

# Convergence in historical phonetics: Stop contrasts in Åland and Iceland

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## Abstract

Data from Åland on the phonetic realisations of stop contrasts show that similar historical developments have occurred in the geographically distinct regions of Åland and Iceland. These developments can be seen as convergent, since they seem to arise independently in the two regions. The Åland data also provide examples of stops that are preaspirated and postaspirated at the same time, which is highly unusual from a typological perspective.

## 1 Introduction

The languages of the Scandinavia, the Faroes and Iceland exhibit similar phonological patterns in their stop systems. All the languages and dialects in this area have a two-way distinction in their stop systems, which is often referred to as fortis vs. lenis. In all these languages and dialects (as far as I am aware), word-initial, prevocalic fortis stops are postaspirated, while the lenis ones are unaspirated (the degree of voicing varies).

There is considerably more variation in the realisation of word-medial, postvocalic stops. Lenis stops range from being voiceless to being fully voiced. Fortis stops are almost always preaspirated or unaspirated. Relatively recent data shows that many speakers of Central Standard Swedish produce intervocalic fortis stops with considerable preaspiration (cf. Gobl & Ní Chasaide 1988, Fant et al. 1991, Helgason 1999a), and this has been noted for Norwegian speakers of various dialects as well (cf. van Dommelen 1998).

Only one dialect, northern Icelandic, is known to have postaspirated stops in these medial positions, and then only if the stop is short (and thus follows a long vowel) or when it is preceded by a lateral or nasal sonorant. In this dialect, a word like *taka* '(to) take' is produced as [t<sup>h</sup>a.k<sup>h</sup>a] and *vanta* '(to) need' as [vant<sup>h</sup>a], with a medial aspirated stop. The northern Icelandic dialect is therefore unique among languages/dialects derived from Old Norse in this respect. Elsewhere, one would expect that these types of words have an unaspirated or a preaspirated stop (which would take the form of a partially voiceless nasal for the latter word). Figure 1 presents an overview of how stops in **V:TV** and **VT:V** (**V** = vowel; **T** = fortis stop) are expressed phonetically in some dialects/languages derived from Old Norse.

But the northern dialect of Icelandic is unique no more. The present paper presents data from a female speaker of the dialect of the southwest, central area of

	S. Icelandic		N. Icelandic		Faer. (Tórshavn)		Centr. St. Swedish		Gräsö Swedish	
	primary type		secondary type							
V:TV	Ht	-	-	-	-	-	-	-	-	-
	t	-	-	-	-	-	-	-	-	-
VT:V	Ht	-	-	-	-	-	-	-	-	-
	t	-	-	-	-	-	-	-	-	-
	tH	-	-	-	-	-	-	-	-	-
	tH	-	-	-	-	-	-	-	-	-

Figure 1. The phonetic exponency of fortis stops in some languages/dialects derived from Old Norse.

Åland. Word-medial, fortis stops in her speech tend to be postaspirated when they occur in **V:TV**, **VT:V** and, especially, in **VNTV** sequences (**N** = nasal). It is particularly notable that intervocalic stops, in particular (phonologically) long ones, have a tendency to be preaspirated as well as postaspirated.

Apart from being of general interest for Swedish dialectology, this has implications for theories on the geographical spread of sound change. Also, the presence of both preaspiration and postaspiration simultaneously in a stop is an apparent typological anomaly. Such stops have not been reported before in the literature.

## 2 Method

The data for the Central Southern Åland dialect come from one informant, FE, a female inhabitant of Åland in her late forties. The material consists of a list of read sentences which were designed to elicit instances of fortis and lenis stops in various types of word-initial and in word-medial positions. The list contained 43 sentences, and was read twice by the subject. For word-initial position, two kinds of sequences were elicited: **DV** (words like *goda*, *datum* etc.) and **TV** (e.g. *tappre*, *katten*). For word-medial position, sequences of the following types were elicited:

Type	Example	Type	Example
<b>V:TV</b> - <b>V:DV</b>	<i>datum</i> - <i>badar</i>	<b>VSDV</b>	<i>miste</i>
<b>VT:V</b> - <b>VD:V</b>	<i>katten</i> - <i>skydda</i>	<b>VTSV</b>	<i>vitsen</i>
<b>VNTV</b> - <b>VNDV</b>	<i>vantar</i> - <i>blundar</i>		

The recordings were made in an anechoic chamber, using a Brüel & Kjær 4145 microphone and recorded directly on a PC using a SoundBlaster Live sound card and CoolEdit 2000. The recordings were labelled using WaveSurfer v1.0. For vowel-stop transitions, the following events in the acoustic signal were labelled: 1) vowel onset; 2) onset of full aspiration (for which the criterion was that noise should be present in formant frequencies above 750 Hz); and 3) oral closure for the stop. For stop-vowel transitions, the following events were labelled: 1) onset of release; 2) onset of aspiration; 3) voice onset; and 4) point of full glottal abduction. Henceforth, the term aspiration refers to the postaspirated phase of a stop, measured from the offset of release to the point of full glottal adduction (modal voice). Likewise, preaspiration is measured from the onset of glottal abduction to the onset of the oral closure for the stop.

## 3 Results

Phrase-initial lenis stops vary with regard to voicing. When they occur in function words (the words *den*, *det* and *dom* occur in the data;  $n = 17$ ) they are almost always voiceless, while in the content words used (*båten* and *barnen*;  $n = 4$ ) the initial stop had an average of 45 ms of voicing. Table 1 (row **DV**) shows the average durations of release and aspiration for all word-initial lenis stops (including phrase-initial ones). The average duration of the release for these stops is 10 ms, and aspiration is virtually absent (averaging less than 1 ms).

Lenis stops in **V:DV** sequences are fully voiced in 22 out of 38 occurrences. In the remaining cases, the closure phase is partially voiceless, the voicelessness ranging from 11-

Table 1. Durations for word-initial and intervocalic stops (further in text).

	V1	pr	T/D	rel	asp	V2	n
<b>TV</b>	-	-	-	21	21	81	54
<b>V:TV</b>	127	19	75	18	17	58	34
<b>VT:V</b>	68	26	119	17	11	61	25
<b>DV</b>	-	-	-	10	1	107	77
<b>V:DV</b>	134	0	43	10	1	98	37
<b>VD:V</b>	107	0	99	11	0	74	18

100% of the closure phase. Lenis stops in **VD:V** sequences are fully voiced in 8 out of 18 cases. In the remaining cases, voicelessness ranges from 6-32% of the closure phase. Table 1 shows the average durations of release and aspiration for all word-medial, intervocalic lenes (rows **V:DV** and **VD:V**). The release phase for long and short stops is similar in duration (11 and 10 ms respectively), and aspiration is virtually absent (less than 1 ms).

Postnasal lenes (in **VNDV** sequences) are practically always fully voiced (in 22 out of 23 occurrences). Table 2 shows the average durations of release and aspiration for postnasal lenis stops. Average release duration is 8 ms, and aspiration is, again, virtually absent (less than 1 ms).

Word-initial fortis stops are always voiceless, and have an average release phase of 21 ms (see Table 1, row **TV**). The aspiration phase also has an average of 21 ms. Fortis stops in **V:TV** sequences have a average release phase of 18 ms and an average aspiration phase of 17 ms (see Table 1). A tendency for preaspiration is also evident in such sequences. The duration of this preaspiration phase is on average 19 ms. In **VT:V** sequences, the release phase is 17 ms, and the aspiration phase only 11 ms. However, while postaspiration is quite short in these sequences, preaspiration is considerably longer, averaging 26 ms. Given the

**Table 2.** Durations for postnasal stops (further in text).

	V1	N	n	T	rel	asp	V2	n
VNTV	97	75	19	63	17	21	66	20
VNDV	107	80	0	29	8	0	74	23

short aspiration phase, the auditory impression of the release phase of these stop is sometimes more that of a lenis rather than a fortis stop. When preaspiration is present, however, the **VT:V** sequence gives the impression of a fortis stop.

Fortis stops in **VNTV** sequences have an average release phase of 17 ms, and an aspiration phase of 21 ms. The stop tends to be voiceless, but it should be noted that the point of transition between nasal and stop in these sequences is difficult to determine, so an assessment of the degree to which the stops are voiceless will not be attempted here. There is a certain tendency towards voicelessness in the preceding nasal as well in many cases, so in Table 2, **N** refers to the voiced part of the nasal and **n** to the unvoiced part.

**Table 3.** Durations for stops in VSTV sequences (further in text).

	V1	S	T	rel	asp	V2	n
VSTV	93	128	40	18	4	86	19

**Table 4.** Durations for stops in VTSV sequences (further in text).

	V1	pr	T	S	V2	n
VTSV	78	39	66	107	88	18

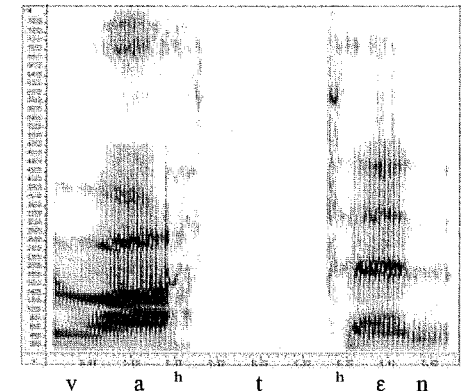
#### 4 Discussion

In both Iceland and the vicinity of Åland, there are dialects which have preaspiration (or voiceless sonorants) before fortis stops. For example, Sundberg (1993) reports on sonorant devoicing in the Brändö dialect (spoken on an island northeast of Åland) and Helgason (1999b) shows that the Gräsö dialect (spoken on an island west of Åland has (or at least had) preaspirated fortis stops. Both sonorant devoicing and preaspiration have long been a hallmark of Icelandic in the phonetic literature. Postaspiration in word-medial, postvocalic and postsonorant position was only thought to occur in the northern dialect of

Icelandic. The present data, however, show that such postaspiration in seems to be a feature of the dialect of southern central Åland. Thus in Iceland on the one hand, and in Åland and nearby islands on the other, very similar divergences in the development of the stop system are observed.

These similarities are most unlikely to be the result of contact between the two language areas. It seems more likely that preaspiration and postaspiration emerged independently in the two locations in a convergent fashion. Thus in both Iceland and Åland, the phonetic preconditions were, in some way, favourable for the development of both preaspiration and postaspiration, as well as simple unpreaspirated stops. This is to say that the production of word-medial postvocalic (and postsonorant) stops in these areas in Old Norse times was such that historical change could go either way, toward preaspiration or towards postaspiration. This has led to convergent developments in these two, geographically distinct areas: preaspiration/sonorant devoicing (southern Icelandic, Gräsö dialect, Brändö dialect); and postaspiration (northern Icelandic, South Central Åland dialect).

Finally, the stop system in this South Central Åland dialect seems to offer a unique typological profile where a stop can be both preaspirated and postaspirated simultaneously. This applies in particular to the phonologically long stops. Here, both preaspiration and postaspiration are relatively short when compared with other instances of preaspiration and postaspiration in the data, and it is as if the "burden" of expressing the fortis category is shared equally between the two. This type of production for a stop is apparently so rare that it has not been reported before in the literature. However, it is quite possible that occurrences such stop types have been overlooked in some languages, especially ones where phonetic data is scarce.



**Figure 2.** Example of a fortis stop with both pre- and postaspiration. The word is *vatten*.

#### References

- Fant, G., Kruckenberg, A. & Nord, L. 1991. Prosodic and segmental speaker variations. *Speech communication* 10, 521-531.
- Gobl, C. & Ni Chasaide, A. 1988. The effects of adjacent voided/voiceless consonants on the vowel voice source: a cross language study. *STL-QPSR*, 2-3/1988, 23-59.
- Dommelen, W. A van. 1998. Production and perception of preaspiration in Norwegian. *Proceedings of Fonetik -98*, Stockholm University.
- Helgason, P. 1999a. Phonetic preconditions for the development of normative preaspiration. *Proceedings of ICPHS 99*, August 1-7, 1999, pp. 1851-1854.
- Helgason, P. 1999b. Preaspiration and sonorant devoicing in the Gräsö dialect: preliminary findings. *Proceedings of the XIIth Swedish Phonetics Conference (FONETIK 99)*, Göteborg, Sweden, June 2-4, 1999: 77-80.
- Sundberg, E. 1993. *Dialekten i Ålands nordöstra skärgård*. Mariehamn: Ålands högskola.