Journal of Germanic Linguistics **34.3** (2022):288–339
doi: 10.1017/S1470542721000234

Faroese Preaspiration: A Nucleus/Onset Interaction Analysis

Laurence Voeltzel

Université de Nantes

This paper focuses on Faroese preaspiration, a phenomenon observed in Western Nordic and in some Eastern Nordic dialects, where fortis stops are preceded by a glottal frication noise in specific contexts. After observing all environments where the mechanism is triggered, I provide phonological representations of the phenomena based on Government Phonology 2.0. In this model, the segmental structures contain melody but also space, which allows for intersegmental relations such as lengthening, even without adding new morphological material. As preaspiration depends on the vowel preceding the fortis stop—more precisely, on its vocalic quality and length—I propose analyzing preaspiration as a spreading of the fortis consonant toward the vowel on the left. In doing so, I provide a unified analysis of all environments in which preaspiration occurs.[*]

Keywords: Western Nordic, Government Phonology 2.0, segmental structure, syllabic structure, phonological lengthening, preaspiration

1. Introduction.

Preaspiration is a phonological process that is active in several Nordic languages—namely, in the majority of Faroese and Icelandic varieties, and in some dialectal varieties of Swedish and Norwegian—but also in other unrelated languages (Steriade 1997, Silverman 2003, Miller et al. 2005, Stevens & Hajek 2007, Gordeeva & Scobbie 2010, Iosad et al. 2015, Iosad

[*] I would like to thank my reviewers for their insightful comments and my colleagues at the LLING for their helpful feedback. All remaining errors are mine.

© Society for Germanic Linguistics 2022.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

2020). Preaspirated segments are preceded by a glottal frication noise ([hC]), which is usually heard after the oral burst of postaspirated stops. In the Nordic family, this phenomenon that affects fortis stops is mostly known through Icelandic, Faroese's closest sister language (Kingston 1990, Pind 1995, Ringen 1999, Keer 2000, Helgason 2002, Hansson 2003, Hoole & Bombien 2010, Árnason 2011, Heimisdóttir 2014). Faroese preaspiration is described as less prominent than the Icelandic one, the aspiration noise duration being shorter in Faroese than in Icelandic (Pétursson 1972, Hansson 2003, Árnason 2011:215, Thráinsson et al. 2012:47). The exact measurements are presented below in table 1 from Thráinsson et al. 2012:47. In Faroese, the duration of preaspiration is shorter than the duration of the closure of the following consonant even when it is a singleton. In Icelandic, by contrast, the duration of preaspiration is close to the duration of a simple stop, making it acoustically comparable to a full-fledged segment.

	Type of word	Length (averages in ms.)		
		Vowel	Preaspiration	Closure
Faroese	pápi, fata, baka	128	70	159
	lappi, hattur, bakka	60	74	227
	abbi, staddur, bagga	81	0	246
Icelandic	pápi, fata, baka	192	0	94
	lappi, hattur, bakka	99	95	110
	abbi, staddur, bagga	87	0	185

Table 1. Duration of preaspiration in Faroese and Icelandic.

This difference in duration leads to a different notation in each language: While in Icelandic preaspiration is transcribed as a full-fledged glottal fricative ([hC]), in Faroese it is noted as a feature of the stop, an aspiration reflex ([ʰC]) (Hansson 2003:50, 64).[1] In some studies, Faroese

[1] The different status given to these two kinds of preaspiration is also based on their role in syllabic structure. This is particularly visible in examples such as *epli* [ˈeːʰplɪ] 'potato.NOM.SG' (Faroese) versus *epli* [ˈɛhplɪ] 'apple.NOM.SG' (Icelandic). Vowel length in Faroese and Icelandic is based on two criteria (which are described and illustrated in more detail in 7): A vowel surfaces as long when it is stressed and in open syllables. In the previous examples, both /e/ and /ɛ/ are

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

preaspiration has even been disregarded in the transcriptions.[2]

Besides the phonetic difference between Icelandic and Faroese preaspiration, the two realizations also vary with respect to the contexts that trigger them. While all the preaspiration triggering contexts that are active in Icelandic are also active in Faroese (gemination and most /fortis+sonorant/ clusters), Faroese includes two additional environments where preaspiration can occur: intervocalic and word-final singletons.

This paper focuses on Faroese preaspiration and aims at providing phonological representations of the phenomenon.[3] More specifically, I look at the intervocalic context, which is a good indicator of how preaspiration is triggered in Faroese and its precise conditions. In doing so, I show that all the triggering contexts that are commonly described can be reduced to a single condition that is related to the preceding vowel. After identifying the trigger for preaspiration, I propose representations of the affected stops. My hypothesis being based on an interaction between a stop and the preceding vowel, I also provide representations for both consonants and vowels in order to illustrate the mechanism at play.

This paper is organized as follows. In section 2, I first introduce the Faroese stops and their behavior with regards to aspiration. I then focus on

---

stressed and followed by a possible onset /pl/, yet only Faroese has a long vowel. Based on this distribution of length, it seems that Faroese [ʰpl] behaves like any other /stop+liquid/ cluster as if the preaspiration was not there ([ɛː.ʰplɪ], compared to [ˈmøː.blaɪ] 'furniture.NOM.PL'). In Icelandic, by contrast, preaspiration seems to act as a consonant on its own, yielding a closed syllable followed by a /stop+liquid/ cluster (Árnason 2011:231, [ˈɛh.plɪ]).

[2] Lockwood (1964:7f.) makes the following observation: "In any case this preaspiration is no more significant than the aspiration heard after Faroese k, p, t on some position, i. e. [kʰ, pʰ, tʰ], as also in English. None of these aspirations are marked in the ordinary transcriptions in this book." Barnes & Weyhe (2002:194f.) write: "In common with their Icelandic counterparts, Faroese [pː, tː, kː] are pre-aspirated; pre-aspiration also occurs before [cː] and sporadically before /p, t, k/ + certain consonants. Neither this nor postaspiration is marked in the phonetic transcription used here."

[3] For more details about the Eastern Nordic preaspiration, see Helgason 2002. For a more comprehensive overview on Icelandic preaspiration, see Thráinsson 1978, Ringen 1999, Keer 2000, Helgason 2002, Hansson 2003, Árnason 2011, Heimisdóttir 2014, Voeltzel 2016.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

the contexts where preaspiration is triggered. I contrast these contexts with the inhibiting contexts in order to identify the required conditions for the mechanism to apply. In section 3, I discuss the framework I use to represent segments. In section 4, I illustrate the internal layout of Faroese stops. Preaspiration, although it affects consonants, is closely linked to the identity of the flanking nuclei. Consequently, in section 5, I introduce the representations I use for vowels. Finally, in section 6, I illustrate the preaspiration mechanism using examples where the phenomenon is triggered, but also where it is inhibited. In doing so, I show the possible interactions between the onsets and the preceding nuclei.

2. Faroese Preaspiration.

As previously mentioned, preaspiration affects fortis stops only. In this section, I present the obstruents of Faroese with particular attention to their behavior with respect to aspiration.

2.1. Post- and Preaspiration of Obstruents.

Faroese has two series of stops: fortis stops /p, t, k/ and lenis stops /b, d, g/. Like other Germanic languages, the contrast between the two series is based on aspiration—not on voicing (Iverson & Salmons 1995, Beckman et al. 2013). Fortis stops are lexically aspirated [p^h, t^h, k^h], while lenis stops are not (Árnason 2011:99, 118; Thráinsson et al. 2012:43). In most dialects of Faroese, voicing is not part of the phonological representation of stops. Thus, the symbols [b, d, g] used in this paper for lenis stops do not refer to voiced consonants, but to lexically unaspirated stops.[4]

Acoustically postaspiration corresponds to a glottal frication noise that occurs during and after the sudden air release in the articulation of a stop. From a phonetic perspective, aspiration results from a VOICE ONSET TIME delay—vocal folds' vibrations start after the oral burst, while articulators are

[4] I choose to use different symbols to transcribe fortis and lenis stops, as fortis consonants [p, t, k] often undergo deaspiration (this topic is further developed below). Árnason (2011) chooses to transcribe the fortis and the lenis stops with the same symbols: [p, t, k]. Consequently, lenis and deaspirated fortis consonants are written identically. Thráinsson et al. (2012) use the devoicing diacritic for lenis stops, which are transcribed [b̥, d̥, g̥]. As voicing is not an active feature in standard Faroese, I maintain the notation [b, d, g] for lenis stops, without any reference to a (de)voicing diacritic. This allows me to distinguish them from deaspirated fortis stops, while acknowledging that they are not voiced in most Faroese dialects.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

already in position for the following vowel's articulation. By contrast, preaspiration corresponds to a glottal frication noise that intervenes before the positioning of the articulators and the silence, characterizing stops.[5]

Both types of aspiration are illustrated below: Figure 1 shows the spectrogram of the word *kóka* 'boil.INF' pronounced by a native speaker of Faroese, where the first /k/ is postaspirated.[6] The release phase of the stop is followed by a continuous and diffuse noise. In figure 2, representing the word *taka* 'take.INF' pronounced by the same speaker, /k/ is preaspirated. A diffuse noise is produced before the silent phase of the stop.

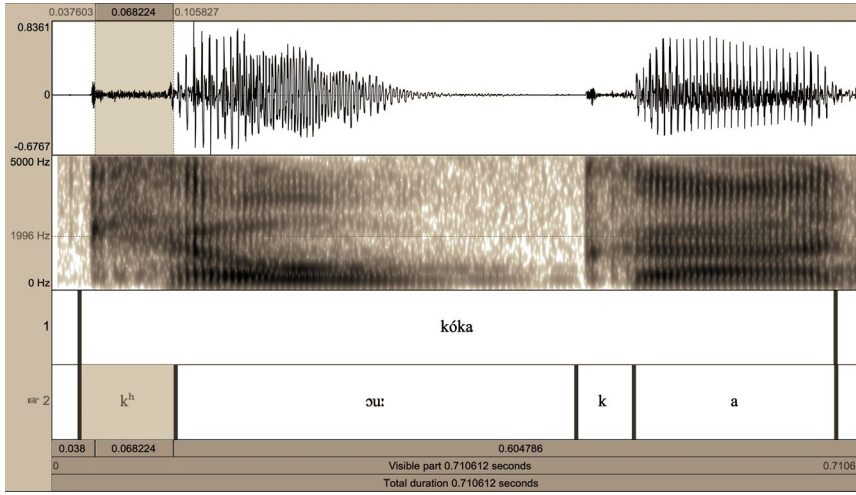


Figure 1. Faroese postaspiration.

[5] For a more detailed view on the perception and the acoustic cues of (pre)aspiration, see Kingston 1990, Pind 1995, Hoole & Bombien 2010. Note that these studies are about Icelandic preaspiration; however, they are still suitable for Faroese to a certain extent. It is also worth mentioning that, in some languages, preaspiration may be realized as an oral fricative. In some cases, the quality of the fricative may directly depend on the quality of the stop: Steriade (1997:66) mentions that Tarascan preaspiration may surface as a homorganic fricative on coronal stops ([st]). In Scottish Gaelic, however, the oral realization of the preaspiration cannot be attributed to the stop: [xp, xt, xk] (Iosad et al. 2015).

[6] The audio data and the images mentioned here are from Voeltzel 2016. The speaker is from Kollafjörður on Streymoy. The second /k/ in *kóka* is not aspirated, as illustrated in the examples in 7.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

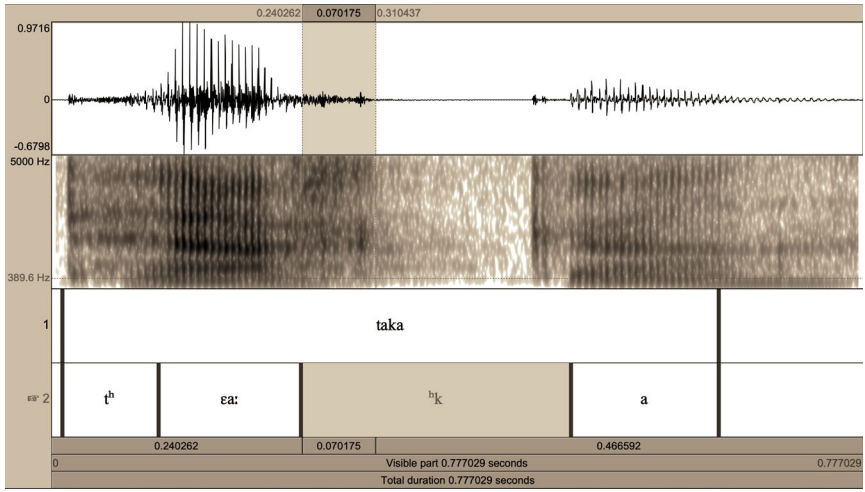


Figure 2. Faroese preaspiration.

In Faroese, preaspiration affects fortis consonants, which have several contextual allophones. In most Faroese dialectal varieties, fortis stops are postaspirated word-initially or morpheme-initially in the case of compounds, as illustrated in 1. Postaspirated stops can be followed by either a vowel or a consonant.

(1)	a.	postur	[ˈ**pʰ**ɔstʊɹ]	‘post.NOM.SG’[7]
	b.	plaga	[ˈ**pʰ**l̥ɛːa]	‘be in the habit of.INF’
	c.	stjúk#pápi	[ˈʃʏkˌ**pʰ**ɔaːʰpɪ]	‘step-father.NOM.SG’
	d.	ting	[ˈ**tʰ**ɪŋg]	‘parliament.NOM.SG’
	e.	tvífalt	[ˈ**tʰ**fʊiːfal̥t]	‘double.NOM.N.SG’
	f.	frí#teinkjari	[ˈfɪʊiːˌ**tʰ**ɔn̥t͡ʃaɹɪ]	‘atheist.NOM.SG (lit. ‘free-thinker’)’
	g.	kona	[ˈ**kʰ**oːna]	‘wife.NOM.SG’
	h.	klógv	[ˈ**kʰ**lɛgv]	‘claw.NOM.SG’
	i.	vega#kort	[ˈviːjaˌ**kʰ**ɔɻ̊ʈ]	‘roadmap.NOM.SG’

[7] The glosses are abbreviated as follows: 1=1st person, 3=3rd person, ACC=accusative, DAT=dative, DEF=definite, F=feminine, GEN=genitive, IND=indicative, INF=infinitive, M=masculine, N=neuter, NOM=nominative, PL=plural, PRS=present, PST=past, PTCP=participle.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

Outside the initial context and the preaspirating environments—which is described below—fortis stops are unaspirated.[8] This is what the data in 2 show. Note that when included in a cluster with /s/, even in word-initial position, fortis consonants are deaspirated.

(2) a. hjálp [ˈjɔl̥**p**] ‘help.NOM.SG’
b. verpa [ˈvɛɹ̥**p**a] ‘lay eggs.INF’
c. spegil [ˈs**p**eːjɪl] ‘mirror.NOM.SG’
d. hefta [ˈhɛf**t**a] ‘hobble.INF’
e. fløska [ˈflœs**k**a] ‘bottle.NOM.SG’
f. mjólk [ˈmjœl̥**k**] ‘milk.NOM.SG’
g. skriva [ˈs**k**riːva] ‘write.INF’

Faroese preaspiration is usually described as occurring in the following contexts (Árnason 2011, Thráinsson et al. 2012, Adams & Petersen 2014): First, when fortis stops are geminated, they surface as long and preaspirated, as shown in 3.

(3) a. heppin [ˈhɛʰ**p**ːɪn] ‘lucky.NOM.M.SG’
b. upp [ˈʊʰ**p**ː] ‘up’
c. dóttir [ˈdœʰ**t**ːɪɹ] ‘daughter.NOM.SG’
d. nátt [ˈnɔʰ**t**ː] ‘night.NOM.SG’
e. drykkur [ˈdrɪʰ**k**ːʊɹ] ‘drink.NOM.SG’
f. gakk [ˈgaʰ**k**ː] ‘go.imp.SG’
g. ikki [ˈɪʰ**t͡ʃ**ːɪ] ‘not’
h. frakki [ˈfɹaʰ**t͡ʃ**ːɪ] ‘coat.NOM.SG’[9]

[8] It should, however, be noted that postaspiration can be found sporadically on medial and final fortis stops. In regards to aspiration, Faroese dialects can be roughly separated into two groups: the HARD SPEECH varieties, in the north, and the SOFT SPEECH varieties, in the south. In the hard speech dialects, noninitial fortis stops are always nonvoiced and may be aspirated. Contrastingly, in the soft speech dialects—spoken in the Southern islands of the Faroes—intervocalic fortis stops tend to be unaspirated and voiced (Helgason 2002, Árnason 2011, Thráinsson et al. 2012). The data used in this article are from the hard speech variety.

[9] The sound [t͡ʃ] corresponds to a palatalized /k/. The velar stops /g, k/ are realized as palatal affricates—[d͡ʒ, t͡ʃ], respectively—before unrounded front vowels [iː, ɪ,

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

Second, fortis stops are preaspirated when followed by a sonorant, thereby forming a /fortis+sonorant/ cluster, as in 4. Only noninitial clusters are considered as preaspiration is unattested word-initially.[10]

(4) a. deplar [ˈdeːʰplaɪ] ‘center-point.NOM.PL’
b. opna [ˈɔʰpna] ‘open.INF’
c. vøtn [ˈvœʰtn] ‘lake.NOM.PL’
d. rytma [ˈɹɪʰtma] ‘rhythm.NOM.SG’
e. betri [ˈbeːʰtri] ‘better.NOM.M.SG’
f. lækni [ˈlaʰknɪ] ‘doctor.NOM.SG’
g. akrar [ˈɛaːʰkraɪ] ‘field.NOM.PL’

Third, preaspiration also occurs when intervocalic stops are preceded by a mid or low vowel, as the data in 5 show. The spectrographic evidence of intervocalic preaspiration is shown in figure 2. It should also be added that the same distribution is observed when singleton fortis stops are word-final, as in 6.[11]

(5) a. drepa [ˈdreːʰpa] ‘kill.INF’
b. opin [ˈoːʰpɪn] ‘open.PTCP.NOM.M.SG’
c. apa [ˈɛaːʰpa] ‘ape.NOM.SG’
e. floti [ˈfloːʰtɪ] ‘navy.NOM.SG’
f. gøta [ˈgøːʰta] ‘street.NOM.SG’
g. eta [ˈeːʰta] ‘eat.INF’
h. taka [ˈtʰɛaːʰka] ‘take.INF’
i. loka [ˈloːʰka] ‘close.INF’

eː, ɛ, ɛiː]. Even when palatalized, the fortis velar /k/ exhibits the same behavior with regards to post- and preaspiration.

[10] In addition, fortis stops preceding another (heterorganic) stop can also be preaspirated: *keypti* [ˈtʃʰɛʰptɪ] ‘buy.IND.PST.SG’, *nokta* [ˈnɔʰkta] ‘refuse.INF’, *vekt* [ˈvɛʰkt] ‘weight, scale.NOM.SG’.

[11] In this context, preaspiration does not occur in the soft speech dialects. As mentioned in note 8, in the southernmost islands of the archipelago, noninitial stops are mostly deaspirated and voiced.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(6) a. søt [ˈsøːʰ**t**] ‘sweet.NOM.F.SG’
b. løk [ˈløːʰ**k**] ‘sheet.NOM.PL’
c. rop [ˈɹoːʰ**p**] ‘burp.INF’

However, when intervocalic or final fortis stops precede a high vowel ([iː, ɛiː, aiː, ɔiː, ʊiː, uː, œuː, ʉuː]), they surface as unaspirated, as shown in 7 below.[12]

(7) a. djúpur [ˈd͡ʒʉuː**p**ʊɹ] ‘deep.NOM.M.SG’
b. leypa [ˈlɛiː**p**a] ‘jump.INF’
c. tupa [ˈtʰuː**p**a] ‘tube.NOM.SG’
d. skip [ˈʃiː**p**] ‘ship.NOM.SG’
e. skjótur [ˈʃœuː**t**ʊɹ] ‘fast.NOM.M.SG’
f. leikur [ˈlaiː**k**ʊɹ] ‘play.NOM.SG’
g. bók [ˈbœuː**k**] ‘book.NOM.SG’
h. hiti [ˈhiː**t**ɪ] ‘temperature.NOM.SG’
i. grýta [ˈgrʊiː**t**a] ‘pan.NOM.SG’
j. broyta [ˈbrɔiː**t**a] ‘change.INF’
k. skeyt [ˈʃɛiː**t**] ‘shoot.IND.PST.SG’

The absence of preaspiration after a high vowel is illustrated in figure 3, where /t/ is preceded by a long /u/ (that is, [uː]).

[12] As mentioned in note 8, it is possible to find intervocalic postaspirated stops in some hard speech dialects. However, no variant of Faroese has preaspiration in this context.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

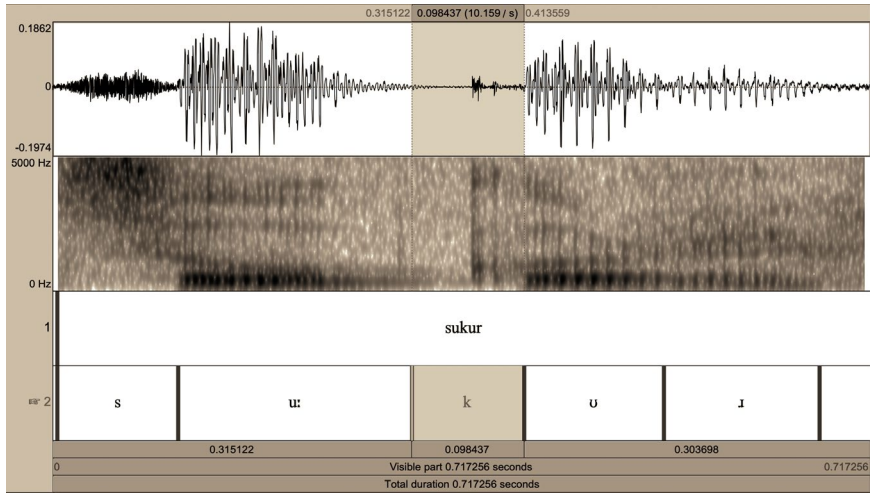


Figure 3. Absence of preaspiration after high vowels.

As can be seen in *sukur* 'sugar.NOM.SG', the fortis stop is preceded by a phase of silence with no glottal frication noise between the vowel and the release phase.[13] The absence of preaspiration was also visible in figure 1, where the second /k/ in *kóka* is preceded by a long diphthong ending in a high gesture: [ɔuː].

Vocalic length is positional in Faroese: A vowel surfaces as long if it is stressed and followed by at most one consonant.[14] If one of these

[13] The recording shown in figure 3 is from the same speaker as in figures 1 and 2 (Voeltzel 2016).

[14] The stress rules in Faroese can be summarized as follows (for a more detailed survey of the stress system, see Thráinsson et al. 2012:28ff., Adams & Petersen 2014:637f.).

(i) a. Native Faroese words have a primary stress on the first syllable.

b. An alternation rule places a weak secondary stress on every other syllable (accordingly, on a scale from 1 (no stress) to 3 (most stressed), trisyllabic words follow the scheme 3–1–2, while bisyllabic words follow 3–1).

c. In compounds, the first syllable of the second part bears a secondary stress.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

conditions is not met, the vowel surfaces as short. The data in 8 and 9 show the distribution of length according to the right-hand environment. The words in 8 and 9 are from the same paradigm (except the examples for /u/), and they all are derived from a monosyllabic root ending in a consonant. If the root is followed by a morpheme starting with a vowel, as in 8, then the stressed vowel in the stem surfaces as long. If the same root is followed by a morpheme starting with a consonant, as in 9, then the stressed vowel in the root surfaces as short. This is true for monophthongs and diphthongs. Note that length is accompanied by tenseness for monophthongs.[15] This is, however, not relevant to the present matter. When short, diphthongs may undergo some quality change, as illustrated by the last two lines. The data in 8 and 9 do not represent the Faroese vocalic system in its entirety. The Faroese vocalic inventory is further elaborated in section 5.

(8)	a.	/i/	[iː]	lin-ur	[ˈli:nʊɹ]	‘soft.NOM.M.SG’
	b.	/e/	[eː]	frek-ur	[ˈfɹe:ʰkʊɹ]	‘greedy.NOM.M.SG’
	c.	/o/	[oː]	tol-a	[ˈtʰo:la]	‘endure.INF’
	d.	/u/	[uː]	gul-ur	[ˈgu:lʊɹ]	‘yellow.NOM.M.SG’
	e.	/ø/	[øː]	høg-ur	[ˈhø:vʊɹ]	‘high.nm.M.SG’
	f.	/ʊi/	[ʊiː]	hvít-ur	[ˈkʰvʊi:tʊɹ]	‘white.NOM.M.SG’
	g.	/ɛa/	[ɛaː]	vak-a	[ˈvɛa:ʰka]	‘be awake.INF’
	h.	/ɔu/	[ɔuː]	tóm-ur	[ˈtʰɔu:mʊɹ]	‘empty.NOM.M.SG’
(9)	a.	/i/	[ɪ]	lin-t	[ˈlɪn̥t]	‘soft.NOM.N.SG’
	b.	/e/	[ɛ]	frek-t	[ˈfɹɛʰkt]	‘greedy.NOM.N.SG’
	c.	/o/	[ɔ]	tol-di	[ˈtʰɔldɪ]	‘endure.IND.PST’

In case a compound contains a monosyllabic first part and a bisyllabic second part, the rule in ia prevails (that is, the scheme is 3–2–1, and not 3–1–2 as expected from rule ib). Loanwords tend to follow the original stress pattern and do not follow rules ia–c.

[15] Long monophthongs are always tense and short monophthongs lax. The vowels [ɪː, i], for instance, are not possible in Faroese. The terminology *tense/lax* is used here as defined in Jakobson & Lotz 1949:153: “TENSE/LAX. The former are produced with walls stiffened by muscular tension and the latter by lax articulation. The stiffening of the walls of the resonance chambers causes a more definite formant (‘clangs’ the sound), while the damping of a lax wall is greater.”

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

d.	/u/	[ʊ]	gul-t	[ˈgʊl̥t]	‘yellow.NOM.N.SG’
e.	/ø/	[œ]	høg-t	[ˈhœgt]	‘high.NOM.N.SG’
f.	/ʊi/	[ʊi]	hvít-t	[ˈkʰvʊiʰtː]	‘white.NOM.N.SG’
g.	/ɛa/	[a]	vak-ti	[ˈvaʰktɪ]	‘be awake.IND.PST.SG’
h.	/ɔu/	[œ]	tóm-t	[ˈtʰœm̥t]	‘empty.NOM.N.SG’

Given the rule of vocalic length distribution, vowels are always expected to be short before a cluster, even when they are stressed. However, note the examples in 10, where some /fortis+liquid/ clusters do not inhibit vocalic length (/kr, kl, pr, pl, tr/). These clusters are possible onsets—they can be found word-initially and may therefore be considered as internal onsets (following the Maximal Onset Principle; Hjelmslev 1938, Kurylowicz 1948, Lowenstamm 1981, Selkirk 1981).

(10) a.	vøkru	[ˈvøːʰkrʊ]	‘beautiful.NOM.F.PL’
b.	bekla	[ˈbeːʰkla]	‘walk crookedly.INF’
c.	jøklar	[ˈjøːʰklaɪ]	‘glacier.NOM.PL’
d.	fepri	[ˈfeːʰprɪ]	‘fever.DAT.SG’
e.	epli	[ˈeːʰplɪ]	‘potato.NOM.SG’
f.	deplar	[ˈdeːʰplaɪ]	‘center-point.NOM.PL’
g.	setrið	[ˈseːʰtrɪ]	‘seat.NOM.SG.DEF’
h.	vetrar	[ˈveːʰtraɪ]	‘winter.NOM.PL’
i.	glitra	[ˈgliːtra]	‘glitter.INF’

Consequently, it would be more accurate to state that vowels are long when they are stressed and in open syllables. In an internal closed syllable, stressed vowels surface as short (Árnason 2011, Thráinsson et al. 2012).[16] Note that in all of the examples in 10, except *glitra* in 10i, the fortis stops are preaspirated, as mentioned in the second condition (i.e. preaspiration when followed by a sonorant).

[16] The reader may have noticed that /tl/ is not mentioned here. The length distribution rule and the fact that /tl/ is unattested word-initially indicate that in words such as *tvætla* [ˈtʰvaʰtla] ‘talk nonsense.INF’, *gøtla* [ˈd͡ʒœʰtla] ‘guess.INF’, *lítli* [ˈlʊiʰtlɪ] ‘little.NOM.M.SG’ /t/ and /l/ should be considered heterosyllabic. Consequently, any vowel preceding /tl/ is in a closed syllable.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

2.2. Toward a Unified Analysis of Preaspiration.
In accordance with the triggering context mentioned in the third condition above, high vowels inhibit preaspiration on the following singleton fortis stop (see data in 7). In those specific examples, the vowels that precede the fortis stops are always long, according to the length distribution constraint given in 8 and 9. However, in 3 and 4, I presented examples of preaspirated stops after a short high vowel: *drykkur* [ˈdrɪ**ʰk**ːʊɪ] 'drink.NOM.SG', *ikki* [ˈɪ**ʰt͡ʃ**ːɪ] 'not', *rytma* [ˈɹɪ**ʰt**ma] 'rhythm.NOM.SG'. In these examples, the vocalic shortness is explained by the rule of length distribution, as illustrated in 8 and 9. Accordingly, it can be concluded that high vowels are not blocking preaspiration per se; it rather depends on their length. By contrast, mid and low vowels are compatible with preaspiration regardless of their quantity, as shown in the various examples in 3–6.

The second condition above states that fortis consonants preaspirate when they are included in a cluster with a sonorant in a postvocalic position. I later introduced examples showing that some /fortis+liquid/ clusters do not prevent vocalic length on their right (see 10). As shown earlier, regardless of the vocalic length, most examples in 10 contain preaspirated stops. Interestingly, the post-long high vowel fortis stop [t] is **not** preaspirated in *glitra* [ˈgliːtra] even though that stop is included in a cluster with a sonorant. This specific example resembles the data given in 7 for intervocalic fortis stops, although in *glitra*, the fortis stop is neither intervocalic nor final.

The following table summarizes the distribution of preaspiration based on the right-hand environment of the fortis stop (whether it is intervocalic/final, geminated, or included in a cluster) and based on the left-hand environment, that is, the quality and the quantity of the preceding vowel. Each configuration is illustrated with an example. Grey cells indicate that the configuration is not possible given the principles of vocalic length I cited earlier.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

Left env. \ Right env.		(i) Geminated fortis stop	(ii) /fortis+sonorant/ cluster	(iii) intervocalic/ final fortis stop
		preaspiration	preaspiration	preaspiration
High V	long		NO glitra [ˈgli:**t**ra]	NO tupa [ˈtʰu:**p**a]
	short	YES drykkur [ˈdrɪ**ʰk**:ʊɹ]	YES rytma [ˈɹɪʰ**t**ma]	
Mid V	long		YES betri [ˈbe:**ʰt**ɪi]	YES gøta [ˈgø:**ʰt**a]
	short	YES heppin [ˈhɛ**ʰp**:ɪn]	YES opna [ˈɔ**ʰp**na]	
Low V	long		YES akrar [ˈɛa:**ʰk**raɹ]	YES apa [ˈɛa:**ʰp**a]
	short	YES gakk [ˈga**ʰk**:]	YES tvætl [ˈtva**ʰt**l]	

Table 2. The distribution of preaspiration in Faroese.

As can be seen from table 2, the main parameter that needs to be considered with regards to the triggering or inhibition of preaspiration is the quality and quantity of the vowel to the left. In other words, all triggering contexts given in 3–6 for preaspiration can be reduced to two principles:

(11) a. Noninitial fortis stops do **not** preaspirate after a long high vowel.
b. Noninitial fortis stops do preaspirate after a short high vowel, or any low/middle vowel, regardless of its length.

The right-hand context is relevant in that it defines the vocalic quantity on the left, but it does not seem to be the main and only criterion. Examples such as *glitra* [ˈgli:tra] show fortis stops included in a /fortis+sonorant/ cluster that are not preaspirated, precisely because they are preceded by a long high vowel. In other words, although preaspiration is a consonantal phenomenon, the distribution of its triggering contexts given in 11 indicates that nuclei play a role in it.

Following this observation, I propose to analyze preaspiration as the result of an interaction between the fortis consonant and the preceding nucleus. More precisely, preaspiration involves spreading of the consonant

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

toward the preceding vowel, if the vowel has enough space in its structure to host it. Given that preaspiration occurs without any additional morphological material, it leads to the hypothesis that segments may not only have melody but also space in their internal layout. The only vowels that do not have available space are the high vowels, but only when they are long. In order to test this hypothesis, I introduce the theoretical framework in which this analysis is couched. This is what the next section is dedicated to.

3. Government Phonology 2.0: Previous Work.

The hypothesis that segments contain melody and space has been proposed in GOVERNMENT PHONOLOGY 2.0 (henceforth GP2) by Pöchtrager (2006). Adding space in a segment means providing it with an internal structure, with layers. While making the internal representation of segments more complex allows one to explain length-related phenomena, it also allows us to revise the number of primes required to qualify consonants and vowels. As I show in this section, some properties traditionally associated with melodic primes—aspiration, voicing, occlusion—can be analyzed as structural effects.

One of the main motivations for GP2 is the vocalic extra lengthening observed in several languages, including English.[17] The phenomenon consists of the lengthening of lexically short nuclei. Correspondingly, lexically long nuclei may surface as extra long. The only condition for this lengthening to happen is that the nucleus must be followed by a lenis stop. A fortis consonant inhibits the lengthening. The following data used to illustrate this are more specifically from New York English, henceforth NYE (Pöchtrager 2006). For instance, the words *rip* and *rib* contain the same nucleus: a lexically short high vowel. However, in NYE, the former surfaces as [rɪp], while the later is realized as [rɪːb]. The words *loop* ~ *lube* also have the same nucleus: a lexically long high vowel. In NYE they are respectively realized as [luːp] ~ [luːːb]. The only difference between these two pairs is the quality of the coda: a fortis versus a lenis stop.[18]

[17] This phenomenon is also described in Belasco 1958, Zimmerman & Sapon 1958, Peterson & Lehiste 1960, House 1961, Chen 1970, and Maddieson 1996.

[18] Following Delattre (1962) and House (1961), the vowel duration differences observed before voiceless versus voiced consonants are to some extent

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

Regarding the melodic content of segments, classical Element frameworks make use of |H| to characterize aspirated segments (Kaye et al. 1990, Harris 1994, Backley 2011, Árnason 2011). In an aspiration-based language, such as English or Faroese, the stops pair /p/ ~ /b/ would be represented as |H U ʔ h| ~ |U ʔ h|, where |H| is responsible for the aspiration, |U| for the labial/round articulation, |ʔ| for the occlusion, and |h| for continuous noise. In this view, the link between the content of a stop and the NYE extra lengthening seems quite opaque. Elements refer to melodic content, while lengthening refers to structural properties that are independent of the content.[19] Accordingly, Pöchtrager (2006) proposes analyzing aspiration not as a melodic property but as a structural configuration: Aspiration derives from an underlying/phonological lengthening of stops, not from their melodic content. Fortis stops, being phonologically long, do not allow the preceding nucleus to lengthen, as the targeted position for length is already occupied.[20] Regarding the origin of the position, since extra lengthening takes place without the addition of any new morphological material, it implies that the position targeted for lengthening is already lexically present. More precisely, it is part of the stop itself. Consequently, stops contain several positions lexically, and the number of positions they use to express their content is what distinguishes fortis from lenis consonants. Based on this, NYE extra lengthening can be illustrated as follows:

"phonemically learned" (Delattre 1962:1143) and do not result only from physiological conditions.

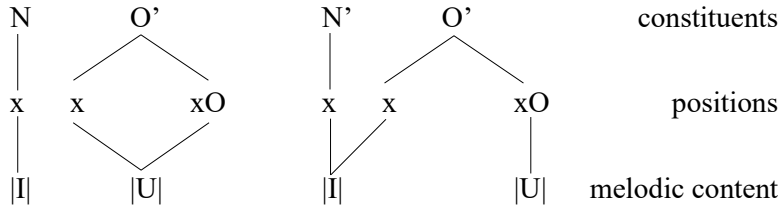
[19] In autosegmental phonology, a long segment is considered to be one element/set of elements linked to two positions on the skeletal tier, that is, two timing slots. For instance, [pː] would yield the representation in i, where the melodic content uses two positions to be phonetically expressed (that is, realized on the surface).

(i)


[20] A similar remark can be found in Kaye 1992, where the author analyzes Italian data such as *fato* [ˈfaːto] 'fate' ~ *fatto* [ˈfatːo] 'fact'. Italian does not have lexically branching nuclei: The length in *fato* is due to metrical lengthening. In *fatto*, the consonant is lexically long and metrical lengthening is blocked, which indicates that /t/ is occupying the position that /a/ would have lengthened to, if it was available.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(12) a. [rɪp] b. [rɪːb]



In 12a, /p/ is represented by two positions (x, the complement, and xO, the head), under the label O'.[21] The melodic content responsible for the labial articulation of /p/ is linked to both positions available in the onset. The lenis stop /b/ is structurally identical to /p/, as both belong to the same natural class. In 12b, however, the melody |U| is linked to only one position, leaving the second position of the stop available for the preceding segment. The preceding nucleus, represented as N in 12, is associated with the melody |I|, which yields an unrounded high vowel. While the nucleus only has its own lexical position available in 12a, it can spread toward the empty x onset position in 12b, hence the extra lengthening. Consequently, the phenomenon is not lexically motivated but results from a sort of compensatory lengthening. In other words, it is possible to explain how aspiration can interfere with vocalic length if one assumes that aspiration results from a specific structural configuration and not from melodic primes.[22] Accordingly, the use of the element |H| is rendered obsolete.

[21] The representations in 12 do not illustrate the whole sequence in [rɪp] or [rɪːb] but only the relevant part, that is, the nucleus and the following stop. Note that according to standard Government Phonology and the Coda Licensing Principle (Kaye 1990), the stop is considered as an onset (followed by an empty nucleus), even though, on the surface, it is word-final.

[22] A similar hypothesis is made by Carvalho (2002, 2008, 2014), who points out that aspiration and its counterpart—voicing—are highly dependent on the following vowel and do not rely entirely on the consonant alone. For instance, in [tʰa], aspiration is perceived because the vocal folds vibrations, necessary for the articulation of [a], start later than they do in the articulation of [ta] (also called *voice onset time delay*). By contrast, in [da], the consonant is voiced because the vocal folds vibrations start earlier than they do in [ta] (known as *voice onset time anticipation*). Consequently, an aspirated consonant takes space away from the vocalic domain, while the voiced consonant's domain is partially occupied by the following vowel in anticipation. Representing aspiration with |H| placed into the

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

The same logic can be applied to occlusion, traditionally represented as |ʔ|. Following Jensen (1994), stops are structurally more complex than their fricative counterparts. In Pulaar, he observes that in the singular/plural alternation in [waːndu] 'monkey' ~ [baːɗi] 'monkeys', [fɛrlo] 'hill' ~ [pɛrle] 'hills', [saːre] 'town' ~ [caʔe] 'towns', the initial fricative from the singular undergoes fortition and surfaces as an obstruent in the plural form. One could assume that the melodic prime |ʔ| responsible for occlusion—as in classical Element Theory—is brought to the representation as the plural marker. In a nonsegmental approach, Jensen (1994) proposes an alternative solution: The plural marker adds empty morphological material, and the reconfiguration of the initial fricative/approximant yields a stop. In other words, the plural form has an initial empty domain, thereby giving the fricative the opportunity to spread to its left. Phonetically, this spreading corresponds to a strengthening of the fricative, which now occupies two domains. This proposal reconnects with the autosegmental principle, which allows any melodic element to appear in any position, without having to formulate a constraint that forbids consonantal elements—such as |ʔ|—to sit in a nuclear position.[23] It was already widely accepted that, if I| sits in an N or an O position, it yields /i/ or /j/, respectively—the vocalic or consonantal status of the segment is determined by the position, not by the content. With this proposal, Jensen extends the same idea to the major laryngeal classes: Stopness, which is restricted to consonants, should also be encapsulated in the syllabic position, not in the melody.

In GP2, this idea translates into the complexity of the stops' structures. As illustrated in 12, stops already contain several positions in order to encode aspiration. Consequently, in order to represent occlusion with structure, new layers have to be introduced into the stops' representation, so that both aspiration and occlusion can be represented in the same segment. This is illustrated in 13.

---

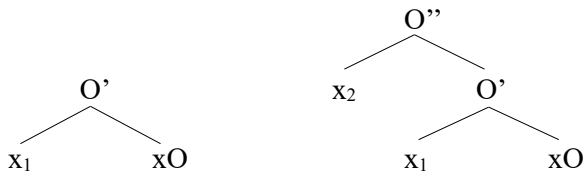
consonant would elude those onset-nucleus relationships, which is why Carvalho (2002, 2008, 2014) represents it as a contour between segments:

(i)


[23] It should be noted that Backley (2011) uses |ʔ| in vowels to represent creaky voice.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(13) a. fricatives b. stops



In 13a, fricatives are provided with two positions in their structure: x and xO, under the label O'. The number of positions that the consonant makes use of to express its content determines if the fricative is a fortis or a lenis consonant (as explained with respect to 12). Contrastingly, in 13b, stops contain one more layer, which encodes stopness. Segmental structures are represented in a recursive fashion: The head of the fricative in 13a, that is, xO, takes a first complement, x_1, and projects a higher level, O'. Similarly, the head of the stop in 13b—xO—takes a first complement, x_1, and projects a higher level, O'. Then the head's projection in 13b takes another complement, x_2, and projects even higher, O''. Once again, the number of positions that a stop uses to express its content determines if it is a fortis or a lenis obstruent.

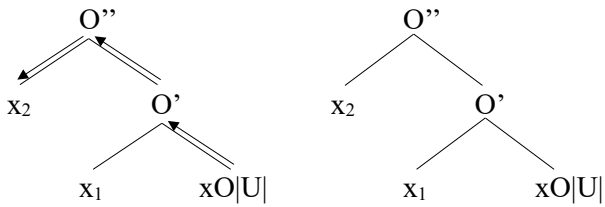
Sections 4 and 5 below are dedicated to the representations of Faroese obstruents and vowels, respectively, according to the generalizations that have been made in GP2. More concretely, I explain the melodic elements that I use in the Faroese segments.

4. The Structure of Obstruents.

The representations I use for the Faroese stops are based on Pöchtrager's (2006) model, which eliminates some melodic primes such as |H| for aspiration and |ʔ| for occlusion. This implies that i) stops are structurally more complex than fricatives, and ii) fortis consonants are phonologically longer than lenis consonants. Consequently, the two labial stops /p/ ~ /b/ have the same internal layout—that is, two tiers—and the same melodic content: |U|. The only difference is the number of positions they use to express this content. In 14, I give the structure of the labial stops.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(14) a. fortis stop [p^h] b. lenis stop [p]/[b]



In accordance with what was presented in section 3, the fortis stop (here in 14a), which lexically contains aspiration, needs two positions to interpret its content. The melodic prime |U|, which is responsible for the rounded/labial articulation, is directly associated with the head of the structure, xO. The link between melody and position is usually achieved through association lines, as in 12. However, such a representation can be problematic once recursive structures and multi-position segments have been introduced. Consequently, the connection between melody and skeletal positions—which are now directly encoded within the consonantal structures—may have to be slightly adapted. Placing the melody directly into the head position is equivalent to linking |U| to xO in 12. In 14, the content can be further associated with several other timing slots (or x's) through a form of spreading, called MELODIC-COMMAND (or m-command, here represented by the arrows).[24] In 14, the targeted position is the highest complement, x_2.[25] Consequently, the melody is interpreted in

[24] Pöchtrager (2006:68) defines melodic command (m-command) as follows:

a. M-command is a binary relationship between two terminals, an m-commander and an m-commandee.

b. Only heads (xN, xO) can be m-commanders.

c. Only non-heads (unannotated x's) can be m-commandees.

d. An m-commandee can be m-commanded only once, but an m-commander can m-command several times.

e. An m-commanded point receives the same interpretation as its m-commander.

[25] As shown in 12 with regards to NYE extra length, fortis stops do not have enough space for the preceding nucleus to spread. This implies that the fortis stop must m-command the highest complement in its structure. If the lowest complement were targeted by m-command, then x_2 would be available for extra length, which would not account for the data. The assumption here is that while

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

two positions: the head xO and the complement x_2.[26] In 14b, the lenis stop uses only one position to express its content: the head xO.

The representation in 14b can also be used for deaspirated fortis stops. As seen in section 2.1, fortis consonants often undergo deaspiration, which means that they lose the aspiration that is lexically present in them. The only difference between a lenis stop and a deaspirated fortis stop is that the former never had m-command in its structure, while the latter used to have it but lost it.

Regarding the alveolar stops /t/ ~ /d/, their structural configuration is identical to what has been presented above. In 15, both stops contain two layers, and the fortis stop contains an m-command relation in order to associate the melodic content to two different positions (the head and the highest complement). The melody associated with the head, however, is different: Coronals contain the element |I|, which is responsible for the high articulation. [27]

---

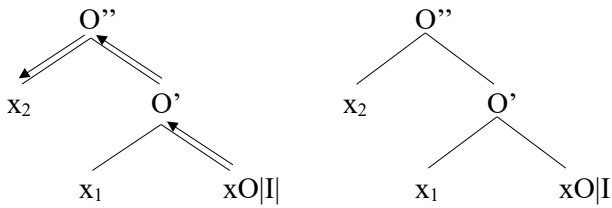
the relative complexity of obstruents (in terms of layers) is given as universal, the use of the positions by each segment is determined on a language-specific basis. Formally nothing prevents the lowest complement from being m-commanded by the head in a language where stops do not exhibit a specific behavior in interaction with flanking nuclei.

[26] Both the association lines and m-command serve the association of an element/a set of elements to (a) structural position(s). One of the advantages of the m-command representation lies in the possible spreading of empty segments (consonants whose place of articulation is expressed through the absence of melody, for instance). M-command emanates from the head, whether it is associated with melody or not. Association lines, by contrast, link melody to timing slot(s). In the absence of melody, no connection can be made with the skeletal tier.

[27] In his original model, Pöchtrager (2006) uses |A| for coronals, and emptiness (that is, no melody) for velars. It should be noted that in the latest developments of GP2 (Pöchtrager 2015), the element |A| is no longer used, as explained in section 5 on the structure of vowels.

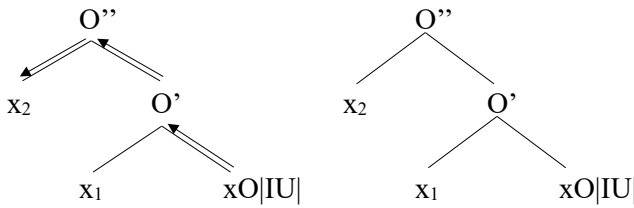
https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(15) a. fortis stop [t^h] b. lenis stop [t]/[d]



The same representations hold for velar stops, shown here in 16. In order to represent velarity with elements, I use both |I| and |U| at the same time.

(16) a. fortis stop [k^h] b. lenis stop [k]/[g]



In the same line of thinking as GP2, which aims at reducing the number of primes, I am not in favor of introducing "new" primes to encapsulate velarity (|v| or |@|; Harris 1994, Harris & Lindsey 1995, Árnason 2011) or coronality (|R|; Harris 1994). I instead use the |I, U| elements to the maximum, that is, |I, U, IU|, in order to represent coronals, labials, and velars, respectively.

The use of |I| for coronals can be found in Backley 2011 and echoes Clements & Hume 1995, Hume 1996. These studies point out the connection between coronals and anterior vowels across several languages. If /t, d, s/ frequently behave like palatals (which are unanimously represented as |I| segments) and easily interact with front vowels during phonological processes, they must share some common property. Backley (2011) distinguishes palatals from coronals based on the head status of |I|: Coronals have a nonheaded |I|, while palatals have a headed |I|. This proposal is also congruent with the acoustic features from Jakobson et al. 1952: The authors use [-grave] (or [acute]) to characterize high vowels, palatals, and coronals (palatals and coronals are then distinguished based on the features [compact/diffuse]). Acoustically, the [-grave] or [acute] feature is characterized by a predominance of the higher

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

part of the spectrum, that is, a concentration of energy at higher frequencies, which is also what |I| encapsulates. Given that Faroese does not have lexical palatals, I can reserve the use of |I| for coronals and keep emptiness for consonants with no oral articulation.

The use of |U| in velars can be found in Scheer 1999, Tifrit 2012, and is also motivated in Backley 2011. It is based on the observation that velars and labials share acoustic properties (a concentration of energy in the lower part of the spectrum, which corresponds to the [grave] feature for Jakobson et al. 1952, or |U|). Contra Backley 2011, I do not distinguish labials from velars based on the head status of |U|, but I instead use the conjunction of |I| and |U|. This approach predicts that velars and coronals are expected to behave alike. Palatalization, which is now inactive in Faroese, targeted velars specifically, making them sensitive to |I| (*kenna* [ˈt͡ʃʰɛn:a] 'know.INF', *kirkja* [ˈt͡ʃʰɪɻ̊t͡ʃa]' church.NOM.SG', *genta* [ˈd͡ʒɛn̥ta] 'girl.NOM.SG' versus *kona* [ˈkʰo:na] 'woman.NOM.SG', *kallaði* [ˈkʰadlajɪ] 'call.IND.PST.SG', *gulur* [ˈgu:lʊɹ] 'yellow.NOM.M.SG'). Palatality may originate from front vowels, but also the glide /j/, traditionally considered the consonantal expression of |I| (*tekja* [ˈtʰe:ʰtʃa] 'roof.NOM.SG', *kjallari* [t͡ʃʰatlaɪɪ] 'cellar.NOM.SG', *kjálki* [ˈt͡ʃʰɔɻ̊t͡ʃɪ] 'jaw.NOM.SG', *gjørt* [d͡ʒœ:ɻ̊t] 'do.PTCP'). Interestingly, Faroese coronals underwent the same process in contact with /j/, yielding the same palatal affricates in most varieties. While the Suðuroy variant maintains the sequences /coronal+j/ as such, the remaining dialects have [t͡ʃ, d͡ʒ]: *tjóvur* [ˈtjɔu:vʊɹ] 'thief.NOM.SG.NOM.SG', *tjørn* [ˈtjøtn] 'pond.NOM.SG', *djarvur* [ˈdjaɪvʊɹ] 'brave.NOM.M.SG' in the southernmost island versus [ˈt͡ʃʰœu:wʊɹ, ˈt͡ʃʰœdn, ˈd͡ʒaɪvʊɹ] everywhere else.[28] Labials, by contrast, do not exhibit any particular behavior in regards to |I|. Having presented and motivated the representations used for Faroese stops, I now turn to the vocalic structures.

5. The Structure of Vowels.

Vowels are represented here in the same way as consonants, that is, with recursive branching structures. The properties encoded in these structures are, however, different, as aspiration and occlusion are not suitable for vowels. In order to cover the whole Faroese vocalic system, I divide this section into two parts: one for the monophthongs and one for the

[28] Jacobs (1993) describes a similar phenomenon in Gallo-roman, where Latin velars palatalized before anterior vowels and /j/, while coronals palatalized before /j/ only.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

diphthongs.

5.1. The Faroese Monophthongs.
As previously mentioned, each monophthong has a long and a short realization. The long variants appear in open stressed syllables, as in 17. If one of these two requirements is not met, then the short variant surfaces, as in 18. From a phonetic perspective, long and short variants vary in terms of tenseness (long vowels are tense, while their short equivalents are lax). The data in 17 and 18 illustrate all the Faroese monophthongs.

(17)	a.	/i/	[iː]	lin-ur	[ˈliːnʊɹ]	‘soft.NOM.M.SG’
	b.	/e/	[eː]	frek-ur	[ˈfɪeːʰkʊɹ]	‘greedy.NOM.M.SG’
	c.	/o/	[oː]	tol-a	[ˈtʰoːla]	‘endure.INF’
	d.	/u/	[uː]	lutur	[ˈluːtʊɹ]	‘part.NOM.SG’
	e.	/ø/	[øː]	høg-ur	[ˈhøːvʊɹ]	‘high.nm.M.SG’

(18)	a.	/i/	[ɪ]	lin-t	[ˈlɪn̥t]	‘soft.NOM.N.SG’
	b.	/e/	[ɛ]	frek-t	[ˈfrɛʰkt]	‘greedy.NOM.N.SG’
	c.	/o/	[ɔ]	tol-di	[ˈtʰɔldɪ]	‘endure.IND.PST’
	d.	/u/	[ʊ]	lurt-a	[ˈlʊ̥ta]	‘listen.INF’
	e.	/ø/	[œ]	høg-t	[ˈhœgt]	‘high.NOM.N.SG’

In 19, I give the representations I use for high vowels /i, u/. In terms of elements, these segments consist of only one melodic prime: |I| or |U|. Nevertheless, these vowels also contain several positions: a head and a complement. In 19a, the head, xN, is associated with the melody |I|. xN|I| takes only one complement and projects a higher level, N’. Similarly, in 19b, the nuclear head bears the melody |U| and takes one complement. The results are respectively [ɪ] and [ʊ].[29]

[29] The linear order of the head and x_1 within the structure does not play any role and does not interfere with the status of the positions. The vertical hierarchy within the structure does. I chose, out of convenience, to represent vowels with the head on the left and consonant with the head on the right. This choice may appear more obvious in figure 5 and onward.

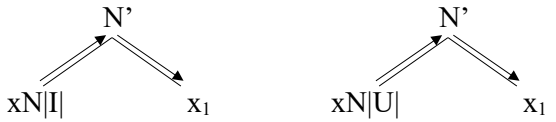
https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(19) a. short /i/ [ɪ] b. short /u/ [ʊ]



The complement position, the unannotated node, can be used by the vocalic head in order to express length. The figures in 20 show that the only complement situated in the structure of high vowels can be m-commanded by the head (as shown by the arrows). In doing so, the vowels now use two positions each to express their content: the head xN and the complement x. The corollary is that long high vowels do not display any available space in their structure, while short high vowels do.

(20) a. long /i/ [iː] b. long /u/ [uː]



Regarding low and mid vowels, classical elements frameworks use |A| along with |I/U| for their content (Harris 1994, Backley 2011). This makes the property corresponding to |A|—aperture—comparable to the other melodic primes, |I| and |U|. However, it should be noted that while melodic propagations of |I| or |U| are common across languages, the spreading of |A| is rarer.[30] Schane (1984) also pointed out that the prime |A| is different, in the sense that it is the only one that can be reduplicated within a segmental expression.[31] Similarly, Pöchtrager (2018) discusses the legitimacy of |A| in the element inventory and proposes to analyze it—like aspiration—as a structural configuration. More precisely, the property encapsulated by |A|—openness—could be represented with (an) empty

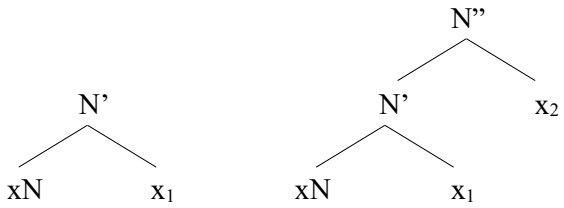
[30] Backley (2011) analyzes phenomena such as *r*-linking and pharyngealization as |A| spreading, which supports the primitive status of |A|.

[31] The exact notation for this prime in Particle Phonology (Schane 1984) is |a|. The reduplication of |a| is necessary in languages that have several open vowels. For instance, /e/ would be represented as |ia| (by contrast with /i/, which has only |i|), but the vowel /ɛ/, which is more open than /e/, is |iaa|.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

layer(s). The more a vowel is open, the more empty layers it projects. This type of representation allows accommodating the rareness of |A| spreading and the possible duplication of the openness property within a segment. As an example, the vowel /a/ is represented in GP2 with an empty structure (here in 21b). That is a structure devoid of melodic content but not of layers. Just like other vowels, empty vowels do contain a head and one or more complements. By comparison, in 21a I give the structure of schwa, which is, by definition, also an empty vowel.

(21) a. schwa /ə/ b. /a/



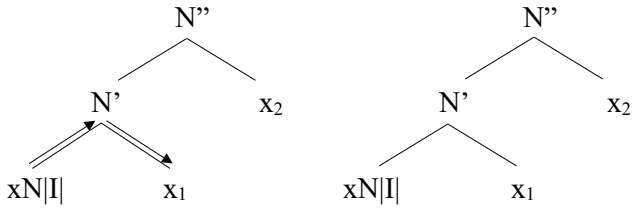
This structure for schwa represents the simplest vocalic configuration (structurally speaking), which is congruent with the fact that schwa is a default vowel. This means that schwa cannot be qualified by any property other than aperture—or openness. If /a/ is also characterized solely by aperture, it needs to be distinguished from schwa: It is represented similarly to schwa but with an extra empty layer, as in 21b. If one posits that openness is now characterized by empty structure, /a/ can be considered to be a more open version of schwa. Accordingly, vowels that consist of a mixture of |I, U| plus the element |A|—mid vowels such as /e, o/—are now represented with a more complex structure. More specifically, they contain (an) empty layer(s).[32]

[32] One of Pöchtrager's (2018:59) main arguments is based on the palatalization phenomenon in Brazilian Portuguese. Among the anterior vowels, only /i/ triggers palatalization, which can be rendered by the transmission of the melody |I| toward the closest onset. Other anterior vowels that also contain |I|, (/e, ɛ/), do not palatalize the flanking consonant. In other words, the presence of |A| in mid vowels prevents the transmission of the |I| element. This impossibility can be satisfyingly represented if one assumes that the empty layer(s)—representing |A|—that covers the |I| element, which sits below in the structure (see 22), prevents it from detecting or interacting with its surroundings.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

In 22, the vowel /e/ contains two layers: In the first layer, the head, xN, is associated with the element |I|. This head takes a first complement and projects a higher level, N'. Then the head's projection takes a second complement, x_2, and projects once more. The highest projection is empty: It is not associated with any content. This specific part of the structure corresponds to the openness property, previously represented as |A|. The more open a vowel is, the more empty layers it contains.[33] This is congruent with the fact that /e/ is considered to be a complex vowel: In Element Theory, it is complex because it contains several primes; in GP2, it is complex because its structure contains two layers.

(22) a. long /e/ [eː] b. short /e/ [ɛ]

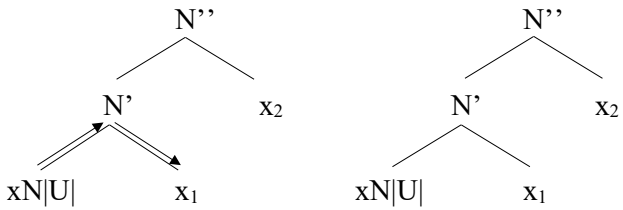


The same applies to the mid vowels /o, ø/, illustrated in 23 and 24, respectively. In order to represent /o/, I use the element |U| and a double-tiered structure. The vowel /ø/ is represented with both the element |IU| and a two-layered structure.

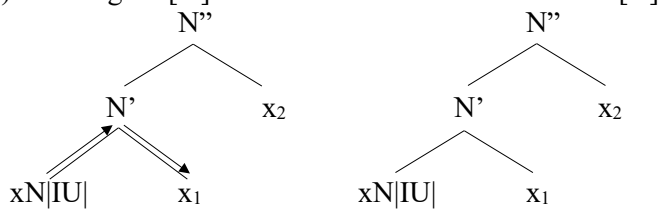
[33] For instance, a language containing two phonemic anterior mid vowels—/e/ ~ /ɛ/—would require one structure containing one empty layer (/e/) and one structure with two empty layers (/ɛ/), in order to mark the contrast. The representation in 22a is also congruent with vowel reduction from /e/ to [i] (as, for example, in Brazilian Portuguese). In GP2, reduction consists of the loss of the highest layer of /e/. The remaining part, the level containing xN|I| and x_1, is equivalent to the vowel [i] (Pöchtrager 2018).

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(23) a. long /o/ [oː] b. short /o/ [ɔ]



(24) a. long /ø/ [øː] b. short /ø/ [œ]



Note that when mid vowels are long (as in 22a, 23a, and 24a), two potential targets can be m-commanded by the head to express length: x_1 or x_2. If x_2 were targeted by vocalic lengthening, then the structure would not offer any available position for the following onset to spread, and it would be in the same configuration as in 20 (that is, after a long high vowel). However, as seen in section 2.2, only long high vowels inhibit preaspiration. Consequently, the only way to account for the triggering of preaspiration before long mid vowels is to state that the target node for vocalic length is the lowest complement, x_1.[34] In the following sections, I illustrate the diphthongs of Faroese and propose the structures for these vowels.

5.2. The Faroese Diphthongs.

As mentioned earlier, diphthongs also have a long and a short variant. The data in 25 and 26 are presented in the same manner as the monophthongs

[34] The remark made earlier in note 25 applies for vowels too: Nothing prevents x_2 from being m-commanded by the head. It is the behavior of the segments on the surface and their possible interactions with the environment that should motivate the m-commandee. In other words, while the complexity of mid vowels is universal, the organization/distribution of the melody within the structure is language specific.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

in 17 and 18: The examples in 25 show that when stressed and in open syllables, diphthongs are realized as long. However, when the suffix following the root vowel starts with a consonant, creating a closed syllable, the diphthong surfaces as short, as in 26.

(25)	a. /ʊi/	[ʊiː]	hvít-ur	[ˈkʰvʊiːtʊɹ]	‘white.NOM.M.SG’
	b. /ai/	[aiː]	heil-ur	[ˈhaiːlʊɹ]	‘whole.NOM.M.SG’
	c. /ɔi/	[ɔiː]	gloym-a	[ˈglɔiːma]	‘forget.INF’
	d. /ɛi/	[ɛiː]	deyð-ur	[ˈdɛiːjʊɹ]	‘dead.NOM.M.SG’
	e. /ɔu/	[ɔuː]	tóm-ur	[ˈtʰɔuːmʊɹ]	‘empty.NOM.M.SG’
		[œuː]	tóm-ur	[ˈtʰœuːmʊɹ]	‘empty.NOM.M.SG’
	f. /ʉu/	[ʉuː]	fúl-ur	[ˈfʉuːlʊɹ]	‘full.NOM.M.SG’
	g. /ɛa/	[ɛaː]	vak-a	[ˈvɛaːʰka]	‘be awake.INF’
	h. /ɔa/	[ɔaː]	vát-ur	[ˈvɔaːʰtʊɹ]	‘wet.NOM.M.SG’

(26)	a. /ʊi/	[ʊi]	hvít-t	[ˈkʰvʊiʰtː]	‘white.NOM.N.SG’
	b. /ai/	[ai]	heil-t	[ˈhaiɻt]	‘completely’
	c. /ɔi/	[ɔi]	gloym-di	[ˈglɔmdɪ]	‘forget.IND.PST.SG’
	d. /ɛi/	[ɛ]	dey(t)-t	[ˈdɛʰtː]	‘dead.NOM.N.SG’
	e. /ɔu/	[ɔ]	tóm-t	[ˈtʰɔm̥t]	‘empty.NOM.N.SG’
		[œ]	tóm-t	[ˈtʰœm̥t]	‘empty.NOM.N.SG’
	f. /ʉu/	[ʏ]	fúl-t	[ˈfʏɻt]	‘full.NOM.N.SG’
	g. /ɛa/	[a]	vak-ti	[ˈvaʰktɪ]	‘be awake.IND.PST.SG’
	h. /ɔa/	[ɔ]	vát-t	[ˈvɔʰtː]	‘wet.NOM.N.SG’

While diphthongs do not undergo a tenseness/laxness change when becoming short, several remarks can be made:

(i) The majority of the diphthongs have a second high gesture (/i/ or /u/)—the diphthongs in 25g,h have a low secondary gesture.

(ii) Some diphthongs become monophthongs when they are short, as in 25d–h.

(iii) The other diphthongs—/ʊi, ɔi, ai/ in 25a–c—remain diphthongs in

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

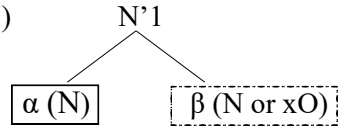
their short version.

(iv) Among the diphthongs that are monophthongs in their short version, the majority—/ɔu, ʉu, ɛi, ɔa/—lose their second gesture, with only /ɛa/ losing its first gesture.

(v) The diphthong /ɔu/ has two long variants and two short variants that are freely distributed. Most speakers produce [ɔuː] when the diphthong is long and [œ] when it is short (especially in Tórshavn, the capital). The other configurations ([œuː]/[ɔ], [œuː]/[œ], [ɔuː]/[ɔ]) are also attested.[35]

In order to represent diphthongs in GP2, I propose to use a nuclear structure that reunites two segmental structures comparable to the monophthongs presented earlier (see 19–24). The canonical representation is given in 27. The structure projected by N_1 can host two vocalic structures, one as a head, one as a complement.

(27)



Every Faroese diphthong contains a first articulatory gesture, which corresponds to a lax monophthong (that is, the short version of monophthongs as presented in 17–18). Consequently, in the position noted as α in 27, one finds the structure equivalent to a short monophthong (either N' or N" depending on the aperture of the first part). Regarding the second position in the diphthong (see position β in 27), I propose that it can be occupied by a vocalic structure (N' or N" for the same reason as previously stated) or by a glide (that is, a consonantal head xO, without any structure; Pöchtrager 2006:91). The division into two types of

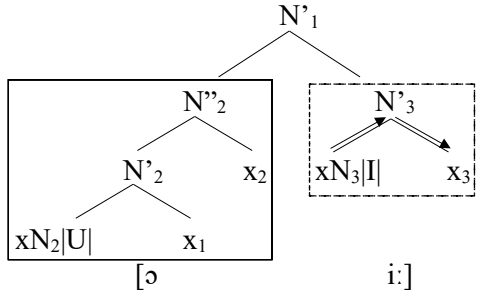
[35] There is more dialectal variation affecting vowels, which is not relevant for the present analysis. From a theoretical point of view, since all four realizations of /ɔu/ are attested ([ɔuː, œuː, ɔ, œ]), I assume that [œ] is obtained through the monophthongization of [œuː], and that [ɔ] derives from [ɔuː], even in areas where a cross pattern (that is, [ɔuː]/[œ]) is observed. For a more detailed survey of the dialectal situation in the Faroe Islands, see Árnason 2011, Thráinsson et al. 2012, Adams & Petersen 2014, Voeltzel 2016.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

diphthongs—some that have purely vocalic gestures and some that are a mix of vocalic and semivocalic gestures—is based on the behavior illustrated in 25–26. The diphthongs that have a semivocalic articulation in β correspond to those that lose their high gesture when becoming short: /ɛi, ɔu, ʉu/ (which can also be transcribed with an offglide as [ɛjː, ɔwː ʉwː]).[36] These vowels correspond to the classical definition of true (falling) diphthongs (Miret 1998). In contrast, diphthongs that maintain a complex articulation when short (/ɔi, ʊi, ai/) correspond to structures where both α and β are occupied by vocalic structures. This distinction allows one to account for the loss versus retention of material in the short version: (Off)glides are not strong enough to subsist in a weak nuclear position, which is an unstressed position.

The structures of the two types of diphthongs are given in 28–29 and 30–31. In 28–29, the diphthongs consisting of two nuclear parts are presented. The diagrams in 28 show the long version of the diphthongs (stressed in open syllables), and the diagrams in 29 show their short version (unstressed or in closed syllables).

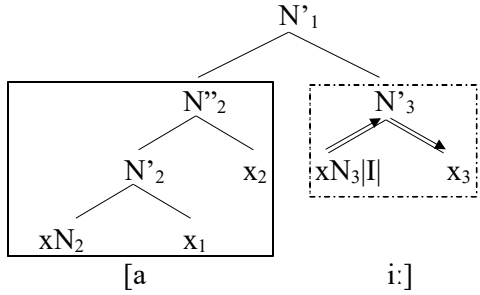
(28) a. /ɔi/ [ɔiː]



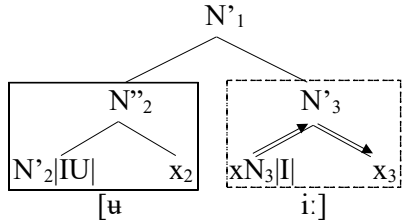
[36] Thráinsson et al. (2012:32) also propose to transcribe them as [i̯, u̯], which would be another way of representing the semivocalic nature of the second gesture. It should be noted that the transcription adopted in this paper [ɔuː, ɛiː, ʉuː] is widely used, even by authors explicitly considering the second part as an offglide.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

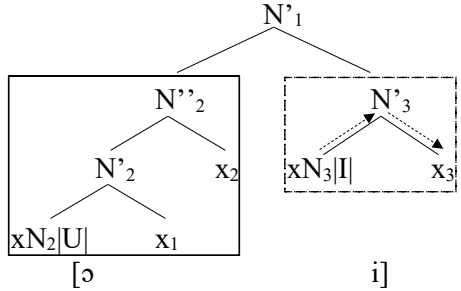
b. /ai/ [aiː]



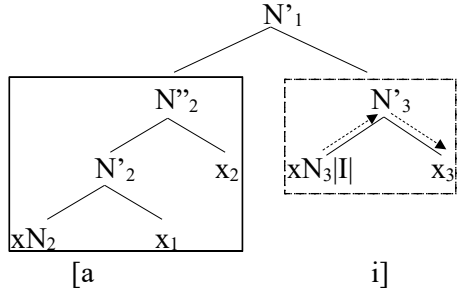
c. /ʊi/ [ʊiː]



(29) a. /ɔi/ [ɔi]

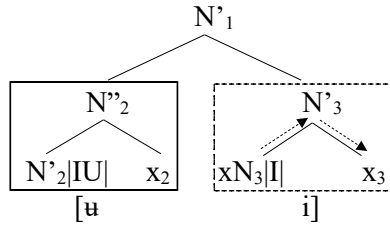


b. /ai/ [ai]



https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

c. /ʊi/ [ʊi]



The structures in 28–29 are equivalent to the canonical figure illustrated in 27. However, this time α and β are occupied by vocalic structures. In /ɔi/, the first part of the diphthong (α, see the solid frame) hosts the structure responsible for the realization [ɔ], that is, a head associated with the melody |U| and an extra empty layer that encapsulates openness. The second position inside the diphthong (β, see the dotted frame) hosts the structure interpreted as [i]. Since the diphthong is represented here in its long form, the head of the second articulatory gesture triggers m-command of an unannotated node, which causes its phonetic length. The same goes for /ai/ and /ʊi/, where the α position is occupied, respectively, by [a] (an empty two-layered structure) and [ʉ] (a high central rounded vowel which corresponds to the structure of a high vowel containing |I| and |U| simultaneously). In their short version (in 29), the diphthongs lose their m-command. However, both parts are maintained in the interpretation—only the length is lost.

Although the representations in 28 and 29 make use of two vocalic structures that also exist as monophthongs in the system, these configurations should be distinguished from hiatus. While diphthongs consist of two vocalic structures reunited under a higher nucleus (N_1 in 28–29), hiatus would yield two different vowels independent from each other. In Faroese, sequences of tautosyllabic vowels—especially when /i/ or /u/ are involved—never surface as such. A glide, or approximant more generally, always appears in the middle (VjV, VwV, or VʊV). This phenomenon is known as GLIDE INSERTION (see Kitto & De Lacy 1999, Staroverov 2014). In diphthongs, by contrast, no segment ever surfaces between the two gestures, and they count, phonologically, as one vowel.[37]

[37] For instance, compare the forms *tí* [ˈtʰʊiː] 'because' and *suði* [ˈsuːwɪ] 'whistling.DAT.SG'. In the former example, the diphthong contains a first articulation similar to /u/ and a second articulation similar to /i/. The structure that

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

In the rest of this section, I focus on the diphthongs containing a semivocalic gesture in the second part of their interpretation. As previously mentioned, I attribute the weakness of the second gesture—the tendency to drop in unstressed position—to a semivocalic status. The representations are given in 30 and 31 of the long and the short variant, respectively. The general structure of this type of diphthong resembles the representations given in 29: The main nuclear projection (N_1) reunites the structure responsible for the first articulatory gesture (the tense monophthong in α; see the solid frame) and the structure responsible for the second articulatory gesture (in β; see the dotted frame). This time, however, the second gesture is occupied not by a nucleus but by a glide. In terms of consonantal strength, glides are below fricatives, which are below stops.[38] Consequently, glides are expected to be even less complex (in terms of structure) than fricatives. Being less complex than a one-layer structure would imply not projecting at all. Glides are hence represented by a consonantal head (xO), which is associated with melody but does not take any complement and, accordingly, does not project a higher level. The

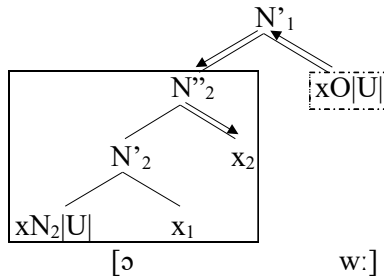
contains both articulatory gestures occupies one vocalic position: In this specific example, the N is in stressed position in an open syllable. It thus surfaces as long, hence the phonetic length. If it were considered as a hiatus—that is, two separate N's—one would expect *[ˈtʰuːˌɪ] given the stress/length distribution rules of Faroese given in note 14. This is, however, what happens in the latter example, where /u/ and /i/ correspond to separate vowels. Only /u/ is in stressed position, and so it surfaces as long. /i/, by contrast, is short due to its unstressed position. The glide [w] is not present lexically but surfaces due to a glide epenthesis, which leads to the surfacing of approximants between adjacent vowels (Anderson 1972, Kitto & De Lacy 1999, Staroverov 2014). Consequently, it does not affect diphthongs that cannot be separated by another phonological object (that is, an epenthetic segment). The same goes for *nei* [ˈnaiː] 'no' (/ai/) versus *hugsaði* [ˈhʊgsajɪ] 'think.IND.PST.SG' (/ɛa.i/), *oyra* [ˈɔiːɪa] (/ɔi/) 'ear.NOM.SG' versus *togið* [ˈtʰoːjɪ] (/o.i/) 'rope.NOM.SG.DEF', and *leypa* [ˈlɛiːpa] 'jump.INF' (/ɛi/) versus *gleði* [ˈgleːjɪ] 'pleasure.NOM.SG' (/e.i/). Faroese orthography is etymological: The graph <ð> in general and the graph <g> between two vowels do not correspond to any synchronic underlying segment and the hiatus are lexical in *hugsaði*, *togið*, *gleði* (Petersen 2010).

[38] The relative strength of segments—consonants, more specifically—is correlated to the sonority scale and can be observed during lenition (Lass 1984, Harris 1990).

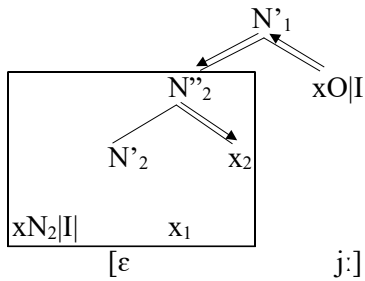
https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

melody associated with glides' heads can be |I| for [j], as in [ɛjː], or |U| for [w], as in [ɔwː, ʉwː]. Since the semivocalic reflex in [ɔwː, ʉwː, ɛjː] does not display any available space in order to express length—it is only a head and does not have an x position available in its own domain—I propose to consider that the m-command emanating from xO|I/U| reaches the closest unannotated position. This would be the higher unannotated position of the first gesture (x_2 in α). As mentioned above, the diagrams in 30 and 31 show the diphthongs containing a semivocalic secondary gesture. In 30, there is a long version (stressed in open syllables), whereas in 31, there is a short version (unstressed or in closed syllables).

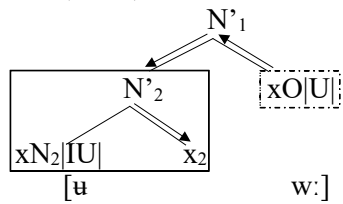
(30) a. ɔu/ [ɔuː] ([ɔwː])



b. /ɛi/ [ɛiː] ([ɛjː])

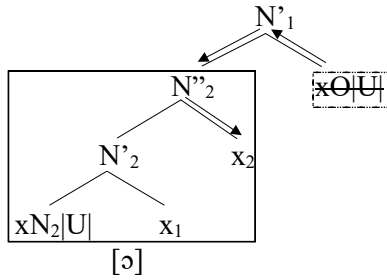


c. /ʉu/ [ʉuː] ([ʉwː])

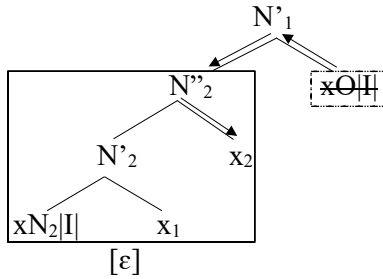


https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

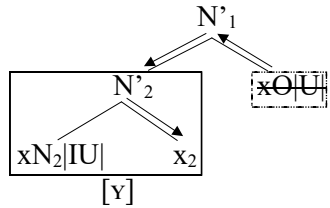
(31) a. /ɔu/ [ɔ]



b. /ɛi/ [ɛ]



c. /ʉu/ [ʏ]



In the short version of these diphthongs (here in 31), the position represented by β drops completely. Consequently, the m-command that emanated from xO is no longer active. The result is a short lax vowel, corresponding to the structure in α.[39]

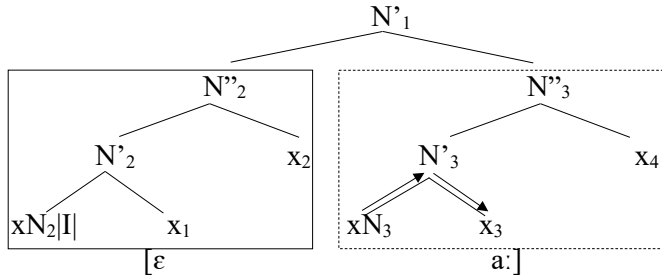
The two remaining diphthongs that need to be addressed (/ɛa, ɔa/) are quite ambiguous: On the one hand, they seem to consist of two fully

[39] The short version of /ʉu/ is transcribed [ʏ], not [ʉ]. In both instances ([ʉuː], [ʏ]), the articulation is high, rounded, and near-front. I shall assume that both realizations emerge from the same phonological representation.

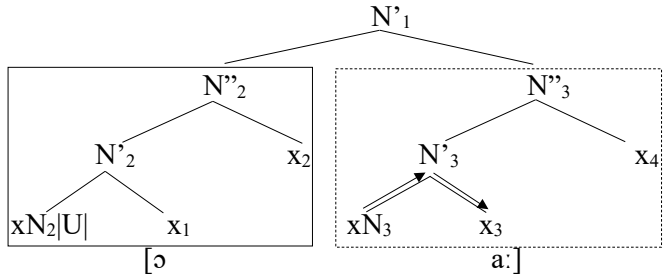
https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

vocalic articulations (that is, no on- or offglide); on the other hand, they lose one of their articulatory gestures when becoming short, just as the semivocalic diphthongs /ɔu, ʉu, ɛi/. Not only do they monophthongize in a weak position, but the loss can affect the first part of the diphthong (/ɛa/ [a]) or the second part (/ɔa/ [ɔ]). Furthermore, they are the only diphthongs that end in a low gesture.[40] Even though the motivation and formalization of the behavior of these two specific diphthongs regarding length/shortness need to be investigated further, I propose the representations in 32 and 33. The diagrams in 32 show the long versions of the diphthongs /ɛa, ɔa/ (stressed in open syllables), whereas the diagrams in 33 show their short versions (unstressed or in closed syllables).

(32) a. /ɛa/ [ɛaː]



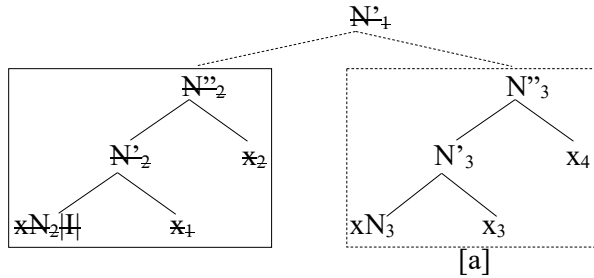
b. /ɔa/ [ɔaː]



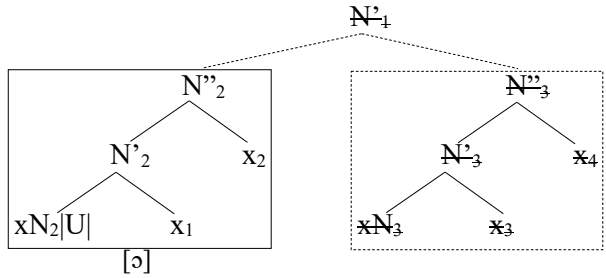
[40] The classification of /ɛa/ and /ɔa/ as diphthongs is not unanimous in the literature: They are sometimes presented as monophthongs because they do not fit into the rest of the inventory of diphthongs, which end in a high gesture. The correct analysis of /ɛa/ and /ɔa/ is a question I leave open for further study.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(33) a. /ɛa/ [a]



b. /ɔa/ [ɔ]



In 32–33, the first articulation gesture of /ɛa/ corresponds to the short vowel [ɛ], whose structure was exemplified in 22b. As an anterior mid vowel, it has a two-layered structure, and the melody |I| is associated with the head. The structure responsible for the articulation of [a], that is, an empty two-layered structure, finds itself under the same dominating node, N'_1. In /ɔa/, the configuration is similar to /ɛa/ in the sense that the first part of the diphthong is a mid vowel (/o/, here with the melody |U| associated with the head), and the second part of the diphthong corresponds to [a]. Since both diphthongs are represented here in their long form, an m-command relationship is present in their structure; more specifically, in the part corresponding to [a]. Thus, the empty head uses a second position, x_3, in order to express its emptiness. In the short versions of the diphthongs in 33, one of the positions is suppressed. In /ɛa/, the first gesture drops. Additionally, the m-command that emanates from the head of [a] is also lost. In /ɔa/, the second gesture drops and, consequently, the m-command responsible for length also disappears.

Although diphthongs, as compared to monophthongs, receive a slightly different phonological representation (both articulations are

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

gathered under the same dominating node, the main head's projection, which counts as one nucleus), the behavior of diphthongs in the preaspiration process is identical to monophthongs. Diphthongs that end in a high gesture are compatible with preaspiration only when they are short. When they are long, the vocalic structure in the second gesture does not offer space for the following onset to spread. The next section is dedicated to the illustration of the preaspiration mechanism. More specifically, it describes how onsets interact with nuclei and how preaspiration is triggered or blocked.

6. Segmental Interactions.

In the preceding sections, the following generalizations have been established

(i) Mid vowels allow preaspiration on their right, regardless of their length.

(ii) High vowels inhibit preaspiration on their right when they are long, but not when they are short.

(iii) Although aspiration is often described as a melodic event (presence or absence of |H|), it more likely results from an underlying lengthening.

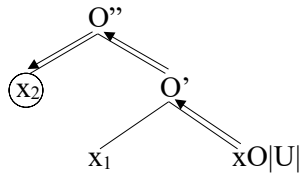
Following this last point, if postaspiration results from lengthening, it should also be possible to analyze preaspiration as such. This is what the next section illustrates.

6.1. The General Preaspiration Mechanism.

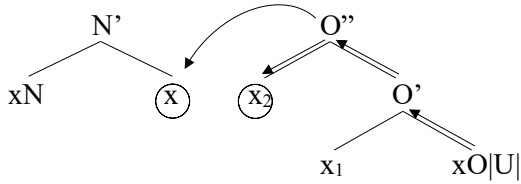
As previously illustrated, postaspirated stops contain an m-command relation between their own head and one of their complement positions (as in 14a, 15a, 16a). I propose analyzing preaspiration as the spreading from an onset's head toward the preceding nucleus position. In other words, both aspirated and preaspirated stops are phonologically long because they use extra position(s) to express their content. The difference lies in the number and the origin of the extra position: While aspirated segments lengthen within their own structure, preaspirated segments further lengthen outside their structure. This is illustrated in 34.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(34) a. postaspirated fortis stop [p^h]



b. preaspirated fortis stop [^{h}p]



The representation in 34a corresponds to a labial postaspirated fortis stop, that is, a two-layered structure, where the head xO|U| m-commands the highest complement of its structure. The representation in 34b corresponds to a labial fortis stop that is longer than a postaspirated one: It m-commands its highest complement, x_2, and also a position inside the preceding nucleus' structure. Phonetically, this results in preaspiration. This representation makes preaspirated segments more complex than postaspirated segments since aspirated fortis stops occupy two positions, while preaspirated fortis stops occupy three positions.[41] These representations are congruent with their distribution across languages: Preaspirated stops are rather rare, while postaspirated stops are common. This analysis may also explain why preaspirated stops are unattested word-initially in Faroese. The spreading of stops outside their own structure also allows one to account for the preaspiration data given in section 2.1.

A similar analysis has been proposed in Sigurjónsdóttir 1990 for Icelandic preaspiration, where only geminate fortis stops and fortis stops followed by /l, m, n/ are preaspirated. She argues that the laryngeal

[41] The representation in 34b is provisional. It is meant to schematize the main difference between post- and preaspiration. The exact relations between onsets and nuclei and their integration within the phonological chain are explained later in section 6.2 on the triggering of preaspiration.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

features of the fortis stop occupies one of the timing slots of the preceding vowel. Consequently, she claims that vowels that precede geminates and /fortis stop + l, m, n/ clusters are virtually long, but that they lose space in favor of the following onset. The following figure represents the preaspiration of /pp, tt, kk/.

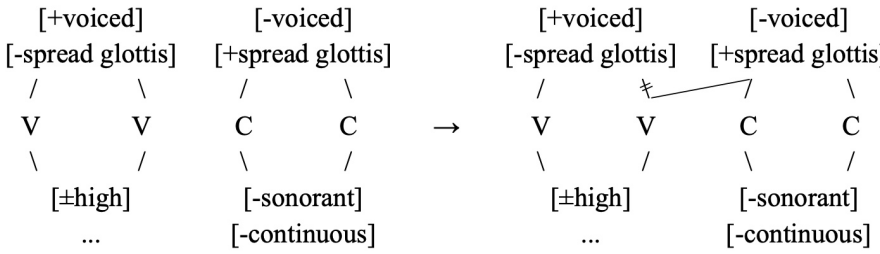


Figure 4. Icelandic preaspiration.

Postaspirated stops, by contrast, spread their laryngeal features toward the following vowel. However, in this scenario the following vowel is underlyingly short (that is, it occupies one single V slot). This accounts for the fact that Icelandic preaspiration duration is close to a singleton and is thus considered a full-fledged [h], while Icelandic postaspiration is similar to the Faroese one and is considered as a reflex [ʰ]. In other words, Icelandic preaspiration is the expression of the fortis stop laryngeal properties onto its own separate syllabic slot, while postaspiration has to share the slot with the following vowel. This analysis is similar to the Contour Model proposed in Carvalho 2002, 2008, 2014, in the sense that aspiration is seen as a spreading of the consonant laryngeal activity toward a vocalic slot (see note 22).

In the next two sections, I illustrate the interaction between stops and the preceding vowels using the segmental representations explicated previously in GP2. I first look at cases where preaspiration is triggered, and then I illustrate cases where preaspiration is inhibited.

6.2. The Triggering of Preaspiration.

In order to illustrate the preaspiration mechanism and the onset/nucleus interaction that I posit, I use the example *gøta* [ˈgøːʰta] in figure 5. In this specific example, the affected fortis consonant is a singleton and it follows a mid vowel. Given that the vowel /ø/ is stressed and followed by only one

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

consonant, it surfaces as long.

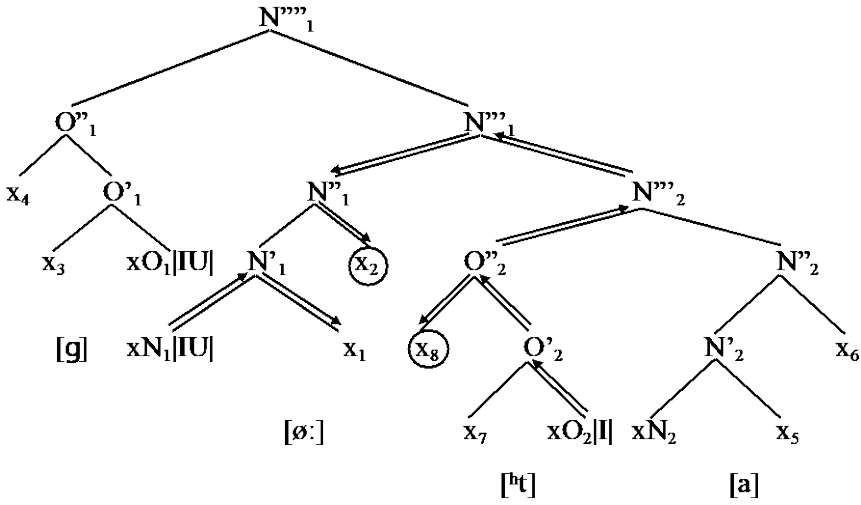


Figure 5. Representation of *gøta* [ˈgø:ʰta] ‘street.NOM.SG’.

Each syllable is supported by a nucleus, and each syllable can contain consonants. In GP2 terms, it means that each nucleus projects as much as needed to express its own content; plus, it projects even more in order to host the neighboring consonant(s). The example in figure 5 has two syllables, each containing an onset. The first nucleus is the vowel /ø/, labeled as $N”_1$. The head of the vowel, $xN_1|IU|$, takes a complement, x_1, and projects a higher level, $N’_1$. The head’s projection takes a second complement, x_2, and projects higher, to $N”_1$. At this point, the structure corresponds solely to the vowel [ø:]. The next projection, $N”’_1$, allows $N”_1$ to host the next nucleus of the chain, $N”_2$. The fourth projection of xN_1, $N””_1$, is where the onset is inserted, here the lenis stop [g]. The second syllable of the word, /ta/, has a similar representation. The second nucleus of the word, /a/, projects sufficiently to host its own content (up to $N”_2$). Given that this syllable has an onset, xN_2 needs to project more in order to host /t/. In other words, each syllable starts from a vowel. If the syllable contains an onset, then it is hosted by its own nucleus.[42] If the syllable is followed by another syllable, then the

[42] This approach bears a resemblance to Precedence-free Phonology (Nasukawa 2011, 2015a, 2015b, 2016; Onuma 2015), where syllabic constituents are replaced

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

second syllable is hosted by the first one. Regarding the preaspiration mechanism, the vowel, although it is long, contains an available position in its structure due to aperture: x_2. This unannotated node is not m-commanded by its head and is thus lexically free from any melody or relationship with its head. The following onset has the space to spread toward this node. Following what I proposed in 24b, the fortis stop /t/ occupying three positions ($xO_2|I|$, x_8 and x_2) surfaces as a preaspirated stop.

The same applies to *apa* [ˈɛaːʰpa] 'ape.NOM.SG'—illustrated in figure 6—where the intervocalic fortis stop follows a long diphthong ending in a low gesture, /ɛa/. In this case, the first syllable consists solely of a nucleus. Accordingly, the vowel /ɛa/ does not host any consonant in its structure—however, the next syllable, /pa/, does.

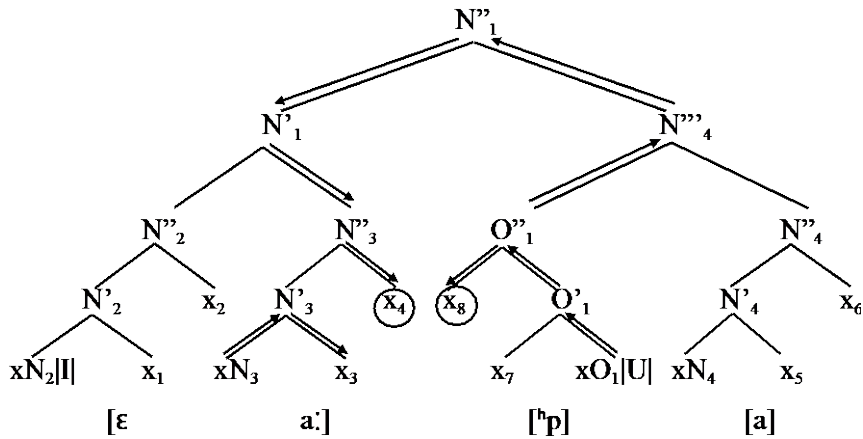


Figure 6. Representation of *apa* [ˈɛaːʰpa] 'ape.NOM.SG'

In a similar manner to what is shown in figure 5, the fortis stop has enough available space to spread toward the diphthong /ɛa/. More precisely, the onset can lengthen to x_4. Consequently, the stop occupies three timing positions and surfaces as a preaspirated segment. I now turn to cases where preaspiration is not triggered.

with baseline elements. This means that nuclei positions are elements that project a whole structure where onsets are hosted.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

6.3. The Inhibition of Preaspiration.

In my first example illustrating the inhibition of preaspiration, *tupa* [ˈtʰuːpa] 'tube.NOM.SG', the fortis stop is preceded by a long high vowel (see figure 7). The vowel /u/ is long because it is stressed and followed by only one consonant (that is, an open syllable). Vocalic length is expressed through the m-command from the nuclear head toward an unannotated node; thus, $xN_1|U|$ occupies x_1. Consequently, the only complement present in [uː] is required by its own head and is not available for another segment to spread to.

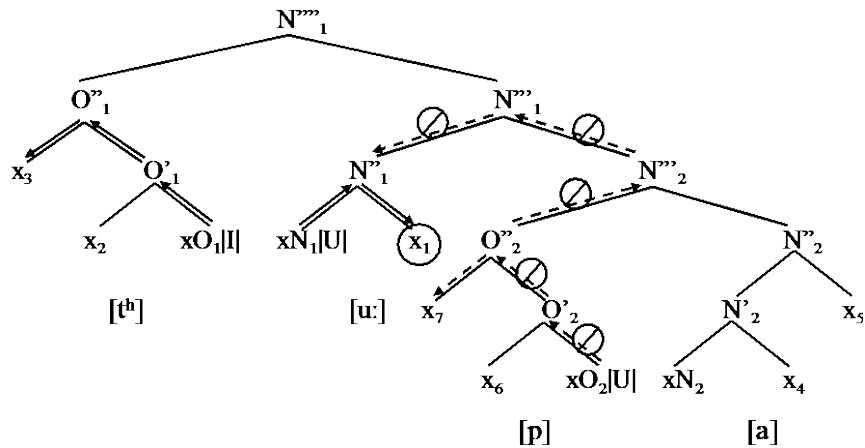


Figure 7. Representation of *tupa* [ˈtʰuːpa] 'tube.NOM.SG'.

The question that may arise at this point is this: Why does the onset not occupy at least its highest complement position (x_7), even though m-command cannot further spread to x_1? According to the representations given in 34, this would result in postaspiration. This outcome is observed in Faroese, but not in all dialects. I mentioned in note 8 the possibility of having intervocalic stops sporadically postaspirated in some areas of the hard speech variety. The sporadic intervocalic postaspiration data from hard speech dialects that illustrate this point are presented in 35.[43]

[43] Although the postaspiration of the intervocalic and final fortis stops may be encountered anywhere within the hard speech area, Thráinsson et al. (2012) point out the following places (in the north-west part of the Faroe Islands): Eysturoy, north of Streymoy, Vágar, and Mykines.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(35) a. hvítur [kʰvʊiːtʰʊɪ] white.NOM.M.SG
b. mjúkur [mjʉuːkʰʊɪ] soft.NOM.M.SG
c. krúpa [kʰɹʉuːpʰa] kneel.INF
d. skjóta [ʃɔuːtʰa] shoot.INF

Consequently, in the absence of available space in the preceding nucleus, nothing formally prevents the fortis stop from m-commanding its highest complement and to surface as postapirated. However, this seems to be parameterized, as internal postaspiration is limited to some hard speech dialects.

The same applies to the next example—*ótu* [ˈɔuːtʊ] 'eat.IND.PST.PL' in figure 8—where the fortis stop is preceded by the long diphthong [ɔuː]. Once again, the only complement position present in the second part of the vowel is already used by its head for length. Consequently, the following onset cannot spread toward x_3. It is, however, not formally excluded that the onset may m-command its own complement in x_6, as previously explained. This would result, in some hard speech dialects, in the postaspiration of the intervocalic stop.

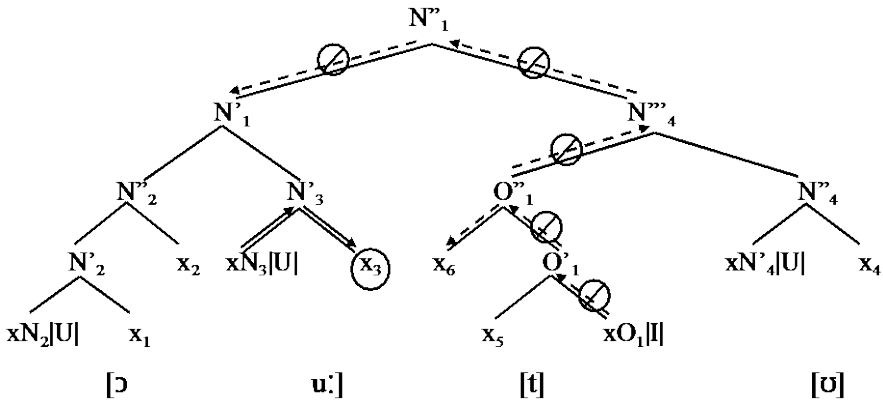
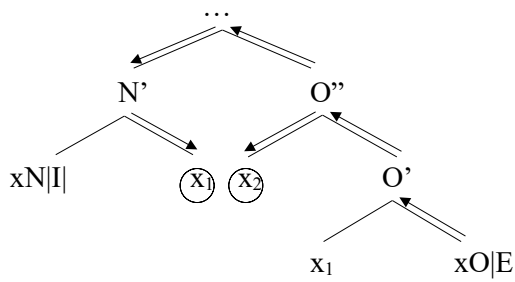


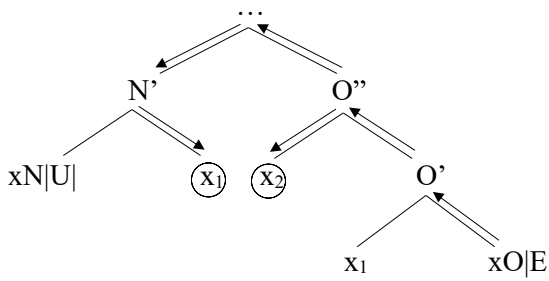
Figure 8. Representation of *ótu* [ˈɔuːtʊ] 'eat.IND.PST.PL'

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

(36) a. preaspiration after short /i/ [ɪ]



b. preaspiration after short /u/ [ʊ]



In cases where high vowels are short (or diphthongs ending in a high gesture are short), as in *rytma* [ˈɹɪʰtma] or *upp* [ˈʊʰpː], the only complement position x_1 is not m-commanded by the vocalic head. It is thus available for the following onset to spread onto. This is summarized in 36, which shows preaspiration after short high vowels.

7. Conclusion.

In this article, I have investigated the preaspiration phenomenon in Faroese. There are three classical contexts that have been shown to trigger preaspiration: fortis gemination, /fortis+sonorant/ clusters, and intervocalic/final fortis singletons, if and only if they are not preceded by a long high vowel. If an intervocalic fortis stop is preceded by a high vowel, preaspiration does not occur. In the example *glitra* [ˈgliːtra], the fortis stop is in a triggering context: /fortis+liquid/. However, /t/ does not preaspirate. The common factor in intervocalic fortis singletons following high vowels and the example *glitra* is the vocalic length. I therefore posit that the main criterion for preaspiration is the quality and the quantity of the preceding vowel. In all the data described in this paper, cases of preaspiration occur after a mid vowel or a short high vowel, regardless of the environment on

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

the right.

This distribution can be explained if one admits that aspiration (post- or pre-) results from an underlying lengthening: Fortis stops are longer than lenis stops. I have accounted for the difference between post- and preaspirated stops through the number and the position of the extra slot(s) that a fortis consonant needs to express its content. Postaspirated stops occupy two positions in their own structure, while preaspirated stops occupy two positions in their structure and spread even further toward the preceding nucleus. This configuration is possible only if the vowel to the left has a structure containing an available slot.

Mid vowels are classically represented with |I, U| + |A|, but it is also possible that the property expressed by |A| is achieved through empty structure. Accordingly, vowels that contain aperture have an empty layer in their structure. This particular layer, which does not bear a melody lexically, is the target of the preaspirating fortis stop. It is thus possible to explain why preaspiration always occurs after a mid or a low vowel, regardless of their quantity. High vowels, by contrast, do not contain as many positions. Since they cannot be characterized by openness, their structures do not contain empty space. As a consequence, when the whole structure of a high vowel is used by its head (to express vocalic length), then the following fortis consonant cannot spread. However, as seen from the data, high vowels allow preaspiration when they are short, which indicates that the complement position they have may be available for the following fortis stop if the vocalic head is not using it.

REFERENCES

Adams, Jonathan, & Hjalmar P. Petersen. 2014. *Faroese: A language course for beginners*. Tórshavn: Stiðin.

Anderson, Stephen R. 1972. The Faroese vowel system. *Contributions to generative phonology*, ed. by Micheal Brame, 1–21. Austin, TX: University of Texas Press.

Árnason, Kristján. 2011. *The phonology of Icelandic and Faroese*. Oxford, NY: Oxford University Press.

Backley, Phillip. 2011. *An introduction to Element Theory*. Edinburgh: Edinburgh University Press.

Barnes, Michael P., & Eivind Weyhe. 2002. Faroese. *The Germanic languages*, ed. by Ekkehard König & Johan van der Auwera, 190–218. London: Routledge.

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

Beckman, Jill, Michael Jessen, & Catherine Ringen. 2013. Empirical evidence for laryngeal features: Aspirating vs. true voice languages. *Journal of Linguistics* 49. 259–284.
Belasco, Simon. 1958. Variations in vowel duration: Phonemically or phonetically conditioned? *Journal of the Acoustical Society of America* 30. 1049–1050.
Carvalho, Joaquim Brandão de. 2002. *De la syllabation en termes de contours CV.* Paris, France: École des Hautes Etudes en Sciences Sociales, Habilitation à diriger des recherches.
Carvalho, Joaquim Brandão de. 2008. From positions to transitions: A contour-based account of lenition and fortition. *Lenition and fortition*, ed. by Joaquim Brandão de Carvalho, Philippe Ségéral, & Tobias Scheer, 415–445. Berlin: Mouton de Gruyter.
Carvalho, Joaquim Brandão de. 2014. C/V interactions in strict CV. *The form of structure, the structure of forms: Essays in honor of Jean Lowenstamm*, vol. 12, ed. by Sabrina Bendjaballah, Mohamed Lahrouchi, Nicolas Lampitelli, & Noam Faust, 123–138. Amsterdam: John Benjamins.
Chen, Matthew. 1970. Vowel length variation as a function of the voicing of the consonant environment. *Phonetica* 22. 129–159.
Clements, Nick G., & Elizabeth V. Hume. 1995. The internal organization of speech sounds. *The handbook of phonological theory*, ed. by John A. Goldsmith, Jason Riggle, & Alan C. L. Yu, 245–306. Oxford: Blackwell.
Delattre, Pierre. 1962. Some factors of vowel duration and their cross-linguistic validity. *Journal of the Acoustical Society of America* 34. 1141–1143.
Gordeeva, Olga B., & James M. Scobbie. 2010. Preaspiration as a correlate of word-final voice in Scottish English fricatives. *Turbulent sounds: An interdisciplinary guide*, vol. 21, ed. by Susanne Fuchs, Martine Toda, & Zygis Marzena, 167–208. Berlin: De Gruyter Mouton.
Hansson, Gunnar Ölafur. 2003. Laryngeal licensing and laryngeal neutralization in Faroese and Icelandic. *Nordic Journal of Linguistics* 26. 45–79.
Harris, John. 1990. Segmental complexity and phonological government. *Phonology* 7. 255–300.
Harris, John. 1994. *English sound structure*. Cambridge: Blackwell.
Harris, John, & Geoff Lindsey. 1995. The elements of phonological representation. *Frontiers of phonology: Atoms, structures, derivations*, ed. by Jacques Durand & Francis Katamba, 34–79. London: Longman.
Heimisdóttir, Linda Ö. 2014. Phonological opacity and Icelandic preaspiration. *University of Pennsylvania Working Papers in Linguistics* 20. 141–149.
Helgason, Pétur. 2002. *Preaspiration in the Nordic languages: Synchronic and diachronic aspects.* Stockholm, Sweden: University of Stockholm dissertation.
Hjelmslev, Louis. 1938. The syllable as a structural unit. *The Proceedings of the Third International Congress of Phonetic Sciences*, ed. by Edgard Blancquaert

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

& Willem Pée, 266–272. Ghent: University of Ghent.
Hoole, Philip, & Lasse Bombien. 2010. Velar and glottal activity in Icelandic. *Between the regular and the particular in speech and language*, ed. by Susanne Fuchs, Christine Mooshammer, & Marzena Żygis, 171–204. Frankfurt am Main: Peter Lang.
House, Arthur S. 1961. On vowel duration in English. *Journal of the Acoustical Society of America* 33. 1174–1178.
Hume, Elizabeth. 1996. Coronal consonant, front vowel parallels in Maltese. *Natural Language & Linguistic Theory* 14. 163–203.
Iosad, Pavel. 2020. The life cycle of preaspiration in the Gaelic languages. *Language on the move across domains and communities: Selected papers from the 12th Triennial Forum for Research on the Languages of Scotland and Ulster,* ed. by Joanna Kopaczyk & Robert McColl Millar, 200–230. Aberdeen: FRLSU.
Iosad, Pavel, Michael Ramsammy, & Patrick Honeybone. 2015. Preaspiration in North Argyll Gaelic and its contribution to prosodic structure. Paper presented at the *Forum for Research on the Languages of Scotland and Ulster* held at the University of the West of Scotland, Ayr Campus, UK, August 12–14, 2015. Available at https://www.anghyflawn.net/viewer/web/viewer.html?file=%2Fpdf%2ffrlsu2015.handout.pdf, accessed on December 4, 2021.
Iverson, Gregory K., & Joseph C. Salmons. 1995. Aspiration and laryngeal representation in Germanic. *Phonology* 12. 369–396.
Jacobs, Haike. 1993. La palatalisation gallo-romane et la représentation des traits distinctifs. *Architecture des représentations phonologiques*, ed. by Bernard Laks & Annie Rialland, 147–171. Paris: CNRS Éditions.
Jakobson, Roman, Gunnar Fant, & Morris Halle. 1952. Preliminaries to speech analysis. *The distinctive features and their correlates*. Cambridge, MA: MIT Press.
Jakobson, Roman, & John Lotz. 1949. Notes on the French phonemic pattern. Word. *Journal of the International Linguistic Association* 5. 151–158.
Jensen, Sean. 1994. Is ʔ an element? Towards a non-segmental phonology. *SOAS Working Papers in Linguistics and Phonetics* 4. 71–78.
Kaye, Jonathan. 1990. 'Coda' licensing. *Phonology* 7. 301–330.
Kaye, Jonathan. 1992. Do you believe in magic? The story of s+c sequences. *SOAS Working Papers in Linguistics and Phonetics* 2. 293–313.
Kaye, Jonathan, Jean Lowenstamm, & Jean-Roger Vergnaud. 1990. Constituent structure and government in phonology. *Phonology* 7. 193–231.
Keer, Edward. 2000. Icelandic preaspiration and the moraic theory of geminates. *The Nordic Languages and modern linguistics 10: Proceedings of the Xth Conference of Nordic and General Linguistics*, ed. by Gudrún Thorhallsdóttir, 145–156. Reykjavík: Institute of Linguistics, University of Iceland.
Kingston, John. 1990. Articulatory binding. *Papers in laboratory phonology*,

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

vol. 1, ed. by John Kingston & Mary E. Beckman, 406–434. Cambridge: Cambridge University Press.
Kitto, Catherine, & Paul De Lacy. 1999. Correspondence and epenthetic quality. *AFLA VI: Proceedings of the sixth Austronesian Formal Linguistics Association (Toronto Working Papers in Linguistics 16)*, ed. by Caroline Smallwood & Catherine Kitto, 181–200. Toronto, ON: Linguistics Graduate Course Union at the University of Toronto.
Kurylowicz, Jerzy. 1948. Contribution à la théorie de la syllabe. *Bulletin de la Société Polonaise de Linguistique* 8. 80–104
Lass, Roger. 1984. *Phonology: An introduction to basic concepts*. Cambridge: Cambridge University Press.
Lockwood, William B. 1964. *An introduction to modern Faroese*. Tórshavn: Føroya Skúlabókagrunnur.
Lowenstamm, Jean. 1981. On the maximal cluster approach to syllable structure. *Linguistic Inquiry* 12. 575–604.
Maddieson, Ian. 1996. Phonetic universals. *UCLA Working Papers in Phonetics* 92. 160–178.
Miller, Wick R., Dirk Elzinga, & John E. McLaughlin. 2005. Preaspiration and gemination in central Numic 1. *International Journal of American Linguistics* 71. 413–444.
Miret, Fernando Sanchez. 1998. Some reflections on the notion of diphthong. *Papers and Studies in Contrastive Linguistics* 34. 27–51.
Nasukawa, Kuniya. 2011. Representing phonology without precedence relations. *English Linguistics* 28. 278–300.
Nasukawa, Kuniya. 2015a. Features and recursive structure. *Nordlyd: Tromsø University Working Papers on Language and Linguistics* 41. 1–19.
Nasukawa, Kuniya. 2015b. Recursion in the lexical structure of morphemes. *Representing structure in phonology and syntax (Studies in Generative Grammar 124)*, ed. by Marc van Oostendorp & Henk van Riemsdijk, 211–238. Berlin: De Gruyter Mouton.
Nasukawa, Kuniya. 2016. A precedence-free approach to (de-)palatalisation in Japanese. *Glossa: A Journal of General Linguistics* 1. 9. https://doi.org/10.5334/gjgl.26
Onuma, Hitomi. 2015. *On the status of empty nuclei in phonology*. Sendai, Japan: University Tohoku Gakuin dissertation.
Petersen, Hjalmar P. 2010. Jakobsen's Faroese orthography from 1889. *Jakob Jakobsen in Shetland and the Faroes*, ed. by Turið Sigurðardóttir & Brian Smith, 47–66. Tórshavn: Shetland Amenity Trust and the University of the Faroe Islands.
Peterson, Gordon E., & Ilse Lehiste. 1960. Duration of syllable nuclei in English. *Journal of the Acoustical Society of America* 32. 693–703.
Pétursson, Magnús. 1972. La préaspiration en islandais moderne. Examen de sa

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

réalisation phonétique chez deux sujets. *Studia Linguistica* 26. 61–80.
Pind, Jörgen. 1995. Constancy and normalization in the perception of voice offset time as a cue for preaspiration. *Acta Psychologica* 89. 53–81.
Pöchtrager, Markus A. 2006. *The structure of length*. Vienna, Austria: University of Vienna dissertation.
Pöchtrager, Markus A. 2015. Binding in phonology. *Representing structure in phonology and syntax (Studies in Generative Grammar 124)*, ed. by Marc van Oostendorp & Henk van Riemsdijk, 255–276. Berlin: De Gruyter Mouton.
Pöchtrager, Markus A. 2018. Sawing off the branch you are sitting on. *Acta Linguistica Academica* 65. 47–68.
Ringen, Catherine O. 1999. Aspiration, preaspiration, deaspiration, sonorant devoicing and spirantization in Icelandic. *Nordic Journal of Linguistics* 22. 137–156.
Schane, Sanford A. 1984. The fundamentals of particle phonology. *Phonology yearbook*, vol. 1, ed. by John Anderson & Colin Ewen, 129–155. Cambridge: Cambridge University Press.
Scheer, Tobias. 1999. A theory of consonantal interaction. *Folia Linguistica* 32. 201–237.
Selkirk, Elisabeth, O. 1981. English compounding and the theory of word structure. *The scope of lexical rules (Linguistic Models 1)*, ed. by Michael Moortgat, Harry Van der Hulst, & Teun Hoestra, 229–277. Dordrecht: Foris.
Sigurjónsdóttir, Sigríður. 1990. Nokkur orð um aðblástur, fráblástur og afröddun í íslensku [Some notes on preaspiration, postaspiration and devoicing in Icelandic]. *Íslenskt Mál Og Almenn Málfræði* 10/11. 130–137.
Silverman, Daniel. 2003. On the rarity of pre-aspirated stops. *Journal of Linguistics* 39. 575–598.
Staroverov, Petr. 2014. *Splitting theory and consonant epenthesis*. New Brunswick, NJ: Rutgers University dissertation.
Steriade, Donca. 1997. *Phonetics in phonology: The case of laryngeal Neutralization*. Unpublished manuscript, University of California, Los Angeles. Available at http://lingphil.mit.edu/papers/steriade/steriade 1997Laryng.pdf, accessed on December 4, 2021.
Stevens, Mary, & John Hajek. 2007. Towards a phonetic conspectus of preaspiration: Acoustic evidence from Sienese Italian. *Proceedings of the 16th International Congress of Phonetics Sciences (ICPhS XVI)*, ed. by Jürgen Trouvain & William J. Barry, 429–432. Saarbrücken: Saarland University.
Thráinsson, Höskuldur. 1978. On the phonology of Icelandic preaspiration. *Nordic Journal of Linguistics* 1. 3–54.
Thráinsson, Höskuldur, Hjalmar P. Petersen, Jógvan í Lon Jacobsen, & Zakaris S. Hansen. 2012. *Faroese: An overview and reference grammar*. Tórshavn: Føroya Fróðskaparfelag.
Tifrit, Ali. 2012. Epenthèse et Principe de Projection Elargi. *Paper presented at*

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press

the 10ème rencontre du Réseau Français de Phonologie (RFP 10), June 2012, Paris, France. Université Paris 8, CNRS. Available at https://hal.archives-ouvertes.fr/hal-01057055/document.
Voeltzel, Laurence. 2016. *Morphophonologie des langues scandinaves. Hiérarchie segmentale et complexité syllabique* [*Morphophonology of Scandinavian languages. Segmental hierarchy and syllabic complexity*]. Nantes, France: University of Nantes dissertation.
Zimmerman, Samuel A., & Stanley M. Sapon. 1958. Note on vowel duration seen crosslinguistically. *Journal of the Acoustical Society of America* 30. 152–153.

UMR6310-LLING, CNRS & Université de Nantes
Université de Nantes UFR des Lettres et Langages
7 Chemin de la Censive du Tertre, BP 81227
44312 Nantes Cedex 3
France
[laurence.voeltzel@gmail.com]

https://doi.org/10.1017/S1470542721000234 Published online by Cambridge University Press