

Vowels in regional variants of Danish

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ABSTRACT

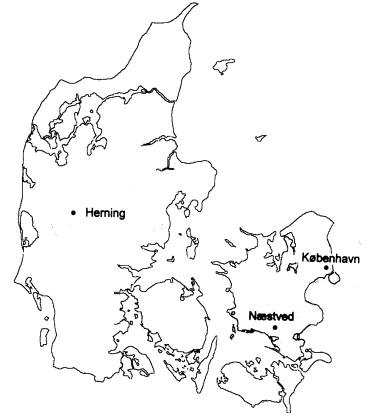
This paper presents the results of an acoustic investigation of the vowel sounds in three regional variants of Danish in spontaneous speech. The material for elicitation represents a conceptual fusion of word lists and interviews. A total of 18 subjects from three regions have been analysed. The expected regional differences have not been found. We find, however, clear indications that a general restructuring of the high and mid front unrounded vowels may be under way, relative to the older Copenhagen norm, and that different vowel quality is a fact for non high short versus long vowels, at least for some speakers.

INTRODUCTION

In stressed syllables Danish has 16 monophthongal vowel sounds, most of which can occur both short and long; long vowels may occur with or without *stød*. Some of these 16 different sounds are allophones but 14 create immediate surface contrasts. Add to this [ə], occurring in unstressed syllables only. Further, there are 21 falling diphthongs, ending in [j w ʌ], and as many rising diphthongs as there are [j]+vowel sequences.

The acoustic analyses in [1] and [2] (long vowels only) serve as our frame of reference. The description in [1] is based on recordings of eight males and one female between 22 and 47 years of age when recorded in 1952. And [2] is based on recordings of ten males and nine females (adults, age not specified) recorded in 1958-59. These are the latest systematic accounts of the acoustic properties of Danish vowels. A recent acoustic investigation of the long unrounded front vowels in Standard Danish [3] indicates that the manifestation of /e:/ and, particularly, /ɛ:/ has changed. /ɛ:/ has narrowed to the point where it merges with /e:/. Until recently almost all phonetic investigations of Danish have been based on read speech.

Consequently, our knowledge of the phonetics of spontaneously spoken Danish is sparse. Furthermore, the phonetic investigations of Danish have focussed largely on Danish as it is spoken in and around Copenhagen. There are of course dialectological investigations of Danish, but their focus is rarely on acoustic investigations.



The average Danish language user will recognize a number of regional variants of Danish. We will refer to these variants as 'regiolects' because 'dialect' traditionally applies to variants of Danish which typically are older and much more dissimilar to modern Copenhagen Danish. Whenever speakers of different regiolects communicate they will notice, among a number of differences, that some vowels are different. Some of these differences are lexically determined: a word like *persille* 'parsley' would be pronounced [p^hæ^ʌ'silə] in Western Danish regiolects but [p^hæ^ʌ'selə] in Copenhagen regiolect. Some differences are due to different allophonic rules. For instance, there is a general tendency to pronounce /u(:)/ as [o(:)] when it occurs after /r/ in Copenhagen regiolect, and likewise a tendency to lower /ɛ/ to [ɑ] between /j/ and /r/ in the Western Danish regiolects as opposed to [æ] in Copenhagen regiolect. Such differences are well known, though not all described in detail. These differences are not the subject of this investigation, and they are carefully avoided.

What is not known, is if there are more general differences between the regiolects regarding the realization of the various allophones. This is the main aim of this investigation. We intend to give an acoustic description of the mono-

phthongs of three Danish regional variants, and to see whether there are any systematic acoustic differences in the realizations of the ‘same’ allophones in these three regiolects. We exclude allophones caused by the presence of /r/. (/r/ is a pharyngeal approximant in prevocalic position, and postvocally it weakens to a semivowel, [ʀ], if it does not merge completely with the preceding vowel. Vowels neighbouring /r/ would accordingly create segmentation difficulties.) We base our analysis on spontaneous speech, for two reasons. First, it is obvious that there is a difference between spontaneous and read speech, though when it comes to the phonetic realisations of the phonemes, there is no knowledge of the quantitative differences. Second, during primary school all Danish pupils are taught to read aloud in a way that is shaped by the local teachers ideas of correct language forms and by the orthography, which in itself is based on Copenhagen regiolect. For those who speak other regiolects than Copenhagen Danish, this means that reading aloud almost inevitably triggers the use of a norm that is different from their everyday language.

MATERIAL

We want to describe the vowels as they occur in ordinary spontaneous speech. However, in the light of our particular interests it is not feasible to base our analysis on free spontaneous speech because phonemes do not occur with equal frequency. To ensure adequate coverage of all the vowel sounds, we have developed a method which is a conceptual fusion between word lists and interviews. Our point of departure is a list of words that contains our target vowel sounds. These words are rendered in drawings, which we make the subjects talk about. The words are carefully chosen so that we may safely assume that they will be familiar to most of our speakers. A second requirement is that they must lend themselves easily to graphical illustration. For some vowels words abound, others are much more troublesome.

We use a number of strategies to ensure that the subjects stay close to their everyday language:

1. We record the subjects in their local area. We do not go to their private homes, in order

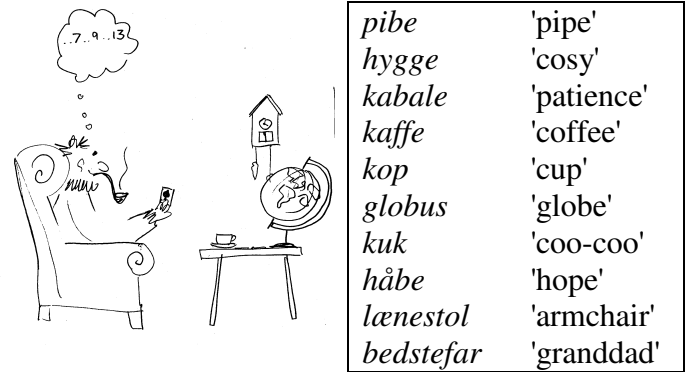


Figure 1: Example of a drawing and the test words it was designed to elicit.

not to impose on them the added stress of being host to us.

2. We put an effort into creating a relaxed and informal atmosphere during the interview.
3. Subjects from the provinces are interviewed by a person who speaks the same regiolect.

Most people living outside the capital are to varying degrees capable of speaking in ways shaped by Copenhagen regiolect. Whenever the situation calls for it, they will shape their language according to Copenhagen regiolect, and an interview with two researchers from the capital is likely to be such a situation, unless we do something to prevent it. We avoided using any of the target words, until the subjects had introduced them. This is to ensure that they use only words that are familiar to them and part of their vocabulary, and that they do not just mimic our pronunciation. Of course, this means that we may miss some target words because the subjects use other lexical items for some objects, or render them with phrasal constructions.

SPEAKERS AND RECORDINGS

The three Danish regiolects are:

1. Copenhagen regiolect, as spoken by native inhabitants of Copenhagen
2. Southern/central Zealandic regiolect, as spoken by native inhabitants of Næstved
3. West/mid Jutlandish regiolect, as spoken by native inhabitants of Herning.

Copenhagen regiolect is chosen because it is prestigious and a well described norm with which the two regiolects can be compared. The

other regiolects are chosen because they are our respective mother tongues, thus enabling us to communicate with our subjects without imposing an undesired linguistic norm on them. Næstved and Herning are modern provincial cities of comparable size (50,000 and 65,000 inhabitants respectively). They serve as economical and educational centres in their regions. Copenhagen has a population of approximately 1 million inhabitants.

18 persons were interviewed: 3 males and 3 females from each of the 3 regions. All subjects were between 18 and 28 years of age. To be considered 'native inhabitant' we require the subjects to be born, raised, educated (at least through primary school) and still living in the particular region. We have not taken any social parameters into account.

In Copenhagen the subjects were recorded in a sound treated recording room at the university. In Næstved we used a library room at a public school, and in Herning a music room at a municipal youth club, after closing time. The recording rooms used in Herning and Næstved were not sound treated, but carefully chosen to ensure quiet surroundings. Subject and interviewer sat at one table, while the other author, from a distance at another table, monitored the recording technically, and - more importantly - also kept a word count to ensure a sufficient number of repetitions of each test item. This meant that the interviewer could devote his attention entirely to the social demands of the situation, making sure the subjects felt at ease.

ANALYSIS AND RESULTS

The CD recordings were transferred to a PC using Exact Audio Copy [www.eac.de]. They have been intensity level adjusted and edited into manageable file chunks using Cool Edit Pro [www.syntrillium.com]. Praat 4.0.13 [www.praat.org] was used for the acoustic analysis. A number of Praat scripts and Perl programs were written to automate the processing of the material. The first stage was to identify all target words and classify and label them according to target allophone and stress. We distinguish five degrees: ordinary stress, weak stress, no stress, extra stress and strong emphasis. Initially, we only want to look at syllables produced with ordinary stress. At a

later stage we intend to compare words with different degrees of stress. For each vowel we mark onset and offset in order to measure duration, and we mark a suitable place near the middle for measuring formant frequencies. Formants were determined with Praat's Formant (Burg) facility, with suitable arguments for individual speakers. All data were manually inspected and suspicious values checked and

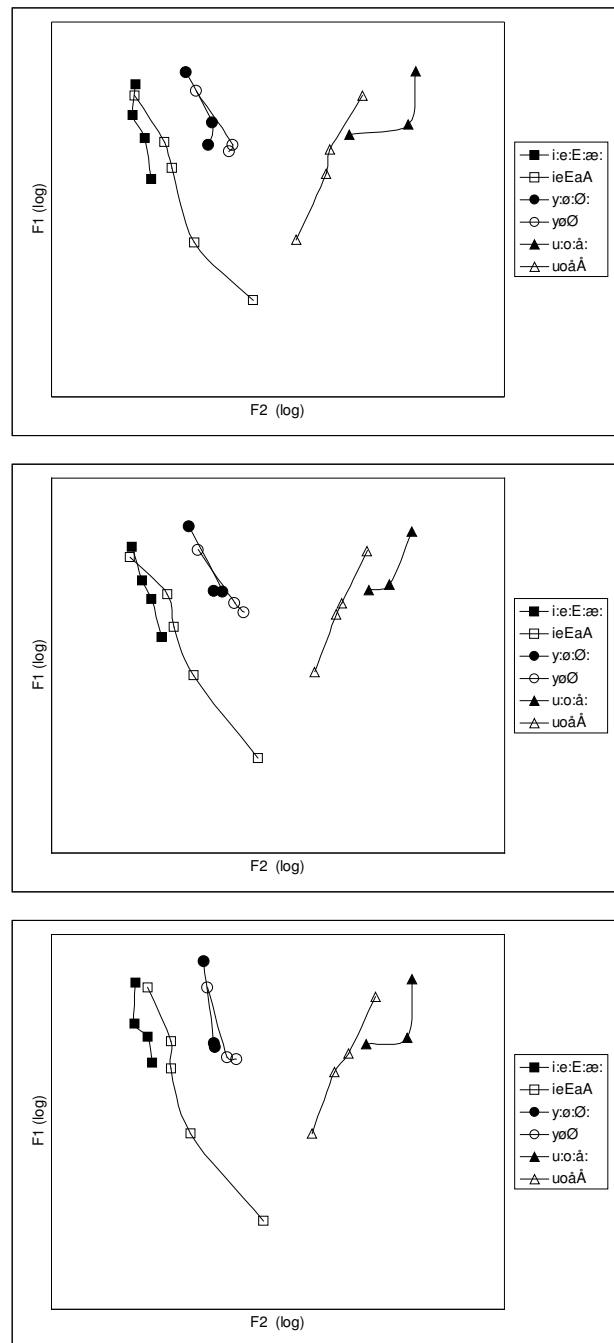


Figure 2: Average F2-F1 plots of short and long vowel sounds from Næstved (top), Herning (mid), and Copenhagen (bottom).

Filled squares: [i e E a:].

Filled circles: [y ø Ø:].

Filled triangles: [u o å:].

Open squares: [i e e a].

Open circles: [y ø œ].

Open triangles: [u o ɔ ʌ].

corrected if needed. Because our interest was foremost in investigating the layout of the vowel system we recalculated the formant frequencies of the female speakers using a fixed scaling factor of 0.877 (For further details see [4]). This enabled us to calculate "average" values based on both men and women.

The formant measurements reveal a surprisingly high agreement between speakers from the three regions, and we therefore consider them to be the same, except for minor differences regarding F3. The only other noteworthy difference is a tendency for the speakers from Herning to diphthongize the /o:/ as either [ou] or [ɔu]. This is not reflected in our measurements because our analysis is based on one measuring point per vowel. We chose just one measuring point because diphthongization was not expected in any of our target words. When we set out to do this investigation, we decided not to include the allophones caused by the presence of /r/. In hindsight this is the most regrettable decision, since listening to our material has made us strongly suspect that the /r/ colouring may be one of the clearest regionally determined phonetic (phonological) differences.

When comparing our results with [1] and [2] it's worth remembering that this comparison not only includes a historic or diachronic dimension, but also a difference in style (word lists and test sentences vs. nonscripted speech) and a difference in normativity: The speakers of [2] were carefully chosen to ensure subjects with a "proper pronunciation" and the recordings in both [1] and [2] were sorted to avoid mispronunciations. In our investigation subjects had to

Table 1. Nuber of subjects showing mergers.

| Vowels | Næstved | Herning | Copenhagen | Total |
|-----------|---------|---------|------------|-------|
| [e:]/[ɛ:] | 2 | 2 | 1 | 5 |
| [ɛ:]/[æ:] | 1 | | 2 | 3 |
| [ø:]/[œ:] | 2 | 4 | 5 | 11 |
| [u:]/[o:] | 1 | | | 1 |
| [o:]/[ɔ:] | | | 2 | 2 |
| [e]/[ɛ] | 1 | 2 | 2 | 5 |
| [ø]/[œ] | | 4 | 3 | 7 |
| [o]/[ɔ] | 2 | 1 | 1 | 4 |

fullfill a set of objective criterea (see above) but were otherwise chosen more or less at random. Their renderings of the target words were sorted according to degree of stress and extra prominence. Judgement of the 'correctness' of the pronunciation was *not* used as a criteria to sort the data. Thus our results include the variation seen in fully stressed renderings of the selected vowels.

Compared to the earlier findings of [1] and [2] we see a number of differences. First of all the tendency for the vowels to be cramped together in the upper part of the vowel space has increased. This means that from a typological point of view the Danish vowel system is increasingly marked, and there is fair reason to believe that this system is prone to change.

The earlier investigations did not find any systematic differences between short an long vowel manifestations. In our data we do find such differences. /i/, /y/ and /u/ appears to have the same quality short as well as long. For the other qualities the short vowel is more open than the long one. Whether the difference is large enough to be significant for the speakers remains to be investigated.

Furthermore quite a number of our subjects merges some of the categories as seen in table 1. These mergers may also indicate that changes are under way.

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