

PREASPIRATION IN SKOLT SÁMI

1. INTRODUCTION

Preaspiration is a well-known feature associated with several Northern European languages.¹ It has also long been acknowledged that preaspiration occurs in several North-American Indian languages.² The phenomenon of preaspiration itself is recognized as being one of the pronunciation characteristics of voiceless stops in these languages. The phonetic correlates of preaspiration are quite varied, for preaspiration may be manifested as [x], [f] sometimes, even an [C]-like sound in addition to the most obvious [h]-like manifestations.³ But what they are precisely, and what the durational and intensity characteristics of preaspiration depend on, are questions not as yet studied in sufficient depth. In his paper on preaspiration in a Norwegian dialect⁴ Wolter rightly quotes Haugen⁵ who claims: "The phoneticians have had their eyes trained too exclusively on the end of the sound where aspiration traditionally occurs."⁶

Although Sámi (or Lappish),⁷ a Finno-Ugric language, is well-documented as containing preaspiration, it has not been sufficiently studied as yet with regard to its phonetic properties. The term "preaspiration" has been denoted by such terms as "the voiceless vowel"⁸ or "voice offset time"⁹: both terms needing to be reviewed

¹ In addition to Icelandic, which is probably one of the most thoroughly studied languages with regard to preaspiration, Faroese, Scottish Gaelic and certain Norwegian dialects are also known to contain preaspirated voiceless stops (Péturson 1972, Shuken 1979, Ni Chasaide 1985, Wolter 1965).

² Trubetzkoy (1939) refers to Fox and Hopi when analyzing preaspirated consonants.

³ Wolter (1965:595), Hasselbrink 1944:102-104.

⁴ Wolter (1965).

⁵ Haugen (1958).

⁶ Wolter (1965:594).

⁷ In recent literature the term "Sámi" has been preferred to the former "Lappish", the latter having acquired a pejorative meaning in most dialects.

⁸ Liberman (1971).

⁹ Engstrand (1987).

in order to establish a proper understanding of the phonetic realizations of preaspiration.

The purpose of the present paper is to examine preaspiration in Skolt Sámi (an Eastern Sámi dialect). An acoustic analysis of the duration of preaspiration was undertaken in order (i) to investigate the conditions upon which preaspiration duration may depend, and (ii) to seek an answer to the apparent segmentation dilemma -- namely, should the duration of preaspiration be associated with the duration of the consonant that follows, or the duration of the vowel that precedes it, or should it even be considered as an independent segment? Following a brief description of the experiment, these two issues will be discussed. In connection with the first it will be argued that (i) short prevocalic duration is most likely to be followed by a longer period of preaspiration, (ii) the place of consonant articulation differences does not seem to affect preaspiration duration significantly, and (iii) high back rounded vowel articulation is followed either by preaspiration of very short duration with low intensity, or (as is more often the case) by no preaspiration at all. In connection with the second issue I shall claim that preaspiration is to be associated with voiceless stops, but that durational and intensity differences are to be considered as consequences of preceding vowel duration and/or vowel quality.

2. THE EXPERIMENT

During my field trips in 1983 and 1984 in Northern Finland (to the Sevettijärvi and Nellimö communities as well as several settlements between in the Ivalo-Nellimö-Sevettijärvi area), I selected two Sámi speakers with whom I decided to make recordings suitable for acoustic analysis. One informant, H.S. (female, 60 years of age at the time of the recording) is a speaker of the Suonikylä dialect; the other, K.J. (female, 55 years of age at the time of the

recording) speaks the Petsamo dialect.¹⁰ Both subjects were prepared during several training sessions prior to the recordings that were made at the University of Manitoba in 1987.

The number of test-words given to the speakers was 550. Of these words it is relevant for the present study to note that there were 63 where preaspiration was apparent or was to be expected. The subjects were asked to place each word in the sentence frame 'say ... again'

waveform, fundamental frequency plots, and segment energy envelope). All these features proved useful when attempting to identify segment boundaries.

Table 2. The duration of preaspiration and the duration of [p]

Table 6. The duration of preaspiration and the duration of [c] in Grade II and Grade III disyllabics (K.J.)

	Preaspiration		[c]	
	\bar{x}	SD	\bar{x}	SD
GRADE II	64	14.1	164.7	15.9
GRADE III	82.2	9.3	282.5	27.1

Table 7. The duration of preaspiration and the duration of [k] in Grade II and Grade III disyllabics (H.S.)

	Preaspiration		[k]	
	\bar{x}	SD	\bar{x}	SD
GRADE II	61.8	8.8	157.6	20.4
GRADE III	82.1	7.1	292.9	22.3

Table 8. The duration of preaspiration and the duration of [k] in Grade II and Grade III disyllabics (K.J.)

	Preaspiration		[k]	
	\bar{x}	SD	\bar{x}	SD
GRADE II				

difference occurring in connection with all the relevant Grade II and Grade III test-words (*Figure 1*).

Figure 1. The duration of Grade II and Grade III consonants in relation to preaspiration duration

preaspiration values.¹³ It is essential then to examine whether similar durational interdependencies may exist in Skolt Sámi between the preceding vowel and preaspiration. Table 9 presents the duration of the vowel preceding consonants in Grade II and Grade III respectively as well as the duration of preaspiration associated with these vowels. There are no significant differences in vowel duration with regard to individual vowel quality differences.¹⁴ With the exception of one vowel -- the high back rounded vowel [u] -- after which preaspiration is manifested differently (see below), all cases of individual vowel duration may safely be averaged and examined in the two grades with regard to the duration of the following preaspiration.

Table 9. The duration of preaspiration and the duration of the preceding vowel

	Preaspiration duration		Duration of the preceding vowel	
	\bar{x}	SD	\bar{x}	SD
GRADE II	64.78	11.4	197.5	21.3
GRADE III	82.21	11.5	108.6	13.5

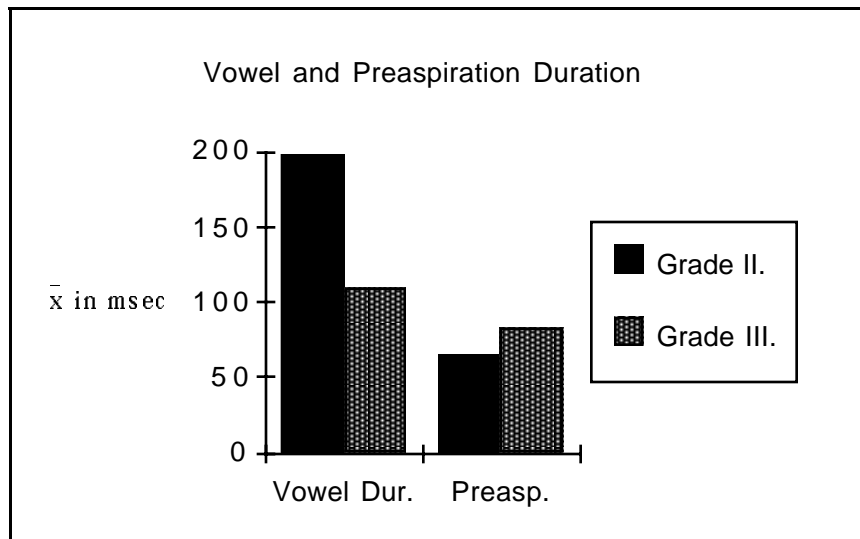
From Table 9 we may conclude that longer preaspiration is associated with shorter vowel duration (*Figure 2*). The question is, then, which determines the duration of preaspiration: the longer duration of the following consonant (as indicated above, 133.92 msec longer in Grade III than in Grade II disyllabics), or the considerably shorter duration of the preceding vowel (88.9 msec shorter in Grade III words)? In Skolt Sámi there exists a

¹³ For example, Garnes (1973:279) mentions that durational values for preaspiration decrease with increasing duration of the corresponding vowel. This accords with the tendency in Icelandic to maintain constant duration from the onset of the vowel to the onset of the consonant.

¹⁴ In McRobbie (1991) there is a detailed analysis of vowel duration and a consideration of possible divergencies due to different vowel qualities. It was concluded there that these differences are not significant enough to hinder distinguishing between the six main structural types of disyllabics in Skolt Sámi.

compensatory relationship between the first syllabic vowel and the consonant(s) following it. I have discussed this relationship in considerable detail elsewhere, so here I will simply state this as one of the characteristic features of Skolt Sámi prosody.¹⁵ It would therefore seem arbitrary to choose either the vowel preceding preaspiration or the consonant following it, as conditioning the duration of preaspiration, for longer consonant duration is associated with shorter vowel duration. Research on preaspiration as manifested in other languages may, however, be able to assist in resolving this dilemma without resorting to an arbitrary choice in this respect. On the basis of examining Icelandic preaspiration,¹⁶ where the duration of preaspiration seems to be conditioned with more certainty by the preceding vowel, we may be entitled to choose the shorter vowel duration as affecting preaspiration duration in Skolt Sámi also.

Figure 2. Vowel duration of Grade II and Grade III disyllabics in relation to preaspiration duration



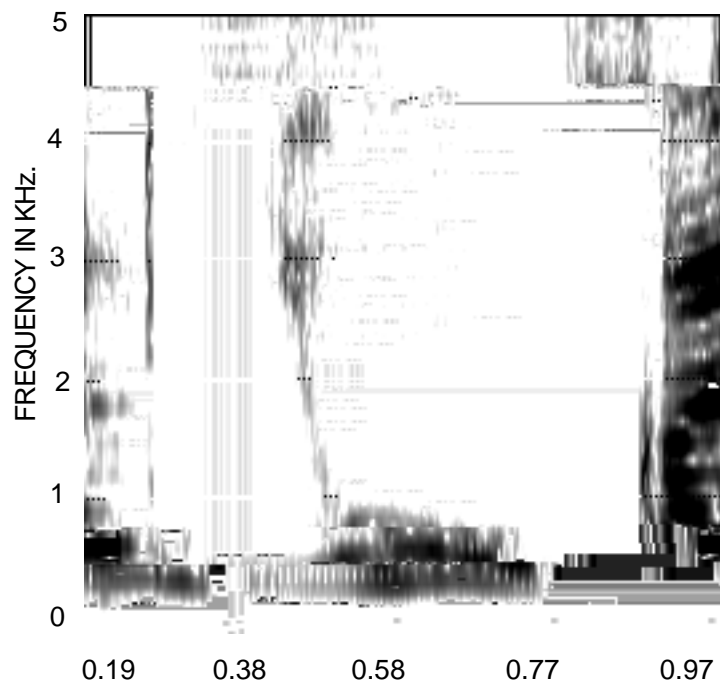
¹⁵ McRobbie (1991).

¹⁶ Haugen (1958), Garnes (1973).

4. THE CASE OF EXCEPTIONS

Preaspiration appears in the vast majority of cases in Skolt Sámi when Grade II and Grade III words that contain voiceless stops. From the above discussion, the regularities present in the manifestations of preaspiration concerning duration are also relatively easy to see. As was stated above, the duration of preaspiration may also be predicted on the basis of the duration of the preceding vowel, shorter vowel duration being associated with longer duration for preaspiration. There is one instance, however, where preaspiration does not appear at all, or, if occasionally appearing, is of considerably shorter duration and of low intensity. This kind of preaspiration -- or rather lack of it -- is noticeable after the vowel [u] in Skolt Sámi. Out of 69 relevant recordings, 16 contain preaspiration of durations between 30 and 40 msec with considerable lower intensity than preaspirations display in general; the rest of the test-words contain no preaspiration at all (see

[ju:k:vɔ̯] 'drink' (Inf.) as spoken by subject K.J. The segments measured:
[u] 195 msec., [k] = 217.5 msec.



This phenomenon was also observed and pointed out in Wolter's analysis of preaspiration in Northern Jæren, a Norwegian dialect.¹⁷ He states that the duration of preaspiration after rounded

be a sufficient condition for predicting the non-occurrence of preaspiration. Examination of Skolt Sámi data suggests that close articulation together with lip rounding have to be regarded as

Figure 7. Broad-band spectrogram (300 Hz bandwidth) of the word [εk:a] 'old woman' (Ill.Sg.) as spoken by subject K.J. The segments measured: [ε] 112.5 msec., [k] = 341.5.5 msec., preaspiration = 131 msec.

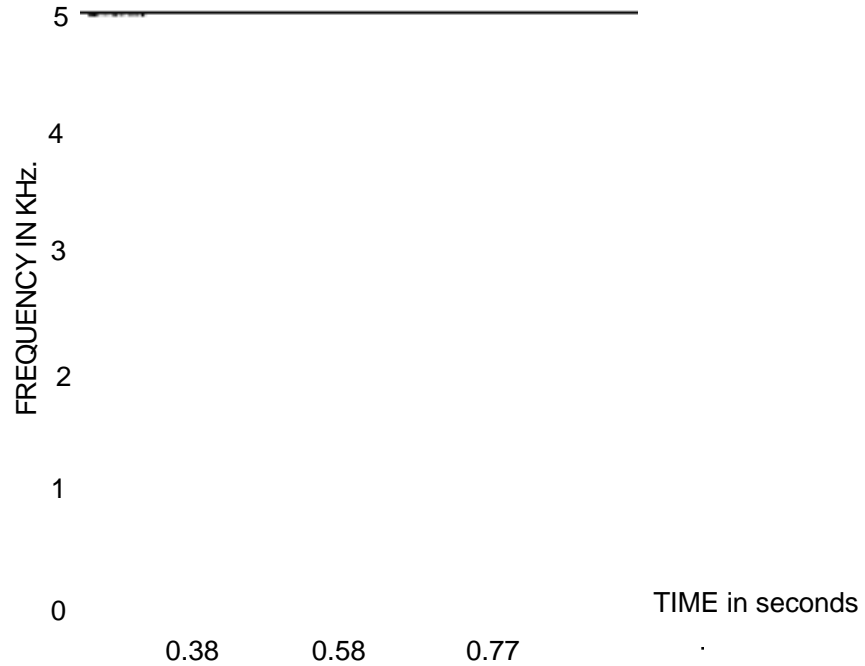
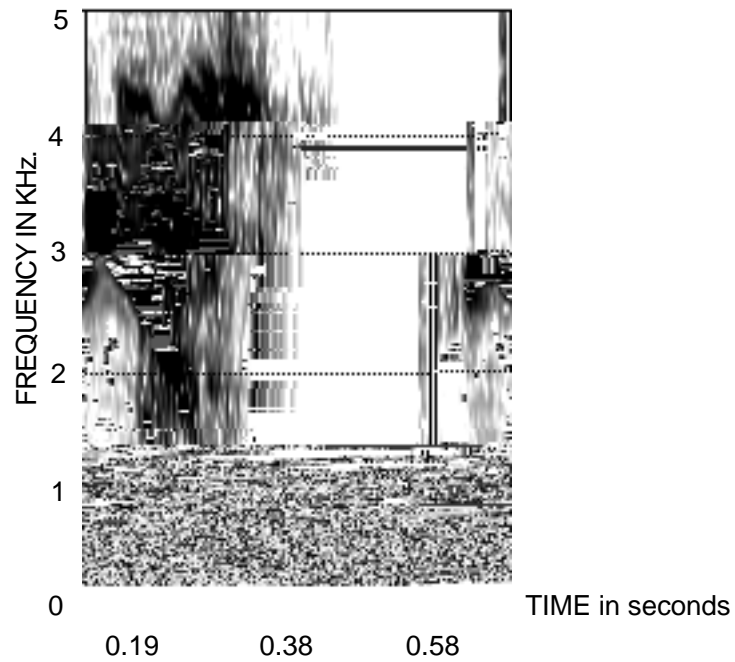


Figure 8. Broad-band spectrogram (300 Hz bandwidth) of the word [tiεt:] 'know' (Prs.Sg3.) as spoken by subject K.J. The segments measured: [ε] 195 msec., [t] = 211 msec., preaspiration = 74 msec.



This characteristic realization of Skolt Sámi preaspiration has caused it to be considered a "voiceless vowel" transcribed in Finno-Ugric literature invariably as [

In view of the above, then, it seems advisable to consider employing the term *preaspiration* instead of either *voiceless vowel* or *voice offset time* .

Having established the characteristic properties of preaspiration, there still remains to be discussed the question relating to the segmentation of preaspiration. Preaspiration occurs only before voiceless stops in Skolt Sámi,²¹ which may suggest that

words) but only 197.5 msec (Grade II) or 108.6 (Grade III) msec for the vowel [u] -- an unlikely assumption.

It may be concluded, then, that counting preaspiration together with the duration of the voiceless stop implies (i) acknowledgement of the primary condition for the manifestation of preaspiration, i.e. there has to be a voiceless stop associated with it, and (ii) that characteristic durational values associated with the end of the vowel and the onset of the following consonant remain constant regardless of the presence or absence of preaspiration.

6. SUMMARY

On the basis of the acoustic analysis of preaspiration in Skolt Sámi three findings have emerged. First, duration of preaspiration does not depend on the place of articulation of the voiceless stops that condition the manifesting of preaspiration. Second, there is an inverse relationship between prevocalic duration and the duration of preaspiration, shorter prevocalic duration being followed by a longer preaspiration period. Third, close rounded vowels cause either preaspiration with considerably shorter than expected duration or no preaspiration at all. In conclusion, concerning segmentation criteria involving preaspiration periods it seems reasonable to count the duration of preaspiration in together with the duration of the following voiceless stop.

REFERENCES

- ENGSTRAND, O. (1987). Preaspiration and voicing contrast in Lule Sámi, *Phonetica* 44, 103-116.
- GARNES, S. (1973). Phonetic evidence supporting a phonological analysis, *Journal of Phonetics* 1, 173-183.
- HAUGEN, E. (1958). The phonemics of modern Icelandic, *Language* 34, 55-88.
- KORHONEN, M. (1981). *Johdatus lapin kielen historiaan*. [Introduction to the history of the Lappish Language] Helsinki: Suomalaisen Kirjallisuuden Seura.

- LIBERMAN, A.S. (1971). The voiceless vowel in Lapp again, *Sovetskoe Finno-Ugrovedenie* VII, 269-276.
- LISKER, L. & ABRAMSON, A.S. (1964). A cross-language study of voicing in initial stops: acoustical measurements, *Word* 20, 384-422.
- McROBBIE, Z. (1991). *An acoustic analysis of duration in Skolt Sámi disyllabics*. Ph.D. dissertation, The University of Manitoba.
- NI CHASAIDE, A. (1985). *Preaspiration in phonological stop contrasts*. Ph.D. dissertation, University College of North Wales.
- PÉTURSSON, M. (1972). La preaspiration en islandais moderne. Examen de sa réalisation phonétique chez deux sujets. *Studia Linguistica* 26, 61-80.
- SHUKEN, C.R. (1979). Aspiration in Scottish Gaelic stop consonants, in R. Hollien (ed.) *Current Issues in the Phonetic Sciences I*. Amsterdam: Benjamins. 451-458.
- TRUBETZKOY, N.S. (1939). *Grundzüge der Phonologie*