

Consonants and Consonant Clusters in Cape Dorset Inuktitut
By:Elizabeth Erhardt

This paper aims to explore various factors at work in syllables in Inuktitut, focusing mainly on consonant clusters. It is divided into 4 sections. The first section of this paper is devoted to a review of consonant sounds in Cape Dorset Inuktitut. The sounds of this dialect are compared with those from other dialects, both the east and the west. With this data, not only can we get a better idea of what sounds we need to consider when characterizing consonant interactions, but we can also make some suggestions about possible historical changes in the language. Section two describes evidence for the maximal syllable template for Inuktitut. The CV template plays a role in limiting the size of consonant and vowel clusters. Some inter-syllables interactions will also be discussed briefly. Section three will be devoted to exploring interactions when two consonants come in contact. These processes include not only assimilation, but also deletion. Lastly, part four is a summary of the findings and some concluding remarks.

Part one: consonant sounds

Before we can analyze consonant clusters in the main parts of this paper, we need to clearly lay out our assumptions about what sounds are present in the Cape Dorset dialect. When we compare the consonant inventory of Cape Dorset to those of other communities, we can get a better picture of the processes that are happening in this dialect. As will be discussed below, the processes in this dialect may or may not be present in other dialects. The geographic position of Cape Dorset puts in the middle of a dialect continuum, stuck between the western dialects, which tend to be more conservative in terms of the amount of assimilation and the more generally progressive dialects a bit further to the east on Baffin Island, and to the south in northern Quebec.

The following table shows the sounds of the Cape Dorset dialect. Some phonemes will be discussed in further detail throughout this section.

	Bilabial	Labio-Dental	Alveolar	Post-Alveolar	Velar	Uvular
Stop	p b ¹		t		k g	q
Affricate				d		
Fricative		v	s z	²	x ³	
Nasal	m			n	ŋ	
Approximant				l		

Table 1: Consonants in Cape Dorset Inuktitut. By convention, with pairs of sounds in the same place and manner, the voiceless variants are represented on the left.

The / / is usually written as ‘r’ when spelling Inuktitut words in the standard roman orthography, but has certain characteristics that distinguish it from the English /r/. For example, it seems to be produced further back in the mouth and generally with more frication than English /r/. A question to be addressed in this paper is whether the ‘r’ is really an approximant or is it just a regular fricative. Does it have any approximant-like features? I’ll be using the IPA symbol / / to represent the unique quality of the sound.

If we compare the Cape Dorset dialect to other dialects, both the western arctic and from the east, we can get a better idea of the unique nature of this particular dialect. I’ll be using two dialects for making comparisons in this paper; Siglit, a dialect from the Northwest Territories, and Inujjuaq which is a dialect from northern Quebec. The Siglit data is taken from Lowe (2001) and the Inujjuaq data is from Dorias (1979).

¹ Very rare. To be clarified in the next section of this paper.

² This is actually a phoneme on its own, but always occurs after /t/. For reasons to be clarified later, it is not listed as /t /.

³ /x/ is an allophone of /q/ to be discussed in the following section. Yumiko Gondaira looked at a spectrogram communicated to me that it looks more like a velar fricative than a uvular fricative.

The Cape Dorset dialect seems to have some unique characteristics, the most noticeable of which is the presence of /z/ which is not mentioned in the consonant inventories of either Siglit or in Inujjuaq.

We can see from table 2 that everywhere we would expect to see /y/ in Cape Dorset, we find /z/. The change is not restricted to any particular morphemes, it occurs wherever we find /y/ in other dialects. In the Siglit and Inujjuaq dialects, it appears that /y/ is most often found in an intervocalic position. Lowe (2001) notes that in the Siglit dialect, it can occasionally follow /g/, /b/ and /r/. It's also important to note that /y/ cannot be a geminate in any dialect. In Cape Dorset, /z/ is only ever intervocalic and never geminated. It is most often written as a 'j' in regular orthography.

Gloss	Tuktoyaktuk, NWT (Lowe, 2001)	Cape Dorset ⁴ , NU	Inujjuaq, Quebec (Dorais, 1979)
'eye'	iyi	izi	iyi
'brown'	-	kazuk	kayuk
's/he is drowning'	kivi-yuaq ⁵	kivi-zuq	kivi-yuq
's/he is eating'	niri-yuaq	niri-zuq	niri-yuq
'canoe'	qayaq	xazaq	qayaq
's/he fell'	iyukkaq-tuaq	izukkaq-tuq	iyukka-puq

Table 2: /y/→/z/ in a variety of environments.

In addition to the absence of /y/ in Cape Dorset, we also find some other differences, especially when compared to the western Siglit dialect. The following table suggests the reason for why we find very few /b/ sounds Cape Dorset and Inujjuaq.

Observe the following words:

⁴ Cape Dorset is called Kinngait in Inuktitut. I'm using the Inuktitut place names for the other two towns... Just to keep it simple, I'll stick with calling it Cape Dorset, but I thought it was important to add that. Our consultant doesn't like to call her hometown Cape Dorset.

⁵ This is glossed as 'it sank', but it's close enough to get the general idea.

Gloss	Tuktoyaktuk, NWT (Lowe, 2001)	Cape Dorset, NU	Inujjuaq, Quebec (Dorais, 1979)
‘today’	u bl umi	u ll umi	u ll umi
‘thumb’	k ubl u	k ull u	k ull u

Table 3: the disappearance of /b/ in the east? We can see regressive assimilation at work.

Lowe (2001) notes the rare environment in which /b/ must be found in Siglit. “Consonant /b/ is always found in simple medial position, followed by a consonant, either /y/ or /l/.” (Lowe, pg. xvii). Does this mean that /b/ is slowly disappearing from Inuktitut?⁶ It seems that the process of regressive assimilation is at work in both Cape Dorset and Inujjuaq, but not really in Tuktoyaktuk yet. We’ll see more evidence for this claim later when the process of regressive assimilation will be discussed further in section three.

With the affricates, in comparing the environments for /t / and /d / in the three dialects, we can also draw some interesting inference from their behavior as to their underlying form. As discussed in Baxter, Erhardt & Gondaira (2007), /t / never occurs word initially or in consonant clusters. This is different from /d / which can occur in consonant clusters and word initially. The following words show typical behavior of /d / in Cape Dorset.

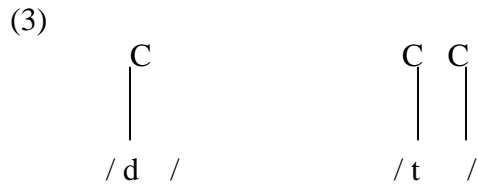
(1) d a:-ŋit-tuŋa
do.emph-not-1st.sg
“I’m not going to.”

(2) a d a lu
ashes
“ashes” (noun)

Is it further argued in Baxter, Erhardt & Gondaira (2007), that /t / is not really a true affricate, but a combination of /t/ and /s/, where the /s/ becomes affricated in all consonant clusters. One exception to this is clusters that begin with a uvular stop /q/. That

⁶ There was only one word that I elicited from our consultant which contained a /b/ and that was /nubut ait/ which is the word for “pencil sharpener”. I’m currently thinking that it might be a loan word.

is to say: /qs/ does not become /q / . The particular behavior of uvulars will be discussed further in the section three. As will be discussed later, /qs/ is a permissible consonant cluster in Cape Dorset. The sound /d /, on the other hand is represented as an affricate in its underlying form, which is why it can occur in consonant clusters, as shown in (3). The underlying representation will be discussed further in the next section on CV templates.



a d a l u “ashes”	p i t i “dried fish”
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There are no geminate fricatives in Cape Dorset Inuktitut. We can see why /z/ cannot be geminated, if it's a regular sound change from /y/ → /z/, and /y/ itself is never geminated. What about /s/? Why might we not find /s/ as a geminate? As noted in Dorais (1985), we see more homogeneous consonant clusters (geminate) as we move from west to east. Will we see the emergence of /ss/ as a consonant cluster in the future? See table 8 in part three for further discussion of /ss/.

So far, I've covered /b/, /z/, /d /, /t /, / / and /s/. And now we'll move our attention to /q/ and /x/, in the following section as it pertains more to syllable structure.

Part two: syllable template.

Another distinctive feature of Cape Dorset dialect is the fricativization of the uvular stop /q/ in onset positions. This phenomenon leads me to propose that /x/ is an allophone of /q/ because it occurs uniformly in all words, wherever /q/ is in onset position. Table 4 (*below*) shows the surface forms of various words in the different dialects. We know that /x/ is /q/ underlyingly because of the orthography and trans-dialectal cues. The general rule for fricativization of /q/ is written out in (4):

$$(4) \quad q \rightarrow x / [_$$

Gloss	Siglit (Lowe, 2001)	Cape Dorset	Inujjuaq (Quebec) (Dorais, 1979)
‘black colour’	qi niqtuq	xi niqtaq	qi nitaq
‘dog’	qimmiq	ximmiq	qimmiq
‘island’	qikiqtaq	xiki taq	qikiqtaq
‘pot’	qattaq	xatta	qatta:q
‘beluga whale’	qilalugaq	xilalugak	qilalugaq
‘ptarmigan’	aqid iq	axigiq	aqi giq
‘frozen (meat)’	quaq	xuaq	quaq

Table 4: /q/ becomes /x/ in onset position in Cape Dorset.

The logical question then is “how do we know when /q/ is in an onset position?” This brings us to the proposed maximal CV template for Inuktitut shown in (5) and the ensuing combinations shown in below in table 5. The syllable template does not vary according to dialect.

$$(5) \quad CV(V)C$$

Possible:	V	CV	CVV	CVC	VV	VC
Impossible:	*#CCVC		*CCC		*CVCC#	*VVV

Table 5: Inuktitut syllables.

The VC syllable is pretty rare, but it does exist. It is probably more rare because of the universal preference for assigning consonants to onsets as opposed to codas. I'm referring here to the maximum onset principle as noted by Kahn (1976):

“First make the onset as long as it legitimately can be, then form a legitimate coda.”

(Gussenhoven, pg. 137) Below in table 6, I've mapped out the syllable structure in each dialect for the word “ptarmigan”.

a q i d i q	a x i g i q	a q i g i q
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Table 6: from left to right, the word for 'ptarmigan' in Siglit, Cape Dorset and Inujuak.

Obviously, the constraints of the syllable template have an effect on consonant clusters. There cannot be a consonant cluster larger than two consonants at any given place in a word. When morphemes are concatenated, we sometimes get more than two consonants together in the underlying form. To resolve these violations of *CCC, one of the consonants is deleted. This is shown below in items (6) through (10b). The violations of *CCC are never resolved by epenthesis of a vowel. This is in contrast to violations of *VVV, which are apparently solved by epenthesis, but not discussed herein. (Alana Johns, personal communication).

- (6) amiaq
paint
“paint” (noun)
- (7) amiaq-tuᅇa
paint-1st.sg
“I'm painting”

- (8a) amia-**qx**au-zuq
 paint-past.today-3rd.sg
 “He/She painted today.”⁷
- (8b) cf. with underlying form: /amia**q-qq**au-tuq/
- (9) sinik
 sleep
 “to sleep”
- (10a) sini-**qx**au-zuᅇa
 sleep-past.today-1st.sg
 “I slept.”
- (10b) cf. with underlying form: /sinik-**qq**au-tuᅇa/

As a side note, we also need to consider why the first consonant of the *CCC is deleted, and not the medial or the final one. My answer would be that the first few segments of each morpheme contain more critical information to help speakers recognize what is being said. That being said, stem vowel deletion seems to be a more common process cross-linguistically.

It is also important to note that the morpheme indicating tense in the above examples /qqau/ follows the rule for fricativization shown in (4) above. The first uvular stop in this morpheme will always be realized as a stop because it will always form the coda of the syllable before it, and the second uvular stop will always be the fricative /x/ because it will always be in an onset position.

Violations of the CV template are not the only factors affecting word formation and consonant clusters in Inuktitut.

Continuing in the theme of syllable interactions, Lowe (2001) describes a “double consonant rule” in the Siglit dialect. This rule “prevents any vocalic segment, that is, a

⁷ The /-tuq/ → /-zuq/ alternation is a reaction to the shape of the previous morpheme. If it ends in a vowel, it becomes /-zuq/. It stays as /-tuq/ if the previous morpheme ends in a consonant. In other dialects, the /-zuq/ form would often be /-yuk/ which fits with the analysis from the previous section.

simple vowel or vowel cluster, preceded by a consonant cluster to be immediately followed by a geminate consonant cluster.” (Lowe, pp. xviii). The result is a deletion of the first segment of the geminate cluster. His data from Siglit is repeated below in (11a) and (11b):

(11a) itkat-pala:q-tuq
 deep-too-3rd.sg
 “It’s too deep.”

(11b) cf. with underlying form: /itkat-**palla**:q-tuq/

(11c) rule: C C VC C → C C VC

Does Cape Dorset have a similar rule? If we observe the following data, we might think that Cape Dorset does indeed have a similar rule. It is important to note that the underlying form of the negative morpheme is /-nŋit-/. This is attested in Harper (1979), as well as Lowe (2001) and Dorais (1975). We rarely see that morpheme initial double nasal in the surface forms. And this rule might be one of the reasons why.

(12a) sini- gunna- lau- ŋit- tuŋa akunialuk
 sleep-able-past.yesterday-not-1st.sg long time
 “It took a long time before I could fall asleep last night.”

(12b) cf. underlying form sinik-**gunna-lauq-nŋit**-tuŋa

We can see that the /kg/ cluster does not violate the CV template. How else then do we account for the deletion of the /k/? The morpheme /-gunna-/ has a geminate /nn/ in the middle of it, which should delete if we follow the same “double consonant rule” that we find in Siglit. The geminate /nn/ should become a single /n/ and the /kg/ cluster should remain. So clearly, we have something else going on in addition to the “double consonant rule”. As for the interactions of /-lauq-/, /nŋit/ and /-tuŋa/, there is a violation of the CV template which presumably first deletes the uvular stop /q/. If the “double consonant rule” then applies, we can explain the simplification of /nŋ/ to just /ŋ/ because it precedes a /tt/ cluster at the edge of the next syllable. This could lead us to hypothesize that there is

yet another rule which governs the types of consonant clusters permitted in the Cape Dorset dialect.⁸ If the rule that governs the removal of /kg/ as a consonant cluster applies first, it would erase the environment needed for the “double consonant rule” to be able to delete the second /n/ from /-gunna-/.

We have evidence for this from the following data that the rule would only apply to consonant clusters that are followed by geminate clusters, and not vice versa.

- (13) izuk**kaq**-tuq
fall-3rd.sg
“He/She fell.”

Additional evidence of rules other than those discussed above, governing consonant clusters in the following set of data shown in (14a) and (14b). The /ql/ cluster does not violate the CV template, why then is the uvular stop /q/ deleted before /l/ and not before /t/ as shown above in (13)?

- (14a) amia-lauq-tuq “He/She was painting yesterday.”
paint-past.yesterday-3rd.sg

- (14b) cf. underlying: /amia**q**-lauq-tuq/

Is the uvular stop /q/ deleted before /l/ because of some phonological restrictions on consonant clusters or could there be some other factors at work? The next section about consonant clusters seeks to answer that question and find out what types of consonant clusters we see on the surface in the Cape Dorset dialect and what types we do not see.

⁸ This is not actually what’s going on, but a working hypothesis for the purpose of illustrating the processes that I went through.

Part 3: consonant clusters

Consonant clusters can either be geminates or certain combinations of different consonants. Dorais (1986) notes: “The numbers and types of consonant clusters vary from one dialect to the other. These variations constitute an important indicator of dialectal differentiation, as well as a good example of historical evolution of Inuktitut phonology.” (Dorais, pg. 32) In Cape Dorset, any single consonant can be a geminate, with the exception of fricatives. All Inuktitut geminate clusters can either be created through assimilation processes, or be part of the underlying representation. In the case of /qq/, it is always a geminate in its underlying form, but becomes /qx/ on the surface because of the interaction with the CV template described in the previous section. The other uvular geminate / ʁʁ / that shows a similar patterning is noted below.

The following table is adapted from Baxter, Erhardt & Gondaira (2007). It is a chart showing all the possible geminate consonants in Cape Dorset.

	Bilabial	Alveolar	Post-Alveolar	Velar	Uvular
Voiceless stops	pp		tt	kk	qq ⁹
Voiced stops	bb ¹⁰			gg	
Voiced affricate			dd		
Approximant			ll		ʁʁ ¹¹
Nasals	mm		nn	ŋŋ	

Table 7: Possible geminates in Cape Dorset dialect. Note there are no geminate fricatives. As mentioned before /t / is not a geminate in any sense and has been removed from the table.

⁹ /qq/ becomes /qx/ as discussed above.

¹⁰ This was in the original chart, but I have no evidence for it yet.

¹¹ / ʁʁ / has an interesting behaviour as a geminate. Although it’s written as a fricative here, the first segment sounds more like /g/ which gives us /gʁ / on the surface. This is consistent with the behaviour of the other uvula /qq/. The second segment there is also a fricative.

With regards to assimilation creating geminates, observing the following data we can note that as we move from Siglit in the west to Inujjuaq in the east, we see more regressive assimilation.

Gloss	Siglit (Lowe, 2001)	Cape Dorset	Inujjuaq (Quebec) (Dorais, 1979)
‘chair’	iksiv autaq	it ivautaq	itsiv autaq
‘fog’	takt uq	tat iq	tattu q
‘hand’	ad gak	agg ak	agg ait
‘dried fish’	pipsi	pit i	-
‘seal’	nat iq	nat iq	natsiq ¹²
‘caribou’	tukt u	tutt u	tutt u
‘woman’	a nak	a ŋak	a ŋak

Table 8: Consonant clusters are in bold.

Within the group of permissible clusters shown below in table 9, we’re starting to see more and more regressive assimilation across morpheme boundaries as well. Examples of the changes taking place in Cape Dorset are seen in (15) through (17). Clusters are becoming more and more homogeneous but the shift to regressive assimilation is not yet complete in all environments. This is constant with the patterning of the amount of regressive assimilation across dialects as we move from east to west.

- (15) /kt/ → /tt/
ka:k
hunger
“hunger” (noun)
- ka:t-tuŋa
hunger-1st.sg
“I’m hungry.”
cf. underlying: ka:k-tuŋa

¹² With the amount of regressive assimilation going on in Inujjuaq, is it possible that /ts/ will become /ss/?

(16) /qm/ → /mm/

ixaluq
fish
"fish" (noun)

mike kapi-su-zuq ixalum-mik
Mike stab-past-3rd.sg fish-obj
"Mike stabbed the fish."

cf. underlying: mike kapi-su-tuq iqaluq-mik

(17) /tn/ → /nn/

axit-tuq
soft-3rd.sg
"It's soft."

axin-nikpa:k xipi:k
soft-superlative blanket
"the softest blanket"

cf. underlying: aqit-nikpa:k qipi:k

The following piece of data shows a possible interaction between assimilation and the "double consonant rule" discussed above.

(18a) kiguti xa-ŋin-nama tamua-gunna-ŋit-tuŋa
teeth have-not-app.1st.sg chew-able-not-1st.sg
"Because I have no teeth, I can't chew."

(18b) cf. underlying: kiguti xar-**ŋnit**-nama tamua-gunna-**ŋnit**-tuŋa

The question then becomes: What is the ordering of the rules and is there data here that we cannot account for given the rules we've created thus far? If we apply the rules in the order of *CCC, assimilation and then the double consonant rule, this is what the output would look like:

Step 1: *CCC

kiguti xar-**nɲit**-nama tamua-gunna-**nɲit**-tuɲa
kiguti xa -**nɲit**-nama tamua-gunna-**nɲit**-tuɲa

Step 2: assimilation

kiguti xa-**nɲin**-nama tamua-gunna-**nɲit**-tuɲa
kiguti xa-**nɲin**-nama tamua-gunna-**nɲit**-tuɲa

Step 3: double consonant rule?

kiguti xa-**nɲin**-nama tamua-gunna-**nɲit**-tuɲa
kiguti xa-**nɲi** -nama tamua-gunna-**nɲi** -tuɲa

Actual surface form:

kiguti xa -ɲin-nama tamua-gunna-ɲit- tuɲa

The final line of step 3 is not what we get on the surface however. We don't actually see the simplification of the geminates that we would expect to see. This is evidence that perhaps the Cape Dorset dialect doesn't actually have this double consonant rule after all and something entirely different is going on. My current hypothesis is that one of two things might be going on. Either the simplification of consonant clusters like those from (14) has to do with restrictions on the type of segments that can remain adjacent after concatenation, or that there are certain morphemes which cause the deletion regardless of their phonetic content. I feel that the argument would be stronger if the types of consonant clusters are predictable based on their content. That being said, after cataloguing all my data, there seems to be a pattern of which clusters are allowed and which are not. The following chart displays all the consonant clusters that we see on the surface forms on the right side. The left side of the chart that is titled "clusters that we don't see" was collected from the underlying forms before the deletions occur.

<i>Permissible Clusters</i>				<i>Clusters we don't see</i>			
qp	kv	qs	t	ql	qk	qx	qŋ
qm	qv	qt		l	kg	k	
kp	kt	t		kl	qg	q	
		s		tl	tg		

Table 9: Different consonant clusters on the surface forms of Cape Dorset Inuktitut.

How can we characterize the types of clusters we find? In clusters where the second segment is a dorsal consonant (uvular or velar), we see the deletion of the first segment. How do we explain that /l/ patterns with them? Is Inuktitut /l/ produced further back in the mouth than English /l/?

Because the amount of data I have collected is relatively limited, we can't rule out that there are not morpheme specific deletions. All of the clusters on the right side of the table are only taken from an assortment of about 20 different morphemes. The patterns that I am seeing could just be coincidence. More data and further research is needed.

Part 4: summary and remarks

More research is needed to flesh out all the interactions between the four rules regulating consonant clusters that I've identified thus far. In summary, the factors that we have identified thus far, for which we have concrete evidence:

- a) *CCC
- b) Assimilation, especially regressive.

Furthermore, this paper has questioned the existence of the “double consonant rule” in the Cape Dorset dialect. After considering much data, I'm of the opinion that the rule does not exist in this dialect.

Also discussed in this paper were the processes affecting consonant clusters. The data is inconclusive about whether there are morpheme specific deletions or general phonological restrictions on what consonant clusters are permitted in this dialect.

More data and analysis are needed to have enough proof to make sure that the trends that we are seeing fully support one conclusion or the other.

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