DOGRIB CO-OCURRENCE RESTRICTIONS: THE DISAPPEARANCE OF [u]

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INTRODUCTION

Of the four Northeastern Athapaskan languages, Slave, Hare, Chipewyan, and Dogrib, Dogrib is the most innovative in its phonology (Saxon, personal communications, 2001). Although it maintains a large consonant inventory like the other languages, Dogrib has eliminated all codas, except [h]. It has also eliminated the round back vowel [u] from its vowel inventory. It is the disappearance of this particular segment, and the contexts in which the reflex sounds occur in Dogrib syllables that is the focus of this paper. These co-occurrence restrictions will be examined through a comparison of derived forms of Dogrib stems with Chipewyan and Slave cognates[1].

Using a general framework of Optimality Theory, this paper proposes the existence of a high-ranking constraint that prevents the realization of the historically high dorsal vowel in Dogrib. This high-ranking constraint motivates a series of identity and markedness constraints which ensure the underlying vowel as either [i] or [o], depending on the features of the preceding consonants. This paper also makes the suggestion that a general constraint against high, dorsal, continuant segments may extend to the consonant inventory of the language as well, since there is a tendency for a stem initial high dorsal consonant, [ɣ]to be realized as [y] in a coronal environment and as a [w] preceding [o].

The first section of this paper outlines the assumptions I will make in my analysis and provides some phonological background concerning Dogrib. The second section will introduce the high-ranking constraint that prevents the realization of [u] in Dogrib. The realization of [*u] as [i] in the environment of a preceding coronal consonant will be discussed in section three, and section four will discuss the realization of [*u] as [o] in a dorsal context. I will consolidate the constraints into three main constraints in the fifth section of this paper, and finally, the other co-occurrence restrictions discussed in this paper, concerning the voiced velar fricative [ɣ], will be briefly explored in section six.

1. ASSUMPTIONS AND BACKGROUND

This discussion of the historical change in the co-occurrence restrictions of Dogrib syllables follows from Lynda Ackroyd's work on Proto-Northeastern Athapaskan (PNEA). According to her 1976 paper, Dogrib merged [*ə] with [*o] from the PNEA period, and shifted [*u] to [i] (29). Dogrib's sound inventory therefore includes the following vowels:

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[1] The forms used in this paper will be cited as follows:The source of the Dogrib forms come from Saxon, & Siemens (eds), 1996, Tłı̨chǫ Yatıı̀ Enı̨htł'è : *A Dogrib Dictionary,* and will have a page reference for that text cited. The only exceptions come from field notes compiled by Dr. Leslie Saxon 1979-1984, and will be cited (Saxon, f.n.).The Chipewyan forms, unless otherwise specified, come from the Elford & Elford, 1998, *Chipewyan Dictionary* and will be cited with a page reference. The source of the Slave forms are taken from Howard, 1990, *South Slave Topical Dictionary* and, again, will be cited with a page number unless otherwise specified.

i

e **o**

a

Dogrib shares many of its phonological rules and historical changes with the dialects of Slave, such as the historical neutralizing of coda consonants to [**h**], and a tendency to avoid high velar consonants preceding the high coronal vowel [**i**]. The sequence [**gi**], for example, is not found in stems in either language (Saxon, personal communications, 2001). If Dogrib is the most innovative of the Northeastern Athapaskan languages, then Chipewyan is the most conservative. Chipewyan separated from the Northeastern language group before Dogrib and Slave separated from each other, and so Dogrib is more closely related to the dialects of Slave than to the language of Chipewayn (ibid). Chipewyan retains the greatest contrast of coda consonants as well as the full six vowel inventory of PNEA (Ackroyd, 53). When possible, I will use internally reconstructed forms based on the proto-PNEA segments Ackroyd has established. But for the most part, I assume for the sake of this paper that the cognate Chipewyan forms are the closest to the historical forms, and will use those forms as representations of the underlying vowels.

I also assume, following Clements and Hume 1995, that the feature, [coronal], applies to front vowels as well as coronal consonants, and the feature, [dorsal], characterizes back vowels as well as dorsal consonants such as velars. I assume all velar consonants in the Dogrib inventory have a dorsal feature, and the palatal sound [**y**] is both coronal and dorsal, as will be developed in section five. The alveo-palatals, unlike the palatal sonorant [**y**], pattern more closely with their alveolar counterparts, and so I assume they do not have a dorsal feature. I base this assumption on a widespread variation between alveo-palatal and alveolar articulations in Dogrib in the historically identifiable alveo-palatal segment (Saxon, personal communications, 2001). Many contemporary Dogrib speakers are replacing the alveo-palatal series with alveolar, which are less particularly complex (ibid). For example, the following alternations appear frequently in the Dogrib dictionary: **j~dz, zh~z, sh~z, ch~ts, ch'~ts'**. The words below are examples of the variation:

jihcho (55) ~ **dzitso** (23)	'big mitts'
gozhîi (47) ~ **gozîi** (47)	'breathing, breath'
shàà (90) ~ **sàà** (92)	'knot'
gocho (39) ~ **gotso** (46)	'ancestors'
ch'o (8) ~ **ts'o** (106)	'porcupine'

This shift indicates a merging of the two series and this merging supports the way they pattern together in respect to the data in this paper. [2]

Consonants aside, this paper will make use of just three distinctive features to distinguish the four Dogrib vowels from each other and from the forbidden [***u**]:

	High	Coronal	Dorsal
i	√	√	
e		√	
a			
o			√
***u**	√		√

[2] I therefore only include the older, alveo-palatal sound in my data lists within this paper.

The feature [labial] is not included in the distinctive features chart since it is redundant, and will be treated as an enhancing feature only. The feature dorsal suffices to distinguish the round vowels from the non-round vowels. Note too, that the vowel [**a**] does not share any of the features [high], [coronal], and [dorsal]. This paper follows the assumption that central vocoids are phonetically placeless (Clements & Hume, 1995).

2. THE DISAPPEARANCE OF [u]

The phonology of Dogrib does not include a high dorsal vowel, despite the historical existence of such a form. As mentioned above, Ackroyd documented a shift in Dogrib from this older vowel, found in the closely related languages, to its coronal counterpart [**i**]. But Ackroyd does not mention the other less common reflex of [***u**], which is [**o**]. This reflex is also regular and will be discussed further in Section IV. For the sake of this section, however, I argue that both these reflexes are the result of a high-ranking constraint that does not allow the realization of [***u**] in all of its features. This repression of [***u**] in all of its features may be formalized as a constraint such as that below in (1).

(1) No dorsal, high vowels: *u

This historical constraint is context free and successfully prevents [**u**] from occurring in the Dogrib language. An unrelated language of the Salish family, Saanich, can be provided as cross-linguistic evidence for such a specific constraint as ***u** , since it too has a historical constraint against such a high, dorsal segment (Montler, 18).

Below in (2) are some examples of forms[3] which historically would have contained an [u] in Dogrib, but no longer realize this vowel in all of its features[4]:

(2)

Dogrib	*Slave*[5]	*Chipewyan*	**PNEA*[6]
degho̜ 'snore' (15)	**ts·edeghu̜** 'snore' (Howard, 250)	-**ɤù̜** 'growl' (Li, 135)	***-ɤù̜**
naeko 'vomit' (226)	**nats·edekuh** 'vomit' (Howard, 285)	**naku** 'he vomited' (336)	***-ku**[7]
ts·eht·ih 'scale (fish)' (Saxon, f.n.)	**ts·eht·u** 'scale (a fish)' (Howard, 443)		***-t·u**
ɬie ~ **ɬiwe** 'fish' (165)	**ɬue** 'fish' (152)	**ɬuɛ** 'fish' (24)	***-luə**

Again, this data indicates that although [**u**] has been retained in Slave and Chipewyan, this vowel has changed into two different vowels, [**i**] and [**o**]. The constraint introduced in (1) accounts for why [***u**] is not realized, but it does not answer the other question raised by the data in (2), which is the question this paper will explore: Why are there two possible realizations for the historical vowel? The following two sections provide a possible explanation.

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[3] This paper examines only the stems, so they are bolded when necessary to distinguish them.

[4] The Dogrib and Salve spelling conventions are consistently based on the Roman alphabet. For the most part, the Chipewyan script is as well, although there is a distinction made between [**e**] from [***e**] and [**ɛ**] from [***ə**]. Please note, however, that stems from Li's stem list, 1932, are based on the phonetic pronunciation.

[5] All of the Slave forms provided are of the dialect of South Slavey, which is the dialect most distinct from Dogirb.

[6] These forms are based in Ackroyd's analysis and reconstruction of PNEA (53).

[7] This form, as well as [***t·u**] 'scale (a fish)' may or may not contain a coda.

3. THE CORONAL INFLUENCE

The context free constraint introduced above interacts with several context sensitive constraints in order to select the correct vowel to replace the forbidden [*u]. The first constraint generated by the grammar is awareness constraint that discourages dorsal vowels in the environment of coronal consonants. Such a context sensitive markedness constraint may account for the data in (3), which demonstrates how a historical [u] is realized as an [i] when preceded by a consonant with the place feature coronal.

(3)

Dogrib	*Slave*	*Chipewyan*
ti 'lake, water' (228)	**tu** 'water' (9)	**tu** 'lake, water' (37)
deji 'mosquito' (198)		**dejuli**[8] 'mosquito' (43)
sìdìi 'funny' (168)		**súdì** 'funny' (27)
gots·ǫ̀ǫ̨hjìi 'spruce cones' (214)		**ɛl najúlɛ** 'spruce cones' (63)
tɬ·i 'string' (216)	**tɬ·uh** 'string' (10)	**tɬ·ulazɛ** 'string' (65)
nàyeeht·i 'punch' (200)	**náts·enet·uh** 'hit with fist' (Howard, 443)	**nánɛst·us** 'I punched him' (250)
nàyeeli 'sew' (207)	**eɬetahnę́ę́dluh** 'be sewn together' (Howard, 334)	
nàich·ih 'ripped' (Saxon, f.n.)	**edech·uh** 'be torn, tear' (Howard, 85)	
gozhìi 'clothes' (153)	**zhú** 'clothes' (59)	**yú** 'clothes' (13)

The above data shows how coronal, non-dorsal consonants influence the realization of the underlying vowel. As mentioned in the first section of this paper, alveo-palatals behave like alveolars in that their influence blocks the dorsal feature of [u] from being realized. This shared behaviour is evident in the data in (3). I offer a more formal representation of this influence by formulating the context sensitive markedness constraint*[coronal] [dorsal] in (4):

(4) A coronal consonant cannot be followed by a dorsal vowel: *[coronal][dorsal]

This constraint encourages the least marked situation to occur. The elimination of the [u] forces a change of features in the vowel, and the language selects a realization of the vowel which is as unmarked as possible, since a sequence of two coronal segments is less marked than a sequence of a coronal followed by a dorsal segment.

This markedness constraint, therefore, works together with the markedness constraint in (1), and helps explain the realization of the [u] input as an output of [i]. But the constraint in (4) is not prominent enough in the phonology of the language to prevent all occurrences of a coronal consonant followed by a dorsal vowel. There are words that occur in Dogrib that violate the constraint in (4), such as the forms below in (5).

[8] Dogrib has lost many final syllables in stems, as well as codas, where Chipewyan has retained them.

(5)

	Dogrib	Slave	Chipewyan
a.	**gocho** 'ancestors' (140)	**secho** 'my parents' (21)	
b.	**chǫ** 'rain' (202)	**chǫ** 'rain' (108)	**chą** 'rain'(53)[9]
c.	**tɬ'o** 'grass' (172)	**tɬ'o** 'grass' (100)	**tɬ'ogh** 'grass' (29)[10]
d.	**t'oò** 'paddle' (195)	**t'oh ~ tohé** 'paddle' (75)	**t'óth** 'paddle' (47)
e.	**nàʔedlò** 'laugh' (183)	**náets'edló** 'laugh' (40)	**násdlógh** 'I laugh' (208)

The vowels of these words maintain their dorsal feature because they remain faithful to the features of the underlying vowel, which the cognate forms indicated to be [o] in the examples in (5). This realization of the dorsal vowels following the coronal consonants in the above examples indicated that the faithfulness constraints which protect the place of articulation of input vowels may be more highly ranked than the markedness constraint in (4). The Dogrib cognates in (5) do not violate the faithfulness constraint in (6) because their vocalic input identity corresponds with the output identity.

(6) If an input segment is [dorsal] then its output segment correspondent is [dorsal]: Ident IO [dorsal]

This constraint conflicts with the markedness constraint in (4) and so it is violated by the forms in (3) but satisfied by all the forms in the data in (5). In less formal terms, the forms in (5) are not motivated to change by the constraint against [u], so they are satisfied to remain in their somewhat marked sequences.

As a continuation of the data presented in (5), the data below in (7) present more coronal consonants followed by dorsal vowels.

(7)

Dogrib	Save	Chipewyan	*PNEA
done ~ dǫ 'person' (196)	**dene** 'person' (18)	**dɛnɛ** 'person' (49)	***dənə**
too 'night, darkness' (192)	**tedhe** 'night' (112)	**tɛdhɛ** 'night' (45)	***təðə**

These dorsal realizations would violate both constraints introduced in this section so far, but, like the data in (5), the constraint against the dorsal high vowel is not relevant to these forms. Therefore the vowels of these forms are not motivated to change further.

Historically, these two examples in (7) differ from the previous examples in (5) because the output dorsal vowel is derived from a [*ə], not [*u]. The constraint in (6) would be irrelevant to this data because there is no dorsal quality in the input vowel to license the dorsal feature of the output vowel. The output vowel in the forms in (7), then suggests that the historical process which changed [*ə] to [*o] in Dogrib stems (Ackroyd, 29) must have taken place before these two conflicting markedness and faithfulness constraints became highly ranked. This historical change is not under examination in this paper, but its occurrence and effects indicate how much of the irregularity of modern forms may be explained through a diachronic rather than synchronic examination of the phonology of a language such as Dogrib.

The interaction of the two constraints introduced in this section thus far do account for the data in (3) as well as that in (5). The identity constraint ensures as many features of the input vowel are retained as possible,

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[9] The nasalization of the low vowel [a] often raises the quality slightly and results in [ǫ] in Dogrib, and a similar process may explain this vowel difference in the Chipewyan cognate.

[10] The dorsal coda forms in (5c) and (5e) may have historically exerted influence over the quality of the stem vowels, but forms such as that in d. with a coronal coda undermines this possibility.

while the markedness constraint ensures that the realization is as unmarked as possible within the environment in which it occurs. For a formal tableau of the interactions of these constraints with examples from the data in (3) see Appendix I A.[11]

Having established an interacting faithfulness and markedness constraint regarding the interaction of coronal consonants and dorsal vowels, the data in (5) and that in (3) where their respective input remains or becomes [i] can be accounted for. The next section will introduce parallel constraints in order to explain in which environments the historically high dorsal vowel retains its dorsal place rather than its height.

4. THE DORSAL INFLUENCE

The data presented in this section exemplify how the corresponding output of [u] is not always [i]. The words below in (8) have stems which suggest that if the stem initial segment is dorsal, the dorsality of the vowel will be maintained, and the [*u] will be realized as [o].[12]

(8)	*Dogrib*	*Slave*	*Chipeywan*
yegho 'scrape hide' (206)		**ts·eghuh** 'scrape, scratch' (Howard, 250)	**-ɤúl** 'to scrape' (Li, 135)
naeko 'vomit' (226)		**nats·edekuh** 'vomit' (Howard, 285)	**naku** 'he vomited' (336)
deghǫ 'snore' (212)		**ts·edeghu̧** 'snore' (39)	**-ɤú̧** 'growl' (Li, 135)
gòo 'worm' (231)		**gu** 'earthworm' (98)	**gu** 'worm (76)
gogòh 'pig' (197)		**gugúh** 'pig' (86)	**guhgús** 'pig' (49)
eghòò, goghòò 'tooth' (223)		**goghú** 'tooth' (38)	**ɛghú** 'tooth' (67)
tsà ekòo '2 year old beaver' (102)			**ɛkúi** 'younger beaver' (5)

The forms above in (8), wherein the underlying vowel is realized as [o], are far less common then those in (3) wherein the vowel is realized as [i]. Despite their relative infrequency, they must be accounted for with a context sensitive constraint which discourages the sequence of a high, dorsal consonant followed by a coronal vowel. A formalization of this constraint, such as the one above in (9) cannot be ranked more highly than a faithfulness constraint, such as that in (10).

(10) If an input segment is [coronal] then its output segment correspondent is [coronal]: Ident IO [coronal]

If these markedness constraints were given precedence in the language over the identity constraints like that in (10) coronal vowels would never occur in dorsal environments. But as the data below in (11) indicates, coronal vowels do sometimes follow dorsal consonants.

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[11] The tableaux included in the appendices are not included in the body of the paper because the complications and technicalities of determining the rankings obscure the main argument of the paper. Optimality Theory is therefore only used as a general framework of the paper.

[12] There is an exception to this pattern for which I have no explanation. The stems for 'fish eggs': Slave [k·u̧ȩ́] (102) and Chipewyan [k·únɛ] (58) contain [u], yet the cognate stem in Dogrib is realized as [k·i̧i̧] (165)

(11)	*Dogrib*	*Slave*	*Chipewyan*
a.	**kʻi** 'birch' (145)	**kʻi** 'birch' (97)	**kʻi** 'birch' (57)
b.	**kʻi̯a̯ʃie ~kʻe̯e̯ʃie** 'saskatoon berry' (206)	**kʻi̯ʃié** 'saskatoon berry' (100)	**kʻi̯hiʃié ~ kʻi̯hʃie** 'saskatoon berry' (57)
c.	**tsàkè̯è̯ ~ tsàkī̯ī̯** 'beaver lodge' (144)		**tsákînɛ** 'beaver lodge' (5)
d.	**gokè** 'foot' (166)	**goké** 'foot' (35)	**ke** 'foot' (26)

Thedata in (11) are evidence for the constraining force which ensures the features of the input vowel will be maintained wherever possible. If a vowel with the input of a coronal place feature follows a dorsal consonant, it will retain its coronality in the output, despite the constraint against the opposing place features of consecutive consonants and vowel sequences. The input quality is maintained because without the motivation of the markedness constraint against [u] pushing the vowel to change, the markedness constraints are less relevant than the faithfulness constraints.

The faithfulness constraint in (10) can therefore explain why coronal vowels maintain their place features when preceded by a dorsal consonant. But no constraint so far has addressed the feature [high]. Like the faithfulness constraints surrounding the place features [coronal] and [dorsal], an identity constraint is needed to retain a connection between the input [u] and the output [i] in forms such as those above in (11) as well as those in (3), in Section II. In order for the constraints in (9) and (10) to remain relevant to the problem of the realization of [u] in the most harmonic, yet faithful, way possible, they must interact with one more faithfulness constraint which has the function of maintaining the place feature [high]. Such a constraint as that in (12) ensures the place feature [high] is maintained whenever possible when [u], or any high vowel is the input vowel.

(12) If an input segment is [high] then its output segment correspondent is [high]:
Ident IO [high]

As an individual constraint, Ident IO [high] will promote the realization of [u] as [i] and therefore helps to account for the earlier data presented in Section II, as well as that in (11).

This constraint also acts in co-operation with the other identity constraints introduced so far. Together, all three conflict with the markedness constraints against coronal-dorsal, or dorsal-coronal sequences. Please see Appendix I B for a formal tableau demonstrating the ranking of the constraints introduced thus far.

5. COMBINING CONSTRAINTS

A reassessment of the constraints proposed thus far may simplify my present analysis. Rather than presenting six different constraints to account for the data presented so far, I suggest there are just three prominent tendencies in the language acting together that effect these various co-occurrence restrictions relevant to the disappearance of [u].

The first tendency, of course, is that which avoids realizing high dorsal vowels, the original constraint introduced in Section II, restated below:

(1) No dorsal, high vowels: *u

The second tendency is one which preserves the place features of the segment undergoing change. If all three faithfulness constraints protecting the dorsal, coronal, high features of this input vowel could be combined into one faithfulness constraint it would be formalized into a cover constraint like that in (14) which would represent this second tendency.

(14) Correspondents in input and output must have identical place features: Ident IO (Place) (Kager, 132)

This constraint covers all three place features under examination in this paper and is far less redundant. It represents a general faithfulness tendency.

The third tendency is to prevent marked sequences such as dorsal consonants preceding coronal vowels, and promote unmarked sequences in which the onset and rhyme of a stem share at least one place feature. In order to represent such a general anti-markedness tendency, the context sensitive markedness constraints can be consolidated, and therefore simplified, in a similar manner. I therefore propose the formalized cover constraint in (15), which eliminates the redundancy of the two markedness constraints *[coronal][dorsal] and *[dorsal][coronal].

(15) A vocalic segment must share a place of articulation with its preceding segment: Same Place

As previously stated, these two cover constraints in (14) and (15), representing two general tendencies, are motivated by the first tendency--an overriding intolerance of the high, dorsal vowel, [***u**]. Once motivated, they interact to ensure the output vowel is as close to its former realizations as possible, in the most harmonic way possible. For a formal representation of how the three consolidated constraints are sufficient in accounting for the correct forms in the data sets provided so far and how they are ranked in relation to each other, see Appendix II.

The next section provides a brief discussion of how these tendencies extend to consonants as well.

6. CORONAL AND DORSAL INFLUENCE ON [ɣ]

The three general tendencies established in the previous section are not necessarily limited to the realization of the vowel with the features high and dorsal. They also extend to the consonantal counterpart of [**u**]. The velar fricative [**ɣ**] shares the features high, dorsal, continuant and voice with the vowel [**u**]. The constraints established to account for the behaviour of the vowel, may therefore also be able to account for the behaviour of [**ɣ**].

This velar fricative [**ɣ**] does still appear in the Dogrib language, but its distribution and the variation in its pronunciation suggests it may be disappearing under the pressure of a similar constraining tendency. The highly-ranked constraint [***u**] may therefore be undergoing a change: it is beginning to extend to all high, dorsal continuant, voiced segments. Like [**u**], [**ɣ**] is often realized as a high, vocalic segment in a coronal environment and a dorsal vocalic segment in a dorsal environment. But rather than being triggered by the consonant, like the processes discussed in the previous sections, this change to the consonant is triggered by the features of the following vowel.

The data below in (16) demonstrates how a stem initial [**ɣ**], represented in the orthography as [**gh**], becomes a palatal glide [**y**] before a coronal vowel.

(16)	*Dogrib*	*Slave*	*Chipewyann*
	naeghį ~ naeyį 'melt' (Saxon, f.n.)	**naaghį** 'melt' (Howard, 243)	**nalghį** 'it's being melted' (225)
	eghe ~ eye 'drum' (160)	**eyeli** 'drum' (69)	**hélghɛli** 'drum' (20)
	eye 'itchy' (180)	**egheh** 'itch' (Howard, 242)	**ts·ɛghethi** 'itch' (35)
	eghè ~ eyè 'eggs' (161)	**eyéhttth·ęę** 'eggs' (71)	**ɛghézé** 'eggs, testicles' (21)
	dèèyeh 'calm down' (149)	**dĩghéh** 'calm down' (Howard, 242)	**déghɛl** 'it became calm' (102)

A segment such as [**y**] is like other palatal sounds in that it has both coronal and dorsal features (Gussenhoven & Jacobs,1998). According to the markedness constraint, **Same Place**, in (15), the place feature [coronal] is what makes [**y**] a less marked candidate to precede a coronal vowel than a non-coronal segment like the velar fricative [**ɣ**].[13] Since [**y**] has all three high, coronal and dorsal features the constraint in (14) is satisfied. The only place feature the high glide does not share with the input segment [**ɣ**] is the feature coronal, but since this feature belongs to the output segment and not the input segment, it does not violate identity.

If the realization of [**ɣ**] as [**y**] can be considered parallel to the realization of [**u**] as [**i**], the variation[14] of [**ɣ**] to the dorsal, round approximate [**w**] might also be considered parallel to the realization of [**u**] as [**o**]. The next data, below in (17), are spelt with a [**gh**], but the pronunciation of this segment in these words resembles that of the approximant [**w**] (Saxon, 1990).

(17) *Dogrib*

a. **goghòò** 'teeth' (41)
b. **goghoò** 'age' (139)
c. **goghoh** 'thigh' (41)
d. **ewohkwǫ̀** ~ **eghohkwǫ̀** 'meat from the thigh and buttocks of a caribou' (37)

As would be expected, it is the dorsal vowel [**o**] which triggers the change to the dorsal approximant. The labial feature may be relevant in this sequence as well, since both [**o**] and [**w**] share the feature [labial] as well as the feature [dorsal]. Another aspect of the environment that may affect this lenition of [**ɣ**] to [**w**] is stress. For example, the form in (17d) is a compound wherein the second element ***-kwǫ̀*** is the head. The stem that changes to ***-who***, then, is the unstressed element, less likely to retain a marked articulation such as [**ɣ**]. This phenomenon, and the behaviour of [**ɣ**] calls for further study and analysis, but for the purpose of this paper the ways this segment alternates offers support to the analysis of the reflexes of [**u**], and the three general tendencies at work which determine how the vowel is realized.

CONCLUSION

What marks the greatest difference between the variations of [**ɣ**] and of [**u**] is that the constraint against [**u**] is active and highly ranked, and so always motivates the other two cover constraints. The segment [**ɣ**], however, is often still realized in Dogrib, despite the alternations that do occur, which suggests the constraint is still in flux. The phonology of the language is still undergoing a process based in historical change. Formal tableaux are not offered to support the last section of this paper due to the difficulty of ranking constraints within Optimality Theory when the constraining tendencies in question have not yet stabilized. Two appendices do, however, provide tableaux for the analysis of the vowel.

The main discussion of this paper centred on the three major constraining tendencies, the first of which motivates the other two. Because the language has a constraint against high dorsal elements identity constraints and markedness constraints must act on the input in order to ensure the output is as faithful and as unmarked as possible. One result of this interaction is the realization of this historical vowel [**u**] as [**i**] when following a coronal

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[13] It may be possible that the approximate nature of [**y**] would allow its articulation to be somewhat less fixed, and therefore more able to favour the coronal element over the dorsal element of articulation when in a coronal environment such as that in (16).

[14] I use the term 'variation' to describe [**ɣ**] to [**w**] rather than 'alternation' because the change has not yet become stabilized, although it does not occur in the specific environment of a following coronal vowel.

consonant and [o] when following a dorsal consonant. The other result is the maintenance of the input features of all vowels that do not have an input of [u].

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APPENDIX I

As previously stated in a footnote, the tableaux included in the appendices are not included in the body of the paper because of the complications and technicalities of determining rankings obscure the main argument of the paper. However, the following tableaux attempt to represent a more formal account of the constraint interaction discussed in the body of the paper.

A)

The tableaux below used the form ***tɬ'o*** 'grass' from the data set in (5) to demonstrate that the identity constraint must be ranked more highly than the markedness constraint in order to produces the correct output:

i.)

tɬ'o	**Ident IO dorsal**	***[coronal] [dorsal]**
⇒ a. **tɬ'o**		*
b. **tɬ'i**	*!	
c. **tɬ'e**	*!	
d. **tɬ'a**	*!	

In i) above, the optimal candidate was the only one that satisfied the identity constraint.

For the purpose of the next tableau, the crucial ranking of faithfulness constraints over markedness constraints extends to the forms in the data in (3), like the word ***tɬ'i*** 'string', with one major difference. The constraint ***u** motivates the other constraints and therefore outranks them. This tableau makes use of all the identity constraints introduced in the second, third and fourth sections of the paper and the markedness constraint which militates against the dorsal vowel following a coronal consonant, which is acting as a tie breaker between candidates a. and b. below:

ii.)

tɬ'u	***u**	**Ident IO [coronal]**	**Ident IO [dorsal]**	**Ident IO [high]**	***[coronal][dorsal]**
⇒a. **tɬ'i**			*		
b. **tɬ'o**				*	*!
c. **tɬ'u**	*!				*
d. **tɬ'e**		*	*!		
e. **tɬ'a**			*	*!	

B)

The two elements in this section act in support of the argument made in the fourth section of this paper. They indicate how data from (8), like the form for 'worm', **gòo** , as well as data from (11) like the form **k'i** 'birch' can be formally accounted for with the constraints introduced so far. These forms indicate the crucial ranking between the following:
Context Free Markedness Constraint >> Faithfulness Constraint >>Context Sensitive Constraint

i.)

gù + V	*u	Ident IO [coronal]	Ident IO [dorsal]	Ident IO [high]	*[dorsal][coronal]
⇒ a. gòo				*	
b. gèe			*!	*	*
c. gìi			*!		*
d. gàa			*!	*	
e. gùu	*!		*		

Note: this V added to the stem ***gù*** is a nominalizing suffix common in Dogrib.

ii.)

k'i	*u	Ident IO [coronal]	Ident IO [dorsal]	Ident IO [high]	*[dorsal][coronal]
⇒ a. k'i					*
b. k'o		*	*!	*	*
c. k'e			*	*!	*
d. k'u	*!	*	*		*
e. k'a		*	*!		

Appendix II

The following tableaux demonstrate the interactions of the three cover constraints with a form from each data set presented in the body of the paper. The three constraints are re-identified below:

1.) The constraint against a high, dorsal, vocalic segment ***u**.

2.) The cover constraint **Ident IO (Place)**, which militates against a change in the place features dorsal, high and coronal.

3.) The cover constraint **Same Place** militates against a sequence of a consonant and vowel that do not share a place of articulation.

The tableau in (i) demonstrates how these constraints interact to produce forms like ***ti*** 'lake, water' from data set (3).

i.)

tu	*u	Ident IO (Place)	Same Place
⇒ a. ti		*	
b. to		*	*!
c. te		**!	
d. ta		**!	*
e. tu	*!		*

Although the tableau in (ii) does not prove a crucial ranking between **Ident IO Place** and **Same Place**, the following tableau in (iii) indicates that the ranking must indeed be crucial in order for the optimal candidate, ***nàʔdlò*** 'laugh' to surface.

ii.)

-dlò	*u	Ident IO (Place)	Same Place
⇒ a. -dlò			*
b. -dlì		*!	
c. -dlù	*!	*	
d. -dlè		*!	
e. -dlà		*!	

Candidates b-e. only violate Ident IO (Place) once each because an [o] is only defined with its dorsal feature in this paper.

The following tableau is an example of the of how the constraints account for data from (8), like **nats'eko** 'vomit':

iii.)

-ku	*u	Ident IO (Place)	Same Place
a. -ki		*!	*
b. -ku	*!		
c. -ke		**!	*
⇒ d. -ko		*	
e. -ka		**!	

This final tableau demonstrates the same three cover constraints in the last environment that [*u] fails to surface in which is under examination in this paper. A term from the data set, (11) like ***tsàkèè̩*** ~ ***tsàkī̩*** 'beaver lodge', where there is more variation in the vowel quality would not be easy to account for with this ordering of constraints. However, the following term from data set (11), ***k'i*** 'birch', whose input vowel has the same features as its output vowel can be accounted for as the tableau in (iv) shows, despite its marked sequence of a dorsal consonant and coronal vowel.

iv.)

-k'i	*u	Ident IO (Place)	Same Place
⇒ a. -k'i			*
b. -k'u	*!	*	
c. -k'o		**!	
d. -k'e		*!	*
e. -k'a		**!	