

Palatalization and “strong i” across Inuit dialects

RICHARD COMPTON and B. ELAN DRESHER
University of Toronto

1. INTRODUCTION

Proto-Eskimo had four vowels, */i, ə, a, u/ (Fortescue et al. 1994). They survive as distinct vowels in the Yupik branch of Eskimo but, apart from some subdialects of Alaskan Inupiaq, no surface [ə] remains in the Inuit branch. In most Inuit dialects, this vowel merged with the reflexes of */i/. However, some Inuit dialects show palatalization after surface [i] corresponding to original */i/, but not after surface [i] corresponding to */ə/ (Dorais 2003:33). In these dialects it is traditional to distinguish between “strong *i*”, which descends from */i/ and causes palatalization, and “weak *i*”, which descends from */ə/ and does not.

In the other Inuit dialects the original distinction between */i/ and */ə/ has been lost. It is interesting that none of these dialects show palatalization. We will show that there is evidence that some of these dialects once had palatalization following */i/; the merger of non-palatalizing */ə/ with */i/ resulted in the loss of palatalization in these dialects. It might be expected that there would be a few dialects in which palatalization was generalized to be triggered by every surface [i], but there are no such dialects. Rather, the presence of palatalization must co-occur with an underlying contrast between /i/ and a fourth vowel. Why is this so? The lack of palatalization in any of the three-vowel dialects is a striking fact that needs to be explained.

We propose that the lack of palatalization in three-vowel dialects follows from certain assumptions about contrast and phonological activity. In brief, we argue that the contrastive status of a vowel /i/ in a four-vowel system is fundamentally different from its status in a three-vowel system.

In this article we will begin by presenting the reconstructed vowel inventory of Proto-Eskimo, highlighting empirical support for this reconstruction. Next we will

Earlier versions of this article were presented at the Inuktitut Linguistics Workshop, University of Toronto, March 22–23, 2008, and at the 2008 annual meeting of the CLA. We thank the participants for discussion. For comments on an earlier draft we are grateful to members of the project on Contrast and Markedness in Phonology at the University of Toronto (homes.chass.utoronto.ca/~contrast/), to an anonymous reviewer, and particularly to Tobias Scheer. This research was supported in part by grant 410-08-2645 from the Social Sciences and Humanities Research Council of Canada.

examine the extent of synchronic and diachronic palatalization across Inuit dialects, showing that palatalization only occurs in dialects that distinguish between “strong *i*” and “weak *i*”. Finally, we will introduce our theoretical framework and propose an analysis to explain the typological gap—the absence of a dialect where all surface [i] trigger palatalization.

2. DATA

In this section we present the reconstructed Proto-Eskimo vowel inventory and examine the extent of palatalization in Inuit.

2.1 Reconstructed vowel inventory of Proto-Eskimo

According to Fortescue et al. (1994:xi), Proto-Eskimo (PE) had four vowel phonemes:

- (1) i u
 ə
 a

There is a great deal of support for this reconstruction from divergent sources. First, all four vowels still exist in the Diomedé subdialect of Bering Strait Inupiaq and in Yupik, the sister language to Inuit.

Second, while modern Canadian and Greenlandic dialects lack surface schwa, historical documents such as Christopher Hall’s 1576 wordlist (reproduced in Dorais 2010) indicate that schwa was present in the speech of Inuit in the 16th century in the area of modern-day Iqaluit. Similarly, Dorais (2010:110–112) notes that the orthography in wordlists collected by “explorers, traders, and missionaries” between 1694 and 1770 “might indicate the presence of ə”¹ in 18th-century Labrador.

Third, comparative reconstruction across Inuit dialects and between Inuit and Yupik points to the existence of /ə/ as a separate phoneme in PE. Dorais characterizes the method of reconstruction by specialists as follows (p. 102):

Their premise was that the most complex phonological . . . forms would also be the most conservative and thus closest to original Proto-Eskimo. This was based on the fact that linguistic materials collected in the Arctic during the past three or four centuries . . . show that the phonological . . . systems of the Eskimo languages have had a tendency to become simplified over the years. Linguistic complexity thus reflects the preservation of a more archaic way of speaking.

For instance, we can compare Fortescue et al.’s (1994:112–113, 133) reconstruction²

¹Dorais uses the grapheme *e* for [ə]. This is made clear elsewhere in his book (e.g., on p. 56).

²Fortescue et al. use the following abbreviations for languages and dialect groups (with the representative dialect or subdialect in parentheses): AAY = Alutiq Alaskan Yupik (Kenai Peninsula dialect); CAY = Central Alaskan Yupik (General Central Yupik dialect); CSY = Central Siberian Yupik; ECI = Eastern Canadian Inuit (Tarramiut); GRI = Greenlandic Inuit

of **əpə-* ‘suffocate’ and **ini-* ‘hang out to dry’:³

(2)	PE	<i>əpə-</i> ‘suffocate’
	AAV K, PWS	<i>əpə-</i> , KP <i>əppaxə-</i> ‘suffocate’
	CAY	<i>əpə-</i> ‘suffocate, drown’
	NSY	<i>əpə-</i> ‘suffocate, gasp for breath’
	CSY	<i>əpə-</i> ‘become stale, flat-tasting’ (also: <i>pəkav-</i> ‘gasp, suffocate’)
	Sir	(<i>pəkavməv-</i> ‘pant, gasp’ [...])
	SPI	<i>ivi-</i> ‘suffocate, drown’
	NAI	<i>ipi-</i> ⁴ ‘suffocate, drown’ (also: <i>ipit-</i> ‘suffocate’)
	WCI	<i>ipi-</i>
	ECI	<i>ipi-</i> ‘die of suffocation’ (also: <i>ipit-</i> ‘suffocate’)
	GRI	<i>ipi-</i> ‘suffocate, drown’
(3)	PE	<i>ini-</i> ‘hang out to dry’
	AAV	<i>ini-</i> ‘hang out to dry’
	CAY	<i>ini-</i> ‘hang out to dry, hang in the air (mirage)’
	NSY	—
	CSY	<i>ini-</i> ‘hang out to dry’
	Sir	—
	SPI	<i>ini-</i> ‘hang out to dry (fish or meat)’
	NAI	<i>iji-</i> ‘hang out to dry’
	WCI	[<i>innitq</i> ‘drying rack’] ⁵
	ECI	<i>ini-</i> ‘put out to dry’
	GRI	<i>ini-</i> ‘hang up, lay out to dry’

While Yupik dialects exhibit a distinction between [ə] and [i] in these two lexemes, both contain [i] in Inuit, which is consistent with the vowels having undergone a merger in Inuit.⁶

(Central West Greenlandic); K = Koniag; KP = Kenai Peninsula; NAI = North Alaskan Inuit (Barrow); NSY = Naukan(ski) Yupik; PE = Proto-Eskimo; PWS = Prince William Sound; Sir = Sirenik(ski); SPI = Seward Peninsula Inuit (King Island dialect); WCI = Western Canadian Inuit (Copper).

³While Fortescue et al. use R and X for uvular fricatives and nʏ for the palatal(ized) nasal, we use the standard IPA [ʁ], [χ], and [ɲ]. We also omit the Aleut cognates the authors sometimes include in entries, since Eskimo-Aleut (the mother language to Proto-Eskimo and Aleut) has not been reconstructed and their status as cognates is often much more speculative. Square brackets in the original were changed to parentheses to differentiate them from our use of square brackets.

⁴Fortescue et al. use *i* for “weak-*i*” in North Alaskan Inupiaq forms. However, they note (citing Kaplan 1981:xi) that it is “phonetically identical to *i*”.

⁵While WCI lacks a cognate for **ini-*, Fortescue et al. point the reader to this related/derived form in a subentry.

⁶An alternative reconstruction lacking */ə/ would need to explain the presence and distribution of [ə] in Yupik as well as its presence in the historical records of eastern dialects. In particular, it is hard to conceive of a conditioning environment that could account for the distribution of [ə] as a split instead of a merger.

Finally, the modern distribution of palatalization in Inuit dialects (as will be shown below) also points to PE having four vowels. In the next section we review the extent of palatalization across Inuit dialects.

2.2 Synchronic and diachronic palatalization across Inuit dialects

While */ə/ has merged completely with */i/ in some dialects, others appear to maintain a fourth underlying vowel phoneme, as seen in the dialect-internal distribution of palatalization. In the following subsections we examine the relationship between palatalization and this fourth vowel.

2.2.1 Dialects with productive palatalization

North Alaskan Iñupiaq (both the North Slope and the Malimiutun dialects), West Greenlandic, and Thule (also known as Polar Eskimo) exhibit synchronic palatalization after strong *i*.

For North Alaskan Iñupiaq, Kaplan (1981:8) notes that “all forms of North Alaskan Inupiaq have some degree of consonant palatalization”. In the North Slope dialect, alveolars undergo palatalization after strong *i* but not after weak *i*. Kaplan (pp. 81–82) provides the following examples in nominal and verbal morphology (with proto-forms here and throughout added from Fortescue et al. 1994):⁷

(4) Barrow palatalization after strong *i* in noun stems:

	Stem	Gloss	‘and a N’	‘N OBL.PL’	‘like a N’	Proto-Eskimo
a.	iylu	‘house’	iylulu	iylunik	iylutun	*əŋlu
b.	iki	‘wound’	ikiɬu	ikiɲik	ikisun	*əki
c.	savik	‘knife’	saviɣɬu	saviɣɲik	saviksun	*tsaviɣ
d.	qimmiq	‘dog’	qimmiɬu	qimmiɲik	qimmisun	*qikmiɬ
e.	ini	‘place’	inilu	ininik	initun	*ənə
f.	kamik	‘boot’	kamiɣlu	kamiɣɲik	kamiktun	*kaməɣ
g.	aiviq	‘walrus’	aiviɬu	aiviɲnik	aiviqun	*ajvəɬ

The suffixes in (4a) have alveolar initial consonants following a stem ending in *u*; the suffixes in (4b–d) show palatalization of the suffix-initial consonant following strong *i*; and the forms in (4e–g) show that palatalization does not occur after weak *i*. We observe the same dichotomy in the verb stems in (5), with strong *i* in (5b, e, g) causing palatalization, while the weak *i* in (5a, c, f) does not (Kaplan 1981:81):

(5) Barrow palatalization after strong *i* in verb stems:

	Stem	Gloss	3 SG.SUB.	FUTURE	3SG.INTR.	Proto-Eskimo
a.	isiq-	‘enter’	isiɬluni	isiɬniaq	isiqtuq	*itəɬ-
b.	isiq-	‘be smoky’	isiɬluni	isiɬɲiaq	isiqsuq	*əðiv-
c.	ipik-	‘be sharp’	ipiɣluni	ipiɣniaq	ipiktuq	*ipəɣ-

⁷We employ the following abbreviations in our glosses: COP = copula; DETRANS = detransitivizer; ERG = ergative; INDIC = indicative; INTR = intransitive; N = noun; NEG = negation; OBL = oblique; PART = participial mood; PE = Proto-Eskimo; PERF = perfective; PI = Proto-Inuit; PL = plural; POSS = possessive; SG = singular; SIM = similar case; SUB = subordinative mood.

d.	puqik-	'be smart'	puqiyλuni	puqiyɣiaq	puqiksuk	*puqiy-
e.	makit-	'stand up'	makilluni	makinniaq	makittuq	*makət-
f.	tikiɣ-	'arrive'	tikiλλuni	tikiɣɣiaq	tikitɣuq	*təkit-

Notice that in both (4) and (5) strong *i* corresponds to etymological⁸ */i/ while weak *i* corresponds to */ə/.⁹ Kaplan (1981:31) recognizes this distinction, stating the following:

All Inupiaq dialects have a phonetic three vowel system, although our feature matrix includes, in parentheses, a fourth vowel, schwa, which is often represented as *i*. While *i* is not present phonetically, there are strong arguments for its existence underlyingly because of phonological processes which it motivates... An abstract phonological analysis of Inupiaq would posit an underlying fourth vowel, and we admit to the possibility of such a solution... .

Moving next to the neighbouring Malimiutun dialect, Kaplan (1981:96–97) notes that the Kobuk subdialect exhibits “an even greater range of palatalization phenomena”. In particular, he notes that palatalization extends to /ɣ/, resulting in [s].¹⁰ He gives the following examples of verb stems followed by the affix /ɣuk/ ‘want to’:

- (6) /iɣa+ɣuk-/ → [iɣaɣuk-]
 cook-want-
 ‘want to cook’
- (7) /tiɣi+ɣuk-/ → [tiɣiɣuk-] (cf. PE *təɣə-)
 take.flight-want-
 ‘want to take flight’
- (8) /tiɣmi+ɣuk-/ → [tiɣmisuk-] (cf. PI *təɣmi-)
 fly-want-
 ‘want to fly’
- (9) /niβi+ɣuk-/ → [niβisuk-] (cf. PE *nəβə-)
 eat-want-
 ‘want to eat’

Once again we see in (7) an instance of stem-final [i] patterning with other vowels in not triggering palatalization, while the instances of [i] in (8) and (9) cause /ɣ/ to

⁸It should be noted that the distribution of reconstructed */ə/ is not based solely on the distribution of palatalization; if it were, this would leave us open to the charge of circularity. The co-extensive distribution of schwa in modern Yupik languages and the Diomedé subdialect of Bering Strait, along with historical documentation of eastern Canadian dialects noted above, provides independent support for these reconstructions.

⁹It is notable that palatalization is unaffected by an intervening consonant, as exemplified in (4c) and (5a–d). In (5e–f) the intervening consonants between the stem vowel and the suffix initial consonant undergo assimilation. In this subdialect homorganic consonant clusters must agree in nasal/lateral manner.

¹⁰This is a separate phoneme in Kobuk but not in Barrow where it is an allophone of /ɣ/ (Kaplan 1981:26).

palatalize to [s]. It is worth noting here that */ə/ is unexpected in the reconstructed proto-form for ‘eat’. Kaplan notes that “the Inupiaq vowel system does not always match in a simple or obvious way that of related languages or of Proto Eskimo” and furthermore that “Inupiaq seems to have innovated a palatalizing type *i* in many cases where Yupik shows a schwa, as is the case with Inupiaq *nīḃi-*, which triggers palatalization, as against Yupik *nəḃə-*” (p. 84). However, as illustrated in the examples above, in the majority of cases strong *i* and weak *i* correspond to *i and *ə, respectively.

At the other end of the geographic dialect continuum, we also observe synchronic palatalization in Greenlandic. According to Dorais (2003:139) “all three Greenlandic dialects assibilate (i.e., palatalize) *t* after a strong *i*, although in East Greenlandic, this phenomenon is not always systematic”. Setting aside the status of palatalization in East Greenlandic for the moment, consider the following examples from Dorais (2003:139) comparing Greenlandic dialects to a non-palatalizing dialect from Canadian Inuktitut, with proto-forms from Fortescue et al.:

(10) *Palatalization in Greenlandic dialects (cf. non-palatalizing Aivilik):*

	West Gr.	East Gr.	Thule	Aivilik	Gloss	PE
a.	isiyak	isiyak	ihiyak	itiyak	‘foot’	*itəyɑḃ
b.	sisamat	sisamat	hihamat	sitamat	‘four’	*sitamat
c.	kalaallisut	kalaattisit	kalaallihut	kalaallitut	‘Greenlandic’ (loan)	
d.	nīḃsurpaa	nīḃsirpaa	nīḃhuqpaa	niqtuqpaa	‘praise him’	*niqtuq-
e.	isiḃḡitsiq	isiḃḡitsiq	ihīḡitsiq	itiḡittuq	‘who does not enter’	*itəḃ- <i>*-nīḃit-</i>

In West Greenlandic, East Greenlandic, and Thule we see palatalization after strong *i*, which once again corresponds to PE *i. Note that in both (10c) and (10e), palatalization is occurring across a morpheme boundary, with the strong *i* in /kalaaliq/ ‘Greenlander’ causing palatalization on the similariis case marker /tuq/ and the strong *i* in /ḡḡit/ ‘NEG’ causing palatalization on the third-person singular participial inflection /tuq/.

Rischel (1974) provides further examples of palatalization occurring across morpheme boundaries in West Greenlandic. For instance, the noun-incorporating verb /tuq/ ‘consume’ is unchanged after a noun stem ending in /u/, as shown in (11), and is unchanged after weak *i* in (12) and (13); but it undergoes palatalization after strong *i* in (14) and (15) (p. 261; glosses added, proto-forms from Fortescue et al.):

(11) /tuttu+tuq+puq/ → [tuttutu^ɹppuq]¹¹

reindeer-consume-INDIC.3SG

‘eats reindeer meat’

(12) /tsii(q)+tuq+puq/ → [tsiitu^ɹppuq]

tea-consume-INDIC.3SG

‘drinks tea’

¹¹Rischel uses a superscript [ɹ] to represent vowel coloration (possibly uvularization or pharyngealization) caused by underlying uvular segments which are subsequently the target of regressive assimilation by a following consonant. We use IPA [ɞ] instead.

- (13) /niqi+tuq+puq/ → [niqitu^fppuq]
 meat-consume-INDIC.3SG
 ‘eats meat’ (cf. PE *nəqə)
- (14) /kaffi+tuq+puq/ → [kaffisu^fppuq]
 coffee-consume-INDIC.3SG
 ‘drinks coffee’
- (15) /missi+tuq+puq/ → [missisu^fppuq]
 dried.fish-consume-INDIC.3SG
 ‘eats dried fish’ (cf. PE *pimtsi)

Similarly, Rischel (p. 261) gives examples of the participial verbal inflection /-tuq/ after weak *i* in (16), as compared to the palatalized variant which emerges after strong *i* in (17) and (18) (glosses added):

- (16) /sinik+tuq/ → [sinittuq]
 sleep-PART.3SG
 ‘sleeping’ (cf. PE *tsinək-)
- (17) /pikkurik+tuq/ → [pikkurissuq]
 diligent-PART.3SG
 ‘diligent’ (cf. PE *pəkku(γ) + *kiγ)
- (18) /nu^wanniq+tuq/ → [nu^wanni^fssuq]
 amusing-PART.3SG
 ‘amusing’ (cf. PE *nunanniš-)

Rischel (p. 263) also demonstrates that the plural marker /-i/ causes palatalization of a subsequent portmanteau possessive and ergative case marker:

- (19) /iḥu+a+ta/ → [iḥu^wata]
 house-SG-3.POSS.ERG
 ‘his/their house’
- (20) /iḥu+i+ta/ → [iḥu^wisa]
 house-PL-3.POSS.ERG
 ‘his/their houses’ (cf. PE *ḥi)
- (21) /ila+a+ta/ → [ilaata]
 companion-SG-3.POSS.ERG
 ‘his/their companion’
- (22) /ila+i+ta/ → [ilaasa]¹²
 companion-PL-3.POSS.ERG
 ‘his/their companions’

¹²The sequence /ai/ undergoes a synchronic process of vowel assimilation to [aa] in West Greenlandic.

Rischel (p. 261) notes that palatalization of /t/ cannot occur word-finally, stating that “/t/ (or /ts/) goes to /s/ if it is preceded by /i₁/, with or without one intervening (non-coronal) consonant, and if it is at the same time followed by a vowel”. However, the lack of word-final palatalization appears to be due to a phonotactic constraint banning word-final fricatives, across all Canadian and Greenlandic Inuit. Nevertheless, he gives the following example of a noun ending in a strong *i* followed by a /t/ which undergoes palatalization once the vowel-initial plural suffix is added:

- (23) /kisittsit+it/ → [kisittsisi]
 figure-PL
 ‘figures (digits)’

In sum, we observe synchronic palatalization of /t/ after strong *i* in West Greenlandic.¹³ Rischel (p. 274) notes, however, that northern subdialects of West Greenlandic have “much less assibilation of suffix initial /t/”, and thus these subdialects (Northern and Upernavik) will be presumed to have only fossilized palatalization.¹⁴

Thule (also known as Polar Eskimo) also exhibits synchronic palatalization; however the situation is complicated by the fact that [s] is debuccalized to [h] intervocalically¹⁵ (although sometimes it is realized as [ç], as noted in Fortescue 1991:9).

¹³Rischel notes that some morphemes exhibit variation in whether they cause palatalization. For instance, the suffix /-vik/ ‘place for -’ triggers palatalization of /taa/ ‘new’ in [uqaluf-fis-saaq] ‘new church’ but not of /tuqaq/ ‘old’ in [uqaluf-fit-tuqaq] ‘old church’. He notes similar examples with /savik/ ‘knife’, /pusi-/ ‘lay [upside down]’, /kini-/ ‘soak’, and /kii-/ ‘bite’. Crucially, though, all such cases correspond to etymological */i/ (i.e., *-ðviγ; *tsaviγ; *putsi; *kənit), except for *kəγə ‘bite’ which also causes palatalization in Inupiaq and thus likely shifted from */ə/ to */i/ in Proto-Inuit, perhaps because the loss of intervocalic */γ/ in this form would have left a long schwa which was illicit, as it is synchronically in Yupik (Jacobson 1995:5–6). Importantly, palatalization has not been extended to occur freely after surface [i].

¹⁴Rischel notes also that some subdialects of West Greenlandic affricate /t/ before [i], regardless of its (synchronic) strong or weak status, as shown in (i). However, there is reason to believe that this is a late phonetic rule. While the palatalization/assibilation phenomenon that is the topic of this article can occur across an intervening consonant, affrication is strictly local.

- (i) /tuqut-ti-vuq/ → [tuquttsivuq]
 kill-DETRANS-INDIC.3SG
- (ii) /kunik-ti-vuq/ → [kunissivuq] (cf. PI *kunik-)
 smell-DETRANS-INDIC.3SG

¹⁵It is likely that there is also synchronic palatalization of /t/ > [h] intervocalically across morpheme boundaries. However, along with WG, Thule has neutralized the exponents of both *ts and *ð (while other dialects of Inuit either maintain a synchronic distinction or have collapsed *ð with *j). Since all Inuit dialects exhibit allomorphy between [t]-initial suffixes (which occur after consonants) and those beginning with the dialect-specific modern exponent of *ð (which occur intervocalically), as illustrated below, it is difficult to distinguish between this pan-Inuit gradation-based allomorphy (which extends beyond coronals) and palatalization.

However, [s] can still appear after [t] and it is in this environment that we can see productive alternations across morpheme boundaries, as illustrated in the examples collected in (24) from Fortescue (1991):

(24)	Stem	Gloss	PART.3SG	PE
a.	qitut-	'is soft, flexible'	qitut-tuq	*qətut-
b.	haat-	'is thin, flat'	haat-tuq	*tsaat-
c.	qanit-	'is near'	qanit-tuq	*qanət-
d.	tinit-	'tide is getting low'	tinit-tuq	*tənət-
e.	mamit-	'heals, forms a scar'	mamit-tuq	*mamət-
f.	aqit-	'is soft, tender'	aqit-suq	*aqit-
g.	nait-	'is short'	nait-suq	*nanit-
h.	takpiit-	'(is) blind'	takpiit-suq	*takviŋit-
i.	amit-	'is narrow, thin'	amit-suq	*amit-

The vowels /u/ and /a/ do not trigger palatalization of the initial /t/ of the participial inflection marker /-tuq/ in (24a–b), and neither does weak *i* in (24c–e). Conversely, strong *i* in (24f–i) does cause palatalization. Similarly, the negation marker /ŋjit/ consistently triggers palatalization of participial inflection markers, such as /-tuŋja/ (Fortescue 1991:174, 178):

(25) niŋi-ŋjit-suŋja (cf. *-niŋit- 'NEGATION')
eat-NEG-PART.1SG
'I am not eating.'

(26) uniur-hama-ŋjit-suŋja
miss-PERF-NEG-PART.1SG
'I haven't missed.'

To summarize, as in West Greenlandic, Thule appears to exhibit synchronic palatalization after strong *i*.¹⁶

In the next subsection we will examine dialects in which palatalization is fossilized, including East Greenlandic.

2.2.2 *Dialects with fossilized palatalization*

As illustrated in (10), East Greenlandic possesses examples of palatalization; however, Dorais (2003:139) characterizes it as being "not always systematic". Dorais seems to be suggesting that while palatalization is synchronically productive in West

-
- (i) *South Baffin*:
pisuk-tuq
walk-PART.3SG
- (ii) ani-juq
go.out-PART.3SG

¹⁶Comparing the Thule verb forms in Fortescue (1991) and the corresponding proto-forms in Fortescue et al. (1994), we observe several instances where an original *i no longer causes palatalization. However, these exceptions all appear to be in one direction; no segments corresponding to */ə/ have innovated palatalization.

Greenlandic and Thule, it has become fossilized in East Greenlandic. This is supported by Tersis (2008:25) who states:

Il semblerait que ces variations soient actuellement figées en tunumiisut [= East Greenlandic]. L'explication, d'ordre diachronique, résulterait de la palatalisation et de l'assibilation de la consonne /t/ dans des contextes spécifiques de consonnes apicales et vélaires en relation avec la présence d'un *i fort précessif distinct d'un *i faible dans la phonologie du proto-eskimo.

Still, as illustrated earlier and stated by Tersis, these fossilized instances of palatalization arose diachronically after strong *i*, supporting the hypothesis that palatalization was productive after strong *i* at an earlier stage.

We see a similar situation in North Baffin and Southeast Baffin, with Dorais (2003:96) stating that in these dialects “palatalization does not seem to be productive any more”. Once again, though, the fossilized instances of palatalization occur after etymological */i/, as illustrated below (Dorais 2003:97):

(27) *Palatalization in North and Southeast Baffin dialects:*

	North	Southeast Baffin		Southwest	Gloss	Proto-Eskimo
	Baffin	Cumberland	Iqaluit/Kim.	Baffin		
a.	isiqpuq	isiqpuq	isiqpuq	itiqpuq	's/he enters'	*iteɸ-
b.	akisiq	akisiq	akisiq	akiti	'pillow'	*akin
c.	isiɣak	isiɣak	isiɣak	itiɣak	'foot'	*itəɣaɸ
d.	ivisaabɔq	ivisaabɔq	ivisaabɔq	ivitaabɔq	'red trout'	*ivitaabɔq ¹⁷
e.	-ilisaq	-ilisaq	-ilisaq/-ilitaq	-ilitaq	'protection'	*-ɲilitaɸ
f.	tisijuq ¹⁸	tisijuq	sisijuq/sitijuq	sitijuq	'it is hard'	*tsitə(y)-
g.	tisamat	tisamat	sitamat	sitamat	'four'	*tsitamət
h.	tikittɯŋa	tikittuŋa	tikittuŋa	tikittuŋa	'I arrive'	*təkitt-
i.	qaiŋŋittɯq	qaiŋŋittuq	qaiŋŋittuq	qaiŋŋittuq	'does not come'	*qabə- *-nɸit-

Dorais notes that palatalization of /t/ sequences in North Baffin, such as those in (27h–i), appears to be confined to older speakers. Furthermore, he notes that palatalization fails to apply in a number of contexts (as compared to Inupiaq or Greenlandic dialects):

(28) *North Baffin:*

tupi-ŋi-titut
tent-PL-3PL.POSS.SIM
'like their tents'

(29) *Inupiaq (Malimiutun):*

tupi-ŋi-situn

However, once again, the fossilized instances of palatalization occur after strong *i* (i.e., the positions where dialects with synchronically productive palatalization have strong *i*).

¹⁷This form is reconstructed to Proto-Inuit, not Proto-Eskimo.

¹⁸Examples (f–g) illustrate metathesis of /sit/ sequences containing strong *i* in North Baffin and in Cumberland Peninsula Southeast Baffin.

Table 1: Summary of palatalization across Inuit dialects

Group	Subgroup	Dialect	Subdialect	Vowels	Palatalization	
Alaskan Inupiaq	Seward	Bering Strait	Diomedede	4 ^a	NO	
			Wales	4 ^b		
			King Island			
		Teller				
		Fish River				
	Qawiaraq					
	Northern Alaskan Inupiaq	Malimiutun		Kobuk	4 ^c	YES; PRODUCTIVE
				Kotzebue		
		North Slope		Common NS		
				Point Barrow		
				Anaktuvuk		
			Uummarmiut			
Western Canadian Inuktitut	Siglitun			3	NO	
	Inuinnaqtun		Holman			
			Kugluktuk			
			Bathurst			
			Cambridge Bay			
	Natsilingmiutut		Natsilik	3	FOSSILIZED	
			Arviligjuag			
			Utkuhiksalik			

...

^aSchwa maintained at the surface in Diomedede subdialect.

^bAccording to Dorais (2003), these subdialects exhibit “sporadic” schwa.

^cThese dialects possess strong *i* and weak *i*, where the latter corresponds to etymological schwa (and surface schwa in Diomedede and the closely related Yupik language).

Table 1: (cont'd)

Group	Subgroup	Dialect	Subdialect	Vowels	Palatalization	
Eastern Canadian Inuktitut	Kivalliq	Kivalliq	Qairnirmiut	3	NO	
			Hauniqturmiut			
			Paallirmiut			
			Ahiarmiut			
		Aivilik	Southampton			
			Rankin Inlet			
	Baffin	North Baffin	Iglulingmiut	3/4 ^d	PROBABLY FOSSILIZED	
			Tununirmiut			
		South Baffin	Southeast	3	FOSSILIZED	
			Southwest	3	NO	
	Quebec–Labrador	Nunavik	Itivimiut	3	NO	
			Tarramiut			
Nunatsiavut		N. Labrador				
		Rigolet				
Greenlandic Kalaallisut	Greenlandic	W. Greenland	Central	4	YES; PRODUCTIVE	
			Southern			
			Upernavik	Northern	3/4	PROBABLY FOSSILIZED
				Upernavik		
		E. Greenland	Ammassalik	3/4	PROBABLY FOSSILIZED	
			Sermilik			
	Polar	Thule	4	YES; PRODUCTIVE		

^dThe number of vowels in North Baffin, East Greenlandic, and the Northern and Upernavik dialects of West Greenlandic depends on whether palatalization is synchronic or fossilized in lexical items. If they are fossilizations (i.e., /s/ in their underlying forms) there would be little or no evidence for speakers to posit a distinct underlying fourth vowel. Conversely, if palatalization is synchronic then speakers would need to posit a fourth vowel (so as not to over generate).

We see in this table that, with respect to the relationship between palatalization and the vowel inventory, there are three types of Inuit dialects/subdialects, with a fourth typological possibility remaining unattested:

(30) *Typology of Inuit vowel inventories and palatalization:*

- a. Four vowels, without palatalization (e.g., Diomedé)
- b. Four vowels, with palatalization (e.g., North Slope)
- c. Three vowels, without palatalization (e.g., Aivilik)
- d. Three vowels, with palatalization (not attested)

The dialects of type (30b) maintain a distinction between palatalizing /i/ and a non-palatalizing fourth vowel, even though the phonetic motivation for distinguishing between types of *i* is gone. This perseveration of a distinction in the absence of its phonetic motivation, as schematized in (31a), is a common historical pattern.²⁰

The dialects of type (30c) show no palatalization. It may be that some of these dialects never had palatalization at all, but it is unlikely that none of them did. Given the presence of palatalization in every dialect group (if only as fossilizations), it is reasonable to assume that some of the dialects of type (30c) descend from a dialect that had palatalization after */i/. Evidently, once */i/ and */ə/ were no longer distinct, speakers of these dialects opted for a “concrete” solution to the problem of distinguishing which vowels caused palatalization and which did not by simply doing away with palatalization altogether, thus simplifying the phonology, as in (31b). This, too, is a common historical development when an original contrast is lost.

Why, however, do we find no examples of the opposite merger (30d)? Given a dialect where /i/ causes palatalization, we might expect it to continue doing so and to extend this process to “new” instances of [i] that arise from */ə/. Assuming that palatalization after [i] has phonetic motivation, it is all the more striking that not a single dialect opted for what might appear to be the optimal solution to the merger of the vowels: maintain palatalization (after /i/), and simplify the grammar by treating all instances of surface [i] the same. By the same token, why has no three-vowel dialect innovated palatalization?

(31) *Diachronic developments from original dialect with palatalization:*

Original dialect	*/it/ > is	*/ət/ > ət
a. Maintain four vowels:	/it/ > is	/Vt/ > it
b. Lose palatalization:	/it/ > is > it	/Vt/ > /it/ > it
c. *Extend palatalization:	/it/ > is	/Vt/ > /it/ > is

No dialect shows evidence of having merged /i/ and the fourth vowel while maintaining synchronically productive palatalization (as in 31c). Even diachronically, fossilized instances of palatalization occur after etymological */i/, demonstrating that the four-vowel inventory was maintained (at least underlyingly) at the time that palatalization was active. No three-vowel dialect has extended palatalization to all surface occurrences of [i] upon the loss of the underlying fourth vowel.

We argue in the next section that this typological gap can be explained via an analysis that draws a connection between phonological activity and contrast.

²⁰Here we use /V/ to represent the underlying fourth vowel (i.e., weak *i*).

3. THEORETICAL FRAMEWORK AND ANALYSIS

In this section we outline our theoretical framework and present our analysis.

3.1 Contrast and activity in phonology

A recurring theme throughout the history of phonological theory is that contrastive properties of phonemes play a special role. This view was particularly prominent among the Prague School linguists such as Jakobson and Trubetzkoy (see Dresher 2009 for discussion), and can be found in the work of contemporary phonologists such as Calabrese (1995, 2005), Clements (2001), and Nevins (2010). It is a main contention of the general approach we follow here, that of Modified Contrastive Specification (Avery and Rice 1989, Dresher et al. 1994, Dresher 2009). This theory adopts what D.C. Hall (2007:20) has called the Contrastivist Hypothesis, which he states as in (32).

(32) *Contrastivist Hypothesis:*

The phonological component of a language L operates only on those features which are necessary to distinguish the phonemes of L from one another.

Put another way, the Contrastivist Hypothesis holds that only contrastive features are active in the phonology. By “active” we mean that a feature can spread, or provoke harmony, or otherwise influence other segments in the phonology. Various phonologists have advocated a “minimalist” approach to phonology, attributing to segments only those properties that are required to account for phonological patterning.²¹ Clements (2001:71–72) proposes, for example, that “phonological representations should be freed of superfluous representational elements, leaving only those that are essential to an understanding of lexical, phonological, and phonetic generalizations”.

3.2 Active features in Inuit dialects

Throughout this article we have considered one example of phonological activity — namely, palatalization of consonants by /i/. Palatalizing /i/ must have an active feature that causes palatalization; we will call this feature [coronal].²² It follows from the Contrastivist Hypothesis that if a feature is active, then it must be contrastive. However, /i/ in three-vowel dialects does not cause palatalization; hence, there is no evidence that [coronal] is active in three-vowel dialects. The typological gap can be accounted for if we can explain why [coronal] is not active in three-vowel dialects.

²¹See, for example, Clements (2001, 2003, 2009), Hyman (2001, 2002, 2003), and Morén (2003, 2006). Versions of phonological minimalism can be found also in Dependency Phonology (Anderson and Ewen 1987, Anderson 2005, Carr et al. 2005) and Radical CV Phonology (van der Hulst 1995, 1996, 2005).

²²The feature [coronal] can be considered equivalent to [front] for our purposes. How palatalization works is the subject of some debate; see Kenstowicz (1994), T.A. Hall (2007), and Kochetov (2011) for overviews and references. All that is important here is that /i/ bears some contrastive feature that triggers palatalization.

Apart from palatalization, what other examples of phonological activity are manifested by Inuit dialects? The vowel /i/ does not appear to initiate or participate in other processes, but /a/ and /u/ do. We will argue that there is synchronic evidence that /a/ has an active feature [low] and that /u/ has an active feature [labial].

First, in West and East Greenlandic the sequences /ai/ and /au/ become [aa], except word-finally (Rischel 1974:74):

(33) /sava+innaq/ → [savaannaq]
sheep-merely

(34) /nuna+u+vuq/ → [nunaavuq]
land-COP-INDIC.3SG

While not specifically pointing to the feature [low], this assimilation can be construed as a feature spreading from /a/ to the following vowel. Moreover, Robbe and Dorais (1986:xx, 105) note that in East Greenlandic uvular segments can cause a preceding /i/ to lower to [a]:

(35) sananaq ‘a side’ (cf. saniliq ‘neighbour’; saniani ‘beside’)

We contend that a feature such as [low] on uvulars spreading to a preceding /i/ is a possible explanation of this lowering.²³

Evidence for the feature [labial] (equivalent for our purposes to [round]) can also be found in East Greenlandic and subdialects of West Greenlandic. Dorais (2003:142) describes a process of vowel harmony in which /u/ becomes [i] in specific phonological environments. Crucially, though, this process is blocked if /u/ “belongs to a syllable initiated by a bilabial consonant”, arguably due to the presence of the feature [labial] on the consonant. Furthermore, he notes that “when immediately followed by another vowel, /u/, /uu/ and /iu/ change to [iv] and [iiv]” (p. 143; slanted and square brackets added). Dorais gives the examples of *iivit* ‘people’ and *niiva* ‘his/her leg’, which appear to be derived as follows:

(36) UR /inuk+it/ person-PL
/inuit/ (deletion of final consonant of stem²⁴)
/iuit/ (gradation/elision of intervocalic [n], p. 141)
SR [iivit] (/iui/ → [iivi])

(37) UR /niuq+a/ leg-3SG.POSS
/niua/ (deletion of final consonant of stem)
SR [niiva] (/iua/ → [iiva])

Once again, the shift between vowel /u/ and consonant [v] suggests a shared feature. We contend that [labial] is a natural choice for this feature.²⁵

²³Nevins (2010:104), following Trigo (1991), observes that uvulars may be distinguished from velars cross-linguistically by the features [low], [high], or [ATR]. In a three- or four-vowel system it is not crucial which of these is chosen, as all perform a roughly similar contrastive function.

²⁴Across Inuit, a number of suffixes cause a preceding consonant to delete. For instance, in both Western and Eastern Canadian Inuktitut we have *iqaluk* ‘fish (SG)’ and *iqalu-it* ‘fish (PL)’; *umiaq* ‘boat’ and *umia-t* ‘boats’ (Dorais 2003).

²⁵Further evidence for specifying /u/ as [labial] comes from the sister language of Yupik. Central Siberian Yupik possesses a series of labialized velars /k^w, ɣ^w, x^w, ŋ^w/, in addition to

3.3 Contrastive features in Inuit dialects

Based on our brief survey of phonological activity in Inuit vowels, we have concluded that [low] is active in /a/, [labial] is active in /u/, and [coronal] is active in palatalizing /i/. According to the Contrastivist Hypothesis, these features must also be contrastive. In this section we will consider how to draw the connection between activity and contrast.

Consider again the vowel system of Proto-Eskimo, repeated from (1).

(38)

i	u
ə	
a	

Let us begin by considering how these vowels might be specified using conventional binary features. To the features we have already identified as active we can add [high], a common feature in analyses of simple vowel systems. The full specifications of the vowels in (38) are as in (39).

(39) *Full feature specifications of Proto-Eskimo vowels:*

	i	ə	a	u
[low]	–	–	+	–
[high]	+	–	–	+
[coronal]	+	–	–	–
[labial]	–	–	–	+

Inspection of these specifications reveals that not all of them are required in order to distinguish these vowels from each other. That is, some specifications are predictable. For example, if we know that /a/ is [+low], then we can predict that it is [–high]; given that /u/ is [+labial], we can deduce its other features; and so on. Put differently, not all features are contrastive; some are redundant.

3.3.1 Contrastive features by the Pairwise Approach

How do we determine which features are contrastive? A common procedure is to identify as contrastive only those features that uniquely distinguish a pair of phonemes. For example, Nevins (2010:98) defines (positional) contrastiveness as in (40); we will call this the *Pairwise Approach* to contrast:

(40) *Positional Contrastiveness:*

A segment S in position P is contrastive for the feature F iff there exists a segment S' in the inventory that is featurally identical to S for all values except F, and S' can occur in position P as well.

Applying this Pairwise Approach to the specifications in (39) does not yield satisfactory results; as shown in (41), the feature [low] uniquely distinguishes /a/ from /ə/, but no other specifications in (39) are identified as contrastive.

the plain velars. Krauss (1975:48) writes that “[t]he labialized velars arise etymologically or morphophonemically in probably every case (except certain instances of /x^w/ and in loans) from the vowel /u/ between a velar and another vowel, to which the /u/ then becomes assimilated, after leaving the velar labialized”. Labialization can be taken as evidence that /u/ bears a phonologically active [labial] feature.

(41) *Contrastive feature specifications by the Pairwise Approach:*

	i	ə	a	u
[low]		–	+	
[high]				
[coronal]				
[labial]				

The Pairwise Approach fares even worse when applied to the three-vowel inventory /i, a, u/: here, no features are identified as contrastive, because every phoneme is distinguished from every other one by more than a single feature. To make a connection with phonological activity in these inventories, we need a different approach to contrast.²⁶

3.3.2 *Contrastive features by the Successive Division Algorithm*

We will assume here that contrastive specifications are assigned by a procedure called the Successive Division Algorithm (SDA) (Dresher 1998, 2003, 2009). This algorithm derives from work of Roman Jakobson and his collaborators (Jakobson et al. 1952, Cherry et al. 1953, Jakobson and Halle 1956, Halle 1959). An informal statement of this algorithm is given in (42).

(42) *Successive Division Algorithm:*

- a. Begin with feature specifications: assume all sounds are allophones of a single undifferentiated phoneme.
- b. If the set is found to consist of more than one contrasting member, select a feature and divide the set into as many subsets as the feature allows for.
- c. Repeat step (b) in each subset: keep dividing up the inventory into sets, applying successive features in turn, until every set has only one member.

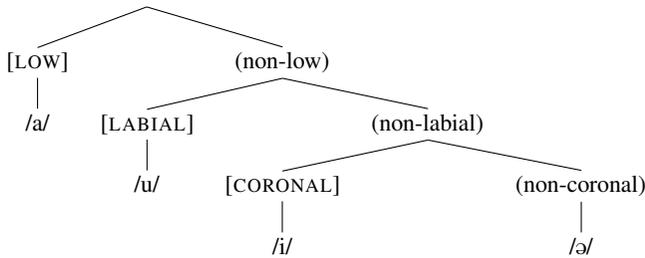
In this approach, features are ordered into a contrastive hierarchy. The ordering of the features and the SDA determine what the contrastive feature specifications are for an inventory. We assume that the ordering of features may vary cross-linguistically, though some orderings may be more common than others. Since the ordering is variable, we must seek evidence for the ordering, in the first place, from phonological activity.

3.3.3 *Contrastive features in Proto-Eskimo and modern four-vowel dialects*

We have seen that in four-vowel dialects the features [low], [labial], and [coronal] are active. This fact suggests that these features should be at the top of the contrastive hierarchy in these dialects. Since these three features are sufficient to fully distinguish the four vowel phonemes, no other features, such as [high], can be contrastive.

Based on the phonological activity observed in all the dialects (including three-vowel dialects), we propose the contrastive feature hierarchy in (43) for the Proto-Eskimo vowel system. For each feature we distinguish between the *marked* value (in small caps) and the *unmarked*, or *default*, value (in parentheses).

²⁶See Dresher (2009) for a detailed discussion of the problems with the Pairwise Approach.

(43) *Contrastive hierarchy for Proto-Eskimo*: [LOW] > [LABIAL] > [CORONAL]

Following Jakobson and Halle (1956), the first division of a vowel system usually distinguishes vowels of high sonority, or lower vowels, from higher vowels of lower sonority. Consequently, we choose the feature [low], which divides the vowel /a/ from the other vowels. Now that /a/ is uniquely specified, it receives no further contrastive features, as shown in (43).

The non-low vowels can be divided up in a number of ways. A common pattern is that the next division is based on a place feature. Of the two active place features, we propose that [labial] is the next feature in the order, for reasons that will become clear later. It separates the vowel /u/ from the other two vowels. Now /u/ is in contrast with every other vowel, and receives no further contrastive features.²⁷

This leaves the vowel phonemes /i/ and /ə/ to be distinguished by the feature [coronal]. Now all the vowels have been distinguished, as shown in (44), with only the contrastive specifications. In this system, /ə/ is the least marked vowel — in fact, totally unmarked for vowel features — while the other vowels each have one contrastive feature.

(44) *Contrastive specifications of Proto-Eskimo vowels*:

[coronal]	i	ə	u
	a		[low]

The contrastive hierarchy proposed above leaves /ə/ contrastively underspecified. Evidence for this comes from Yupik, which retains the four-vowel system. However, schwa does not have the same status as the other vowels. According to Kaplan (1990:147), it “cannot occur long or in a cluster with another vowel”, instead undergoing dissimilation or assimilation when adjacent to full vowels. Susceptibility to assimilation is characteristic of unmarked elements: they tend to be targets of phonological processes and they are not triggers (Rice 2007). For instance, Jakobson (1995:37, 45) states that sequences of /əɲji/ become [ai] when the velar nasal

²⁷Inverting the order of [low] and [labial] (i.e., if our hierarchy were to be ordered [labial] > [low] ... instead of [low] > [labial] ...) would be compatible with the analysis presented here. Ultimately, the ordering is the product of phonological evidence available to speakers during language acquisition and potentially of cross-linguistic universals.

is dropped between two single vowels, while other vowel-schwa clusters created by velar/uvular dropping undergo assimilation:

- (45) a. /nəqə+ɟit-/ → [nəqaitə-]
 fish-lack-
 ‘lack fish’
- b. /atkuy+ət/ → /atkuət/ → [atkuut]
 parka-PL
 ‘parkas’
- c. /tanɣuɣaβ+ət/ → /tanɣuɣaət/ → [tanɣuɣaat]
 boy-PL
 ‘boys’

Similarly, in some Inuit dialects weak *i* undergoes a variety of assimilation and deletion processes that do not affect strong *i* or the other vowels /u/ and /a/, further suggesting that it lacks contrastive features. For example, weak *i* changes to [a] before another vowel, as in (46a), but strong *i* does not, as illustrated in (46b).

(46) *Barrow Inupiaq weak and strong i before a vowel:*

- a. /aɟuti+u+tuq/ → [aɟutauuq] (cf. PE *aɟun²⁸)
 man-COP-PART.3SG
 ‘It is a man.’
1. /iki+u+tuq/ → [ikiuuq] (cf. PE *əki)
 wound-COP-PART.3SG
 ‘It is a wound.’

(Kaplan 1981:119)

Following Underhill (1976) and Kaplan (1981), we take the view that dialects that distinguish between strong and weak *i* retain four underlying vowels, as in the proto-language, with the same contrastive features as in (43) and (44).²⁹ This analysis accounts for the phonological behaviour of this vowel system, including productive phonological processes like those in Inupiaq. Thus, these contrastive values account for the fact that /i/ can trigger palatalization, as it has a relevant contrastive feature. The fourth vowel is the least marked, literally, and therefore cannot trigger palatalization, and is more susceptible to receiving features from the context.

²⁸Despite lacking */ə/ in Fortescue et al.’s reconstructed form for ‘man’, root-final /tə/ and /n/ alternate synchronically in Yupik in this and other morphemes (Jacobson 1995:30–31):

- (i) aɟun (citation form)
 (ii) aɟutə- (base form)

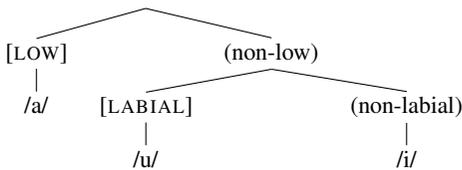
Furthermore, the related proto-forms *aɟutəkfaq ‘stepfather’ and *aɟutəviaq ‘male bird’ contain *tə.

²⁹See Archangeli and Pulleyblank (1994:73–84) for an analysis of Barrow Inupiaq that is similar in spirit, though proceeding from different theoretical assumptions.

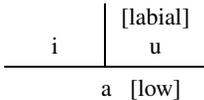
3.4 Contrastive features in three-vowel dialects

The loss of the fourth vowel results also in a loss of contrast, and this has consequences for the contrastive specification of the remaining vowels. If we retain the contrastive hierarchy in (43), the first feature is [low], which, as before, distinguishes /a/ from the other vowels. The next feature is once again [labial], which applies to /u/. But now we are finished, because all three vowels are in contrast. The loss of the fourth vowel means that the feature [coronal] is not required for any contrastive function. As a result the vowel /i/ now becomes the unmarked vowel with no contrastive [coronal] feature:

(47) *Contrastive hierarchy for /i, a, u/ dialects: [LOW] > [LABIAL]*



(48) *Contrastive specifications in three-vowel dialects:*



The unmarked status of /i/ in three-vowel dialects is supported by its use in satisfying phonotactic rules in loanwords, as illustrated in the following examples from Labrador (Dorais 1993:97–98):

- (49) a. matsisi 'matches'
 b. puliisi 'police'
 c. siisi 'cheese'
 d. vaini 'wine'
 e. kuukusi 'pig' (from the Innu *kâkus*)
 f. pakaakuani 'chicken' (from the Innu *pakâkwani*)

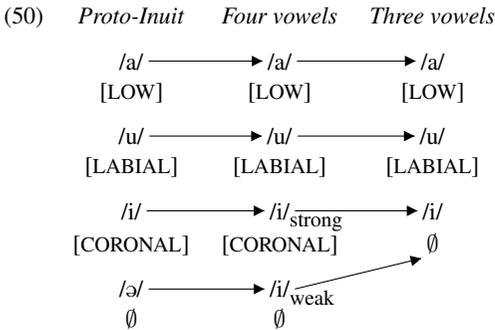
In order to avoid word-final [s] and [n], which are not possible in Eastern Canadian Inuktitut, /i/ is inserted. This use of /i/ as the default vowel supports its unmarked status in the inventory of three-vowel dialects.

One question remains to be resolved for these three-vowel dialects: if /i/ is characterized only by the unmarked features [–low, –labial], why does it not surface as [ə]? This is tantamount to asking why inventories of the form /i, a, u/ are more common than /ə, a, o/. Following the approach taken in Modified Contrastive Specification, we posit that contrastive feature specifications can be enhanced by non-contrastive features that promote the phonetic distinctiveness of the contrastive features (Stevens et al. 1986, Stevens and Keyser 1989, Keyser and Stevens 2001, Dyck 1995, Rice 2002, Hall to appear). Thus, the contrastive feature [–low] is enhanced by [+high], [+labial] (low F2) is enhanced by [+back] (also low F2), and [–labial] is enhanced by [coronal]. That is, if [coronal] is not used as a contrastive feature, it is available to enhance the unmarked features of /i/. It follows, then, that

though /i/ in a three-vowel system has the unmarked status of /ə/ in four-vowel systems, it will tend to surface as [i] rather than [ə].

3.5 Explaining the typological gap

Crucially, the system we have proposed accounts for the typological gap whereby no three-vowel dialects exhibit palatalization. If palatalization of consonants is triggered by a contrastive feature [coronal] on strong *i*, and if strong and weak *i* are solely distinguished by this contrastive feature, the loss of the fourth vowel will necessarily consist of the loss of the [coronal] feature, resulting in a loss of palatalization. This shift from a four-vowel dialect to a three-vowel dialect is illustrated in (50).



Accordingly, palatalization should occur only in dialects that have four underlying vowels, and not in dialects with only three underlying vowels.

It is important to note that we are not claiming that /i/ cannot cause palatalization in all three-vowel systems cross-linguistically. We presume that other languages can employ different contrastive hierarchies.³⁰ Rather, we are arguing that in any three-vowel system, one vowel will lack contrastive features and be unable to trigger phonological activity, while being a likely target for it.

Given that feature ordering is not universally fixed, it is possible in principle for learners to re-analyze a vowel system, assigning new features or a new ordering of features to the contrastive hierarchy. If [coronal] were ordered higher in the feature hierarchy, the result would be that /i/ could trigger palatalization even in a three-vowel system. Our assumption is that feature hierarchies tend to be stable in a language family across time and space, unless a series of changes arise that crucially change the nature of the contrasts that characterize the system.³¹ The reason,

³⁰There is evidence that [coronal] takes precedence over [labial] in Manchu-Tungusic and Eastern Mongolian vowel systems, with the consequence that /i/ has a marked [coronal] feature whereas /u/ lacks a marked place feature (Dresher and Zhang 2005, Dresher 2009:176–183). Though these are not three-vowel systems, a similar ordering in a three-vowel system would result in /i/ having a marked [coronal] feature and /u/ being the unmarked vowel.

³¹Zhang (1996) argues that such a change occurred in the modern Manchu dialects, causing them to have a different contrastive hierarchy from the other Manchu-Tungusic languages, with concomitant changes in phonological patterning (see Dresher and Zhang 2005 and Dresher 2009:180–182 for discussion).

presumably, is that the same basic phonological and phonetic evidence that leads learners to set up a particular set of contrasts and hierarchy of features in one dialect exists also in related dialects, barring some radical upheaval that changes the primary evidence. A survey of consonant systems in Inuit dialects (Compton 2008) suggests that the consonantal feature hierarchy is relatively stable across dialects, with some minor local variations. The use of /i/ in three-vowel dialects as the default vowel in loan-word adaption suggests that /i/ indeed remains contrastively underspecified in these dialects.

4. CONCLUSION

In this article we have argued that we can explain the absence of palatalization in Inuit three-vowel dialects by employing the Contrastivist Hypothesis. If we assume that (i) only contrastive features are phonologically active, (ii) the contrastive feature differentiating strong and weak *i* in four-vowel dialects is [coronal], and (iii) [coronal] is ordered after the other contrastive features in these dialects, then the merger of these vowels leaves /i/ without contrastive features and unable to trigger palatalization. Thus, this contrastive approach to phonological patterning explains a conspicuous gap in the typology of Inuit dialects.

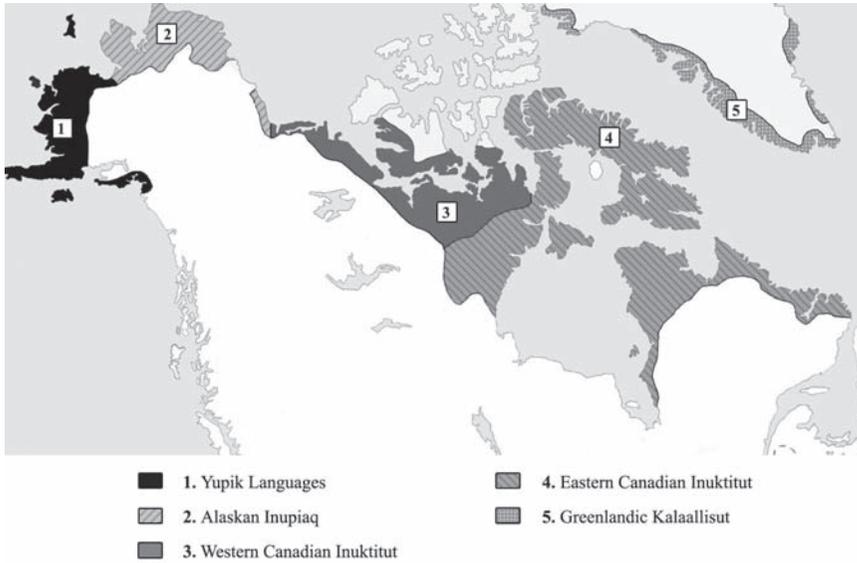
REFERENCES

- Anderson, John M. 2005. Old English *i*-umlaut (for the umpteenth time). *English Language and Linguistics* 9:195–227.
- Anderson, John M. and Colin J. Ewen. 1987. *Principles of dependency phonology*. Cambridge: Cambridge University Press.
- Archangeli, Diana and Douglas Pulleyblank. 1994. *Grounded phonology*. Cambridge, MA: MIT Press.
- Avery, Peter and Keren Rice. 1989. Segment structure and coronal underspecification. *Phonology* 6:179–200.
- Calabrese, Andrea. 1995. A constraint-based theory of phonological markedness and simplification procedures. *Linguistic Inquiry* 26:373–463.
- Calabrese, Andrea. 2005. *Markedness and economy in a derivational model of phonology*. Berlin: Mouton de Gruyter.
- Carr, Philip, Jacques Durand, and Colin J. Ewen, eds. 2005. *Headhood, elements, specification and contrastivity: Phonological papers in honour of John Anderson*. Amsterdam: John Benjamins.
- Cherry, E. Colin, Morris Halle, and Roman Jakobson. 1953. Toward the logical description of languages in their phonemic aspect. *Language* 29:34–46.
- Clements, G.N. 2001. Representational economy in constraint-based phonology. In *Distinctive feature theory*, ed. T. Alan Hall, 71–146. Berlin: Mouton de Gruyter.
- Clements, G.N. 2003. Feature economy in sound systems. *Phonology* 20:287–333.
- Clements, G.N. 2009. The role of features in phonological inventories. In *Contemporary views on architecture and representations in phonological theory*, ed. Eric Raimy and Charles Cairns, 19–68. Cambridge, MA: MIT Press.
- Compton, Richard. 2008. Contrast in Inuit consonant inventories. In *Proceedings of the 2008 annual conference of the Canadian Linguistic Association*, ed. Susie Jones. Available at: www.chass.utoronto.ca/~cla-acl/actes2008/CLA2008_Compton.pdf.

- Dorais, Louis-Jacques. 1993. *From magic words to word processing: A history of the Inuit language*. Iqaluit: Arctic College.
- Dorais, Louis-Jacques. 2003. *Inuit uqausiqatigiit: Inuit languages and dialects*. 2nd rev. ed. Iqaluit: Nunavut Arctic College.
- Dorais, Louis-Jacques. 2010. *The language of the Inuit: Syntax, semantics, and society in the Arctic*. Montreal: McGill-Queen's University Press.
- Dresher, B. Elan. 1998. On contrast and redundancy. Paper presented at the annual meeting of the Canadian Linguistic Association, Ottawa.
- Dresher, B. Elan. 2003. Contrast and asymmetries in inventories. In *Asymmetry in grammar*, Vol. 2: *Morphology, phonology, acquisition*, ed. Anna-Maria di Sciullo, 239–257. Amsterdam: John Benjamins.
- Dresher, B. Elan. 2009. *The contrastive hierarchy in phonology*. Cambridge: Cambridge University Press.
- Dresher, B. Elan and Xi Zhang. 2005. Contrast and phonological activity in Manchu vowel systems. *Canadian Journal of Linguistics* 50:45–82.
- Dresher, B. Elan, Glyne Piggott, and Keren Rice. 1994. Contrast in phonology: Overview. In *Toronto Working Papers in Linguistics* 13, ed. Carrie Dyck, iii–xvii.
- Dyck, Carrie. 1995. Constraining the phonology–phonetics interface, with evidence from Spanish and Italian dialects. Doctoral dissertation, University of Toronto.
- Fortescue, Michael. 1991. *Inuktun: An introduction to the language of Qaanaaq, Thule—En introduktion til Thulesproget*. Copenhagen: Institut for eskimologis skriftrække, Københavns Universitet.
- Fortescue, Michael, Steven A. Jacobson, and Lawrence D. Kaplan. 1994. *Comparative Eskimo dictionary with Aleut cognates*. Fairbanks: Alaska Native Language Center.
- Hall, Daniel Currie. 2007. The role and representation of contrast in phonological theory. Doctoral dissertation, University of Toronto.
- Hall, Daniel Currie. To appear. Phonological contrast and its phonetic enhancement: Dispersedness without dispersion. *Phonology*.
- Hall, T. Alan. 2007. Segmental features. In *The Cambridge handbook of phonology*, ed. Paul de Lacy, 311–334. Cambridge: Cambridge University Press.
- Halle, Morris. 1959. *The sound pattern of Russian: A linguistic and acoustical investigation*. The Hague: Mouton.
- Hyman, Larry M. 2001. Vowel harmony in Gunu. *Studies in African Linguistics* 30:146–170.
- Hyman, Larry M. 2002. On the limits of phonetic determinism in phonology: NC revisited. In *The role of perception in phonology*, ed. Elizabeth Hume and Keith Johnson, 141–185. New York: Academic Press.
- Hyman, Larry M. 2003. 'Abstract' vowel harmony in kàlòŋ: A system-driven account. In *Typologie des langues d'Afrique et universaux de la grammaire*, ed. Patrick Sauzet Anne Zribi-Hertz, 85–112. Paris: l'Harmattan.
- Jacobson, Steven A. 1995. *A practical grammar of the Central Alaskan Yup'ik Eskimo language*. Fairbanks: Alaska Native Language Center.
- Jacobson, Roman, C. Gunnar M. Fant, and Morris Halle. 1952. *Preliminaries to speech analysis*. MIT Acoustics Laboratory Technical Report, No. 13.
- Jacobson, Roman and Morris Halle. 1956. *Fundamentals of language*. The Hague: Mouton.
- Kaplan, Lawrence D. 1981. *Phonological issues in North Alaskan Inupiaq*. Fairbanks: Alaska Native Language Center.
- Kaplan, Lawrence D. 1990. The language of the Alaskan Inuit. In *Arctic languages: An awakening*, ed. Dirmid R.F. Collis, 131–158. Paris: UNESCO.
- Kenstowicz, Michael J. 1994. *Phonology in generative grammar*. Oxford: Blackwell.

- Keyser, Samuel Jay, and Kenneth N. Stevens. 2001. Enhancement revisited. In *Ken Hale: A life in language*, ed. Michael J. Kenstowicz, 271–291. Cambridge, MA: MIT Press.
- Kochetov, Alexei. 2011. Palatalisation. In *The Blackwell companion to phonology*, vol. 3: *Phonological processes*, ed. Colin J. Ewen, Beth Hume, Marc van Oostendorp, and Keren Rice, Chapter 71. Oxford: Wiley-Blackwell.
- Krauss, Michael A. 1975. St. Lawrence Island Eskimo phonology and orthography. *Linguistics: An International Review* 152:39–72.
- Morén, Bruce. 2003. The Parallel Structures Model of feature geometry. In *Working Papers of the Cornell Phonetics Laboratory*, ed. Johanna Brugman and Anastasia Riehl, vol. XV, 194–270. Ithaca: Department of Linguistics, Cornell University.
- Morén, Bruce. 2006. Consonant–vowel interactions in Serbian: Features, representations and constraint interactions. *Lingua* 116:1198–1244.
- Nevins, Andrew. 2010. *Locality in vowel harmony*. Cambridge, MA: MIT Press.
- Petersen, Robert. 1990. The Greenlandic language: Its nature and situation. In *Arctic Languages: An awakening*, ed. Dirmid R.F. Collis, 293–308. Paris: UNESCO.
- Rice, Keren. 2002. Vowel place contrasts. In *Language universals and variation*, ed. Mengistu Amberber and Peter Collins, 239–270. Westport, CT: Praeger.
- Rice, Keren. 2007. Markedness in phonology. In *The Cambridge handbook of phonology*, ed. Paul de Lacy, 79–97. Cambridge: Cambridge University Press.
- Rischel, Jørgen. 1974. *Topics in West Greenlandic phonology*. Copenhagen: Akademisk Forlag.
- Robbe, Pierre and Louis-Jacques Dorais. 1986. *Tunumiit Oraasiat — Tunumiut oqaasii — Det østgrønlandske sprog — The East Greenlandic Inuit language — La langue inuit du Groenland de l'Est*. Québec: Centre d'études nordiques.
- Stevens, Kenneth N. and Samuel Jay Keyser. 1989. Primary features and their enhancement in consonants. *Language* 65:81–106.
- Stevens, Kenneth N., Samuel Jay Keyser, and Haruko Kawasaki. 1986. Toward a phonetic and phonological theory of redundant features. In *Invariance and variability in speech processes*, ed. Joseph S. Perkell and Dennis H. Klatt, 426–449. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Tersis, Nicole. 2008. *Forme et sens des mots du tunumiisut: Lexique inuit du Groenland oriental*. Paris: Peeters.
- Trigo, Loren. 1991. On pharynx–larynx interactions. *Phonology* 8:113–136.
- Underhill, Robert. 1976. The case for an abstract segment in Greenlandic. *International Journal of American Linguistics* 42:349–358.
- van der Hulst, Harry. 1995. Radical CV phonology: The categorial gesture. In *Frontiers of phonology*, ed. Jacques Durand and Francis Katamba, 80–116. Essex: Longman.
- van der Hulst, Harry. 1996. Radical CV phonology: The segment–syllable connection. In *Current trends in phonology: Models and methods*, ed. Jacques Durand and Bernard Laks, 333–361. Salford: European Studies Research Institute (ESRI).
- van der Hulst, Harry. 2005. The molecular structure of phonological segments. In *Headhood, elements, specification and contrastivity: Phonological papers in honour of John Anderson*, ed. Philip Carr, Jacques Durand, and Colin J. Ewen, 193–234. Amsterdam: John Benjamins.
- Zhang, Xi. 1996. Vowel systems of the Manchu-Tungus languages of China. Doctoral dissertation, University of Toronto.

APPENDIX: MAP OF INUIT DIALECT GROUPS AND YUPIK LANGUAGES



Adapted from an image at en.wikipedia.org/wiki/File:Langs_N.Amer.png#filehistory created by 'Ishwar' and licensed under the Creative Commons Attribution 2.0 Generic license. Dialect group boundaries added, using dialect maps from Dorais (2003, 2010) and Fortescue et al. (1994).