

Dialectal and sociophonetic aspects of preaspiration

Pétur Helgason, Katrin Stölten and Olle Engstrand

Department of Linguistics

University of Stockholm

E-mail: petur@ling.su.se

ABSTRACT

A review of a number of recent studies of preaspiration in the Scandinavian dialects confirms that preaspiration is a strong, next to omnipresent feature of this linguistic area. In most dialects, however, preaspiration appears to be facultative whereas in others it is an obligatory phonetic correlate of fortis stops in certain contexts. Against this background, we present some preliminary results of a sociophonetic study of preaspiration in the Arjeplog dialect (Northern Sweden). Data suggested a significant effect of age and sex on preaspiration duration such that female Arjeplog speakers produced longer preaspiration intervals than did male speakers, and older speakers produced longer preaspirations than did younger speakers. It is concluded that these observations support Docherty's conclusion that sociophonetic consonantal variation can be very systematic and fine-grained. The observation that young women tended to preaspirate more than young men parallels Docherty's observation that female speakers of Tyneside English use preaspiration to a greater extent than male speakers. However, whereas preaspiration appears to be a phonetic innovation in Newcastle-upon-Tyne, its apparent decline in young Arjeplog speakers is probably a reflection of dialect-levelling going on in the Swedish speech community at large.

1. PRELIMINARY REMARKS

In his contribution to this session and elsewhere, Docherty has convincingly illustrated the merits of focusing on socially conditioned phonetic variation within a dialect area. He is able to show in detail how realisations of certain sound dimensions such as preaspiration are conditioned by factors such as age, sex and socioeconomic affiliation. It is particularly interesting, in our view, to gain an insights into the socially structured linguistic interplay between parents and children which is at the heart of transmission of phonetic norms from generation to generation.

In this commentary we would like to offer a few remarks with reference to preaspiration in the Swedish dialects. In particular, we will present a few recent findings to illustrate the complex interaction between dialectal, social and, possibly, biological constraints on preaspiration.

The empirical basis of our observations largely comes from a current research project on the Swedish dialects, *Phonetics and phonology of the Swedish dialects around the year 2000 (SWEDIA 2000)*; see, e.g., Bruce et al. [1] for an interim report. During the course of this project, speech samples have been recorded from 107 Swedish

dialect areas in Sweden and the Swedish-speaking parts of Finland. Each dialect is represented by at least 12 speakers with 3 elderly female, 3 elderly male, 3 young female and 3 young male speakers. Recordings have been made of spontaneous speech as well as words and phrases elicited with a number of specific research objectives in mind, including sociolinguistically oriented problems such as phonetic and phonological variability based on age or sex. (Approximately one-minute long samples from each dialect produced by one speaker of each age and sex category can be heard at <http://www.swedia.nu>). Much of our current knowledge of preaspiration in the Swedish dialects is the direct result of analyses of the database material. A brief survey, also including other Scandinavian dialects, is given in the next section.

2. PREASPIRATION IN SCANDINAVIA

Preaspiration is known as an areal linguistic feature of Northwestern Europe. Several recent studies suggest that it occurs as an attribute of fortis stop consonants across the whole of the Scandinavian peninsula. For example, Wretling et al. [2] presented data from 57 elderly male speakers of 19 Northern Swedish dialects (with 3 speakers per dialect). In two of these dialects, preaspiration appears to be obligatory in some contexts in the sense that it is consistently present in those context; lack of preaspiration is thus not permitted in the phonetic norm and heard as deviant or non-native by native speakers (for a discussion of 'normative' or 'obligatory' dialect features, see [3]). In the remaining 17 dialects, preaspiration is more variable, usually with smaller durations.

In a study of 15 Southern Swedish dialects, Tronnier [4] presents data from 10–12 speakers per dialect (a total of more than 150 subjects) both with regard to the incidence and mean durations of preaspiration. Her findings suggest that preaspiration is used to differing degrees in most Southern Swedish dialects with durations ranging between 15 and 70 ms depending on dialect and context. Tronnier thus suggests that preaspiration is a significant aspect of fortis stop production in many of these dialects.

Van Dommelen [5] investigated the durational properties of VC intervals in one strongly and one weakly preaspirating Norwegian dialect. On average, speakers of the strongly preaspirating group displayed preaspiration durations in the order of 58 ms; the corresponding figure for the less strongly aspirating group was 25 ms. If the breathy portion preceding the aspirative noise portion was included, the preaspiration intervals amounted to 80 and

48 ms, respectively. However, van Dommelen stresses that there is a high degree of individual variation in the data.

Taken together, the Wretling et al., Tronnier and van Dommelen studies suggest that preaspiration occurs in many dialects and speakers across Scandinavia and that, in some cases, it has developed into an obligatory attribute of fortis stop production.

In a recent PhD thesis, Helgason [3] carried out in-depth studies of stop production in Central Standard Swedish (henceforth CSw), the Swedish dialects of Gräsö and Åland, and Tórshavn Faroese [6]. For CSw, spontaneous speech produced by four subjects was examined. The subjects were three females (GT, CK, FS) and one male (MP). The lenis stop cognates were usually produced as fully voiced stops or approximants by these speakers. Fortis stops varied on a phonetic continuum from voiceless unaspirated to voiceless preaspirated. The data presented below pertain to stops in word-medial, postvocalic position.

An analysis of stops produced with full closure reveals a high degree of structure in the use of preaspiration. Figure 1 a-d shows duration of preaspiration as a function of vowel + preaspiration in lexically stressed syllables. The filled circles represent data points in VC; and VCC sequences (in words such as *vatten* ‘water’ and *att* ‘inf. marker’). The unfilled triangles represent data points in V:C sequences (in words such as *båten* ‘the boat’ and *mot* ‘against’). This mode of presentation was chosen in order to highlight the durational relationship between vowel and preaspiration, which has been shown to play a central role in the perception of preaspiration in Icelandic [7]. It can be seen, for example, that preaspiration duration in short vowel context increases faster as a function of vowel + preaspiration duration than does preaspiration duration in long vowel context.

The diagrams also show that the male speaker (MP) and one of the female speakers (GT) tend to preaspirate very little. The remaining two female speakers (CK and FS) display considerably greater preaspiration durations. In fact, the durations pertaining to speaker FS are quite comparable to those found in Faroese, where preaspiration is an obligatory attribute of fortis stop production ([3], [6]).

Since preaspiration is used with such regularity by many speakers it reasonable to assume that it is a linguistically relevant, thus learned, feature of the production of vowel + fortis stop sequences in CSw and other varieties of Scandinavian. At the same time, however, it is likely to vary along sociolinguistically defined dimensions such as age and sex. For example, it has been suggested that preaspiration is more common in women’s than in men’s speech ([8], [9], [10], [11]). Some further data supportive of these observations are reported in the next section.

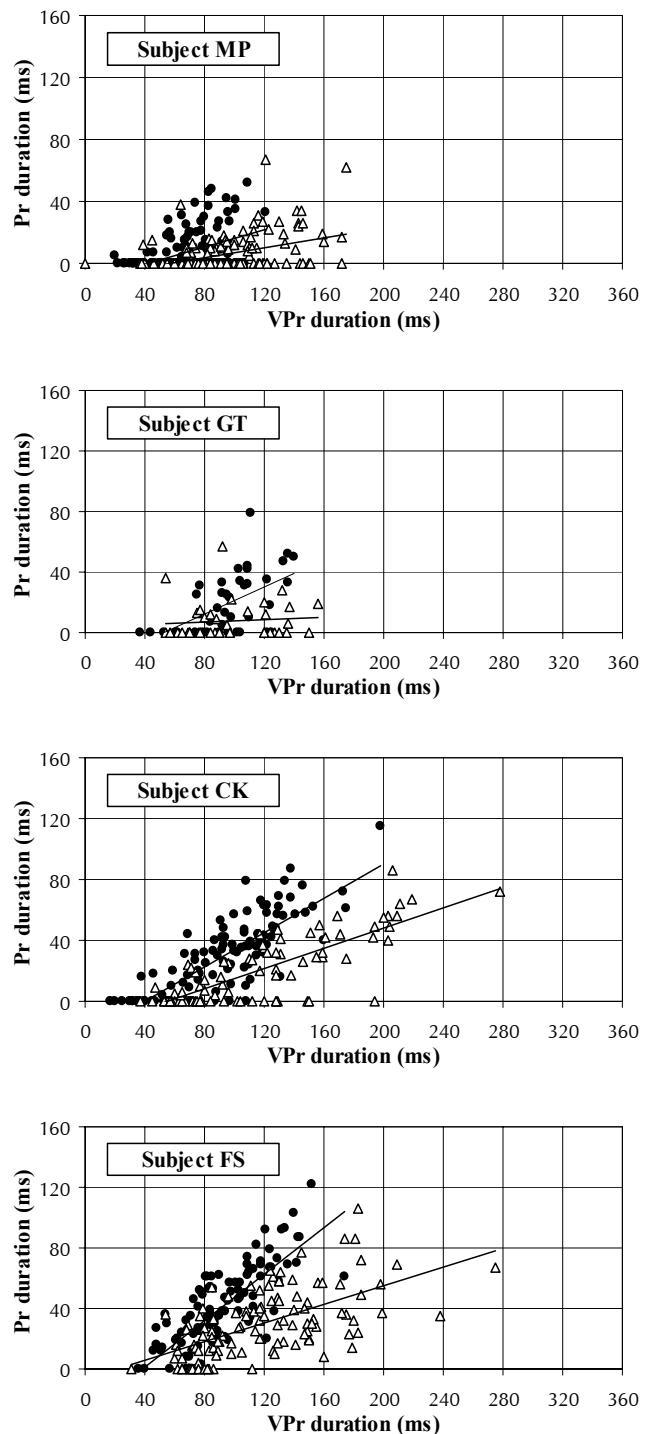


Figure 1 a-d. Preaspiration duration plotted against the combined duration of vowel and preaspiration in lexically stressed word-medial syllables for four CSw speakers. The filled circles represent data points in VC; and VCC syllables (i.e., in words like *vatten* and *att*). The unfilled triangles represent data points in V:C(C) syllables (i.e., words like *båten* and *mot*).

3. PREASPIRATION IN ARJEPLOG: SOCIOPHONETIC OBSERVATIONS

The Arjeplog dialect is spoken in the northernmost part of Sweden and is characterized by a prominent preaspiration associated with fortis stops in VC sequences [12]. An example is given in Figure 2 which shows a spectrographic representation of the word *typ* ‘type’ as spoken by an elderly female speaker of the dialect. The frequency range shown is 0-7kHz. The duration of the preaspiration interval is in this case approximately 220 ms, which is about 40 ms over the average for the elderly female speakers of the dialect. It is clearly seen that the noise is fricative rather than aspirative which is more typical in non-high vowel context in this and other dialects that we have had the opportunity to observe.

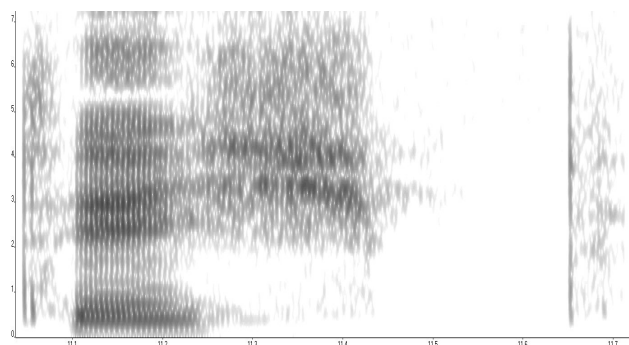


Figure 2. Spectrogram illustrating the word *typ* ‘type’ as produced by an elderly female speaker of the Arjeplog dialect of Swedish. The frequency range is 0-7 kHz and the duration of preaspiration interval is approximately 220 ms.

To assess possible effects of age and sex on preaspiration duration, measurements were made on the words *typ* [ty:p] ‘type’ (as in the above spectrogram) and *lott* [lot:] ‘lottery ticket’ as produced by 12 speakers of the dialect. The speakers were 3 elderly women and 3 elderly men (in their sixties or seventies) and 3 young women and 3 young men (in their early twenties). The recordings were made in the speakers’ homes using high-quality field equipment. Each speaker produced the words at least three times in isolation at a relatively constant pace. As usual, preaspiration was measured as the time interval between voice offset in the pre-stop vowel and the termination of aspirative or fricative noise prior to the stop closure interval.

The results are presented graphically in figure 3. For each group, mean duration pertaining to *typ* and *lott* are shown by the respective left and right bars in each pair. It can be observed that average preaspiration duration is consistently greater in *typ* than in *lott*. Also, preaspiration in the former word frequently consisted of turbulence noise generated at the place of articulation (cf. above spectrogram) but was clearly aspirative in the latter word (as noted, this effect is commonly associated with vowel height in this and other dialects, fricative and aspirative noise tending to occur in high and non-high vowel contexts, respectively). An ANOVA with the factors age (elderly/young) and sex (female/male) indicated that the older speakers produced

typ with a significantly longer preaspiration than did the younger speakers ($F(1,32)=12,255$, $p=0.001$). There was no statistically significant age difference for the word *lott*, however. A significant sex difference was observed in both words such that the male speakers displayed shorter preaspirations than did the female speakers ($F(1,32)=7.067$, $p=0.012$ for *typ*, and $F(1,32)=10.853$, $p=0.002$ for *lott*).

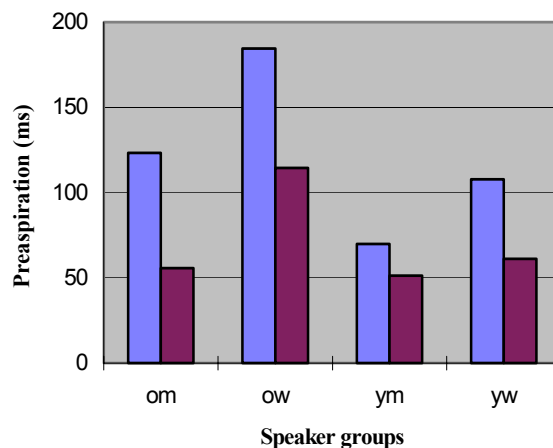


Figure 3. Preaspiration duration (ms) for 3 elderly men (om), 3 elderly women (ow), 3 young men (ym) and 3 young women (yw) during the production of the words *typ* (left bar in each pair) and *lott* (right bar in each pair).

In sum, these data suggest that female Arjeplog speakers produce longer preaspiration intervals than do male speakers. We also observe a tendency for speakers of the older generation to use longer preaspirations than the younger speakers (but this effect was statistically significant in only one of the two test words).

These observations further corroborate Docherty’s conclusion that sociophonetic consonantal variation can be highly systematic and fine-grained. More specifically, the Arjeplog data compare in an interesting way with Docherty’s observations on Tyneside English. Among other things, Docherty notes [8] that preaspiration is strongly associated with young Newcastle women. This appears to parallel the present data to the extent that young women tend to preaspirate more than young men. But in Newcastle-upon-Tyne preaspiration appears to be a phonetic innovation primarily associated with the young generation’s speech. This seems to contrast with the Arjeplog data in which the tendency is for young women to preaspirate *less* than elderly women. (It should be noted, however, that the studies are not directly comparable since Docherty reported incidence of preaspirations rather than their durations.) At any rate, the tendency revealed by the young Arjeplog speakers probably reflects a change in progress towards a regional standard pronunciation. This would be one of numerous symptoms of the dialect levelling process that is going on in the Swedish speech community at large at that is clearly noticeable in the SWEDIA 2000 database. Extensive listening to different dialect and speakers contained in the database gives a rather definite impression that this development is led by the young women.

In connection with the latter point, the following observation is also worthy of consideration. Stölten & Engstrand [12] asked a number of young native Swedish listeners (students of Stockholm University) to rank the 12 Arjeplog speakers on the basis of dialect strength. Spontaneous speech samples were chosen such that age-related topics or other circumstances that could disclose the speaker's age would not be present. There was one particularly clear effect in the listener responses – young women were consistently judged to speak with a less marked dialect than speakers of the remaining groups, i.e., young men, elderly women or elderly men. Since the young female speakers preserved preaspiration to a large extent, listener judgments were apparently based on other properties. Quantitative evaluation of the presence and strength of other dialectal segmental and prosodic properties in the four groups still have to be done. But so far, it appears as if preaspiration is particularly resistant to dialect-levelling in young Arjeplog women.

In the face of evidence from different sources of sex effects on preaspiration it seems reasonable to assume a partly biological and partly learned basis for the Arjeplog data. As in Tyneside English, the preaspiration patterns observed in the group of Arjeplog speakers thus appear to represent a complex interaction between 'volitional' and 'non-volitional' influences [13]. It goes without saying, however, that data from many more speakers will be needed to give a picture of the structured sociophonetic variation in Arjeplog that is as empirically well-founded as that given by Docherty and colleagues for Tyneside English.

4. References

- [1] G. Bruce, C.-C. Elert, O. Engstrand, & P. Wretling, "Phonetics and phonology of the Swedish dialects - A project presentation and a database demonstrator," *Proceedings of the XIVth International Congress of Phonetic Sciences (ICPhS 99)*, San Francisco, August, 1999: 321-324, 1999.
- [2] P. Wretling, E. Strangert, F. Shaeffler, "Quantity and preaspiration in Northern Swedish dialects," *Proceedings of Speech Prosody 2002*, Aix-en-Provence, France, 11-13 April, 2002.
- [3] P. Helgason, *Preaspiration in the Nordic Languages: Synchronic and Diachronic Aspects*, doctoral thesis, Department of Linguistics, Stockholm University, 2002.
- [4] M. Tronnier, "Preaspiration in Southern Swedish dialects", *Fonetik 2002, the XVth Swedish Phonetics Conference*, Fysikcentrum, Stockholm, May 29–31, 2002. In *Quarterly Progress and Status Report, Department of Speech, Music and Hearing and Centre for Speech Technology, KTH, Stockholm*, 44, pp. 33–36, 2002.
- [5] W.A. van Dommelen, "Preaspiration in intervocalic /k/ vs. /g/ in Norwegian," *Proceedings of The 14th International Congress of Phonetic Sciences*, 1–7 August 1999, San Francisco, pp. 2037-2040, 1999.
- [6] P. Helgason, "Faroese preaspiration," *these proceedings*.
- [7] J. Pind, "Rate-dependent perception of aspiration and pre-aspiration in Icelandic," *Quarterly Journal of Experimental Psychology* 49A, pp. 745-764, 1996.
- [8] G. Docherty, "Speaker, community, identity: Empirical and theoretical perspectives on sociophonetic variation," *this volume*.
- [9] G. Docherty & P. Foulkes, "Instrumental phonetics and phonological variation: case studies from Newcastle upon Tyne and Derby," in Foulkes, P. & Docherty, G.J. (Eds.) *Urban voices: Accent studies in the British Isles*. London: Arnold, pp. 47-71, 1999.
- [10] Foulkes P, Docherty GJ, Watt D: "Tracking the emergence of sociophonetic variation," *Proceedings of the 14th International Congress of Phonetic Sciences*, 1-7 August 1999, San Francisco, pp. 1625–1628, 1999.
- [11] R. Iversen, *Senjen-maalet. Lydverket i hoveddrag*, Oslo, 1913.
- [12] K. Stölten & O. Engstrand, "Effects of sex and age in the Arjeplog dialect: a listening test and measurements of preaspiration and VOT," *Fonetik 2002, the XVth Swedish Phonetics Conference*, Fysikcentrum, Stockholm, May 29–31, 2002. In *Quarterly Progress and Status Report, Department of Speech, Music and Hearing and Centre for Speech Technology, KTH, Stockholm*, 44, pp. 29–32, 2002.
- [13] D. Abercrombie, *Elements of General Phonetics*, Edinburgh: EUP, 1967.