

Fundamental frequency patterns: the factors of age and discourse type

Systematic studies verify that speaking characteristics show specific changes depending on age (cf. Torre–Barlow 2009). Voicing quality and fundamental frequency patterns represent peculiar differences in speech production of younger and older speakers. Although there are various investigations dealing with the characteristics of the voice quality of elderly, there are much fewer data on the fundamental frequency changes in relation to aging.

This paper aims at investigating the effect of aging on speech in the case of two discourse types, in reading aloud and in spontaneous speech production. Our main research question concerns the effects of (i) age and (ii) various discourse types on the fundamental frequency patterns and on voicing of our subjects' speech production.

Our hypotheses are that (i) there will be differences in the fundamental frequency values and in their ranges in speech samples of younger and older speakers, (ii) the fundamental frequency patterns will show dependence on both the age and the discourse type and (iii) there will be significantly more glottalized syllables in the speech of elderly than in younger speakers' speech.

Two kinds of speech material were used in the experiments, read text (containing 13 sentences of a newspaper paragraph) and spontaneous narratives of 10 old females (ages between 70 and 85) and 10 young females (ages between 20 and 32) from the BEA Hungarian spontaneous speech data base. Fundamental frequency patterns and voicing characteristics were analyzed depending on the syntactic structures in both reading aloud and in spontaneous speech samples. In addition, glottalization and whispering characteristics of the speakers' speech samples were taken into consideration in both discourse types. Analysis was carried out using Praat software and statistical analysis was conducted by SPSS software.

Results show that (i) there are significantly lower F0-values in older subjects' speech samples than in younger subjects' speech samples, (ii) the F0-values had a wider range with older than with younger subjects and (iii) the fundamental frequency differences are dependent on the discourse type. The older speakers' fundamental frequency contours show larger differences in reading than in spontaneous speech samples which is not the case with the younger subjects. There are more glottalized syllables in reading aloud than in spontaneous speech with both the older and younger speakers.

Our results may provide a better insight into the characteristic features of older people's speech and also into the possible differences of reading aloud and speaking spontaneously.

References

- Boersma, Paul – David Weenink 1998. Praat: doing phonetics by computer (Version 5.0.1). http://www.fon.hum.uva.nl/praat/download_win.html.
- Torre, Peter – Barlow, Jessica A. 2009. Age-related changes in acoustic characteristics of adult speech. *Journal of Communication Disorders* 42: 324–333.