'ál		**!			
b. ☞mil-m'ál		*	*		*
c. m'il-mál	*!				
d. mil-mál	*!				

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[6] Tarpent (1982) also posits a third rule applying to all consonants in C_2 position, which is the generalization stated above concerning coda deglottalisation. Thompson (1984:71-72) challenges this rule by presenting conflicting data. As researchers such as Shaw (1987) have maintained Tarpent's generalization (see also Fallon 2002), and Tarpent (1987:769) presents clear cases of coda deglottalisation, I will assume for the time being that the generalization stands.

Next we turn to Gitksan, which gives us a complete picture of the typological range of glottalisation patterns found in the Tsimshianic languages.

4.3   Gitksan

Like Nisgha, Gitksan exhibits deglottalisation of sonorants in the onset (C_1) position of reduplicants (25a). However, Gitksan has extended this process to include the obstruents, as well (25b).

(25) Gitksan C_1 deglottalisation[7]

a.	m'asx^w	mis-m'asx^w	'to sting (trans.)'
	m'at^s	mis-m'at^s	'to hit, strike'
	m'aχs	maa-m'aχs	'pants'
	w'in	win-w'in	'tooth'
b.	t'oq	daχ-t'oq	'to grab'
	t'aap	dip-t'aap	'to hammer'
	t^s'iik^w	d^{z}ix^w-t^s'iik^w	'to leak'
	t^s'aq	d^{z}aχ-t^s'aq	'nose'
	t'is·	dis-t'is	'to push, slug, push'
	q'ap	ɢap-q'apx^w	'relative, kinsman'
	k'uuɬ	guɬ-k'uuɬ	'to be wrong, to miss'

This pattern completes the typology of C_1 behavior. While Coast Tsimshian exhibited no deglottalisation at all, Nisgha deglottalised sonorants, and Gitksan exhibits deglottalisation of both sonorants and obstruents. What this entails is yet another difference based on the relative ranking of MAX-BRσONS(CG). In order to prohibit *all* glottalised consonants from the reduplicant onset, *CG/SON and *CG/OBS must outrank MAX-BRσONS(CG).

(26) MAX-IO(CG) » *CG/SON, *CG/OBS » MAX-BRσONS(CG), MAX-BR(CG)

(27) Gitksan glottalised obstruents in reduplication

/red + t'is/	MAX-IO(CG)	*CG/SON	*CG/OBS	MAX-BRσONS(CG)	MAX-BR(CG)
a. t'is- t'is			**!		
b. ☞dis-t'is			*	*	*
c. t'is-dis	*!		*		
d. dis-dis	*!				

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[7] There is an allophonic process whereby underlyingly plain voiceless stops and affricates are voiced before vowels. This allophony is overtly represented in the transcription used here.

(28) Gitksan glottalised sonorants in reduplication

/red + w'in/	MAX-IO(CG)	*CG/SON	*CG/OBS	MAX-BRσONS(CG)	MAX-BR(CG)
a. w'in-w'in		**!			
b. ☞ win-w'in		*		*	*
c. w'in-win	*	*			
d. win-win	*				

Thus it can be shown that all three languages differ with respect to how MAXBRσONS(CG) is ranked relative to the markedness constraints on glottalisation. This is illustrated by the typology below:

(29) Typology of Constraints on Glottalisation
Tsimshian: MAX-IO(CG), **MAX-BRσONS(CG)** » *CG/SON, *CG/OBS » MAX-BR(CG)
Nisgha: MAX-IO(CG) » *CG/SON » **MAX-BRσONS(CG)** » *CG/OBS » MAX-BR(CG)
Gitksan: MAX-IO(CG) » *CG/SON, *CG/OBS » **MAX-BRσONS(CG)**, MAX-BR(CG)

The diachronic implications of this typology, as well as implications for theories of markedness will be discussed in the following section.

5   Discussion

While all the languages in the Tsimshianic family treat reduplicant codas (C_2) the same, there is an interesting asymmetry that emerges with respect to onsets (C_1). The typology of glottalised consonants in reduplication is illustrated below for the two languages (where ✗ indicates a prohibition of glottalised segment, and ✓ indicates presence of a glottalised segment):

(30) Typology of glottalisation

	C_1 obstruents	C_1 sonorants	C_2 obstruents	C_2 sonorants
Coast Tsimshian	✓	✓	✗	✗
Nisgha	✓	✗	✗	✗
Gitksan	✗	✗	✗	✗

What this indicates is that a diachronic pressure to deglottalise has pushed its way from the coast to the interior. The fact that Nisgha exhibits an asymmetry between the two series of glottalised consonants is telling here: if we predict that the more marked segment will be the first to undergo the process, then a language that has not *fully* undergone the process will provide evidence for this relative markedness. As it stands, the glottalised sonorants appear to be more marked than the obstruents. There is both cross-linguistic and language-internal evidence to support this conclusion.

The claims to the relative markedness of the glottalised sonorants above resonate well with Maddieson's (1984:116) statement that "In general, laryngealized sonorants are found only in languages with glottalic stops.

Nineteen of the 20 languages in UPSID which have laryngealized sonorants have ejective stops, implosives or voiced laryngealized plosives in their inventories", and also, "if a language has any laryngealized sonorants it also has glottalic or laryngealized stops. 19/20 95.0%" (Maddieson 1984:121).

Language- (or family-)internally, there is also some evidence for the marked status of the glottalised sonorants compared to the obstruents. First, there is the gap of [l'] in word-initial position mentioned in section 2. While potentially an accidental gap, it could also turn out to be the result of a larger, less immediately obvious pattern. For instance, the lack of [l'] in this position could be the result of pressure exerted by a speaker's knowledge of the patterns and frequencies of glottalised sonorants (and their co-occurrence with other segments) across the lexicon (see Brown in prep for further discussion). Second, while there is (potentially) an individual pattern which retains glottalisation on obstruents but loses it on sonorants, there seems to be NO pattern that retains glottalisation on sonorants but loses it on obstruents in a given position. Third, work by Um (1998) suggests that the cues for glottalisation on sonorants are extremely weak, especially in word-initial position. According to measurements by Um, glottalised sonorants in this position are realized as a glottal stop plus sonorant sequence, and that the duration of the sonorant portion of a word-initial glottalised sonorant is considerably shorter than a plain sonorant word-initially. This suggests that a laryngeal contrast in word-initial position may be turning into a durational contrast.

All of these things together argue for a view of glottalised obstruents as less marked than glottalised sonorants. If we consider the reduplicant to be a location *par excellence* where unmarked values are allowed to emerge (McCarthy & Prince 1994), then the patterns found in Tsimshianic provide evidence that 1) glottalised obstruents are less marked than glottalised sonorants, and 2) Maddieson's claims regarding markedness universals can be extended to areas of morphology (such as reduplication).

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