

PITCH ACCENTS IN STANDARD LITHUANIAN

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ABSTRACT

In Standard Lithuanian there is no overall scheme for the realisation of pitch accents. A common feature in speakers of the Standard language and also in those of various dialects is the constant presence of opposition of acute and circumflex accents, while the choice of phonetic characteristics used in opposition and the way they were used varied from dialect to dialect. Prosodic distinctions are found in the difference in level of amplitude and fundamental frequency and not in their contours.

INTRODUCTION

Contemporary researchers into Standard Lithuanian pitch accents /1,2,3/ have attempted to find an overall scheme for their realisation in the parameters of difference in fundamental frequency, in intensity and in duration. They took averages of data received from speakers of both sexes (with varying disposition of voice) who also had different dialect origins. Their estimates of durational, fundamental frequency and amplitude difference in pitch accents of vowels were based only on the number of cases and did not take into account whether or not such differences were of any significance for perception. Researchers have also failed to attach significance to the following remarks of the well-known dialectician Z. Zinkevičius /4/: "Speakers of dialects who subsequently learn Standard Lithuanian pronounce monophthongs and diphthongs with the pitch accents of that dialect. They do not acquire the pitch accents of Standard Lithuanian, that is of the language spoken in the southern part of Western Aukštaičiai."

Pitch accents were studied from oscillographic recordings of normal and whispered speech and from listening tests using segmented quasi-homonyms as stimuli. The following parameters were investigated: duration, amplitude, fundamental frequency, proportional energy of stressed vowels (the amount of total energy per msec), total energy of unstressed vowels as well as pitch fluctuation in adjacent syllables.

The work presents data from a recent oscillographic study of pitch accents in isolated disyllabic quasi-homonyms of speakers of Standard Lithuanian from different regions that has shown all the dialects to have a continual opposition of accent, while choice of phonetic characteristics and the manner of their use varied from dialect to dialect. Two speakers spoke the Kapsai dialect: Sp.1, 4; the Veliuoniškiai dialect was represented by Sp.2; the Dzūkai dialect by Sp.5. Amplitude, fundamental frequency and proportional energy were measured for vowels as a whole and for vowel parts (I, II, III): of the first and second components of diphthongs and monophthongs. This method was used to gather information concerning amplitude, fundamental frequency and proportional energy difference in different pitch accents of vowels in identical parts of the vowels. This identified the part which carries information about differences between the pitch accents in each of the various parameters. Analysis of the vowel part by part makes it possible to define the difference between pitch accents occurring, not in the contours of amplitude and fundamental frequency, but in the uneven level of these parameters as a whole. Only in this way is it possible to identify the particular part of the vowel where compensation of one parameter another takes place, to find out where correlation between them occurs and to find out which parameter is most important.

Differences of pitch accents in duration, amplitude and fundamental frequency were expressed in per cent and compared in pairs by the sign criterion (sign test) $P = 0.05$. First and foremost, we estimated all the differences revealing this tendency, disregarding their contribution to perception. The significance of differences in duration and amplitude as postulated by Weber and Fechner, and the significance of differences in fundamental frequency (tone) as postulated by Flanagan and Saslaw. Only these perceptually significant differences were later taken into consideration. Data on duration differences also included a record of the differences in the type of vowels under study.

PITCH ACCENTS IN SPEAKERS OF KAPSAI ORIGIN (Sp.1 AND 4)

In kapsai dialect (Sp.1 and 4), the most important features were amplitude (especially for Sp.4) and duration. In the pronunciation of Sp.1, information on vowel differences in amplitude, depending of the type of pitch accent, was contained in 1) an entire vowel (monophthong or diphthong), 2) an entire monophthong or the first component of a diphthong, 3) the first and third parts of a vowel. Sp.1 showed differences in whole vowels in 82% of the cases, significant differences in 55% of the cases. For 2) we obtained 91% and 55%, respectively. For 3) 82% and 64% for the 1st part of a vowel and 91% and 73% for the 3rd part of a vowel. In all the situations mentioned above, the stressed vowel with acute accent had greater intensity than the vowel with circumflex accent. Data values expressing the tendency shown in points 1), 2), 3) by the sign criterion ($P = 0.05$) were labelled "+", and the significant difference in amplitude was called "-".

Therefore, the amplitude in phonetic realization of pitch accents in the pronunciation of Sp.1 is highly important. On the one hand, it is distinguished by a stable level within the vowels and expresses the tendency. On the other hand, the small number of quasi-homonyms where differences in amplitude were significant, indicates a certain lack of independence of this parameter. The same may be said concerning the differences in duration of vowels with various pitch accents. Duration differences in vowels were expressed in 100% of the cases; differences were significant in 64% of the cases, while differences significantly correlated with the character in only 55% of the cases. The expressed duration differences by the sign criterion ($P = 0.05$) were considered "+", and significant differences in all the previously mentioned cases were "-".

Comparison of data on the ratio of amplitude and duration leads to the following conclusion. In the pronunciation of Sp.1 the uneven level of amplitude within vowels with different pitch accents is supported by their difference in duration: the proportional energy of the whole stressed vowel with acute accent is greater than that of a corresponding vowel with circumflex accent in 91% of the cases. The 1st, the 3rd parts in 82% of the cases. In all cases data values for the sign criterion ($P = 0.05$) were "+", indicating the correlation of these two parameters.

Difference in fundamental frequency of vowels with different pitch accents for Sp.1 in 64% of the cases were expressed and significant only in the 1st part of the vowels. In both cases data values for the sign criterion ($P = 0.05$) were "-". Factors that witness its participation were

as follows. First, the shift of maximum amplitude to the first part of the vowel in whispered speech. Secondly, the lack of significant differences in these vowel parts in amplitude and in duration. Third to some extent the test values for perception: pitch accents in quasi-homonyms with deleted initial consonants and onglides of vowels in some pairs were recognized as different, while in others they lost information concerning differences and were taken for identical acute accents (Fig.1).

In the pronunciation of Sp.1, the difference in fundamental frequency between syllables acted as an auxiliary: the differences in fundamental frequency between the last part of the vowel with acute accent and a following unstressed vowel was greater than the corresponding difference between the vowel with circumflex accent and a following unstressed vowel in 73% of the cases.

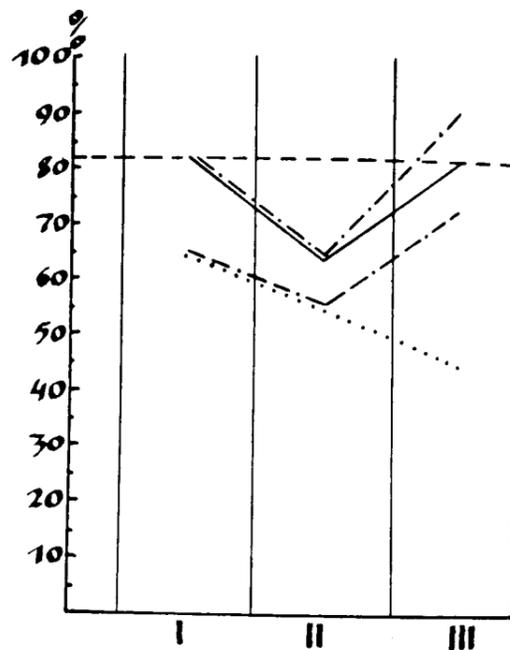


Fig.1. Speaker 1. Difference between vowels with acute accent and the corresponding vowels with circumflex accent. --- amplitude difference shown; - - - - significant amplitude difference; proportional energy difference; - · - · - significant fundamental frequency difference; I, II, III corresponding parts of vowels; - - - - positive data value for $P = 0.05$.

In the pronunciation of Sp.4 duration differences of vowels were expressed in 100% of the cases, significantly so in 92%, and significantly corresponding to the character in 84% of the cases. Data values ($P = 0.05$) in all three cases were "+", indicating the independence of durational dif-

ferences in vowels. Information on amplitude differences in pitch accents was carried by 1) the whole vowel, 2) the whole monophthong or only by the first component of the diphthong, 3) 1st and 2nd parts of the vowels. Differences in whole vowels were marked in 75% of the cases, significantly so in 50% of the cases; in monophthongs and only the 1st components of diphthongs they were expressed in 75% of the cases, significantly in 58% of the cases, in the 1st parts in 84% of the cases, significantly in 50%; in 2nd parts differences were expressed and significant in 84% of the cases. Data values expressing the tendency shown in points 1), 2), 3) by the sign criterion ($P = 0.05$) were "+". Data values of significant differences in amplitude in all the aforementioned points by the sign criterion ($P = 0.05$) were "-", excepting the 2nd parts, where data values were "+". The fact that amplitude differences are of prime importance in the opposition of pitch accents was confirmed by the perception tests. In the pronunciation of Sp.4, the listeners could not discriminate even dynamically marked differences in the stressed syllable. Difference in fundamental frequency of vowels with different pitch accents in 58% of the cases were expressed and significant in the 2nd and 3rd parts of the vowels (Fig.2).

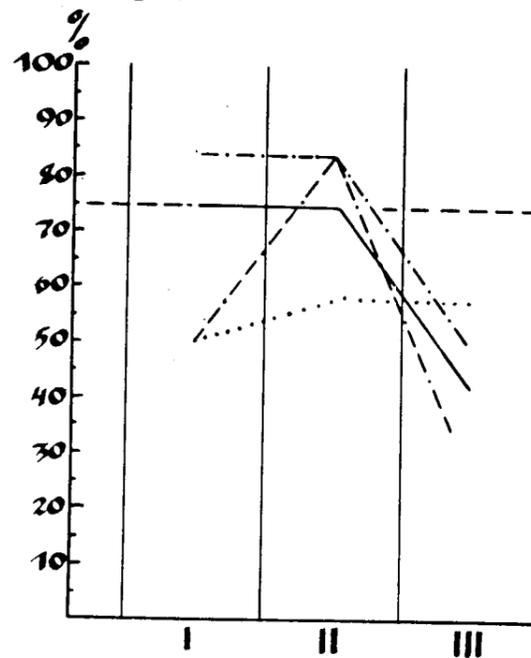


Fig.2. Speaker 4. Explanatory notes as at fig.1.

PITCH ACCENTS IN SPEAKER OF VELIUONIŠKIAI ORIGIN (Sp.2)

The most important features were duration

and fundamental frequency. Duration differences of vowel sound were significantly marked and in keeping with the general character in 100% of the cases. Data values of significant difference according to the sign criterion ($P = 0.05$) were "+". Difference in fundamental frequency level occurred in all parts of the vowel, and greater amplitude and higher fundamental frequency were characteristic of certain parts of the vowel with acute accent in comparison with the vowel of circumflex accent. Differences in vowels with various pitch accents were marked and significantly so in 90% of the cases of whole vowels and monophthongs on the same grounds with the 1st components of diphthongs. In the 1st, 2nd and 3rd parts of vowels, differences were expressed and significantly so in 80% of the cases. Data values for the sign criterion ($P = 0.05$) were "+". Difference in amplitude of the whole vowel was expressed in 90% of the cases; differences in monophthongs in the same manner, with the 1st components of the diphthongs in 80% of the cases; of the first parts in 90% of the cases. Data values pressing tendency for the sign criterion ($P = 0.05$) were "+", significant differences in all the points were "-". In addition, the differences in vowels with acute and circumflex accents were supported by the differences expressing the tendency, of post-stressed syllables in total energy (in 80% of the cases), and also by the differences inclined toward tendency of the fundamental frequency between syllables (70%).

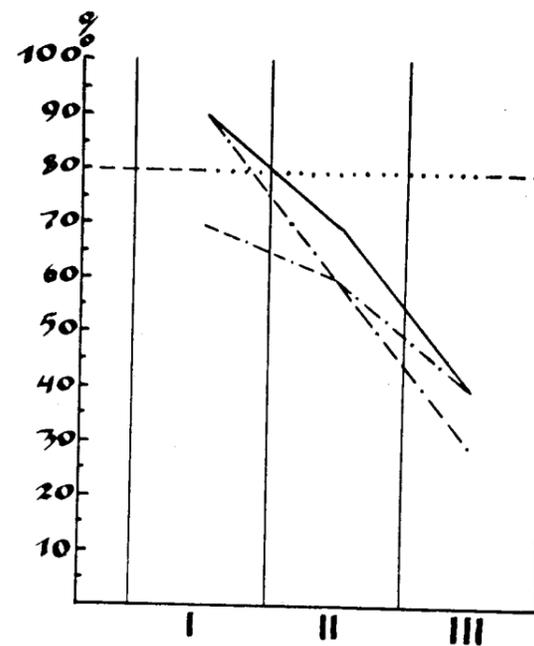


Fig.3. Speaker 2. Explanatory notes as at fig.1.

PITCH ACCENTS IN SPEAKER OF DŽUKAI
ORIGIN (Sp.5)

In the speech of Sp.5, a representative of the džukai dialect, the important role in phonetic realization of vowels with different pitch accents was played by differences in duration (These were expressed in 90% of the cases and significantly corresponded to the character in 80% of the cases), by differences in fundamental frequency modulation between syllables (Differences in fundamental frequency between vowels with acute accent and post-stressed vowels in 80% of the cases were smaller than those between vowels with circumflex accent and post-stressed vowels), and by differences in total energy of post-stressed vowels (After acute accent the total energy was greater than after circumflex accent in 80% of the cases). Data values of significant differences in all aforementioned cases by the sign criterion ($P=0.05$) were "+" (Fig.4).

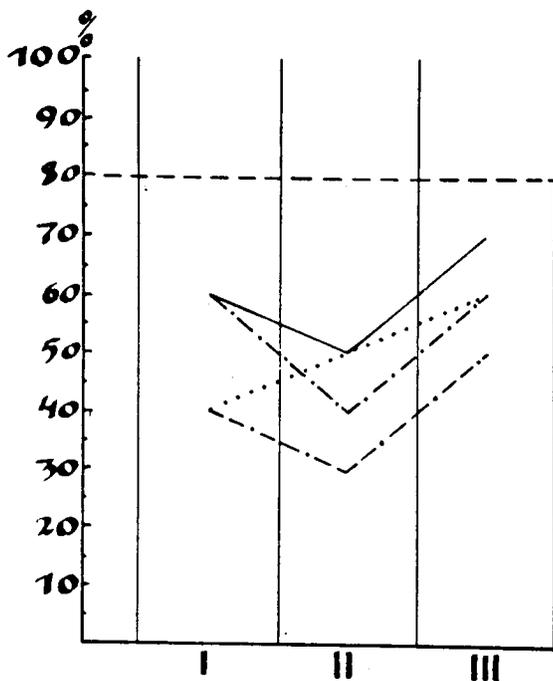


Fig.4. Speaker 5. Explanatory notes as at fig.1.

CONCLUSION

The data which we have obtained appears to show that the hitherto prevailing theory of the existence of an overall for the realisation of pitch accents of speakers of Standard Lithuanian irrespective of their original dialect is groundless. However, these investigations can at best, serve only as the starting point of a great deal of further work for those researchers investigating the prosody of Lithuanian, both in the standard language

and in its dialects.

REFERENCES

- /1/ A.Girdenis, A.Pupkis, "Pietinių vakarų aukštaičių priegaidės (prozodiniai požymiai)", Eksperimentinė ir praktinė fonetika I, Vilnius, 1974.
- /2/ A.Pakerys, "Lietuvių bendrinės kalbos prozodijs", Vilnius, 1982.
- /3/ A.Pakerys, "Lietuvių bendrinės kalbos fonetika", Vilnius, 1986.
- /4/ Z.Zinkevičius, "Lietuvių dialektologija", Vilnius, 1966.