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Positional Faithfulness Theory and the Emergence of the Unmarked: The Case of Kagoshima Japanese *

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Abstract

Kagoshima Japanese exhibits active deletion of word-final vowels, and consonants placed word-finally by this process are systematically reduced to least marked forms to the possible extent: a stop and an affricate become a glottal stop, a fricative becomes coronal [s] or [ʃ], a nasal becomes moraic nasal [N] and a rhotic becomes [j] (Haraguchi 1984; Kaneko 1998; Kibe 2001). We investigate this phenomenon making crucial use of Positional Faithfulness Theory developed by Beckman (1995, 1998), claiming that the theory successfully provides an insightful account without any additional stipulations. Positional Faithfulness Theory derives the so-called coda condition (Itô 1986, 1989)—a condition that requires coda consonants to be place-linked to a following consonant —from the ranking (1):

(1) IDENT-IO(PLACE)<ONSET> » *PLACE » IDENT-IO(PLACE)

We show that (1), which is independently motivated to account for the behavior of coda consonants in Kagoshima Japanese, simultaneously explains the reduction of word-final consonants: given *PLACE » IDENT-IO(PLACE) the faithfulness to the input specification is disregarded, and thus unmarked forms emerge. Our analysis crucially depends on, and therefore provides an additional empirical endorsement to, Positional Faithfulness Theory.

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1. Introduction

Many languages disallow coda consonants unless they are place-linked to the following onset consonants (see Itô 1986, 1989; Itô and Mester 1994 for an overview). Such a restriction is exemplified by the data (1) from Japanese. Since Itô's (1986, 1989) influential work on prosodic phonology, this ubiquitous restriction on coda consonants has been analyzed as the effect of "the coda condition" (or the coda filter) that prohibits an independent place node linked to a coda consonant. This condition is formulated in (2).[1] Codas are disallowed to have a place node, but doubly linked place nodes escape the violation of (2) by virtue of linking constraint (Hayes 1986). A similar approach to this problem is Licensing Theory (Itô 1986, 1989; Goldsmith 1990; Itô and Mester 1993 among others), which stipulates that every feature must be "licensed" by some prosodic element. This theory stipulates that a place feature cannot be licensed by a coda consonant, but it is licensed by virtue of being linked to a following onset node. These two approaches are fundamentally similar in that they both posit an independent condition on codas—i.e., "coda consonants may not have an independent place" or "coda nodes cannot license a place node".

(1) A restriction on coda consonants (data from Japanese)

Well-Formed		Ill-Formed
happa	'a leaf'	*hatpa
katta	'bought'	*kapta
sakkaa	'soccer'	*saktaa

(2) Coda Condition

*C] σ
|
[PLACE]

Obviating independent mechanisms such as the coda condition or the prosodic licensing, Beckman (1998) explains the putative coda condition effect within the framework of Positional Faithfulness Theory (PFT). PFT itself is a sub-theory of

[1] See Itô and Mester (1994) where the coda condition is reanalyzed as an alignment constraint that requires the left edge of C-Place to be aligned with the left edge of a syllable. Doubly-linked places satisfy this constraint by virtue of being linked as an onset of the second syllable.

Optimality Theory (Prince and Smolensky 1993). PFT maintains that psychologically or semantically prominent positions are governed by a special set of faithfulness constraints.[2] The privileged positions, as proposed by Beckman (1998), include syllable onset, as opposed to syllable codas, among others. Syllable onsets, therefore, are governed by privileged faithfulness constraints, which are universally ranked higher than general (or "context-free") faithfulness constraints. Segments in coda positions are governed only by the general faithfulness constraints.

(3) Universal Positional Faithfulness Schema

FAITH<ONSET> » FAITH

Beckman proposes that the so-called coda condition effect is derived when markedness constraints that prohibit place features (abbreviated here as *PLACE) are sandwiched between these two kinds of faithfulness constraints, as in (4):

(4) IDENT(PLACE)<ONSET> » *PLACE » IDENT(PLACE)

Beckman's theory is here demonstrated by the tableau in (5) with a hypothetical form /kapta/ as its input. The constraint ranking indeed reduces the coda consonant to be place-linked, the very requirement imposed by the coda condition.

(5) Deriving "Coda Condition Effect"

/kapta/	IDENT(PLACE)<ONSET>	*PLACE	IDENT(PLACE)
[kapta]		***!	
☞[katta]		**	*
[kappa]	*!	**	*

Given *PLACE » IDENT(PLACE), coda consonants are prevented from having their own place, and hence must be place-linked to a following onset consonant. Place features in the onset segments on the other hand remain unchanged due to the ranking IDENT(PLACE)<ONSET> » *PLACE.

[2] Recent work that discusses positional asymmetries in phonology is too numerous to thoroughly list here. Aside from Beckman's fairly comprehensive work, see McCarthy and Prince (1995); Padgett (1995); Casali (1996); Urbanczyk (1996); Alderete (1999, 2001); Pater (1999) among many others. See also McCarthy (2002b: 179).

Our primary aim of this paper is to provide an additional empirical endorsement of PFT by analyzing the reduction of word-final consonants concomitant with high vowel apocope found in Kagoshima Japanese. Consonants placed as a consequence of apocope are systematically reduced to unmarked forms while preserving their manner features. Some of the relevant data are provided below for illustration (the data are mostly taken from Kibe 2001, in addition to forms solicited from native speakers):

(6) Stop, Affricate → [ʔ]

tobu	toʔ	'fly'
kutsu	kuʔ	'shoes'
kutʃi	kuʔ	'mouth'

(7) Fricatives → s, ʃ

kwaʃi	kwaʃ	'sweets'
kwaʒi	kwaʃ	'fire'
usu	us	'a mortar'
kazu	kas	'number'

(8) Nasal → [N]

inu	iN	'dog'
kami	kaN	'paper'

We will analyze these reduction patterns by making crucial use of PFT, claiming that constraints ranking motivated to account for the restriction on coda consonants can directly explain the reduction of word-final consonants. We will show that the overarching generalization that accounts for every aspect of Kagoshima dialect is not that consonants cannot have an independent place, as the coda condition would demand. Rather, consonants are required to have the least marked place of articulation, as imposed by place markedness sub-hierarchy. Thus, it must be place-linked when a consonant follows, and when place-linking is impossible, the most unmarked forms emerge. Merely stipulating the coda condition fails to capture this broader generalization.

To achieve our goal, the rest of this paper is mapped out as follows. §2 more thoroughly presents relevant data concerning the apocope and consonant reduction patterns. This section also aims to provide relevant aspects of Kagoshima Japanese

phonology. Based upon the discussion in §2, we will present an Optimality-Theoretic analysis in §3. The final section concludes the paper.

2. Data

This section is allotted to the presentation of relevant data in Kagoshima Japanese. We describe the inventory of coda consonants and the reduction of word-final consonants as a result of apocope.

2.1. Restriction on coda consonants

In this dialect of Japanese, coda consonants are either (i) homorganic to a following onset or (ii) glottal stops. This is illustrated by the following examples. This is a very typical instance of the coda condition effect: no consonants with an independent place are allowed.

(9) a. natta ‘became’
attʃi ‘there’
nanna ‘tear’
ʃinzo ‘heart’

b. kiʔne ‘fox’
suʔnaka ‘little’
maʔnoʔ ‘pine tree’

2.2. Apocope

The Kagoshima Dialect exhibits active apocope (the deletion of a word-final vowel) of high vowels (Haraguchi 1984; Kaneko 1998; Kibe 2002). This apocope, however, only takes place in Yamato (native) vocabulary (Kibe p.c). The phonological stratification in Japanese lexicon was recognized as early as Martin (1952) and McCawley (1968), and its importance in phonological theorizing has been discussed in many OT works including Itô and Mester (1995ab, 1999a), Itô, Mester and Padgett (1999), Fukazawa (1998), and Fukazawa, Kitagawa, Ota (1998, 2001, 2002) and others. Most phonologists agree that Japanese phonological lexicon is split into four strata: Yamato (native), Sino-Japanese (Chinese borrowing), Foreign (recent borrowing) and Mimetics. Each of

the strata is shown to exhibit different degree of obedience to markedness constraints. For instance, post-nasal voicing takes place only in the Yamato stratum e.g., *sin* + *ta* 'died'→ *sinda*, but fails to take place in the other stratum, as in *sampo* (Sino-Japanese) 'to take a walk,' *santa* (Foreign) 'Santa Claus,' and *tonton* (Mimetics) 'sounds of hitting.' The fact that apocope only takes place in the Yamato vocabulary fits the generalization that this stratum exhibits the highest degree of obedience to markedness constraints (to the extent that apocope is a reaction to a markedness constraint such as FINAL-C; see below).

As a result of apocope, consonants placed word-finally are reduced to unmarked sounds. All stops and affricates are reduced to a glottal stop regardless of their voicing or place specification. This dialect has only coronal fricatives in the Yamato vocabulary[3] and they retain their place specification, but voicing contrast is lost. All nasals are reduced to a moraic nasal [N]. Finally, [r] becomes [j] and forms a part of a diphthong. These points are illustrated by the following data:

(10) Stop, Affricates: b, ts, tʃ, dz, dʒ, k, g → [ʔ]

tobu	toʔ	'fly'
kutsu	kuʔ	'shoes'
kutʃi	kuʔ	'mouth'
midzu	miʔ	'water'
adʒi	aʔ	'taste'
kaki	kaʔ	'persimmon'
ojogu	ojoʔ	'swim'

(11) Fricatives: s, z, ʃ, ʒ → s, ʃ

kwaʃi	kwaʃ	'sweets'
kwaʒi	kwaʃ	'fire'
usu	us	'a morter'
kazu	kas	'number'

[3] Only word-initially does this dialect have a phonemic /h/, which realizes as three allophones [h], [ç] and [ɸ]. This phoneme is not pertinent to our discussion because our focus is exclusively on word-final consonants.

(12) Nasal: n, (ɲ,) m → [N]

taɲi	taN	‘valley’
inu	iN	‘dog’
kami	kaN	‘paper’

(13) Rhotic r → [j]

mari	maj	‘ball’
çiru	çij	‘noon’

3. Analysis

Having introduced the descriptive generalizations, we now develop an Optimality-Theoretic analysis of these patterns. First, we derive the coda condition effect within Positional Faithfulness Theory (PFT). Next, we will show how the ranking established for that purpose can account for the reduction of word-final consonants.

3.1. Coda Restrictions in general

3.1.1. Basic Schema

First, let us see how PFT derives the coda condition effect from the interaction of markedness constraints and two kinds of faithfulness constraints (i.e., faithfulness constraints specific to onsets and general faithfulness constraints). It is a fairly uncontroversial that coronal consonants are less marked than labial and dorsal consonants. To reflect this observation, *PLACE is decomposed into a place markedness sub-hierarchy (Prince and Smolensky 1993; Beckman 1998; Lombardi 1998ab, 2001; Alderete et al 1999 *inter alia*):

(14) *LAB(ial), *DOR(sal) » * COR(onal)

Given that *COR is ranked the lowest,[4] coronal consonants are the least marked

[4] Lombardi (1998b, 2001) extends the sub-hierarchy at the lower end, adding *PHAR(yngeal) below *COR. We do not take this position, and consider [h] and [ʔ] as truly placeless. This, however, is for the sake of simpler exposition of our discussion,

amongst the three places of articulation. Notice, however, that an even less marked option is not to have a place specification at all. That is, to best satisfy the sub-hierarchy in (14) is to remain placeless or to be linked to a following onset sound, thereby having no place specification of its own.

As mentioned in §1, PFT maintains that faithfulness constraints are specialized in psychologically or semantically prominent positions. Relevant to our present discussion is FAITH<ONSET>, which is universally ranked higher than context-free FAITH. Beckman (1998) derives the coda condition effect from the interaction of these two families of faithfulness constraints and the place markedness sub-hierarchy (14). Two constraints are particularly relevant:

(15) IDENT(PLACE)<ONSET>:

Let s_1 be a segment that is syllabified as an onset in the surface, then the place specification of s_1 in the input and output should be identical.

IDENT(PLACE):

The place specification of s_2 in the input and output should be identical.

The coda condition effect emerges when IDENT(PLACE)<ONSET> and IDENT(PLACE) together sandwich the place markedness sub-hierarchy. Then, given an input like /kapta/, the would-be coda consonant [p] loses its place specification and is linked to the following [t]. The tableau in (16) illustrates (here and throughout vocalic place features are ignored except when they are relevant):

(16)

/kapta/	IDENT-PLACE<ONSET>	*LAB	*DOR	*COR	IDENT-PLACE
a. [kapta]		*!	*	*	
b. ☞ [katta]			*	*	*
c. [tatta]	*!			**	**

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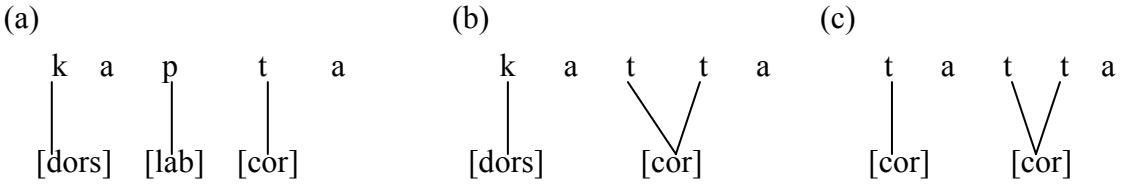
and our argument does not hinge upon this assumption (see below).

(17) Representation of each candidate



As mentioned above, the best strategy to avoid a violation of the markedness constraints against place specifications is not to have a place at all. Then, given *LAB, *DOR » *COR » IDENT(PLACE), coda consonants lose their place specification (compare the candidate (a) and the candidate (b) above), and they are place-linked to the following consonant. On the other hand, IDENT(PLACE)<ONSET> is ranked the highest, so the place specification for onset sounds never changes, as the failed candidate (c) suggests.

3.1.2. Placeless consonants

In addition to place-linked consonants, Kagoshima Japanese allows a glottal stop in coda position. We assume in this paper that a glottal stop can appear in coda position by virtue of being placeless (Clements 1985; Steriade 1987; McCarthy 1988; Clements and Hume 1995),[5] and hence incurs no violation of *PLACE. This sound, therefore, is allowed to surface even in coda position because of its placelessness. A demonstrative tableau is provided in (18) to show how a glottal stop surfaces:

(18)

/kiʔne/	*LAB	*DOR	*COR	IDENT(PLACE)
a. ☞ [kiʔne]		*	*	
b. [kinne]		*	*	*!

There is another placeless obstruent, [h], which should be considered here. Despite being placeless, this sound does not seem to appear in a coda position. This sound, however, is in fact prohibited throughout the Kagoshima Japanese phonology in the Yamato-stratum except in word-initial positions (Kibe p.c). We hence assume that a

[5] Lombardi (1998b, 2001) explicitly claims that a glottal stop has a laryngeal place of articulation and should not be treated as placeless. Note that our treatment of a glottal stop as placeless is purely for the sake of simplicity. We can account for the presence of a glottal stop as a coda by assuming that IDENT(PLACE) » *PHAR.

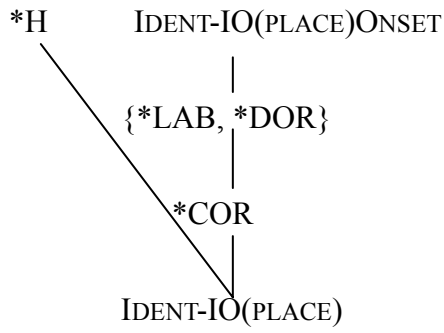
constraint against [h][6] in this stratum is ranked so high that it allows the presence of [h] in very limited environments. Following Beckman (1998; Chapter 2), we assume that word-initial syllables are governed by position-specific faithfulness constraints. These faithfulness constraints dominate *H, the prohibition against [h], so that this sound is disallowed to surface elsewhere.[7] Other than this, little can be said about the position of *H with respect to other constraints, but it must at least dominate IDENT(PLACE). These rankings are demonstrated by the following tableau in (19), whose input is a hypothetical form /kihta/ which has /h/ in the would-be coda position. As shown, /h/ does not surface, given *H » IDENT(PLACE):

(19)

/kihta/	*H	*LAB	*DOR	*COR	IDENT(PLACE)
a. ☞ [kitta]			*	*	*
b. [kihta]	*!		*	*	

So far, the following ranking has been established to account for the behavior of coda consonants in Kagoshima dialect:

(20) Ranking Summary



[6] It is conceivable that there is a specific constraint against [h] in a coda position because there are languages, e.g., English, which prohibits [h] specifically as a coda consonant.

[7] We ignore this exceptional licensing of [h] since it is not germane to our discussion. Hence IDENT<σ1> » *H is excluded from our ranking throughout.

3.2. Apocope and the emergence of the unmarked

3.2.1. Deriving apocope

Now let us move onto the discussion of consonant reduction as a result of apocope. As an impetus for word-final vowel deletion in Kagoshima Japanese, we employ FINAL-C, which requires that every prosodic word end with a consonantal element.[8] This constraint is satisfied so long as a prosodic word ends in an obstruent, nasal, liquid or glide. This markedness constraint is ranked higher than MAX, an anti-deletion constraint, since otherwise no deletion would take place.[9] Note, however, that it is only high vowels that delete word-finally. We adopt Pulleyblank's (1998ab) idea that faithfulness to some feature F depends crucially on F's sonority (see Haraguchi 1984 for a similar view). The deletion or any alternation of more sonorous elements is more serious (thus more costly) than the deletion of less sonorous elements. For our purposes, this idea is formally articulated as relativization of MAX according to the height of vowels.

(21)

FINAL-C:	A prosodic word must not end with a vocalic element (McCarthy and Prince 1994; McCarthy 1993, 2002a; Gafos 1998)
MAXNONHIGH:	No deletion of non-high vowels (McCarthy and Prince 1995; Pulleyblank 1998ab)
MAXHIGH:	No deletion of high vowels.

These constraints need to be ranked as MAXNONHIGH » FINAL-C » MAXHIGH. The ranking can be confirmed by the following two tableaux in (22):

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[8] For the application of this constraint, see McCarthy (1993) in the analysis of Eastern Massachusetts English, Gafos (1998) for the case of Hebrew, McCarthy (2002a) for Lardil, and McCarthy and Prince (1994) for Makassanese among others. See also Duncan (1994) and Ussishkin (2000) for a reanalysis of cases which apparently require FINAL-C.

[9] That apocope takes place only for Yamato-items suggests that MAX constraints for other sub-lexica are ranked higher than FINAL-C. See Itô and Mester 1995ab, 1999a, Itô, Mester and Padgett (1999), Fukazawa (1998), and Fukazawa, Kitagawa, and Ota (1998, 2001, 2002) for relevant discussion.

(22) MAXNONHIGH » FINAL-C » MAXHIGH

/CVCV/ [-high]	MAXNONHIGH	FINAL-C	MAXHIGH
a. ☞ [CVCV]		*	
b. [CVC]	*!		

/CVCV/ [+high]	MAXNONHIGH	FINAL-C	MAXHIGH
a. [CVCV]		*!	
b. ☞ [CVC]			*

In the following discussion, we ignore MAXNONHIGH because the constraint is orthogonal to our discussion, and let MAX stand for MAXHIGH.

3.2.2. Stops

Now let us proceed to see how the ranking motivated above can account for the reduction of word-final consonants. Given that the prohibition against a place specification is ranked higher than the faithfulness constraint regulating the identity preservation in coda positions, word-final consonants systematically lose their place when they are forced to stand alone word-finally, whether they be a labial, coronal or dorsal. This is demonstrated by the three tableaux below:

(23) Labial

/tobu/	FINAL-C	MAX	IDENT(PLA)<ONS>	*LAB	*DOR	*COR	IDENT(PLA)
a. [tobu]	*!			*		*	
b. [tob]		*		*!		*	
c. ☞ [toʔ]		*				*	*
d. [ʔoʔ]		*	*!				**

(24) Coronal

/kutsu/	FINAL-C	MAX	IDENT(PLA)<ONS>	*LAB	*DOR	*COR	IDENT(PLA)
a. [kutsu]	*!				*	*	
b. [kuts]		*			*	*!	
c. ☞ [kuʔ]		*			*		*
d. [ʔuʔ]		*	*!				**

(25) Dorsal

/kaki/	FINAL-C	MAX	IDENT(PLA)<ON>	*LAB	*DOR	*COR	IDENT(PLA)
a. [kaki]	*!				**		
b. [kak]		*			**!		
c. ☞ [kaʔ]		*			*		*
d. [ʔaʔ]		*	*!				**

As shown in these tableaux, no consonants with an independent place are allowed; all stops and affricates are reduced to a glottal stop. This can be conceived of as an instance of *the emergence of the unmarked* (McCarthy and Prince 1994)—by FINAL-C » MAX, generally prohibited sounds (i.e., word-final consonants) are forced to surface, in which case they must be least marked.

Some considerations on other featural domains are necessary here. First, it is not clear to us which constraint(s), other than IDENT(PLACE), is violated when an affricate is reduced to a glottal stop. Whatever this constraint might be, it must be ranked lower than the place markedness sub-hierarchy. Second, since a glottal stop is [-voiced], the change from voiced stops to [ʔ] incurs a violation of IDENT(VOICE). Hence this constraint must be ranked below the place markedness sub-hierarchy, as the following tableau suggests. This ranking implies that preserving a place specification in order to retain its underlying voicing specification is not viable.

(26) *LAB, *DORS » *COR » IDENT(VOI)

/kaʒi/	*LAB	*DOR	*COR	IDENT(VOI)
a. [kaʒ]		*	*!	
b. ☞ [kaʔ]		*		*

3.3.3. Nasals

Nasals show a parallel behavior with stops. The phonetic status of word-final (or moraic) nasal is a matter of debate: it can be conceived of as a uvular nasal or a nasalized vowel assimilated to the preceding vowel. Whatever the actual phonetic property of this nasal is, what is important to our present discussion is that [N] can be considered as placeless phonologically. We follow this view, and assume that [N] emerges as a word-final consonant because it does not incur any violation of the place markedness sub-hierarchy.

(27)

/kami/	FINAL-C	MAX	IDENT(PLA) <ONS>	*LAB	*DOR	*COR	IDENT(PLA)
a. [kami]	*!			*	*		
b. [kam]		*		*!	*		
c.☞ [kaN]		*			*		*

3.2.4. Fricatives

The patterns of fricatives are slightly more complicated than the case of stops: fricatives are not reduced to a placeless coda [h]. This, however, has to do with the general ban against [h] in Kagoshima dialect. Due to this prohibition against [h], as word-final fricatives, the most unmarked sounds (i.e., coronal fricatives) appear. We assume that [s] and [ʃ] are both coronal, and they are distinguished in terms of height: [s] is [-high] and [ʃ] is [+high] (Cairns 1988 and reference cited therein). Here, a new ranking relation can be established. *H, the prohibition against [h] (and its allophonic variants), must be higher than *COR since coronal sounds emerge to avoid this potentially less marked sound. This does not come as a surprise at all since the distribution of [h] is strictly restricted in this dialect.

(28)

/kwaʃi/	FINAL-C	MAX	IDENT(PLA) <ONSET>	*H	*LAB	*DOR	*COR	IDENT(PLA)
a. [kwaʃi]	*!				*	*	*	
b. [kwah]		*		*!	*	*		*
c. ☞ [kwaʃ]		*			*	*	*	

(29)

/usu/	FINAL-C	MAX	IDENT(PLA) <ONSET>	*H	*LAB	*DORS	*COR	IDENT(PLA)
a. [usu]	*!						*	
b. [uh]		*		*!				*
c. ☞ [us]		*					*	

The two tableaux above show that underlying coronal fricatives are allowed to surface. Given the Richness of the Base (Prince and Smolensky 1993; Smolensky 1996; Kurisu 2000; McCarthy 2002b) we need to make sure that other fricatives surface as coronal word-finally. In other words, we need to allow for any kind of fricatives as a potential input, and make them all surface as coronal. Our ranking established thus far does the job, which is illustrated by the hypothetical form /uh/ in (30).

(30)

/uh/	FINAL-C	MAX	IDENT(PLA) <ONSET>	*H	*LAB	*DORS	*COR	IDENT(PLA)
a. [uh]		*		*!				
b. ☞ [us]		*					*	*

Indeed, any fricative sounds ([h], [ɸ], [ɕ], [ç], etc) turn into coronal given our ranking. Notice importantly that the coda condition alone on the other hand cannot account for this point. All fricatives with a place feature are equally bad with respect to the coda condition, and thus the coda condition is unable to differentiate the status of coronal fricatives from other fricatives. Therefore, dorsal and labial fricatives cannot become coronal fricatives due to the requirement of the coda condition.

What is important here is that coronal sounds are allowed to surface precisely because there is no less marked fricative i.e., coronals are most unmarked among other

options. Notice, then, that the overarching generalization that explains every aspect of coda consonants in this dialect is not that they are prohibited to have an independent place—the requirement expressed by the coda condition. Coronal fricatives constitute crucial counterexamples. Given the *violability* of Optimality Theory (Prince and Smolensky; see also McCarthy and Prince 1993), this apparent counterexample to the coda condition might not be a crucial flaw of the coda condition approach; however, it still fails to explain (i) why only coronals are allowed for fricatives, and (ii) why such an exceptional option is given only for fricatives. The approach we have developed readily provides an answer to these questions. Coronals are allowed for fricatives precisely because they are least marked options, and stops do not surface as coronals because there is an option which is less marked than coronals (i.e., a glottal stop).

Finally, to complete our discussion on fricatives, let us consider why [s] and [ʃ] are not neutralized. As above-mentioned, these two sounds are distinguished in terms of [±high]. Whether this be a privative or binary feature, some markedness constraint should prohibit the occurrence of this feature. The failure of neutralization suggests that this markedness constraint is ranked lower than IDENT(HIGH). Moreover, since [h] does not surface at the cost of violating *HIGH, *H is ranked higher than *HIGH.

(31) *HIGH: Feature specification in terms of [high] is prohibited.
IDENT(HIGH): The [high] specification in the input and output should be identical.

It is also important to note here that fricatives do not become stops in order to avert a violation of *COR. Thus, IDENT(CONT) must dominate *COR. More generally, manner features are preserved (except in the case of a rhotic which becomes a glide; see below). This suggests that faithfulness constraints regulating manner features such as nasality are ranked relatively high, i.e., at least higher than *COR.

(32)

/usu/	*LAB	*DOR	IDENT(CONT)	*COR
a. [uʔ]			*!	
b. ☞ [us]				*

Finally, coda devoicing is observed in the case of word-final fricatives (e.g., /kazu/ → [kas]). The prohibition against voiced coda can also be accounted for by PFT

by posing ranking below in (33) (see Beckman 1998: 28-51; for an alternative see Itô and Mester 1998, 1999b), where the ban against a voiced obstruent *VOIOBS is flanked by two kinds of faithfulness constraints:

(33) IDENT (VOI)<ONSET> » *VOIOBS » IDENT(VOI)

With this ranking, voicing contrast in onset consonants is preserved (e.g., [do:kiN] 'cleaning towel'). Coda consonants on the other hand cannot sustain voicing feature because the IDENT(VOI) is ranked lower than *VOIOBS. This is illustrated by the two following tableaux:

(34)

/do:kiN/	IDENT(VOI)<ONSET>	*VOIOBS	IDENT(VOI)
a. ☞ [do:kiN]		*	
b. [to:kiN]	*!		*

(35)

/kazu/	IDENT (VOI)<ONSET>	*VOIOBS	IDENT (VOI)
a. [kaz]		*!	
b. ☞ [kas]			*

3.3.5. Liquids

Finally, let us consider the behavior of a rhotic sound. The sound [r], placed word-finally, becomes a non-syllabic high front glide [j]. We assume that this sound forms a diphthong with the preceding nucleus vowel. We conjecture, first of all, that this is partly because there are no "placeless" liquids allowed in this dialect[10]. Therefore, it cannot be reduced to a placeless counterpart. Thus, rather than becoming a placeless liquid the language prefers to change the sound into a glide. This idea can be formally captured by the ranking: HAVEPLACE(LIQUID) » IDENT(CONS) (For HAVEPLACE, see Itô and Mester 1993; Padgett 1995 among others).

(36) HAVEPLACE(LIQUID): A placeless liquid is prohibited.

[10] In fact contrastive non-coronal liquids are extremely rare)Ladefoged and Madison 1996).

The next question is: why is [toj] more harmonic than [tor]? It is important to ask this question since the former candidate incurs an additional violation of IDENT(CONS). We conjecture that this is due to the ranking NOCODA » IDENT(CONS)—a diphthong [Vj] satisfies FINAL-C while simultaneously avoiding the violation of NOCODA.

(37) NOCODA: A syllable must not have a coda.

Following Clements and Hume (1995), we assume that [j] has a coronal place[11] specification. Then, HAVEPLACE(LIQUID) must dominate *COR because otherwise a candidate with a placeless liquid would be more harmonic than the desired candidate [toj]. The following tableau summarizes the story ([ℝ] represents a placeless liquid):

(38)

/tori/	HAVEPLACE(LIQUID)	*COR	NOCODA	IDENT (CONS)
a. [toℝ]	*!			
b. [tor]		*	*!	
c. ☞ [toj]		*		*

Concerning the ranking of NOCODA with respect to other constraints we have been considering, it must be ranked below FINAL-C because the latter intrinsically necessitates a violation of NOCODA. Next, the fact that this diphthongization strategy is not taken for stops and fricatives implies the ranking IDENT(SON) » NOCODA. The same pattern applies for nasals i.e., IDENT(NAS) » NOCODA. What these rankings imply is that, although a diphthong is the best in terms of markedness requirement in that it simultaneously satisfies FINAL-C and NOCODA, obstruents and nasals cannot become a part of a diphthong because of the relevant faithfulness requirement.

(39)

/kaki/	IDENT(SON)	NOCODA
a. ☞ [kaʔ]		*
b. [kaj]	*!	

[11] We abstract away from the distinction between V-Place and C-Place for the sake of simplicity. It is conceivable that IDENT(COR, V-PLACE) and IDENT (COR, C-PLACE) are different and hence can be separately ranked.

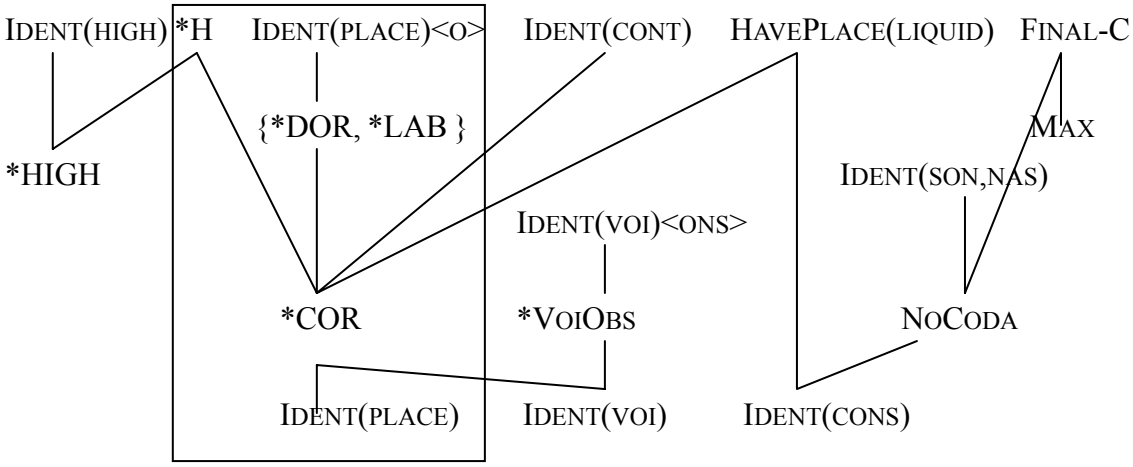
(40)

/kami/	IDENT(NAS)	NOCODA
a. ☞ [kaN]		*
b. [kaj]	*!	

4. Summary

We have established the following ranking to account for all of the behaviors of coda consonants, including word-final consonants, in Kagoshima dialect. The most important point is that this is compatible with what we saw in the interim ranking summary (indicated by a box below), which is responsible for the coda condition effect. Indeed, not only is the boxed ranking compatible with the fully developed ranking given below, but it is also enough to account for the reduction of word-final consonants.

(41) Final Ranking



What we have shown in this paper is that in PFT the ranking motivated to account for the behavior of coda consonants can naturally explain the consonant reduction as a result of apocope. This is because the generalization that pertains to both of the aspects in this dialect (i.e., the coda condition effect and the consonantal reduction) are such that coda consonants are required to be least marked to the extent possible. This can be uniformly captured as a result of the ranking IDENT(PLACE)<ONSET> » *PLACE » IDENT(PLACE).

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