A'INGAE SYNTAX CONDITIONS THE REPRESENTATION OF GLOTTALIZATION

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PROPOSAL.

In this paper, I address the complex facts of glottalization in A'ingae (or Cofán, an Amazonian isolate, ISO 639-3: `con`). I argue that A'ingae glottalization has two morphosyntactically-conditioned representations: Within the verbal inflectional domain, glottalization is a laryngeal feature of the metrical foot, which I will represent as $(\acute{\sigma}\sigma)^{\text{ʔ}}$. Within the larger predicate domain, it is a regular glottal stop, represented with `ʔ`. Thus, I show that the phonemic status of glottalization varies with word-internal morphosyntax.

1 INTRODUCTION

A'ingae (or Cofán, ISO 639-3: `con`) is an endangered Amazonian isolate spoken by the Cofán people in northeast Ecuador and southern Colombia.

A'ingae has contrastive glottalization, as is demonstrated by the existence of numerous minimal pairs. Some of the minimal pairs involve lexical roots, such as (1-3a-b). The examples use the practical orthography, except the glottal is represented as in the IPA. Postvocalic *n* and *m*, as in (2), represent vowel nasality or prenasalization of the of the following consonant; they are not codas. Stress is represented with the acute accent and an underline.

(1)	a.	*chíga*	god	"god"
	b.	*chíʔga*	not want	"not want"
(2)	a.	*úmba*	up	"up"
	b.	*úʔmba*	fill up	"fill up"

(3)	a.	*káni*	yesterday	"yesterday"
	b.	*káʔni*	enter	"enter"

Most glottal minimal pairs in the language, however, are morphologically complex, like (4-6a-b). This is a result of the fact many of the language's functional morphemes begin with glottal stops (they are preglottalized). As we see in (1-6), glottalization is most typically associated with the syllabic nucleus.[1] The orthographic *û* represents /ɨ/.

(4)	a.	*án-mba*	eat-SS	"having eaten"
	b.	*án-ʔmba*	eat-N	"yuca"
(5)	a.	*tsá=ma*	that=ACC	"that"
	b.	*tsá-ʔma*	that-FRST	"but"
(6)	a.	*í=ngi*	bring=1	"I brought"
	b.	*í-ʔngi*	bring-VEN	"come to bring"

Now, glottal constriction has received a number of treatments in the phonological literature. Hawaiian (Austronesian), for example, is analyzed as having a segmental glottal stop (Parker Jones, 2018). In other languages, glottalization has a more clearly prosodic character. Silva (2016), e. g., argues that glottalization in Desano (Tucanoan) is best understood as a suprasegmental laryngeal feature of the root. Penner (2019) analyzes glottalization in Ixtayutla Mixtec as aligned with respect to the metrical foot.

In this talk, I argue that A'ingae glottalization has two representations, dependent on the word-internal morphosyntax: Within the verbal inflectional domain, glottalization is a facultative feature of the metrical foot. Within the larger predicate domain, it is a regular glottal stop. All the data in this paper come from my own fieldwork[2] and Borman's (1976) dictionary.

As a brief aside, in talking about two representations of glottalization, I abstract away from its phonetic implementation, which is variable but independent of morphosyntax. The phonetic realization of glottalization ranges from glottal closure to creakiness. For example, in Figure 1, glottalization is realized as closure followed by an aspirated alveolar stop /ʔtʰ/. The two

1 In a small number of contexts, it can surface as an onset, e. g. (i). For further discussion, see Section A.2.

(i)	a.	*áʔi*	person	"person"
	b.	*túʔi*	tomorrow	"tomorrow"

2 For my previous work on A'ingae stress and glottalization, see Dąbkowski (2019a,b, subm, in press, in prep).

together can be seen on the spectrogram as a long pause. In Figure 2, glottalization is realized as creaky phonation, whose beginning coincides with glottalization postulated for the underlying form but which extends across the rest of the word.

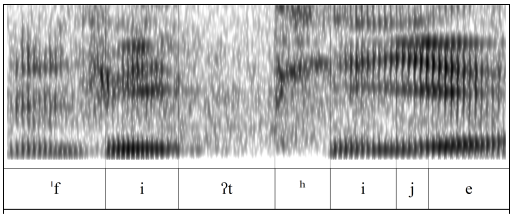

Figure 1: *fi̱ʔthi-ye* 'kill-INF.'

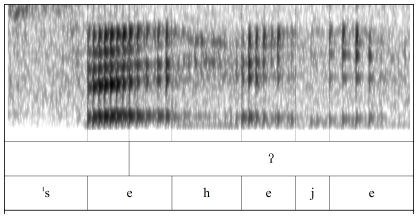

Figure 2: *sé̱ʔje-ye* 'cure-INF.'

The rest of the paper is organized as follows. In Section 2, I describe the structure of the A'ingae verbal predicate. In Section 3, I present the phonological properties of metrical glottalization within the inflected verbal stem. In Section 4, I analyze metrical glottalization. In Section 5, I present and analyze segmental glottalization within the larger predicate domain. In Section 6, I conclude.

2 VERBAL PREDICATE STRUCTURE

In A'ingae, the suffixes expressing voice, aspect, and associated motion can appear only on verbs (7).

(7) a. *pa̱nzá -ji*
hunt -PRCM
"about to hunt"

b. **tsandie -ji*
man -PRCM
intended: "about to be a man"

Other suffixes (e. g. expressing of plurality, reality, polarity, and clause-level categories) can appear on predicates of any lexical class (8).

(8) a. *pa̱nzá -mbi*
hunt -NEG
"not hunt"

b. *tsá̱ndie -mbi*
man -NEG
"not be a man"

When suffixes of both types are present on a verb, the verbal inflectional morphemes precede the predicate-level morphemes. Thus, we can say that the verb stem and the verbal inflectional morphemes create a *verbal inflection domain* within a larger *predicate domain*. In (9), the two domains are delimited by curly braces { } and abbreviated as *verb* and *pred*, respectively.

(9) { { *panza -ye -jí* $_{verb}$ } *-ʔfa -ya -mbi* $_{pred}$ }
hunt -PASS -PRCM -PLS -IRR -NEG
"(they$_{PLS}$) will$_{IRR}$ not$_{NEG}$ be about$_{PRCM}$ to be$_{PASS}$ hunted"

In Table 1, you can see the simplified template of A'ingae verbal morphology. The verbal inflectional domain is separated from the predicate domain by a vertical dashed line. My main claim is that the grammar of glottalization differs between the two domains: In the verbal inflectional domain, glottalization is a facultative property of the metrical foot, which I will represent with $(\sigma\sigma)^{\text{ʔ}}$. In the predicate domain, it is a regular glottal stop, represented as ʔ.

verbal inflectional domain						*predicate domain*			
VERB	VALENCE/VOICE			ASP	MOT	NUM	REAL	POL	C
...	*-ña*	*-khu*	*-ye*	*-ʔje*	*-ʔngi*	*-ʔfa*	*-ya*	*-mbi*	*-ʔya*
	PASS	RCPR	PASS	IPFV	VEN	PLS	IRR	NEG	VER
				-ji	*-ʔnga*				*-ʔta*
				PRCM	AND				COND
				-ʔñakha					*-ja*
	$(\sigma\sigma)^{\text{ʔ}}$			FREQ			ʔ		IMP
				-kha					*-kha*
				DMN					IMP2
									-jama
									PRHB

Table 1: Simplified template of A'ingae verbal morphology.

3 METRICAL GLOTTALIZATION WITHIN THE INFLECTED VERB

In this section, first I present the basic facts of stress within the verbal inflectional domain. I then consider the interaction of stress with glottalization to show that glottalization is property of metrical structure in the grammar of the verbal inflectional domain.

There are two classes of verbal stems: underlyingly stressless and with underlying word-initial stress. Underlyingly stressless verbs are assigned penultimate stress by default (10).

(10) a. / *panza* /
[*pánza*]
hunt

b. / *atapa* /
[*atápa*]
breed

Underlying word-initial stress is preserved in the surface forms (11).

(11) a. / á̲fa /
[á̲fa]
speak

b. / kún̲dase /
[kún̲dase]
tell

Observe that both (10a) and (11a) have penultimate stress on the surface. I have said, nevertheless, that they are underlyingly different. This can be seen by looking at forms inflected with morphemes which are inside the verbal domain. Those suffixes count for the calculation of the default penultimate stress (12).

(12) a. / { *panza -ji* $_{verb}$ } /
[{ *panzá -ji* $_{verb}$ }]
hunt -PRCM

b. / { *atapa -ji* $_{verb}$ } /
[{ *atapá -ji* $_{verb}$ }]
breed -PRCM

However, stress is not reassigned to the penultimate syllable if it is underlyingly present (13).

(13) a. / { *á̲fa -ji* $_{verb}$ } /
[{ *á̲fa -ji* $_{verb}$ }]
hunt -PRCM

b. / { *kún̲dase -ji* $_{verb}$ } /
[{ *kún̲dase -ji* $_{verb}$ }]
tell -PRCM

Thus, the difference in the underlying form between (10a) and (11a) is revealed by the stress difference between (12a), where stress is assigned to the penultimate syllable by default, and (13a), where initial stress is preserved.

(10) a. / { *panza* $_{verb}$ } /
[{ *pán̲za* $_{verb}$ }]
hunt

b. / { *atapa* $_{verb}$ } /
[{ at̲ápa $_{verb}$ }]
breed

(11) a. / { *á̲fa* $_{verb}$ } /
[{ *á̲fa* $_{verb}$ }]
speak

b. / { *kún̲dase* $_{verb}$ } /
[{ *kún̲dase* $_{verb}$ }]
tell

(12) a. / { *panza -ji* $_{verb}$ } /
[{ *panzá -ji* $_{verb}$ }]
hunt -PRCM

b. / { *atapa -ji* $_{verb}$ } /
[{ *atapá -ji* $_{verb}$ }]
breed -PRCM

(13) a. / { *á̲fa -ji* $_{verb}$ } /
[{ *á̲fa -ji* $_{verb}$ }]
hunt -PRCM

b. / { *kún̲dase -ji* $_{verb}$ } /
[{ *kún̲dase -ji* $_{verb}$ }]
tell -PRCM

Now, I will consider the interaction of glottalization with stress. There are two classes of verbs when it comes to glottalization: non-glottalized (regular) verbs, like we have seen up to this point, and glottalized verbs.

In glottalized verbs, there is at most one glottalization per verbal root. When disyllabic verbs are glottalized, glottalization is realized on the first syllable. When trisyllabic verbs are glottalized, glottalization is realized in the second syllable. Monosyllabic verbs are normally not glottalized.[3]

(14) a. *σʔ

b. σʔ σ
seʔ je
cure

c. σ σʔ σ
a kheʔ pa
forget

The glottalized verb roots do not shift stress when inflectional morphology attaches, which is to say that they behave like the underlyingly stressed verbs.

(15) a. / { *sé̲ʔje -ji* $_{verb}$ } /
[{ *sé̲ʔje -ji* $_{verb}$ }]
cure -PRCM

b. / { *á̲kheʔpa -ji* $_{verb}$ } /
[{ *á̲kheʔpa -ji* $_{verb}$ }]
forget -PRCM

So the major first observation to be made is that all glottalized roots are underlyingly stressed. There are no underlyingly stressless glottalized verbs.

	STRESSLESS		STRESSED	
NON-GLOTTALIZED	*sema*	work	*khṹ̲si*	get drunk
	atapa	breed	*á̲fase*	cheat
	utishi	wash hands	*kú̲ndase*	tell
GLOTTALIZED	N / A		*sé̲ʔje*	cure
			kú̲ʔfe	play
			á̲kheʔpa	forget

Table 2: Roots by glottalization and stress.

TAKEAWAY 1. All glottalized roots are underlyingly stressed.

Second, certain suffixes within the verbal inflectional domain, such as *-ye* 'PASS' or *-khu* 'RCPR,' delete preexisting stress from the verb stem. This stress deletion property is represented with a subscripted empty set ($\emptyset$). Whether a suffix deletes stress or not is not predictable from its semantics or syntax.

3 Monosyllabic bimoraic verbs can be glottalized. For discussion, see Section A.2.

By deleting lexical stress, these morphemes make the underlyingly stressed verbs behave like the underlyingly stressless ones.

Thus, when a stress-deleting suffix is present and there are no predicate-level suffixes then stress is assigned to the penultimate syllable even if the stem is underlyingly stressed (16-17).

(16) a. / { *panza -ye*$_{\emptyset\ verb}$ } /
[{ *panzá -ye* $_{verb}$ }]
hunt -PASS

b. / { *áfa -ye*$_{\emptyset\ verb}$ } /
[{ *afá -ye* $_{verb}$ }]
speak -PASS

(17) a. / { *panza -ye*$_{\emptyset}$ *-ji* $_{verb}$ } /
[{ *panza -yé -ji* $_{verb}$ }]
hunt -PASS -PRCM

b. / { *áfa -ye*$_{\emptyset}$ *-ji* $_{verb}$ } /
[{ *afa -yé -ji* $_{verb}$ }]
speak -PASS -PRCM

What happens when the root is glottalized? Glottalization is deleted along with stress. And then stress is assigned to the penultimate syllable by default (18-20).

(18) a. / { *séʔje -ye*$_{\emptyset\ verb}$ } /
[{ *sejé -ye* $_{verb}$ }]
cure -PASS

b. / { *séʔje -kha*$_{\emptyset\ verb}$ } /
[{ *sejé -kha* $_{verb}$ }]
cure -DMN

(19) a. / { *kúʔfe -ye*$_{\emptyset\ verb}$ } /
[{ *kufé -ye* $_{verb}$ }]
play -PASS

b. / { *kúʔfe -kha*$_{\emptyset\ verb}$ } /
[{ *kufé -kha* $_{verb}$ }]
play -DMN

(20) a. / { *ákheʔpa -ye*$_{\emptyset\ verb}$ } /
[{ *akhepá -ye* $_{verb}$ }]
forget -PASS

b. / { *ákheʔpa -kha*$_{\emptyset\ verb}$ } /
[{ *akhepá -kha* $_{verb}$ }]
forget -DMN

TAKEAWAY 2. All stress-deleting suffixes also delete glottalization.

Third, there are preglottalized suffixes, such as *-ʔje* 'IPFV,' *-ʔngi* 'VEN,' and *-ʔnga* 'AND.' These suffixes glottalize the last syllable of the stem and place stress on the syllable which immediately precedes the glottalized syllable (21-22). The stressed syllable precedes the glottalized syllable.[4] This binarity suggests that glottalized suffixes trigger the construction of a trochaic foot with which they are right aligned.

(21) a. / { *panza -ʔje*$_{\emptyset\ verb}$} /
[{ (*pánza -ʔ*)*je* $_{verb}$}]
hunt -IPFV

b. / { *panza -ʔnga*$_{\emptyset\ verb}$} /
[{ (*pánza -ʔ*)*nga* $_{verb}$}]
hunt -AND

(22) a. / { *atapa -ʔje*$_{\emptyset\ verb}$} /
[{ *a*(*tápa -ʔ*)*je* $_{verb}$}]
breed -IPFV

b. / { *atapa -ʔnga*$_{\emptyset\ verb}$} /
[{ *a*(*tápa -ʔ*)*nga* $_{verb}$}]
breed -AND

This pattern is not limited to forms inflected with preglottalized suffixes. In general, glottalization comes in the weak branch of a foot, in all lexical classes, including nouns. For example, the default stress on nouns is penultimate (23a), but antipenultimate if the penultimate syllable is glottalized (23b). Also recall that while most verbs are underlyingly stressless (24a), verbs with glottalization on the penultimate syllable have antepenultimate stress (24b).

(23) a. *pishíra*
lettered aracari

b. (*úmaʔ*)*ndu*
macaw

(24) a. *atapa*
breed

b. (*ákheʔ*)*pa*
forget

TAKEAWAY 3. Glottalization triggers the construction of a trochaic foot.

Now, I consider the following question: What happens when preglottalized suffixes attach to stressed roots? All preglottalized suffixes override the stress of the base they attach to. In other words, they are stress-deleting.

(25) a. / { *áfa -ʔje*$_{\emptyset\ verb}$} /
[{ (*áfa -ʔ*)*je* $_{verb}$}]
speak -IPFV

b. / { *áfa -ʔnga*$_{\emptyset\ verb}$} /
[{ (*áfa -ʔ*)*nga* $_{verb}$}]
speak -AND

(26) a. / { *kúndase -ʔje*$_{\emptyset\ verb}$} /
[{ *ku*(*ndáse -ʔ*)*je* $_{verb}$}]
tell -IPFV

b. / { *kúndase -ʔnga*$_{\emptyset\ verb}$} /
[{ *ku*(*ndáse -ʔ*)*nga* $_{verb}$}]
tell -AND

4 More precisely, stress is assigned to the syllable which contains the second mora to the left of the glottal stop. For further discussion, see Section A.1.

There are no preglottalized non-stress-deleting suffixes.

	STRESS-PRESERVING		STRESS-DELETING	
NOT PREGLOTT	*-ña*	CAUS	*-ye*$_{\emptyset}$	PASS
	-ji	PRCM	*-khu*$_{\emptyset}$	RCPR
			-kha$_{\emptyset}$	DMN
PREGLOTT	N / A		*-ʔje*$_{\emptyset}$	IPFV
			-ʔngi$_{\emptyset}$	VEN
			-ʔnga$_{\emptyset}$	AND

Table 3: Suffixes by stress-deletion and preglottalization.

Earlier we saw that stress-deleting non-preglottalized suffixes, such as *-ye* 'PASS,' also delete glottalization. Here we see that preglottalized suffixes (all of which are stress-deleting) also delete glottalization.

(27) a. / { *séʔje -ʔje*$_{\emptyset\ verb}$} /
[{ (*seje -ʔ*)*je*$_{\ verb}$}]
cure -IPFV

b. / { *séʔje -ʔnga*$_{\emptyset\ verb}$} /
[{ (*seje -ʔ*)*nga*$_{\ verb}$}]
cure -AND

(28) a. / { (*ákheʔ*)*pa -ʔje*$_{\emptyset\ verb}$} /
[{ *a*(*khépa -ʔ*)*je*$_{\ verb}$}]
forget -AND

b. / { (*ákheʔ*)*pa -ʔnga*$_{\emptyset\ verb}$} /
[{ *a*(*khépa -ʔ*)*nga*$_{\ verb}$}]
forget -AND

Since there is at most one glottalization per root, and all preglottalized suffixes delete glottalization, there is ever at most one glottalization per inflected verb.

TAKEAWAY 4. Glottalization is culminative at the level of the verbal inflectional domain.

4 ANALYSIS OF METRICAL GLOTTALIZATION

I propose that within the verbal inflectional domain, glottalization is a facultative feature of the metrical foot which is the head of the phonological word, i. e. the metrical foot with has the primary stress (29).

(29) GLOTTALIZATION WITHIN THE INFLECTED VERB: $(\acute{\sigma}\sigma)^{\text{ʔ}}$
Within the inflected verb, glottalization is a feature of the foot.

I will represent the underlying glottal feet with a superscripted glottal stop $(\acute{\sigma}\sigma)^{\text{ʔ}}$. This abstract representation intends to capture the idea that in the

underlying representation, glottalization is not associated with either of the glottal foot's syllables. The surface position of glottalization is resolves by OT constraints: GLOTTALNONFINALITY (30) and ALIGN(ʔ, FOOT-R) (31).

(30) GLOTTALNONFINALITY, or: NONFINʔ
Glottalization is not final in a prosodic word.

(31) ALIGN(ʔ, FOOT-R), or: ALIGNʔ)
Glottalization is right-aligned with a metrical foot.

This analysis accounts for the distributional properties of glottalization in roots. Recall (14).

(14) a. *σʔ

b. σʔ σ
seʔ je
cure

c. σ σʔ σ
a kheʔ pa
forget

Disyllabic words with glottalization violate ALIGN(ʔ, FOOT-R) but avoid glottalization at the end of the word, which shows that ALIGN(ʔ, FOOT-R) is outranked by GLOTTALNONFINALITY (32).

(32)	(*seje*)ʔ:	NONFINʔ »	ALIGNʔ)
☞ i.	(*séʔje*)		*
ii.	(*séjeʔ*)	*	———

cure

Trisyllabic words have enough syllables for violations of GLOTTALNONFINALITY not to be a problem. Thus, the surface position of glottalization is governed by ALIGN(ʔ, FOOT-R), as demonstrated in (33).

(33)	(*uma*)ʔ*ndu*:	NONFINʔ »	ALIGNʔ)
i.	(*úʔma*)*ndu*		*
☞ ii.	(*úmaʔ*)*ndu*		
iii.	*u*(*máʔndu*)		*
iv.	*u*(*mándu*ʔ)	*	———

macaw

Now, if glottalization is a feature of the metrical foot, it supervenes on metrical structure. And if glottalization supervenes on metrical structure, then it naturally follows that it disappears when metrical structure is deleted

(34). Thus, the analysis derives the fact the stress deletion also targets glottalization.

(34) $(\acute{\sigma}\sigma)^{\text{ʔ}} \xrightarrow{\text{delete metrical structure}} \sigma\sigma$

Second, if glottalization is a feature of the metrical foot, it follows that all glottalized roots are stressed. It also follows that the preglottalization in preglottalized suffixes is a partial representation of metrical structure.

Assuming a well-formedness requirement on metrical structure such that partial feet are banned in surface forms, the rest of the metrical structure must be supplied in the output (35).

(35) ʔ $\xrightarrow{\text{supply rest of metrical structure}}$ $(\acute{\sigma}\sigma\text{ʔ})$

This explains why preglottalized suffixes trigger foot construction (22).

(36)	*atapa-ʔje*:	*PartialFeet	NonFinʔ »	Alignʔ)
i.	*atapaʔje*	*	———	
☞ ii.	*a(tápaʔ)je*			
iii.	*ata(páʔje)*			*
	breed-IPFV			

Finally, if glottalization is a property of the head foot, i. e. the foot which has the primary stress, it follows that glottalization must be culminative in the the prosodic word: It is so, as there can be only one glottalization per root, and the all glottalized suffixes delete preceding glottalization.

5 SEGMENTAL GLOTTALIZATION WITHIN THE PREDICATE

I proposed that glottalization is treated by the grammar of A'ingae as a facultative property of the foot within the verbal inflectional domain, but a regular segmental glottal stop within the larger predicate domain. This means that within the larger predicate domain, glottalization should not show any of the special properties which I attributed to its metrical nature in the verbal inflectional domain.

	VERBAL INFL	PREDICATE
PREGLOT SFX	triggers foot construction	does nothing special
STRESS DELETION	targets glottalization	ignores glottalization
GLOTTALIZATION	is culminative	is not culminative

Table 4: Characteristics of glottalization by morphosyntactic domain.

First, the basic principle for stress assignment when predicate-level suffixes are present: When predicate-level morphology is present, stress is assigned to the last syllable of the verbal inflectional domain (37).

(37) a. / { { *panza -ji* $_{verb}$} *-ya* $_{pred}$} /
[{ { *panza -jí* $_{verb}$} *-ya* $_{pred}$}]
hunt -PRCM -IRR

b. / { { *panza -ji* $_{verb}$} *-ya -mbi* $_{pred}$} /
[{ { *panza -jí* $_{verb}$} *-ya -mbi* $_{pred}$}]
hunt -PRCM -IRR -NEG

In (37a), we see that stress falls on the syllable which immediately precedes the predicate domain. Stress in (37a) falls on the penultimate syllable, but this is not because of the default penultimate stress assignment. The evidence for that comes from forms with more then one predicate-level suffix. In (37b), for example, stress falls on the antepenultimate syllable.

If the suffixes in the predicate domain are glottalized, then the exact same thing happens. Stress falls on the last syllable of the verbal inflectional domain (38).

(38) a. / { { *panza* $_{verb}$} *-ʔfa* $_{pred}$} /
[{ { *panzá* $_{verb}$} *-ʔfa* $_{pred}$}]
hunt -PLS

b. / { { *panza -ji* $_{verb}$} *-ʔfa* $_{pred}$} /
[{ { *panza -jí* $_{verb}$} *-ʔfa* $_{pred}$}]
hunt -PRCM -PLS

c. / { { *panza -ji* $_{verb}$} *-ʔfa -mbi* $_{pred}$} /
[{ { *panza -jí* $_{verb}$} *-ʔfa -mbi* $_{pred}$}]
hunt -PRCM -PLS -NEG

d. / { { *panza -ji* $_{verb}$} *-ya -ʔta* $_{pred}$} /
[{ { *panza -jí* $_{verb}$} *-ya -ʔta* $_{pred}$}]
hunt -PRCM -IRR -COND

TAKEAWAY 1. In the larger predicate domain, glottalization does not have any effect on stress. This is in stark contrast with the verbal inflectional domain, where glottalization triggers foot construction.

Two suffixes in the predicate domain, *-jama* 'PHRB' and *-kha* 'IMP2' delete preceding stress and assign stress to the immediately preceding syllable (39-40).

(39) a. / { *panza -jama*$_{\emptyset\ pred}$} /
[{ *panz<u>á</u> -jama* $_{pred}$}]
hunt -PRHB

b. / { *panza -kha*$_{\emptyset\ pred}$} /
[{ *panz<u>á</u> -kha* $_{pred}$}]
hunt -IMP2

(40) a. / { *<u>á</u>fa -jama*$_{\emptyset\ pred}$} /
[{ *af<u>á</u> -jama* $_{pred}$}]
speak -PRHB

b. / { *<u>á</u>fa -kha*$_{\emptyset\ pred}$} /
[{ *af<u>á</u> -kha* $_{pred}$}]
speak -PRHB

However, they do not delete glottalization, regardless of whether the glottalization comes from the stem (41) or an earlier suffix (42).

(41) a. / { *sé?je -jama*$_{\emptyset\ pred}$} /
[{ *se?j<u>é</u> -jama* $_{pred}$}]
cure -PRHB

b. / { *sé?je -kha*$_{\emptyset\ pred}$} /
[{ *se?j<u>é</u> -kha* $_{pred}$}]
cure -IMP2

(42) a. / { *panza -?fa -jama*$_{\emptyset\ pred}$} /
[{ *panza -?f<u>á</u> -jama* $_{pred}$}]
hunt -PLS -PRHB

b. / { *kh<u>ú</u>si -?fa -kha*$_{\emptyset\ pred}$} /
[{ *khûsi -?f<u>á</u> -kha* $_{pred}$}]
get drunk -PLS -IMP2

TAKEAWAY 2. Glottalization is not treated as a metrical feature by the phonological grammar of the predicate domain. Thus, stress deletion is not accompanied by the deletion of glottalization. This is in stark contrast with the verbal inflectional domain, where stress deletion is accompanied by the deletion of glottalization.

Finally, there can be multiple glottalizations within the predicate domain. One of those glottalizations may be introduced in the verbal inflectional domain (43a) or all the glottalizations may be introduced in the predicate domain (43b).

(43) a. / { { *sé?je* $_{verb}$} *-?fa* $_{pred}$} /
[{ { *sé?je* $_{verb}$} *-?fa* $_{pred}$}]
cure -PLS

b. / { { *panza* $_{verb}$} *-?fa -?ta* $_{pred}$} /
[{ { *panz<u>á</u>* $_{verb}$} *-?fa -?ta* $_{pred}$}]
hunt -PLS -COND

TAKEAWAY 3. Glottalization is not treated as a metrical feature by the phonological grammar of the predicate domain. Thus, there is not requirement of culminativity—there may be multiple glottalizations within the

predicate domain. This is in stark contrast with the verbal inflectional domain where glottalization culminative.

6 CONCLUSION

In conclusion, I argued that glottalization is metrical property in the verbal inflectional domain. As a consequence, it shows the following characteristics: glottalization triggers foot construction, glottalization is deleted when stress is deleted, and glottalization is culminative. In the predicate domain, glottalization is not treated as a property of the metrical foot, but rather a regular glottal stop. Thus, it shows none of the special characteristics seen in the verbal inflectional domain.

Implications for phonological theory: Shows a need for a relatively powerful theory with different domain-specific phonological grammars (representation of glottalization), and where particular morphemes may idiosyncratically trigger phonological operations (stress deletion).

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A APPENDIX

A.1 *LIGHTHEAVY

Stress falls two syllables before the glottal stop, unless the final syllable is heavy, in which case stress falls on the final syllable (44).

	⏑⏑] +	−⏑] +	⏑−] +
(44)	a. *fétha-ʔje*	b. *fúite-ʔje*	c. *fúndúi-ʔje*
	open-IPFV	help-IPFV	sweep-IPFV

Preglottalized suffixes, such as the imperfective aspect (44) *-ʔje* 'IPFV,' require glottalization immediately to their left. To capture this fact, I propose that glottalization is linearized in suffixes, but not in roots. Accordingly, I will represent glottalization in suffixes with a regular type glottal stop -ʔσ.[5]

5 Since glottalization is a property of a metrical foot, a regular type glottal stop -ʔσ is a partial representation of a metrical foot: It represents the position of glottalization, but not the foot's

Given the above assumption about the underlying representation of glottalization in functional morphemes, ALIGN(ʔ, FOOT-R) captures the stress as attracted by preglottalized suffixes in (44a-b), shown in (45-46).

(45)	*fetha-ʔje*:	NONFIN? »	ALIGNʔ)
☞ i.	(*fétha*ʔ)*je*		
ii.	*fe*(*thá*ʔ*je*)		*
	open-IPFV		

(46)	*fûite-ʔje*:	NONFIN? »	ALIGNʔ)
☞ i.	(*fûite*ʔ)*je*		
ii.	*fûi*(*té*ʔ*je*)		*
	help-IPFV		

To capture the presence of the glottal stop in the stressed syllable of (44c), I propose that a MARKEDNESS constraint which prohibits the cross-linguistically dispreferred light-heavy trochee (⏑–) is active in A'ingae.

*LIGHTHEAVY, or: *(⏑–)
The right branch of a trochee is light.

*LIGHTHEAVY ranks above ALIGN(ʔ, FOOT-R), which correctly predicts (44c), the winner of (47).

(47)	*fûndûi-ʔje*:	*(⏑–),	NONFIN? »	ALIGNʔ)
i.	(*fúndûi*ʔ)*je*	*		————
☞ ii.	*fû*(*ndúi*ʔ*je*)			*
	sweep-IPFV			

Finally, the current proposal naturally captures the fact that stress-deleting suffixes delete glottalization as well. If glottalization is a property of the metrical foot, it follows naturally that it will also be targeted by a deletion mechanism which targets stress.

I have proposed that A'ingae glottalization is a non-linearized property of the metrical foot (σ́σ)ʔ. Its distribution and effects on stress emerge from

left or right boundary. To create a well-formed metrical representation, the rest of the foot is supplied in the output.

a ranking of GLOTTALNONFINALITY, ALIGN(ʔ, FOOT-R), and *LIGHTHEAVY. Finally, treating glottalization is a property of the metrical foot naturally captures the fact that stress-deleting suffixes delete glottalization as well.

A.2 *Apparent glottal metathesis*

Glottalization cannot appear in monomoraic roots. In monosyllabic but bimoraic roots (i. e. in monosyllabic roots which contain diphthongs), glottalization surfaces in monosyllabic roots, glottalization surfaces intervocalically (48-50a). When an additional suffix or clitic attaches, glottalization surfaces intervocalically (48-50b) or in the nucleus after the diphthong (48-50c), depending on the suffix.

(48)	a.	*á̲ʔi*	person	"person"
	b.	*á̲ʔi-nakhû*	person-COLL	"people"
	c.	*áiʔ̲-ña*	person-CAUS	"domesticate"
(49)	a.	*kú̲ʔi*	drink	"drink"
	b.	*kú̲ʔi-mbi*	drink-NEG	"does not drink"
	c.	*kúiʔ̲-ña*	drink-CAUS	"make drink"
(50)	a.	*tsá̲ʔu*	house	"house"
	b.	*tsá̲ʔu=ma*	house=ACC	"house"
	c.	*tsáuʔ̲-ña*	house-CAUS	"build a house"

TAKEAWAY. The position of roots glottalization depends on the functional morpheme.

I propose that the difference between (50b) and (50c) can be understood as consequence of cyclic phonological evaluation. Specifically, I propose that derivational suffixes such as the causative *-ña* 'CAUS' are phonologically evaluated with the root, whereas inflectional suffixes and clitics are not.

(51)	a.	[(*kûi*)ʔ]	b. [(*kûi*)ʔ *-ña*]	c. [[(*kûi*)ʔ] *-mbi*]
		(*kú̲ʔi*)	(*kúiʔ̲*)*ña*	[(*kú̲ʔi*) *-mbi*]
				(*kú̲ʔi*)*mbi*
		drink	drink-CAUS	drink-NEG

When the root spells out by itself, the glottal stop ends up between the two vowels because of the high-ranked GLOTTALNONFINALITY (51a). The derivational *-ña* 'CAUS' is spelled out with the root, so foot-final glottalization does not violate GLOTTALNONFINALITY in (51b). The inflectional *-mbi* 'NEG' attaches after the root's spell-out, i. e. after GLOTTALNONFINALITY already had

a chance to apply. Thus, glottalization's position is resolved to be intervocalic and it remains so even after the attachment of the inflectional suffix (51c).