

REGIONAL VOICE QUALITY VARIATION IN SWEDEN

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ABSTRACT

Recordings of c. 60 (incl. some bidialectal) speakers representing important regional varieties of Swedish have been subjected to spectrography, F0 (mean, range, distribution) and perturbation analysis. LTAS and listener panel evaluation are being planned. Preliminary findings are that Växjö (S. Sweden) voices are characterized by higher pitch, wider range and a overall high frequency creak. Gothenburg (W. Sweden) speakers use smaller jaw opening and exhibit phrase terminal creak.

1. GENERAL PRESENTATION

Voice quality is defined as the perceived overall characteristics of an individual's speech. It depends on the morphology and size of the speech apparatus of the speaker and his articulatory habits. There are various ways of analyzing and describing voice quality. Laver [9] makes use of the concept of "articulatory setting", introduced by Honikman [6]. Voice quality is characterized by supralaryngeal settings, such as labial protrusion, pharyngalization, raised larynx etc., and phonatory settings, which are described partly in perceptual terms, such as falsetto, creak, harshness etc. Another approach to the analysis of voice quality is to study the relationships between the acoustic data and perceived voice characteristics, for instance, normal, rough, coarse, steady and nasal voice [5].

Voice quality has a wide range of linguistic and sociolinguistic functions. It can characterize a speaker's sex, age, personality, mood or relationship to a

speaking partner. It distinguishes also groups of speakers, e.g. a language community as a whole ("Gesamtpärke der einzelnen Sprachen"; [7, 246-251], certain dialects [3] or sociolects [2], [10]. The regional variation of voice quality in Swedish and in most other languages has not been studied systematically. There are a few cursory references in the dialectology literature. A study of the sentence intonation in various parts of Sweden revealed that, on average, speakers from the north used a lower fundamental pitch than those from the south [8, 185]. A brief account of the distribution of such voice quality features as high pitch, nasality, breathiness and creak in regional variants of Swedish is given by Elert ([1] (with maps).

2. METHODS

The present paper reports the preliminary findings of an investigation of voice quality among speakers in selected areas of Sweden. So far recordings of text readings and spontaneous speech have been made by c. 60 speakers (men and women) from Gällivare-Malmberget, Göteborg, Linköping and Växjö. There are plans to obtain recordings of speakers in Stockholm and Umeå. The places have been chosen as representing important varieties of Swedish or interesting types of voice quality. It has been difficult to find subjects who are truly representative of the regional voice quality and to neutralize the effect of variation of individual voice properties among speakers of the same regional variety. We have also compared recordings of dialect and standard

Swedish by a few bidialectal speakers.

The recordings have been analyzed acoustically by various methods. Fundamental frequency distribution analysis (FFDA) yields, besides the distribution histogram, data, such as mode, mean and range of the fundamental pitch (F0) (in Hz and in cents). Perturbation measurements give values for small variations from period to period in the speech waveform. Spectrograms and oscillograms of part of the recordings have been studied. It is our plan to carry out long time average spectrum (LTAS) analysis. All these methods have been tested in the analysis of pathologic voices where they have yielded results which are highly correlated with perceptual categories of voice quality (see [5]). We have made a perceptual analysis of all recordings. Our plan is to supplement this analysis by submitting comparable portions of the material to an group of independent listeners for evaluation.

3. PRELIMINARY RESULTS

Average F0 is higher among the Växjö men than among comparable groups in Göteborg and Linköping. The pitch of Linköping men is not only lower but has also a smaller range. A general high frequency creak of most of the voices of Växjö subjects is easily perceived in an auditory analysis. Higher pitch and raising of the larynx was observed when a bidialectal speaker changed from a speech form close to standard Swedish to his native southern Småland dialect. Some irregularities in the waveform may be correlated with the properties perceived in Växjö voices (see Figs. 1 and 2). Another characteristic of the Växjö speakers is the overall velarization or uvularization which is associated with the occurrence of uvular [R] or (in medial and final position) a central or back vowel as allophones of the frequent phoneme /r/. Acoustic correlates of such features may be detected in a projected long time spectrum analysis.

The particular voice quality characteristics of the Linköping and Göteborg speakers are less clear. This

applies both to the perceptual and acoustical analysis. The Göteborg speakers exhibit various forms of creak, esp. at the end of phrases. There is a preference among Göteborg male speakers to speak with smaller jaw opening.

4. REFERENCES

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VXGPTATA.SMP

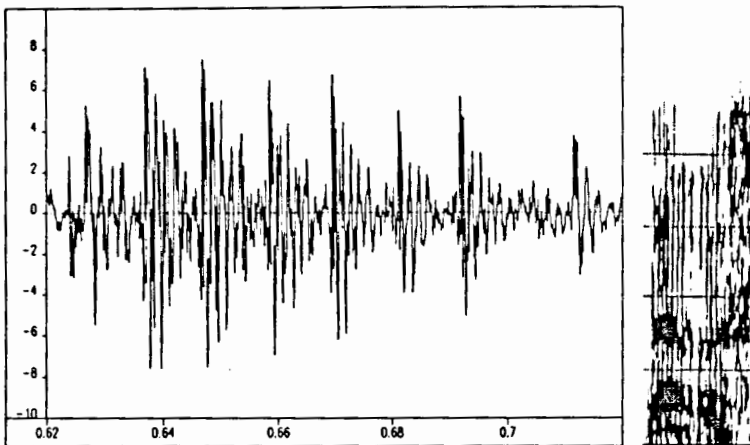


Figure 1. Waveform of [a(R)] and spectrum of [aRe] in the word *tätare* pronounced by the male Växjö speaker GP.

GBCOTATA.SMP

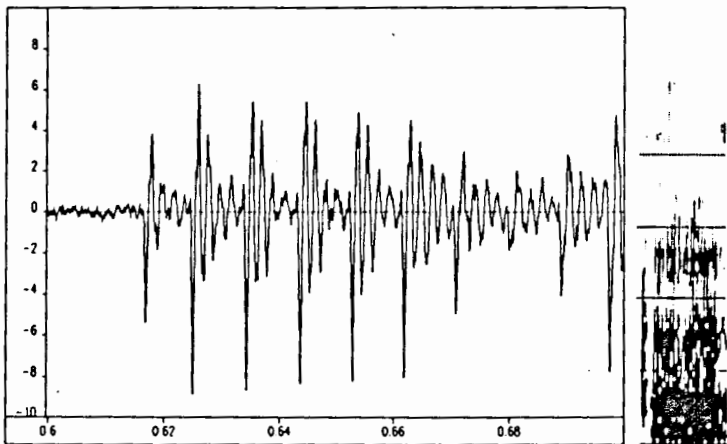


Figure 2. Waveform of [ar(e)] and spectrum of [are] in the word *tätare* pronounced by the male Göteborg speaker CO.