

QUANTITY (IN)SENSITIVITY AND UNDERLYING GLOTTAL-STOP DELETION IN CAPANAHUA*

José Elías-Ulloa
Rutgers University

This article accounts for two superficially contradicting phenomena found in Capanahua. In this language, underlying glottal stops are deleted in the coda of even syllables. The account of the distribution of glottal-stop deletion depends on quantity-insensitive footing. Glottal stops cannot occur at the right edge of metrical feet. However, contrary to expectations, Capanahua has a quantity-sensitive stress. Closed syllables attract stress. The account presented solves the puzzle in a straightforward and unified way. While both phenomena rely on disyllabic feet, the quantity of closed syllables contextually varies within disyllabic feet: closed syllables surface as heavy if they are stressed and if they do not form part of an (HL) foot; otherwise, they surface as light.

1. Introduction

In Capanahua¹, underlying /ʔ/ is deleted in the coda of even syllables. As an illustration, the suffix /-riʔbi/ ‘again’, which has an underlying glottal stop, surfaces without it when the syllable containing it is even, but preserves it when the syllable is odd. See (1) to (3). Brackets indicate foot boundaries.

(1) /toʔko -riʔbi/ → (ʔtoʔ.ko) (-riʔ.bi)

Frog –again

‘Again the frog’

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¹ The Capanahua data come from Loos (1969), Loos & Loos (1998) and my fieldwork in Limoncocha, a Capanahuan village in Eastern Peru (Iquitos – Peru, Summer 2001). The data that do not come from my fieldwork are tagged with the relevant source information. The funds for the Capanahua fieldwork (2001) were provided by Rutgers University (José Camacho and Liliana Sanchez).

- (2) /ʔotʃiti **-riʔbi**/ → (ʔo.tʃi) (ti **-ri**)bi
 Dog –again
 ‘Again the dog’
- (3) /mananʃawi **-riʔbi**/ → (ma.'nan) (ʃa.wi) (**-riʔ.bi**)
 Turtle –again
 ‘Again the turtle’

The account for the distribution of the Capanahua underlying glottal stop deletion relies crucially on quantity-insensitive footing. The deletion occurs at the right edge of disyllabic feet. If the footing were quantity-sensitive, then we wrongly predict *('his)(-ma.**-ri**)(**bi**.-wi) to surface in (4.a); that is, with the glottal stop deleted and *('his)(-**riʔ.bi**)(-ma.-wi) in (4.b), with the glottal stop preserved.

- (4) a. ('his.-ma)(**-riʔ.bi**)-wi
 See-causative-again-imperative
 ‘Show (it) again’ (Loos & Loos 1998)
- b. ('his.-**ri**)(**bi**.-ma)-wi
 See-again-causative-imperative
 ‘Make (him/her) see (it) again’ (Loos & Loos 1998)

However, in spite of having quantity-insensitive footing, Capanahua shows quantity-sensitive stress. Closed syllables attract stress. The data from Capanahua counter the traditional assumption that an implicational relation holds between quantity effects and the footing a given language has. Thus, moraic trochee systems (trochaic languages that make distinctions between heavy and light syllables) must have quantity-sensitive footing; that is, either heavy syllables alone or two light syllables form a foot. Capanahua challenges that relation. It has both quantity-sensitive stress and quantity-**ins**ensitive footing.

Building on work by Rosenthal and van der Hulst (1999) and Morén (1999, 2000), I argue that the quantity of closed syllables contextually varies within disyllabic feet in Capanahua. Closed syllables surface as heavy if they are stressed and if they do not form part of an (HL) foot; otherwise, they surface as light.

Section §2 presents a detailed account of the quantity-sensitive stress system of Capanahua and demonstrates why alternative “standard” approaches fail to obtain the right results for Capanahua. Section §3 provides an account for the underlying glottal stop deletion in Capanahua, taking into account the metrical

structure proposed in the previous section. Thus, this paper offers a unified explanation of both superficially contradicting phenomena. The conclusions are presented in section §4.

2. Quantity-Sensitivity in Capanahua

Capanahua, a Panoan language spoken in Eastern Peru, has sixteen consonants: /p, t, k, β, s, ʃ, ʂ, ts, tʃ, r, m, n, w, y, h, ʔ/. It has four short vowels: /i, i, u, a/. I use [o] rather than [u] and [b] rather than [β] in the transcriptions below. Onsets and codas are optional. Complex onsets and codas are disallowed. Only sibilants, nasals and the glottal stop can surface in coda position. Vowels are nasalized when followed by a nasal coda. Stress in Capanahua is phonetically realized by high pitch and intensity. Secondary stresses are not reported to occur.

The quantity-sensitivity of stress in Capanahua is supported by closed syllables' attraction of stress. The data in (5) and (6) come from Loos & Loos (1998). Stress occurs on the second syllable, if closed; otherwise, on the first syllable. Stress never goes beyond the second syllable.

(5) Stress on the First Syllable

- a. ('ni.ʃi) 'Rope'
- b. ('biʃ.pi) 'Plant shoot'
- c. ('ʔi.ko)nin 'Nephew'

(6) Stress on the Second Syllable

- a. (tsi.'his) '(Sp.) Wood'
- b. (ʂon.'tiʂ) 'Seedless cotton'
- c. (kiʂ.'kan)kin 'To incline'

Further evidence for the heaviness of closed syllables comes from stress shifts when closed syllables are created due to affixation. If stress were lexical, then we would not expect the alternations in (7) to occur. Compare (5.a-b) with (7.a-b). In both cases, we have the same nouns: *niʃi* 'rope' and *biʃpi* 'plant shoot'. In (5.a-b), the stress occurs on the first syllable, since the second one is open. However, in (7.a-b), the stress occurs on the second syllable because the ergative suffix has made it closed.

Now compare (6.a-b) with (7.c-d). This time the nouns are: *tsihis* (sp.) 'wood' and *ʂontiʂ* 'seedless cotton'. In (6.a-b), the stress occurs on the second syllable because it is closed. Nevertheless, in (7.c-d), the stress shifts to the first

syllable since the second one has become open due to the addition of the ergative suffix.

- (7) a. /niʃi -n / → (ni.'ʃin) 'Rope (ergative)'
 b. /biʃpi -n / → (biʃ.'pin) 'Plant shoot (ergative)'
 c. /tsihis -n / → ('tʃi.hi)san '(Sp.) Wood (ergative)'
 d. /ʃontiʃ -n / → ('ʃon.ti)ʃan 'Seedless cotton (ergative)'

2.1 Capanahua is Trochee by Default

In words that do not contain closed syllables, Capanahua behaves as a regular trochee system. Assuming the framework of Optimality Theory (Prince and Smolensky 1993, henceforth P&S 1993), this is due to the interaction of two rhythmic constraints: TROCHEE and IAMB. See definitions in (8) and (9).

(8) TROCHEE: Foot heads are left aligned.

(9) IAMB: Foot heads are right aligned.

In Capanahua, the ranking TROCHEE >> IAMB makes the trochaic foot the default option in the absence of quantity effects. See tableau (10).

(10) /niʃi/ → ('ni.ʃi)

		TROCHEE	IAMB
(a)	☞ ('L.L)		*
(b)	(L.'L)	*!	

2.2 When Weight is More Important than Foot Uniformity

Traditionally it is assumed that natural languages respect *Foot Uniformity* (Hayes 1995, 1997; Prince 1990); that is, a language can have either trochaic or iambic feet but not both. However, in this article, I assume that the foot type a given language shows must be the product of constraint interaction. Interestingly, the interaction of well-known metrical constraints does predict the existence of languages with more than one foot type. Languages like Capanahua support this prediction. Other cases have been reported by P&S (1993), Cohn & McCarthy (1994), Hung (1994).

Having said that, we can continue the analysis of Capanahua stress taking into account the behavior of closed syllables. Since closed syllables attract stress,

they must be heavy; that is, their codas are moraic. In OT, this is understood as the conflict between two constraints: WEIGHT-BY-POSITION and DEP- μ .

(11) WEIGHT-BY-POSITION (WBP): Codas are moraic (Hayes 1989, 1995; P&S 1993).

(12) DEP- μ : Do not insert moras in the output (that is, output moras have input correspondents -McCarthy and Prince 1995).

The ranking WBP >> DEP- μ makes closed syllables heavy. In tableau (13), this ranking renders the coda of the closed syllable moraic, while candidate (13.b) loses for lack of moraic coda.

(13) /tsihis/ → (tsi.^hhis)

		WBP	DEP- μ
(a)	☞ (L. ^h H)		*
(b)	(L. ^h L)	*!	

Furthermore, WBP must also dominate TROCHEE; otherwise, /tsihis/ would result in *^htsi.his rather than tsi.^hhis. See tableau (14).

(14) /tsihis/ → (tsi.^hhis)

		WBP	TROCHEE	DEP- μ	IAMB
(a)	☞ (L. ^h H)		*	*	
(b)	(^h L.L)	*!			*

As observed in tableaux (13) and (14), the winner candidate is an iambic foot. We obtained this result mainly because the constraint WBP outranks the rhythmic constraint TROCHEE. This means that Capanahua has trochaic feet by default except in cases like (13) and (14) due to the need to satisfy WBP.

2.3 Variable Closed Syllable Weight within Disyllabic Feet

The stress pattern displayed by words like those in (15) helps us to understand the behavior of closed syllables in Capanahua.

- (15) a. (ʃon.^htiʃ) ‘Seedless cotton’
 b. (‘ʔi.ko) nin ‘Nephew’
 c. (kiʃ.^hkan) kin ‘To incline’

First, main stress is trapped within the two initial syllables. See (15.b-c). This stress window of two syllables hints at the presence of a disyllabic foot aligned to the left edge of the PrWd. Otherwise, there would not be a way to stress the second closed syllable of a word in a sequence of three closed syllables, as is the case in (15.c).

Why do we not find the stress occurring on the first syllable in a sequence of two closed syllables as in (15.a) and (15.c) if Capanahua has trochaic feet by default? Unlike the cases in (13) and (14), WBP cannot help us at all since both syllables within the foot are closed. An important hint here is that a sequence of two closed syllables, (*ʃon.tiʃ*), behaves as it were a light syllable plus a heavy one as in (*tsi.'his*) in (13) and (14). Here, the need for the constraint WEIGHT-TO-STRESS PRINCIPLE (WSP) becomes evident. This constraint ranked over WBP makes closed syllables light when they are unstressed. See tableau (17).

(16) WSP: Heavy syllables must be stressed (Prince 1990, P&S 1993)

(17) /ʃontɨʃ/ → (ʃon.tɨʃ)

		WSP	WBP	TROCHEE	DEP-μ
(a)	☞ (L.'H)		*	*	*
(b)	(H.'H)	*!		*	**

The constraint WSP also explains why an iambic (LH) foot is the optimal solution in a sequence of an open syllable plus a closed one and not a trochaic (LH) foot. See tableau (18).

(18) /tsihis/ → (tsi.'his)

		WSP	WBP	TROCHEE	DEP-μ	IAMB
(a)	☞ (L.'H)			*	*	
(b)	('L.H)	*!			*	*

However, the constraint WSP alone ranked over WBP does not solve the whole puzzle. If we add an ('H.L) candidate in (17), that is, a candidate whose first closed syllable is heavy and the second one light, it would wrongly beat the desired winner since it satisfies the constraint TROCHEE. At this point, the relevance of *Grouping Harmony* (Prince 1990) to Capanahua becomes clear. According to *Grouping Harmony*, recast as the constraint *(HL) in (19), the (HL) foot is the worst possible case of quantity distribution within the metrical foot.

- (19) GROUPING HARMONY *(HL): Do not have a foot in which the size of the first syllable is greater than the size of the second. The syllable size is measured in moras (Prince 1990; P&S 1993).

This constraint reflects the well-known avoidance natural languages show for the (HL) foot; that is, the uneven trochee (Prince 1990; P&S 1993; Hayes 1995; Bakovic 1996a, 1996b; Green 1996, 1997; Gouskova 2003). Languages show different strategies in order to avoid grouping a heavy syllable followed by a light one. For example, in languages like Cairene Arabic, heavy syllables are forced to form their own foot in order to avoid (HL) feet. Other languages recur to Trochaic Shortening. For example, in Fijian, syllables containing a long vowel followed by a syllable containing a short one surface as (LL) but not as *(HL). Trochaic Shortening has been observed in many other languages. Prince (1990) cites English (Chomsky & Halle 1968), while Hayes (1995) cites Fijian (Schütz 1985; Dixon 1988), Hawaiian (Pukui & Elbert 1979), and Tongan (Churchward 1953; Feldman 1978). However, all the cases of Trochaic Shortening cited involve the shortening of long vowels. In contrast, the case Capanahua involve the “shortening” of a closed syllable by banning it from surfacing with a moraic coda when grouped with a following light syllable.

As with WSP, the constraint *(HL) when ranked over WBP makes closed syllables light if they form part of an (HL) foot. Candidates (20.a) and (20.b) satisfy WSP by violating WBP minimally. However, candidate (20.b) is ruled out because it violates the constraint *(HL); that is, Grouping Harmony, while candidate (20.a) satisfies it.

(20) /ʃontɪʃ/ → (ʃon.ˈtɪʃ)

		WSP	*(HL)	WBP	TROCHEE	DEP-μ	IAMB
(a)	☞ (L.ˈH)			*	*	*	
(b)	(ˈH.L)		*!	*		*	*

In tableau (21), candidate (b) satisfies WBP by having its coda moraic. However, it is eliminated when compared to candidate (a) because the bimoraic syllable of candidate (21.b) groups together with a following light syllable, thus violating Grouping Harmony (*(HL)).

(21) /biʃpi/ → (ˈbiʃ.pi)

		WSP	*(HL)	WBP	TROCHEE	DEP-μ	IAMB
(a)	☞ (ˈL.L)			*			*
(b)	(ˈH.L)		*!			*	*

The constraint FOOT-BINARITY (FTBIN) in (22) ranked over WBP explains why a disyllabic foot cannot shrink to an (H) foot. Instead, WBP is violated in order to satisfy FTBIN. See tableaux (23) and (24).

(22) FOOT-BINARITY (FTBIN): Feet are disyllabic (P&S 1993).

(23) /ʃontiʃ/ → (ʃon.ʹtiʃ)

		WSP	*(HL)	FTBIN	WBP	TROCHEE	DEP-μ
(a)	☞ (L.ʹH)				*	*	*
(b)	(ʹH)L			*!	*		*

(24) /biʃpi/ → (ʹbiʃ.pi), *(ʹbiʃ)pi

		FTBIN	WBP	TROCHEE	DEP-μ	IAMB
(a)	☞ (ʹL.L)		*			*
(b)	(ʹH)L	*!			*	

The footing of the winner candidate in tableau (24) finds empirical support in Capanahua from the behavior of the underlying glottal stop deletion. If the first syllable forms a foot on its own, then we would wrongly predict *(ʹbiʃ)(pi.-ri)bi in (25).

(25) /biʃpi -riʔbi/ → (ʹbiʃ.pi) (-riʔ.bi)

Plant_shoot-again
 ‘Again the plant shoot’

The interaction of WBP with FTBIN, WSP and Grouping Harmony *(HL) may make this analysis seem complicated. However, this is a false impression due to the common but erroneous assumption that WBP is a parameter instead of a violable constraint. Under a parametric approach, WBP takes a value (active or inactive) once and for all in a given language. Thus, if active, all closed syllables in that language are heavy. If inactive, then all closed syllables are light. A parametric approach cannot predict a language like Capanahua, which allows closed syllables to vary their weight.

In contrast, once WBP is conceived as a truly violable constraint, languages in which closed syllables can vary their weight are predicted. The present research builds on the work of Rosenthal and van der Hulst (1999) and Morén (1999, 2000). I use their approach of the variable weight of closed syllables within OT, in the case of Capanahua and bring into this research program the essential role that the interaction of Grouping Harmony and FOOT-BINARITY plays in accounting for contextually variable closed syllable weight.

Thus far, the inputs in the tableaux have not had moraic consonants so a potential problem for the present analysis occurs when inputs with moraic consonants are considered. The constraint MAX- μ penalizes the deletion of underlying moras. So how do we account for the positional variable closed syllable weight of Capanahua taking into account underlying moras and the effect of MAX- μ ?

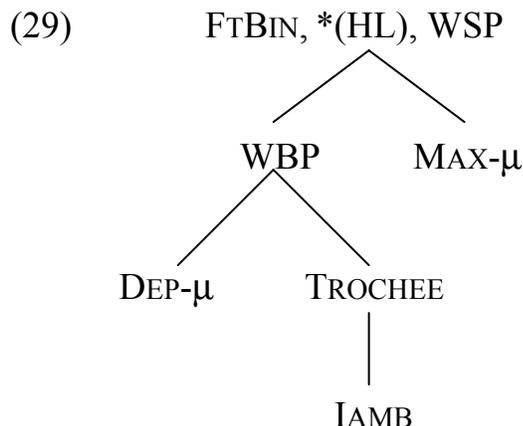
(26) MAX- μ : Do not delete moras (that is, input moras have output correspondents – McCarthy and Prince 1995).

The tableaux below show that even when inputs have moraic consonants, the markedness constraints *(HL), FTBIN and WSP ensure the appropriate results by dominating both WBP and MAX- μ . In tableau (27), the input has a moraic consonant. Candidates (27.b-c) satisfy the constraint MAX- μ by being faithful to the underlying mora. They also satisfy WBP since their codas are moraic. However, candidates (27.b) and (27.c) are ruled out because they violate the higher-ranked constraints *(HL) and FTBIN, respectively.

(27)	/CVC μ .CV/	FTBIN	*(HL)	WBP	MAX- μ
(a)	$\text{ɪ} \rightarrow \text{ɪ} \text{ ('L.L)}$			*	*
(b)	('H.L)		*!		
(c)	('H)L	*!			

In tableau (28), the input has two moraic consonants. Candidate (28.b) satisfies both MAX- μ and WBP. However, it is also eliminated because it does not satisfy the constraint WSP that outranks both MAX- μ and WBP.

(28)	/CVC μ .CVC μ /	WSP	WBP	MAX- μ
(a)	$\text{ɪ} \rightarrow \text{ɪ} \text{ (L. 'H)}$		*	*
(b)	('H.H)	*!		



In (29), I show the grammar for Capanahua. It accounts for the language's stress pattern and the contextually variable weight of its closed syllables.

2.4 Alternative Analyses

In this section, I briefly show how and why alternative approaches to Capanahua stress fail.

2.4.1 Prominence-Based Analysis

An analysis based on prominence cannot account for the data in (30), in which the final syllable of a trisyllabic word does not obtain the main stress even though it is closed.

- (30) a. ('ʔi.ko) nin 'Nephew'
 b. *ʔi.ko.'nin

If such an analysis were undertaken, one could argue that in Capanahua the main stress is assigned to the rightmost heavy syllable. Otherwise, the main stress occurs on the first syllable. The right results would be obtained for disyllabic words. However, this approach fails to account for the stress pattern of words of more than two syllables when at least one closed syllable occurs after the first two. In (31), I compare the results yielded by the quantity-insensitive footing analysis proposed here and those of an analysis based on prominence.

(31)	Disyllabic Words	Quantity-Insensitive Footing	Prominence
	CV.CV →	('L.L)	'L.L
	CVC.CV →	('L.L)	'H.L
	CV.CVC →	(L.'H)	L.'H
	CVC.CVC →	(L.'H)	H.'H
	Trisyllabic Words		
	CV.CV.CVC →	(('L.L)L	* L.L.'H

The prominence analysis yields incorrect results. It predicts that (30.b) *ʔi.ko.'nin would be the surfacing form. The main stress is expected to occur beyond the first two syllables of the PrWd when there is a closed syllable available to their right side. However, the main stress in Capanahua is bounded within the first two syllables because, in our proposal, they form a disyllabic foot.

2.4.2 Quantity-Sensitive Footing Analysis

The data in (32) are unexpected under an analysis based on quantity-sensitive footing.

- (32) a. (kiʃ.'kan)kin 'to incline'
 b. * kiʃ.kan.'kin
 c. * 'kiʃ.kan.kin

Under this analysis, one could argue that, in Capanahua, closed syllables are always heavy and that only bimoraic feet are allowed; that is, either two light syllables group together to form a foot (LL) or a heavy syllable forms its own foot (H). Furthermore, one could argue for the main stress position by claiming that it must be located either in the leftmost foot or in the rightmost foot of the PrWd. Neither of these possibilities yields satisfactory results for the stress patterns shown in Capanahua.

With the leftmost foot bearing the main stress, it incorrectly predicts that main stress occurs on the first syllable in words having an initial closed syllable since it forms its own foot and therefore is the leftmost foot of the PrWd. See (33).

(33) Disyllabic Words	→	QI Footing	QS Footing with Main Stress in the Leftmost Foot
CV.CV	→	('L.L)	('L.L)
CVC.CV	→	('L.L)	('H)L
CV.CVC	→	(L.'H)	L('H)
CVC.CVC	→	(L.'H)	* ('H)(H)
Trisyllabic Words			
CVC.CVC.CVC	→	(L.'H) L	* ('H)(H)(H)

If we continue the analysis based on a quantity-sensitive footing but with the rightmost foot bearing main stress, we again fail to yield the correct stress patterns. In (34), consider, for example, trisyllabic words whose final syllable is closed. We incorrectly predict that the final closed syllable bears the main stress since it forms its own foot and is the rightmost. We cannot claim that the non-occurrence of main stress in the final closed syllable is due to *non-finality* effects (the avoidance of having final syllables stressed), since in Capanahua final closed syllables can be stressed (see (5.d-e)).

(34) Disyllabic Words	QI	QS Footing Analysis with Main
	Footing	Stress in the Rightmost Foot
CV.CV	→ ('L.L)	('L.L)
CVC.CV	→ ('L.L)	('H)L
CV.CVC	→ (L.'H)	L('H)
CVC.CVC	→ (L.'H)	(H)('H)
Trisyllabic Words		
CVC.CVC.CVC	→ (L.'H)L	* (H)(H)('H)

In summary, the quantity-sensitive footing analysis fails to account for the stress pattern of Capanahua. In contrast, a stress analysis based on a quantity-insensitive footing, as I propose here, can account straightforwardly for the stress pattern by claiming that the first two syllables group together into a foot in order to satisfy FOOT-BINARITY. Furthermore, WSP, ranked at the top of the hierarchy, forces unstressed closed syllables to be light, and Grouping Harmony *(HL), also ranked at the top, rules out candidates with (HL) feet. The result is a grammar that allows for both trochaic LL feet and iamb LH feet.

2.4.3 Quantity-Sensitive Footing and Initial Syllable Light

A variation of quantity-sensitive footing analysis is presented by Gonzalez (2002, 2003). Based on a proposal by Safir (1979:104), Gonzalez concludes that Capanahua does not allow heavy syllables to occur in the initial position of the PrWd. Thus, closed syllables in this position surface light. This is obtained by using the constraint in (35) which must be satisfied by all Capanahua outputs since it is undominated. The result is that word initial CV(C).CV sequences are always footed as (L.L) and CV(C).CVC sequences are L(H).

- (35) INITIAL SYLLABLE LIGHT: Initial Syllables are light.
(Gonzalez 2002, 2003)

Even though this analysis seems to have some degree of success in dealing with the distribution of Capanahua stress and glottal-stop deletion, the typological predictions that emerge if the constraint in (35) is allowed to be part of the Universal Grammar are unattested. This constraint predicts languages in which the contrast between long and short vowels is neutralized in word-initial position but not in word-medial and word-final positions. This prediction is shown schematically in (36).

- (36) /CVV.CV.../ → L.L...
 /CV.CV.../ → L.L...
 /...CVV.CV/ → ...H.L
 /...CV.CVV/ → ...L.H

The pattern in (36) goes against the general tendency observed in natural languages to preserve contrasts in initial position but to neutralize them in non-initial positions (Beckman 1998). The unattested predictions of the constraint in (35) contrast with the attested effects of Grouping Harmony; that is, the constraint *(HL) (Prince 1990; P&S 1993; Hayes 1995; Bakovic 1996a, 1996b; Green 1996, 1997; Gouskova 2003).

3. Accounting for the Underlying Glottal Stop Deletion

As described at the outset of this article, Capanahua has underlying glottal-stop deletion that only affects the coda consonants of even syllables. The phenomenon is not restricted to the suffix *-riʔbi*. For example, in (37) to (39), two clitics, *taʔ* ‘evidential marker’ and *raʔ* ‘probably’, surface without their underlying glottal stop when they are aligned with the right edge of a foot. The data come from Loos (1969:182).

- (37) /ʔotʃiti -taʔ -ki/ → (' ʔo.tʃi) (ti.-ta)-ki
 Dog-evidential-declarative
 ‘It is a dog’
- (38) /ʔotʃiti -raʔ -taʔ -ki/ → (' ʔo.tʃi) (ti.-ra) (-taʔ.-ki)
 Dog-probably-evidential-declarative
 ‘It is probably a dog’
- (39) /ʔotʃiti -ma -raʔ -taʔ -ki/ → (' ʔo.tʃi) (ti.-ma)(-raʔ.-ta)-ki
 Dog-negation-probably-evidential-declarative.
 ‘It is probably not a dog’

Glottal stops in Capanahua are not inserted in the coda of odd syllables. Their occurrence in coda position is unpredictable as the minimal pair in (40) shows (Loos & Loos 1998).

- (40) a. ('toʔ.ko) ‘Frog’
 b. ('to.ko) ‘Weal’

The ranking in (41) deal with Capanahua’s underlying glottal-stop deletion. Underpinning this ranking is the idea that glottal stops are banned from occurring at the right edge of metrical feet. The constraint in (42) is an expositional device adopted while further research is carried out to obtain a better understanding of the underlying factors motivating the deletion of glottal stops at the right edge of metrical feet.

(41) *ʔ) >> Max-Seg >> *Coda

(42) *ʔ): Do not have a glottal stop aligned with the right edge of the foot.

(43) MAX-SEG: Segments in the input must have correspondents in the output (McCarthy and Prince 1995).

(44) *CODA: Syllables do not have codas (P&S 1993).

In tableau (45), the input has two underlying glottal stops: one in the coda of the first syllable and the other in the coda of the third. Candidate (45.b) is eliminated because the glottal stops, which are not at the right edge of the foot, have been deleted thus violating MAX-SEG while the winner, candidate (45.a), satisfies the constraint.

(45) /toʔ.ko -riʔbi/ → ('toʔ.ko)(-riʔ.bi)

		*ʔ)	MAX-SEG	*CODA
(a)	☞ ('toʔ.ko)(-riʔ.bi)			**
(b)	('to.ko)(-ri.bi)		**!	

In tableau (46), the input has an underlying glottal stop in the coda of its fourth syllable. This time, candidate (46.b) is eliminated because it violates the constraint *ʔ), which penalizes glottal stops at the right edge of the foot. Candidate (46.a) wins because it satisfies that constraint at the cost of violating MAX-SEG.

(46) /ʔotʃiti -taʔ -ki/ → ('ʔo.tʃi)(ti.-ta)-ki

		*ʔ)	MAX-SEG	*CODA
(a)	☞ ('ʔo.tʃi)(ti.-ta)-ki		*	
(b)	('ʔo.tʃi)(ti.-taʔ)-ki	*!		*

4. Conclusions

The conundrum posed by Capanahua comes in two parts: its peculiar quantity-sensitive stress system and its relation with the phenomenon of underlying glottal-stop deletion. In this article, a straightforward solution to this puzzle is provided by asserting that both phenomena crucially depend on quantity-insensitive footing. Thus, both otherwise-contradicting phenomena are unified in a simple fashion.

Furthermore, in Capanahua the weight of closed syllables contextually varies within disyllabic feet due to the effects of well-known metrical constraints, FOOT-BINARITY, WSP and *(HL), outranking WBP. That is, Capanahua adjusts the quantity of closed syllables instead of shrinking the size of the disyllabic feet.

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Department of Linguistics
 Rutgers University
 18 Seminary Place
 New Brunswick, NJ 08904
 joselias@eden.rutgers.edu