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Tronnier, M.

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Preaspiration in Southern Swedish Dialects

Mechtild Tronnier

Department of Linguistics and Phonetics, Lund University

Abstract

It has been observed that preaspirated stops are produced in various southern Swedish dialects (Götaland). In this paper, a closer look has been taken at the geographic distribution of the occurrence of preaspirated stops and whether it is used to enhance quantity contrast.

Introduction

Preaspirated voiceless stops are known to occur in various Scandinavian languages, among them Icelandic and in some Swedish and Norwegian dialects. However, preaspiration is not known to be a phonological contrast in any language (Ladefoged & Maddieson, 1996). For Icelandic, preaspiration is an obligatory/normative phonetic feature, but this is not the case for a speaker of some Swedish dialect (i.e. the Gräsö dialect), where preaspiration is rather optional/non-normative (Helgasson, 1998).

For Norwegian it has been found from a production study that preaspiration is a constituent part of voiceless stops, in contrast to voiced stops (van Dommelen, 1998). Perceptually, preaspiration enhances the impression of a stop to be voiceless, but is not only responsible for the recognition of the voiced/voiceless contrast.

For some northern Swedish dialects a variation of the duration of preaspiration is observed to play a role in contrasting the prosodic aspect of quantity. In that way, longer preaspiration occurs in the rhyme *short vowel + long consonant* than in the rhyme *long vowel + short consonant*. Swedish has complementary quantity contrast in stressed syllables.

In this study the geographic distribution of occurrence of preaspiration in some southern Swedish dialects (Götaland) is investigated and whether preaspiration in these dialects is used to signal a phonological quantity contrast. For the latter purpose, the duration of preaspiration is also measured and compared between minimal pairs for each dialect.

Material and Speakers

The speech material investigated here is part of the speech database of the dialect project *SweDia 2000* (Aasa et al., 2000;

<<http://www.swedia.nu>). The selection contains two word pairs, showing quantity contrast. More specifically, the word pairs are *tak* ([tɑ:k], 'roof') and *tack* ([tak:], 'thanks'), *låt* ([lɔ:t], 'song') and *lott* ([lɔt:], 'share'). In both word pairs the rhyme of the first monosyllabic word contains *long vowel + short consonant* and the rhyme of the second monosyllabic word contains *short vowel + long consonant*. These words were elicited by the speaker having to answer a question with the target word and then repeating it up to five times. Samples were produced by 10 to 12 speakers of both genders and a younger and an older age group (20-30 years old and 55-75 years old) from 15 towns scattered all over the south of Sweden (Götaland). The geographic distribution of the towns representing a dialect each is shown in Figure 1.

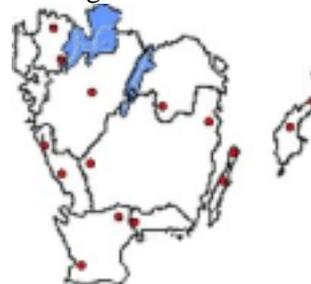


Figure 1. Geographic distribution of the towns in the south of Sweden, from where the speech samples originate.

In specific, the towns, their abbreviations and their placing were:

Ankarsrum (**ank**; Småland, NE), Årstad & Heberg (**ars**; Halland, C), Asby (**asb**; Östergötland, S), Bara (**bar**; Skåne, SW), Bengtsfors (**ben**; Dalsland, N), Böda (**bod**; Öland, N), Bredsättra (**bre**; Öland, C), Broby (**bro**; Skåne, NE), Burseryd (**br**; Småland, W), Fårö (**fao**; Gotland, N), Floby (**flo**; Västergötland, S), Fole (**fol**; Gotland, C), Frändefors (**fra**; Dalsland, S), Frillesås (**fri**; Halland, N) and Jämshög (**jam**; Blekinge, W).

The recordings were made mainly in the speakers' homes, where care was taken to avoid major acoustic disturbances, like ticking clocks and echo effects. The recordings were made on portable DAT-recorders and later transferred to digital workstations. The beginning and end of each word was marked as well as the beginning and end of each vowel and the beginning and end of the occlusion of the word final. The end of the vowel was set to the point where the formants' intensities decreased abruptly. This place was not always consistent with the beginning of the occlusive phase of the word final stop. In many cases frication noise preceded by a breathy part of the vowel occurred between a modal offset of the vowel and the beginning of the occlusion.

Frequency of occurrence

Procedure

To account for the frequency of occurrence of preaspiration the number of labeled preaspirations were counted for each target word in every dialect and matched against the absolute number each target word was uttered by all speakers in every dialect. A comparison of frequency of occurrence of preaspiration between the different dialects was then carried out.

Results

Table 1. Frequency of occurrence in % of preaspirated stops for all dialects and the four words under investigation.

	<i>tak</i>	<i>tack</i>	<i>låt</i>	<i>lott</i>
ank	29	49	80	93
ars	18	21	56	54
asb	50	78	89	98
bar	7	26	50	56
ben	29	66	69	87
bod	1	2	44	58
bre	19	26	69	70
bro	2	5	29	41
brr	20	42	65	73
fao	24	30	67	67
flo	21	39	59	80
fol	23	47	70	76
fra	25	32	74	87
fri	9	31	42	59
jam	9	26	21	42

Table 1 and Figs. 2 and 3 show that preaspiration occurs in all of the southern

Swedish dialects investigated. However, different dialects show such an occurrence to a varied degree. It can also be seen that frequency of occurrence is related to which word is uttered. In that respect, a word order can be shown for most dialects - except two: **ars** and **jam**-, where preaspiration occurs least often for the word *tak*, more often for *tack*, followed by *låt* and most often for *lott*. For **ars** the order is *tak tack lott låt* and for **jam** it is: *tak lot tack lott*.

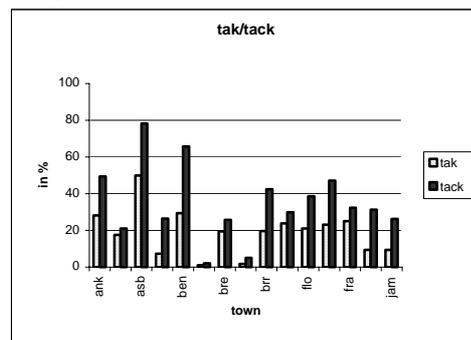


Figure 2. Frequency of occurrence of preaspiration for the words *tak* and *tack* for all dialects.

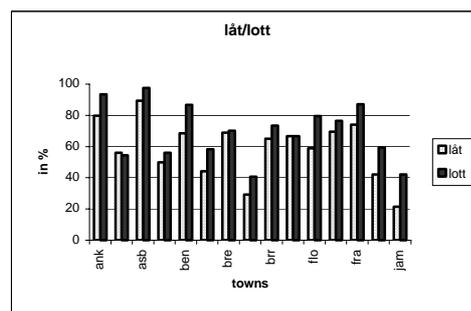


Figure 3 Frequency of occurrence of preaspiration for the words *låt* and *lott* for all dialects.

On a five level scale (low: 0-10%; moderate low: 11-44%; intermediate: 35-65%; moderate high: 66- 89%; high: 90-100%) the distribution of frequency of occurrence looks as follows: the word *tak* is produced by some dialects with very little preaspiration (1-9%; **bar**, **bod**, **bro**, **fri** & **jam**), by other dialects with moderate low occurrence (18-29%; **ank**, **ars**, **ben**, **bre**, **brr**, **fao**, **flo**, **fol** & **fra**) and by dialects with an intermediate number (50%; **asb**).

For the word *tack*, only two dialects remain at the level of very little preaspiration (**bod**, **bro**). The range for the moderate low occurrence is between 21 to 32% (**ars**, **bar**, **bre**, **fao**, **fra**, **fri** & **jam**). At the intermediate level between 39 and 66% the following dialects can be found: **ank**, **ben**, **brr**, **flo** & **fol** and once again, **asb** has

the highest frequency of occurrence at a moderate high level with 78%.

For the word *låt* the least amount of occurrence is presented by **bro** and **jam** (21-29%). At an intermediate level (42-65%) the following dialects can be found : **ars**, **bar**, **bod**, **brr**, **flo**, **fri** and at a moderate high level (67-80%) **ars** can be found.

For the word *lott* the two lower levels of occurrence are not present anylonger. At an intermediate level (41-59%), **ars**, **bar**, **bod**, **bro**, **fri** and **jam** can be found. At the moderate high level (67-87%) there are **ben**, **bre**, **brr**, **fao**, **fol** & **fra** and at a high level of occurrence (93-98%) there are **ank** and **asb**.

In summary, the dialects **bar**, **bod**, **bro**, **fri** and **jam** have the tendency to have the lowest occurrence of preaspiration across the different words. At the other end of the scale the dialects **ank** and **asb** with the highest frequency of occurrence is found. The other dialects are found inbetween.

It should be noted that for both word pairs in all dialects except one (**ars**), the word containing *short vowel + long consonant* - i.e. *tack* and *lott* - appears more often with a preaspirated stop than the respective counterpart. However, for **ars**, where this order is not maintained for the pair *låt/lott*, only a minor degree of variation (2%) is observed.

Duration

Procedure

The duration of each labeled preaspiration was measured. The average duration of preaspiration for each word across all speakers in all dialects was calculated. A comparison of the average duration between all the words and more specifically those two constituting a word pair with quantity contrast was carried out for each dialect.

Results

It can be obtained from Table 2 and Fig. 4 that the average duration of the preaspiration across all words and for all dialects ranges between 15ms (**bar**, *låt*) and 70ms (**brr**, *tak*). For each individual word the range is as follows: 23-70ms for *tak*, 18-53ms for *tack*, 15-51ms for *låt* and 19-54ms for *lott*.

A closer look at the individual dialects shows that no severe duration variation (> 20ms) occurs across the four words for most dialects:

ank, 32-40ms; **ars**, 36-43ms; **asb**, 37-54ms; **bar**, 19-23ms; **ben**, 33-43ms; **bre**, 20-40ms; **fao**, 46-56ms; **flo**, 42-48ms; **fol**, 39-51ms; **fra**, 39-44ms; **fri**, 42-61ms; **jam**, 38-47ms. In two cases, a wider range of duration variation was observed, which were: **bro**, 22-48ms and **brr**, 41-70ms.

Table 2 Average duration of the preaspiration section prior to the stop for all dialects and for the four words under investigation.

	<i>tak</i>	<i>tack</i>	<i>låt</i>	<i>lott</i>
ank	32	39	33	40
ars	36	39	36	43
asb	37	42	48	54
bar	23	18	15	19
ben	35	33	39	43
bre	40	20	38	35
bro	48	27	22	24
brr	70	43	43	41
fao	56	49	46	46
flo	45	48	42	42
fol	39	42	51	51
fra	44	39	41	42
fri	61	53	42	45
jam	44	38	47	43

There does not seem to be a given word order with which the duration increases for all dialects, in that there is segmental influence on duration. Neither is there a consistent variation within the word pairs across all dialects. In more detail in the word pair *tak/tack*, the dialects **ank**, **ars**, **asb**, **flo** and **fol** show a longer preaspiration section in the word *tack*, which contains *short vowel + a long consonant*. For the other dialects the reverse is the case. In the word pair *låt/lott*, the dialects **ank**, **ars**, **asb**, **bar**, **ben**, **bro** and **jam** show the same tendency, that is a longer duration of preaspiration in the word *lott* with *short vowel + long consonant*.

The dialects which show consistency across the word pairs in that the words in both pairs with *short vowel + long consonant* (*tack*, *lott*) have a longer preaspiration duration, are **ank**, **ars** and **asb**. A reverse consistency can be found for the dialects **bre**, **brr** and **jam**, in that the words with *long vowel + short consonant* (*tak*, *låt*) present us with a longer preaspiration duration. For all other dialects, longer preaspiration occurs prior to the short consonant in one word pair and prior to the long consonant in the other word pair.

Discussion and Conclusion

It can be said that frequency of occurrence of preaspiration is related to segmental context and dialect. For the first case, preaspiration occurs more often in the context of a rounded back vowel followed by a alveolar stop compared to the context of an unrounded open vowel followed by a velar stop. A more detailed production study on whether specific segments further the appearance of preaspiration would be an interesting examination.

For the second case, it shows that the dialects from the north eastern part of Götaland bring along preaspiration most frequently (**ank**, **asb**), whereas mainly dialects from the south western part of Götaland (**bar**, **bro**, **jam**) together with one north western (**fri**) and one eastern dialect (**bod**) bring along preaspiration least frequently. Inhibiting factors to preaspiration could be diphthongs, which are typical for the south western dialects. Thus, there might be no room for preaspiration after a dynamic vowel. However, such an assumption is contradicted by the more frequent occurrence of preaspiration in dialects on the island Gotland (**fao**, **fol**), which are famous for their diphthongs. An other inhibiting factor might be the tendency for some west coast dialects – among them **ars** and **fri** – to pronounce a voiced final stop, if it is a short consonant. So this can be seen as a reason for **fri** to show less frequency of preaspiration.

The duration of preaspiration varies between dialects but not in dependency of segmental context. It is longest for **brr** and **fri** – the latter occurring less frequently-, and shortest for **bar**, also showing the least frequency of occurrence.

The dialects **ank**, **ars** and **asb** show a consistent duration difference for the different quantity words in each pair, which, however, is a very short difference of 3-7ms. **ank** and **asb** are also dialects with frequently occurring

preaspiration, where the words with a short vowel appear more often in both word pairs. For **ars**, voicing of the short consonant is likely to occur. Thus, longer preaspiration together with a long consonant could be in line with van Dommelen's findings (1998), that longer preaspiration enhances the impression of a sound to be voiceless. Thus, preaspiration is not an indication to quantity contrast in the first place, but a consequence to voicing distinction.

In summary, the dialects **ank** and **asb** seem to include preaspiration as a typical character, where it even might be a factor to signalise quantity contrast. However, more detailed studies are necessary. The dialect **brr** is also a candidate for having preaspiration as a character by its pronounced duration, but its role concerning quantity still has to be sorted out. A dialect that obviously does not have preaspiration as a typical feature is **bar**, where it either rarely shows or it is very short.

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References

- Aasa A, Bruce G, Engstrand O, Eriksson A, Segerup M, Strangert E, Thelander I, Wretling P, (2000) Collecting dialect data and making use of them: an interim report from Swedia 2000. *Fonetik 2000*, Skövde.
- van Dommelen W (1998). Production and perception of preaspiration in Norwegian. *Proceedings of Fonetik 1998*, Stockholm University, 20-21.
- Helgasson P (1998) On-line preaspiration in Swedish: implications for historical sound change. *Proceedings of Sound Patterns of Spontaneous Speech (SPoS)* 98: 51-54.
- Ladefoged P, Maddieson I (1996) *The Sounds of the World's Languages*. Oxford: Blackwell.

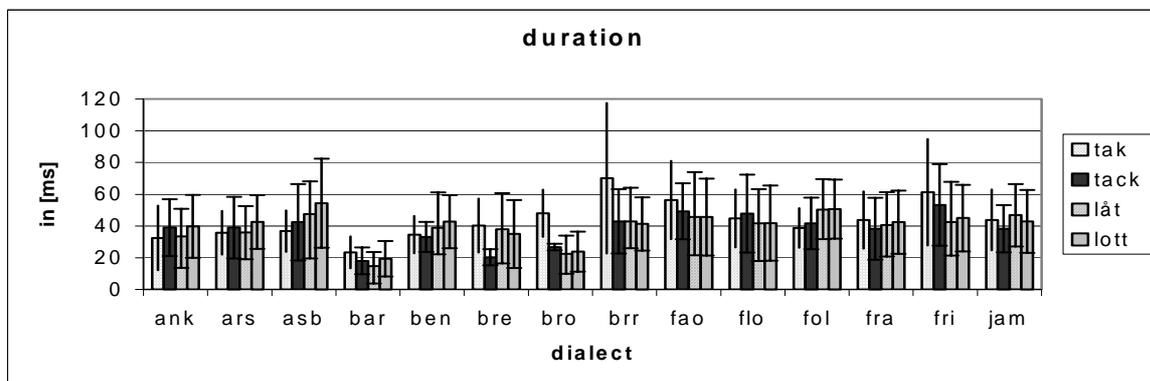


Figure 4. Average duration and standard deviation of preaspiration for all words and dialects.