Loan Phonology in Huave: Nativization and the Ranking of Faithfulness Constraints

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1 Introduction

Although the degree of nativization shown by borrowed lexical items varies considerably in any language (Holden 1970), Kiparsky 1968 noted that not all phonological conditions are equally violable, but rather that if an item fails to be subject to a (rule enforcing) a certain constraint, this may imply that the item is also an exception to another rule (constraint). Itô & Mester 1994, analyzing loan phonology in Japanese, understand these implications in terms of a gradual transition from 'core' (highly nativized or native) to 'peripheral' (less nativized) lexicon. In later work, Itô & Mester 1995 recast their account in terms of Optimality Theory (Prince & Smolensky 1993). Borrowed forms exhibit a tension between the need to retain segments and structure of the source form (FAITHFULNESS constraints) and the need to conform to constraints of the borrowing language. The transition from core to periphery is modelled as the reranking of Faithfulness constraints, where low Faithfulness correlates with high nativization; the ranking of other constraints remains constant:

(1) Variations in degree of nativization correspond only to rerankings of Faithfulness constraints; nativization never involves reranking of other constraint types.

In this paper we present a detailed analysis of loans from Spanish into Huave (dialect of San Mateo), a language isolate of Oaxaca, Mexico (Diebold 1961a,b, Kreger & Stairs 1981). As in Japanese, loanwords in Huave exhibit a wide range of nativization; nevertheless, not all logically conceivable accomodations to Huave phonology are attested. Concentrating here only on prosodic phonology, we show that reranking of MAX: I-O (PARSE) and DEP: I-O (FILL) with respect to four other constraints yields five separate subphonologies, accounting for exactly the range of variation seen in our sample of 469 loans. Because reranking does not involve constraints aside from the Faithfulness family, we explain why certain patterns of nativization do not occur.

2 Loan phonology processes

From the perspective of process phonology there is a considerable variety of changes from Spanish source forms to Huave surface forms. Focusing here on changes which affect syllable count and weight only, the deformation of the Spanish form includes (2) no change; (3a) epenthesis of a final glide, or (3b) of a vowel to break up a cluster; deletion of word-final material, including the last syllable (4a,b), apocope of the final vowel (4c,d), truncation of final VC (4e,f), or of final VCV (4g), or of final C (4h); as well as combinations of epenthesis and apocope (5).

(2)	a.	médiko → médiko	'médico / doctor'
	b.	mandádo → mandáda	'mandado / command'
	c.	siémpre → siémpre	'siempre / always'
(3)	a.	kafé → kaféy	'café / coffee'
	b.	klabíxa → kalabíhe	'clavija / peg'
(4)	a.	gwanábana → gʷanába	'guanabana / sweet-sop'
	b.	potránka → potrán	'potranca / filly'
	c.	kučiʎo → kočiʼ	'cuchillo / knife'
	d.	garabáto → garabát	'garabato /hook'
	e.	tixéras → tišér	'tijéras / scissors'
	f.	kardúmen → kardóm	'cardúmen/ flock'
	g.	ígado → ík	'hígado / liver'
	h.	apóstol → apústa	'apóstol / apostle'
(5)	a.	todabía → todabíy	'todavía / still'
	b.	pláto → polát	'plato / silver'

The range of variation seen in (2-5) appears at first glance to be quite diverse and sporadic. It cannot be concluded that the Huave forms converge on any set of inviolable output conditions of prosodic well-formedness. For example, while many loans do not tolerate final open syllables, repairing these by apocope, truncation, or epenthesis of /y/ (3a, 4b–g, 5a), there is a residue of cases with final open syllables (2, 3b, 4a, 4h). Similarly, while onset consonant clusters are broken up by epenthesis in some instances (3b, 5b), clusters remain in other forms in similar environments (2c, 4b). Our task then is two-fold. First we explain the strategies by which Huave speakers accomodate Spanish forms in terms of constraints present in the phonology of native vocabulary. We then show that while certain repairs appear to be optional or sporadic, in fact there is an implicational relation among these repairs, explaining why certain logically possible nativizations are unattested.

3 Huave stress and Spanish stress

We concentrate first on those aspects of loan phonology that arise from the mismatch between stress placement in Huave and Spanish. The two systems of accent are in large part identical with the important proviso that, unlike Spanish, Huave does not admit lexical exceptions to its regular pattern.

In Huave, stress falls on the final syllable if heavy, otherwise on the penult (Noyer 1991, Pike & Warkentin 1961), which we understand here as a system of moraic trochees with right-edge prominence (Hayes 1995).

(6)	a.	ni.pi.lán	'people'	LL(H)
	b.	lol.ngán	'large ant'	H(H)
	c.	ší.ke	'I'	(LL)
	d.	hóo.wa	'hello'	(H)L

The Spanish system is in outline identical (Harris 1995), but with certain additional complications, two of which we consider here. First, where the final consonant is /s, n/, the final syllable may be treated as if light (7). Second, in a class of specially marked items, antepenultimate stress is possible, provided that the penult and final are light (8a–c); final stress is also a lexical option (8d).

(7)	a.	ti.jé.ras	'scissors'	*ti.je.rás
	b.	car.dú.men	'flock'	*car.du.mén
	c.	a.zú.car	'sugar'	*a.zu.cár

(8)	a.	gua.ná.ba.na	'sweet sop'	gua(naba)na
	b.	lás.ti.ma	'compassion'	(lasti)ma
	c.	hí.ga.do	'liver'	(higa)do
	d.	ca.fé	'coffee'	ca(fe)

4 Exceptionally stressed Spanish source words in Huave

Because Huave admits no cases of exceptional stress such as in (7–8), many cases of nativization involve readjustment of forms so that the place of stress is preserved in the loan word, but no violation of Huave stress constraints ensues. The examples in (9) show that the Huave loan retains the stress on the same vowel as the source form, but with concomitant adjustment of syllable weight or count so that stress is positioned in accordance with the Huave stress parameters ('N' below is a final syllable closed by /n s/):

(9)	a.	L(L)	→	L(H)	
		ka.fé		ka.féy	'cofee'
	b.	L(LL)L	→	L(LL)	
		gwa.ná.ba.na		gʷa.ná.ba	'sweet-sop'
	c.	(H)LL	→	(H)L	
		lás.ti.ma		lás.ta	'compassion'
	d.	(LL)L	→	(H)	
		í.ga.do		ík	'liver'
	e.	L(LN)	→	L(H)	
		ti.xé.ras		ti.šér	'scissors'
	f.	H(LN)	→	H(H)	
		kar.dú.men		kar.dóm	'flock'

In (9a), epenthesis of glide /y/ makes the final stressed syllable of /kafé/ heavy and appopriately stressable in Huave. In the remaining examples, word-final material is truncated such that the stressed vowel can appear either in a penult with light final (9b,c), or in a heavy final (9d–f).

5 Analysis in Optimality Theory

We now present an analysis of these adjustments in terms of the ranked and violable output constraints of Optimality Theory, considering first apocope and truncation (sections 5 and 6), and then epenthesis (section 7).

We have seen that in nearly all cases, a stressed vowel in the Spanish source form corresponds to a similar stressed vowel in the Huave loan: call this constraint MATCH (STRESS). For convenience, we abbreviate the set of constraints which eventuate in the right-prominent moraic trochee stress system as the constraint STRESS. We will understand the requirement that segmental material appearing in the Spanish form have some reflection in the Huave loan as a species of MAX: I-O (McCarthy & Prince 1995), a constraint esteeming those candidates which maximize correspondence between inputs and outputs (formerly called PARSE):

(10) MATCH (STRESS)
Stress falls on the same vowel in the source word as in the loan word.

(11) STRESS
Cover term for constraints eventuating in right-edge-prominent moraic trochee system

(12) MAX : I-O (segment) ≈ PARSE
Each segment of the input (Spanish source word) has a correspondent in the output (Huave surface form)

Given widespread apocope and truncation, it is evident that conforming to Huave stress rules is typically more important than retaining all segments of the source form, hence:

(13) STRESS » MAX: I-O (segment)

However, not all cases of apocope result solely from these two forces: quite often apocope occurs independently (14), where final (LL) is unexceptionally stressed in Spanish and would also be in Huave, had apocope not applied:

(14)	a.	mésa → més	'mesa / table'
	b.	kapóte → kapót	'capote / cloak'
	c.	garabáto → garabát	'garabato /hook'

Apocope may arise even in cases where the result creates a final CC cluster, otherwise unattested in native Huave forms:

(15) a. márso → márs 'marzo / March'
b. múlta → múlt 'multa / fine'

These developments are unsurprising, however, since with the exception of a small class of function words, final open syllables are not tolerated in native vocabulary. We formalize this constraint as FREE-V (cf. Prince & Smolensky 1993).

(16) FREE-V: *V Word]

The presence or absence of apocope is a major source of variation in loan phonology. We consider first the more nativized grammar in which apocope is the norm, and so FREE-V is ranked higher than the Parse constraint MAX: I-O:

(17) MATCH, STRESS, FREE-V » MAX: I-O

Loans conforming to this grammar minimally truncate (underparse) word-final material until stress is 'correctly' positioned for Huave and the final syllable is closed. For example, in a penultimately stressed source form such as /garabáto → garabát/ 'garabato/hook', simple apocope suffices to meet these conditions (Tableau 1).

/garabáto → garabát/ 'garabato/ hook'

	MATCH	STRESS	FREE-V	MAX: I-O
ga.ra.bá.to.			*!	
ga.ra.ba.tó	*!	*	*	
ga.rá.bat.⟨o⟩	*!			
☞ ga.ra.bát.⟨o⟩				o

Tableau 1. Simple apocope in penultimate stress source forms.

Although /o/ is unparsed in the optimal candidate, this violation is immaterial relative to more the more pressing need to avoid a final open syllable and to retain the original site of stress.

Where the final rime is a stressless heavy syllable ending in /n s/, the entire VC rime must delete (Tableau 2). Underparsing of the final /n/ is insufficient, since this yields a final open syllable in /*kar.dú.me⟨n⟩/, in violation of of FREE-V. The option of further underparsing to correct /kar.dúm⟨en⟩/ shows that FREE-V » MAX: I-O. A more extensive example of underparsing is /ígado → ík/ 'hígado / liver', yet even here, underparsing is minimal to meet the prior demands of MATCH, STRESS, and FREE-V.

/kardúmen → kardóm/ 'cardúmen / flock'

	MATCH	STRESS	FREE-V	MAX: I-O
kar.du.mén	*!			
kar.du.mé	*!	*	*	
kar.dú.me⟨n⟩			*!	n
☞ kar.dúm⟨en⟩				en

Tableau 2. Deletion of final rime in penultimate stress source forms with final /n s/.

6 Variation as Reranking of Faithfulness Constraints

While many loan words fit comfortably within the grammar defined in (17), there is a considerable residue of forms which do not exhibit apocope, and for such forms MAX: I-O must rank higher than FREE-V. For such forms, underparsing of a final vowel will incur a fatal penalty should it arise solely to avoid a final open syllable. Following the premise that variation in nativization should correspond only to reranking of Faithfulness constraints, we are led to understand this reranking as repositioning of MAX: I-O. The minimal change from (17) is simply raising MAX: I-O above FREE-V while holding MATCH and STRESS constant at the top:

(18) Reranking #1
MATCH, STRESS » MAX: I-O » FREE-V

This grammar produces different results from that of (17) in several instances. If the source form is antepenultimately stressed, such as /gwanábana/ 'sweet-sop', the final CV is truncated, but the output still contains a final open syllable /g^{w}anába/ (Tableau 3):

/gwanábana → g^{w}anába/ 'guanábana / sweet-sop'

	MATCH	STRESS	MAX: I-O	FREE-V
g^{w}a.na.bá.na	*!			*
g^{w}a.ná.ba.na		*!		*
g^{w}a.ná.ban⟨a⟩		*!	a	
☞ g^{w}a.ná.ba⟨na⟩			na	*
g^{w}a.náb.⟨ana⟩			!ana	

Tableau 3: Truncation of final σ in antepenultimate stress forms.

The effects of minimal violation are quite evident here: underparsing is limited to only final /na/. Although putative /gʷa.náb.⟨ana⟩/ is not prosodically ill-formed, further underparsing of the penult /a/ of the source form is both pointless, since final open syllables are tolerated in this layer of the lexicon, and prohibited, since MAX: I-O » FREE-V. However, the /a/ of the final syllable of the source form must be apocopated, but this is owing to the condition on stress placement, and not FREE-V. This is to be compared with /ígado → ík / 'hígado / liver' where exactly the opposite holds in grammar (17).

It follows straightforwardly that penultimately stressed source forms subjected to grammar (18) will show no apocope (Tableau 4).

/mandádo → mandáda/ 'mandado / command'

	MATCH	STRESS	MAX: I-O	FREE-V
☞ man.dá.da				*
man.dád ⟨a⟩			! a	

Tableau 4: Failure of apocope in penultimate stress source forms.

There are in fact a number of penultimately stressed source forms which have doublets, one in grammar (17) with apocope, the other in grammar (18) without apocope:

(19) a. domíng ~ domíngu ← domíngo 'domingo / Sunday'
b. afwér ~ ahuére ← afwéra 'afuera / outside'
c. ást ~ ásta ← ásta 'hasta / until'
d. brúh ~ brúha ← brúxa 'brujo / wizard'
e. lór ~ lóra ← lóro 'loro /type of bird'

Leaving MATCH as inviolable and hence top-ranked, MAX: I-O has only one further possible reranking, that is above STRESS:

(20) Reranking #2
MATCH , MAX: I-O » STRESS » FREE-V

In such cases we predict that the Huave loan will not conform to the general stress pattern of native vocabulary, and the Spanish form will be fully parsed (Tableau 5). Such examples are among the least nativized in our sample (21).

(21) a. myérkoles → myérkoles 'miércoles / Wednesday'
b. sábado → sábadu 'sábado / Sunday'

/médiko → médiko/ 'médico / doctor'

	MATCH	MAX: I-O	STRESS	FREE-V
me.dí.ko	*!			*
mé.di⟨ko⟩		!ko		*
mé.dik⟨o⟩		!o	*	
☞ mé.di.ko			*	*

Tableau 5: Failure of apocope in antepenultimately stressed source forms.

To summarize so far, we have proposed that reranking of MAX: I-O with respect to the three constraints MATCH, STRESS, and FREE-V yields three grammars as shown below:

(22) MATCH
← MAX : I-O Non-nativized: no apocope, no truncation, nonnative stress
STRESS
← MAX : I-O Somewhat nativized: truncation, no apocope
FREE-V
← MAX : I-O Highly nativized: truncation and apocope

The proposal outlined in (22) provides a three-layer lexicon ranging from highly nativized to non-nativized forms. In addition we derive an important prediction. If only MAX moves and all other constraints remain in situ, we correctly predict that there should be no forms with apocope and also with nonnative stress placement:

(23) a. médiko —/→ *médik (médiko) 'doctor'
b. gwanábana —/→ *gʷanában (gwanába) 'sweet-sop'

If the option of violating Huave stress placement were freely available and independent of the (repair) rule enforcing apocope, there would be no way to predict this lacuna in the otherwise rather permissive range of variation we have seen. On the present account however, forms such as /*médik/ can never occur: to do so would require FREE-V to outrank MAX (yielding apocope), while MAX must outrank STRESS (yielding nonnative stress placement). By transitivity, this entails that FREE-V must outrank STRESS: an impossibility if the ranking STRESS » FREE-V is fixed for the whole lexicon.

7 Complex Clusters and Epenthesis

In this section we turn to the effects of epenthesis on syllable weight and count. First, final stressed light syllables are augmented by glide (mora) insertion:

(24) a. kafé → kaféy 'café / coffee'
b. todabía → todabíy 'todavía / still'
c. xudío → šodíy 'judío / Jew'

Glide (mora) insertion occurs minimally to ensure that final stressed syllables are heavy, in conformity with STRESS. We assume the existence of a constraint DEP: I-O (McCarthy & Prince 1995: 264), formerly known as FILL, which inhibits epenthesis except where forced:

(25) DEP: I-O ≈ FILL
Every mora of the output form (Huave loan) has a correspondent in the input (Spanish source) form.

Since apocope may be co-present with epenthesis (24b,c), DEP: I-O must rank below FREE-V in at least some grammars (26), as shown in Tableau 6.

(26) MATCH, STRESS, FREE-V » DEP: I-O (FILL)

/todabía → todabíy/ 'todavía / still'

	STRESS	FREE-V	MAX: I-O	DEP: I-O
to.da.bí.a		! *		
to.da.bí⟨a⟩	*!	*	*	
☞ to.da.bíy⟨a⟩			*	y

Tableau 6: Glide insertion plus apocope.

FREE-V forces the apocope of final /a/, but this leaves final /i/ which cannot be apocopated, being the site of stress. Glide epenthesis is tolerated insofar as it permits conformity with STRESS and MATCH.

Turning to vowel epenthesis, we note first that with few exceptions, native vocabulary admits no complex onsets, owing to a constraint *COMPLEX-ONS.

(27) *COMPLEX-ONS
Complex onsets are impossible.

Complex onsets in Spanish source forms may sometimes (28) but not always (29) be broken up by an epenthetic vowel, depending, we now suppose, on the relative ranking of DEP: I-O:

(28) More nativized: Epenthesis. *COMPLEX -ONS » DEP: I-O
a. pláto → pəlát 'plato / silver'
b. brasáda → bərasáda 'barazada /unit of measure'
c. klabíxa → kəlabíhe 'clavija / peg '

(29) Less nativized: Full Parsing of Onset Clusters.
DEP: I-O » *COMPLEX -ONS
a. plása → plás 'plaza / market'
b. tramóxo → tra.mó.ho 'tramojo / sheaf'
c. siémpre → siém.pre 'siempre/ always'
d. eskribáno → es.kri.bán 'escribano / scribe, notary'

We hypothesize that *COMPLEX-ONS occupies an invariant position below FREE-V (for reasons made clear below), and that the variation in (28, 29) arises from the re-ranking of DEP: I-O.

An important generalization over our sample of loans is that epenthesis of all varieties is never permitted in post-tonic position, even where expected by phonotactic constraints. There are two subcases. First, when the final syllable is NOT stressed, a glide (mora) is never inserted in word-final position to 'save' a form from ending in a vowel:

(30) a. bérde —/→ *bérdey (bérde) 'green'
b. garróte —/→ *garrótey (garrót ~ ngarrót) 'stick'

In such situations, apocope or no adjustment at all are the only options. Second, we never find epenthesis of a vowel to break up an onset cluster where the cluster is post-tonic:

(31) siémpre —/→ *siémpəre (siémpre) 'always'

If the repairs associated with what we have called FREE-V and *COMPLEX-ONS were simply independent of the rest of the phonology, and freely applied or did not to selected forms, we would again have no explanation for these absences. But on the present proposal both follow from a single stipulation:

(32) STRESS » DEP: I-O

Since by hypothesis FREE-V is ranked below STRESS in every grammar, glide insertion (violation of DEP: I-O) will never occur to save a form from violating FREE-V if the price is violation of STRESS, given (32). This explains the absence of forms such as (30). Likewise, post-tonic epenthesis can never occur as in (31), since to do so would alter the syllable count, forcing a violation of STRESS:

/siémpre → siém.pre/ 'siempre / always'

	STRESS	MAX: I-O	*COMPLEX	DEP: I-O
☞ siém.pre			*	
siém.pe.re	*!			ⓔ
siém.per⟨e⟩	*!	e		ⓔ

Tableau 7: Failure of post-tonic epenthesis.

The onset cluster /pr/ is permitted in /siém.pre/ only because there is no alternative. Epenthesis disrupts the syllable count, forcing a violation of STRESS.

The final lacuna in our sample is the systematic absence of underparsing in pre-tonic position.

(33) plása —/→ *⟨p⟩lás (plas) 'market'

Most cases of underparsing (apocope or truncation) arise in post-tonic position in conformity with STRESS, MATCH and FREE-V (review 4). Pre-tonic underparsing, were it to occur, would arise only to satisfy *COMPLEX-ONS, provided no alternative is present. This can arise only if Epenthesis is not available. Since the relevant case (33) is in pre-tonic position, any putative Epenthesis would not disrupt the syllable count, so the stress-related constraints are immaterial. The absence of forms such as (33) indicates that MAX: I-O (PARSE) outranks DEP: I-O (FILL) in all cases, making Epenthesis the preferred escape from onset clusters, other things being equal.

8 The Space of Admitted Grammars

The list in (34) summarizes the proposals given for constraints and their rankings.

(34) 1. Only MAX: I-O & DEP: I-O can be re-ranked.
By hypothesis (Itô & Mester 1995b).
2. MAX: I-O (PARSE) » DEP: I-O (FILL).
Underparsing never occurs pre-tonically.

3. STRESS » FREE-V.
No final epenthesis in forms like /bérde, *bérdey/.
4. MATCH » STRESS.
MAX: I-O (PARSE) can be ranked between them.
5. STRESS » DEP: I-O (32)
Epenthesis never occurs post-tonically.

The proposed constraints along with the above conditions on their rankings define a space of grammars, which in turn gives 6 classes of extensionally equivalent grammars, shown by the rankings in (35).[1]

(35) The Space of 6 Classes of Grammars

(a)	(b)	(c)	(d)	(e)	(f)
Match	Match	Match	Match	Match	Match
Parse	Parse	Stress	Stress	Stress	Stress
Stress	Stress	Parse	Parse	Free-V	Free-V
Free-V	Free-V	Free-V, Fill	Free-V	Parse	Parse/*Comp
Fill	*Complex	*Complex	*Complex	Fill	Fill
*Complex	Fill		Fill	*Complex	

(36)

a/b	c	d
stress violation	no apocope truncation no V-epenthesis	no apocope truncation pre-tonic V-epenthesis
médiko	*tramóho*	*barasáda*
	*g*ʷ*anába⟨na⟩, apústa⟨l⟩*	
	módo	

(37)

e	f
post-tonic underparsing apocope no V-epenthesis	post-tonic underparsing apocope pre-tonic V-epenthesis
trapíč ⟨e⟩	*polát⟨o⟩*
kés⟨o⟩, kardúm⟨en⟩, aláam⟨bre⟩, ík⟨ado⟩, todabíy⟨a⟩	

[1]Grammars (a) and (b) differ only on inputs of the form CCv́CVCV, where the latter has epenthesis in the pretonic cluster and the former does not. Such source forms are lacking, so grammars (a) and (b) will be classed together from here on.

In this way, we derive a five-layer lexicon, depicted in (37–38), ranging from the less nativized 'periphery' (grammars a–c) to the more nativized 'core' (e–f).

10 Conclusion

At first glance, loanwords from Spanish into Huave present a bewildering variety of accomodations to Huave phonotactic and prosodic conditions. We have identified five layers in the Huave lexicon corresponding to degrees of nativization. These layers are defined in terms of Optimality-Theoretic grammars, where the two Faithfulness Constraints MAX: I-O (PARSE) and DEP: I-O (FILL) are amenable to reranking, provided MAX always dominates DEP, while all other constraints are held in a constant rank. Several systematic lacunae in the behavior of loans were then explained, including (1) the absence of post-tonic epenthesis to break up onset clusters; (2) the absence of pre-tonic deletion; (3) the absence of glide insertion in final stressless light syllables, despite a general dispreference for final vowels, and (4) the absence of apocope in forms which violate Huave stress rules. These four predictions are not available in a theory in which the accomodations enforced by loan phonology do not in some way form an interrelated system, but instead are represented in terms of rules which sporadically do or do not apply to selected forms. Insofar as our account meets with success, we provide strong evidence in favor of the proposal of the layered lexicon given in Itô & Mester 1995.

However, let us end on a note of caution. Alternative explanations for some of the layering effects are probably available through diachronic analysis: loans presumably entered Huave at various times and then were subject to sound changes, such as apocope, after an initial (but now lost) nativization. Loan phonology must always consist of two steps: first, speakers internalize by reanalysis underlying forms of source words, second, speakers subject these reanalyzed forms to their native phonology. Optimality Theoretic devices, which situate explanation in relations among surface forms, allow us to lose sight of the complexities inherent in the reanalysis/rephonologization process. Nevertheless, the surprising facility with which reranking of Faithfulness constraints deals with the complex outcome of these historical events suggests something essentially correct in the approach, however elusive at present.

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