

SUMMARY

Word stress in English and Ukrainian is energetic dynamic in nature. The main physical essence of word stress is an increased impulse of the acoustic energy.

Word stress singles out the accentual centre of the word, organizes the word as a linguistic unit. Word stress is the inevitable element of all the speech units – of a sense-group, a phrase, overphrasal unities and the text – the highest unit of speech on suprasegmental level. Word stress is characterised by some amount of degree of energy which is the result of muscular tension of the articulating organs in the process of speech. The syllables which are characterised by the increase of acoustic energy in comparison with other syllables in the word are said to be stressed.

In a word consisting of two or three syllables, one of the syllables of which is characterised by a bigger tension of the organs of speech and consequently, by a stronger impulse of the acoustic energy, is said to be stressed. The other or the others syllables of the word that are characterised by a weaker impulse of acoustic energy are said to be unstressed. Thus, each syllable has some degree of acoustic energy. There are as many degrees of energy as there are syllables in a word, but a human being usually can perceive only four of five degrees of syllable energy. Only those degrees of acoustic energy are considered to be degrees of word stress, which are phonologically opposed to other degrees of acoustic energy, and thus, are perceived as word stress.

In English and Ukrainian the majority of phoneticians assert that there are syllables of three linguistically relevant degrees of stress – primary, secondary and unstressed syllables.

The theory of word stress has been considered by linguists in the course of time. Different definitions of word stress were suggested by scientists.

The physiological conception of word stress, proposed by L.V. Shcherba was especially popular in the 1950s. According to this theory the word stress is the result of the increased muscular tension of the organs of speech and consequently, by a longer duration. The exceptional role of duration as the main characteristic feature of

a word stress in Russian was later supported by the results of experimental investigations (Zlatoustova L.V., 1953).

It was noted that the force gradation produces the impression of strong and weak syllables in most languages (Tompson A.I., 1910). It was stated that the energetic articulation of speech organs and their coordinate movements involves a strong push of the air from the lungs and gives the impression of intensity or loudness on the level of perception due to which the degree of stress is distinguished (Torsnev T.P., 1950).

Rather many scientists have come to the conclusion that due to the tension of articulation, stressed syllables are characterised by higher fundamental frequency and are perceived as higher in pitch than the unstressed syllables (Jones D., 1956; Mateescu D., 2003, and others).

Higher fundamental frequency cannot be considered a parameter discriminating stressed and unstressed syllables in English and Ukrainian as well as in other languages of a dynamic type of stress. It has been proved in numerous experimental phonetic investigations that frequency characteristics differentiate communicative types of utterances, various modal and emotional connotations on suprasegmental level but are irrelevant on a segmental level.

Some scientists suggested that, besides a greater degree of speech organs tension, stressed syllables have a higher degree of prominence (Vassilyev V.A., 1963; Mateescu D., 2003).

This point of view was criticized by some linguists because prominence is a wider phenomenon than word stress – it is a combined effort of timbre, duration, intensity, intensified sentence stress and intonation.

It was demonstrated in Chapter 5 that the main physical characteristic feature of a syllable is total acoustic energy.

The total acoustic energy is a complex physical characteristic which might be a coordinated effort of intensity and duration, defined as intensity over time.

Stressed and unstressed syllables are similar in nature. The difference between stressed and unstressed syllables is purely quantitative – the stressed syllable is

characterised by a bigger degree of acoustic energy than the corresponding unstressed syllable or unstressed syllables in the same word.

Thus, each syllable in the word has some degree of energy. From the physical point of view there are as many degrees of energy in a word as the number of syllables in it.

From the linguistic point of view there exists a functional discrimination of definite degrees of word stress in any language. But only those syllables are said to be stressed which are phonologically opposed by the degree of the total acoustic energy to other syllables of the word. Several degrees of stress may be opposed to stressed and unstressed syllables in words consisting of more than three syllables, that is the biggest degree of acoustic energy may be opposed to a weaker degree of energy and both of them may be opposed to the weakest degrees of energy of the word. The majority of English phoneticians assert that there are three degrees of stress in English polysyllabic words – primary, secondary and unstressed syllables.

In Ukrainian three degrees of word stress are observed in polysyllabic words too, but not so often as in English.

The primary stress is characterised by the biggest degree of acoustic energy in the word. The secondary stress is also rather strong, but weaker than the primary one.

In Ukrainian stressed syllables are weaker in acoustic force and are not so vividly opposed by the degree of acoustic energy to the unstressed syllables as in English. It might be explained by the absence of reduction in Ukrainian, by the difference in the grammatic and rhythmic organization of the two languages.

Word stress has not been studied experimentally before the appearance of electro acoustic speech recording apparatuses in the laboratories of experimental phonetics. The results of the first experimental investigations of the acoustic nature of word stress were contradictory.

D.B. Try (1955) asserted that duration and intensity were both cues for judgment of word stress in English, but duration was more effective.

P.H. Lieberman tried to prove that intensity is a more important correlate of word stress than duration, though fundamental frequency according to him seemed to

be more relevant. Observations of other scientists supported the leading role of frequency characteristics of word stress in British English.

Contradictory results of word stress may be explained by a limited experimental material. Besides the influence of the grammatic and phonetic structure of the languages on the characteristics of word stress were not taken into consideration. The results of the experimental investigation were not verified with the help of methods of the statistic analysis.

Ukrainian word stress has not been studied experimentally until the 1960-70s.

One of the first systematic contrastive experimental analyses of English and Ukrainian word stress was published in the second part of the 20th century (Brovchenko T.A., 1972).

All the requirements of phonetic experimental analysis were preserved:

- The amount of experimental material (over 3000 units) and the number of speakers (20 speakers of English and 20 speakers of Ukrainian) were statistically sufficient.
- Stressed and unstressed syllables were taken in different positions in the word, in different syllabic structures of the words and in different communicative types of phrases.
- The results of the electro-acoustic phonetic experimental research were subjected to mathematic statistic analysis to prove their reliability.

The results of experimental analysis supported the hypothesis that the main physical characteristic of stressed syllables in English and Ukrainian is the total acoustic energy (W_{tot}) – a coordinate action of its components: intensity (A) and duration (t). In all the observed cases the absolute meaning of the total acoustic energy of the stressed syllable was considerably bigger than that of the corresponding unstressed syllable.

The average relative coefficients reflecting the correlation of the total energy characteristics of stressed and unstressed syllables in English – 2.06 rel. units, in Ukrainian – 1.96 rel. units showed that the total acoustic energy was about twice as big as the total acoustic energy of the unstressed syllables and remained stable under

various conditions of pronunciation and consequently, is the main acoustic characteristic of word stress both in English and Ukrainian.

Duration and intensity of stressed and unstressed syllables did not differ so much and were not so stable as the total acoustic energy, the relative coefficients were not so big and stable as those of the total acoustic energy. The coefficient of correlation which showed the difference between the relative characteristics of intensity of stressed and unstressed syllables in English was 1.24 rel. units. The coefficient showing the relation between characteristics of duration of stressed and unstressed syllables were 1.39 rel. units in English and 1.58 rel. units in Ukrainian.

The data about the correlation of the two components of the total acoustic energy, that is about their relative characteristics made it possible to assert that the shares of intensity and duration are not equal in creating the stressed syllables in the two languages. Intensity is a more important component of the total acoustic energy in English, in most cases the share of intensity was much bigger than that of duration. The average relative coefficients, showing the correlation of intensity between stressed and unstressed syllables were considerably bigger than those of duration. Thus, intensity is a more important component of the total energy than duration in English.

In Ukrainian the share of the components of the main acoustic characteristic of word stress – the total acoustic energy was not equal either. Duration proved to be a more important component of the total energy than intensity in Ukrainian. In most cases the share of duration was much bigger than that of intensity. The average relative coefficients showing the relation between the duration of stressed and unstressed syllables were considerably bigger than those of intensity. It shows that duration is a more important component of word stress than intensity in Ukrainian.

Experimental investigations showed that the difference in fundamental frequency both in English and Ukrainian is insignificant. Fundamental frequency cannot be considered a relevant acoustic characteristic of word stress. It belongs to melodic characteristics of suprasegmental units of speech (fig. 6.1, p. 227).

The auditory subjective analysis testified that most stressed syllables were perceived by the listeners as stronger, louder and longer. The higher pitch of voice of the stressed syllables was perceived by the listeners in rather rare cases.

An equal perception of stressed syllables as longer and louder in a prevailing number of cases, both in English and Ukrainian, while the share of duration – a main characteristic of a word stress is bigger in Ukrainian than in English may be explained by the phonological length of vowels in English, while in Ukrainian the length of vowels is phonologically irrelevant.

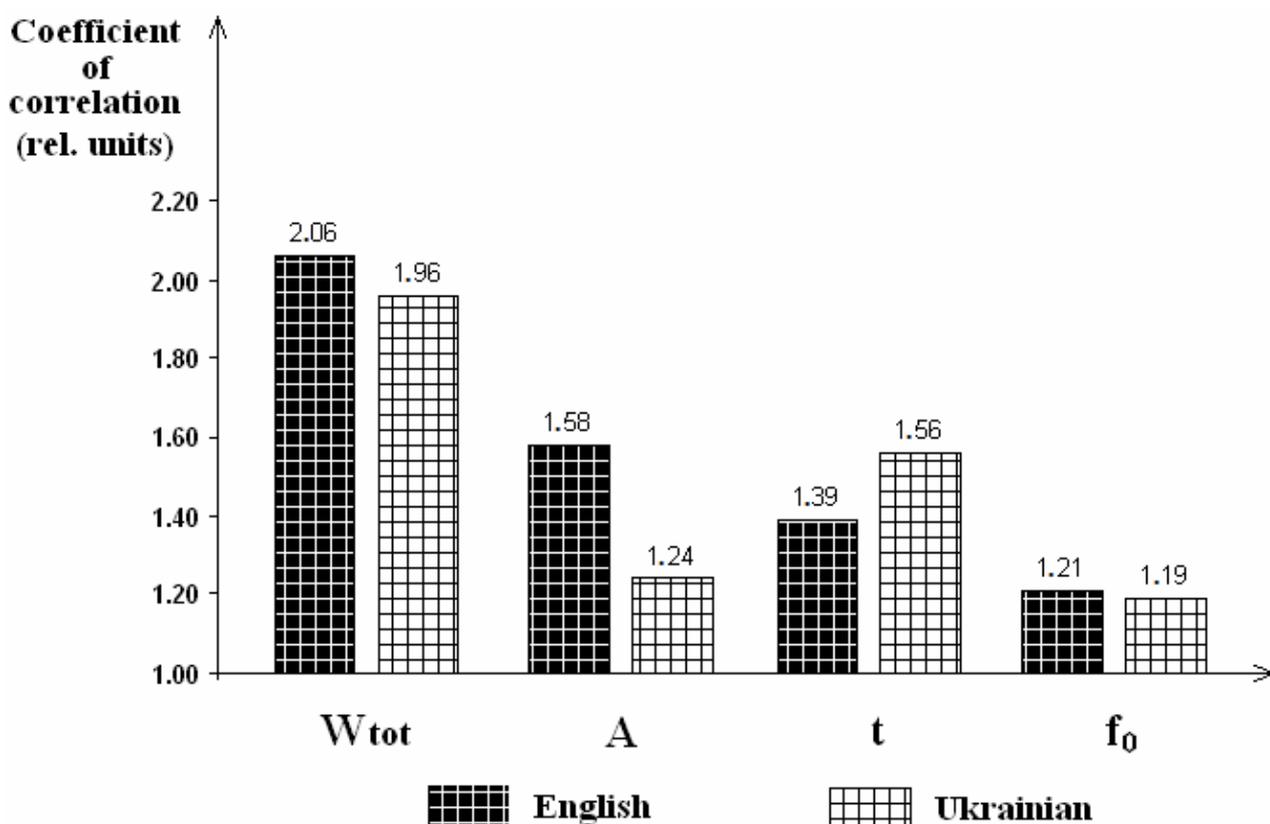


Fig. 6.1. Average objective acoustic relative coefficients of correlation between stressed syllables in English

The experimental analysis of subjective characteristics of word stress supports their leading role in the perception of stress.

The subjective perceived characteristics of word stress revealed the same regularities as the corresponding objective characteristics. The subjective characteristics of strength as well as the corresponding objective characteristics of the total energy are the main feature of word stress in English and Ukrainian. On the

level of perception the share of subjective parameters of loudness and length is different in the two languages as well as of the corresponding objective characteristics.

Though the share of the components of the main acoustic characteristic of word stress – total energy, intensity and duration may be different in different languages and one of them may be more important than the other, it should be taken into consideration that both the components of the dynamic type of stress are necessary for creating the main characteristic of the syllable in the dynamic type of languages – total energy.

The subjective characteristic of weight was perceived by a rather large number of listeners and may be considered as a characteristic feature of word stress on the level of perception though its physical nature is not clear.

The results of the perceptual subjective analysis of word stress in English are presented in fig. 6.2.

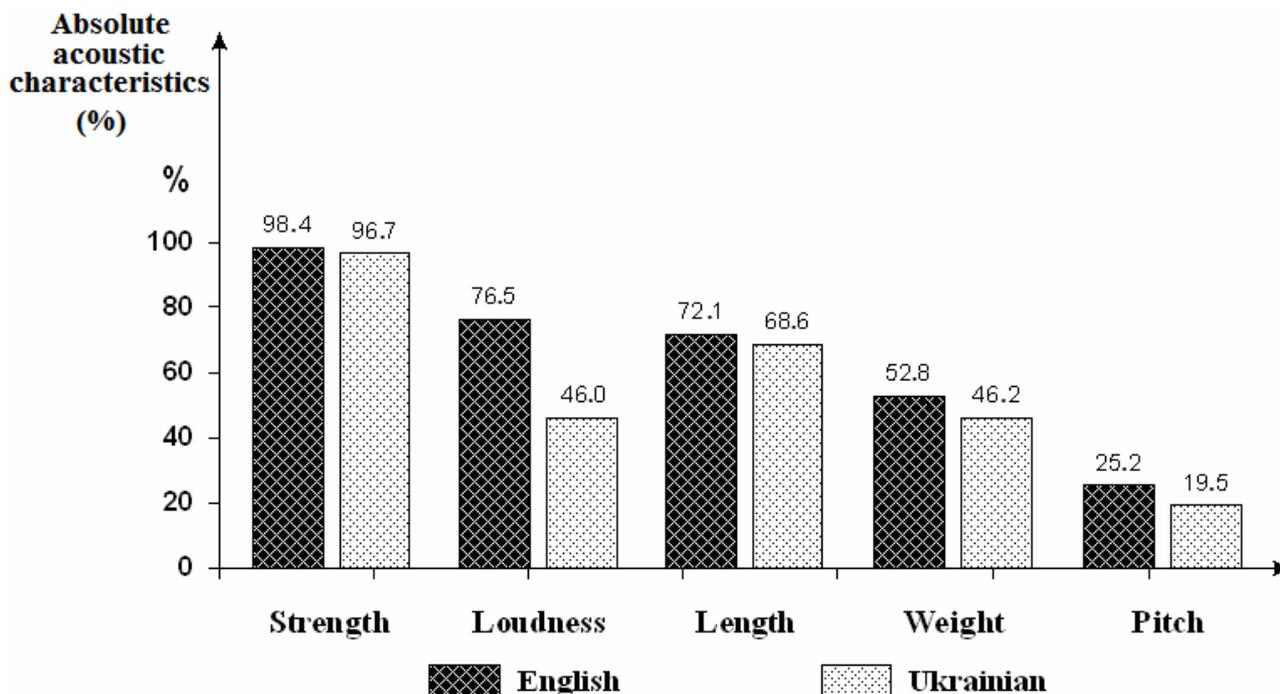


Fig. 6.2. Average subjective perceived acoustic characteristics of stressed syllables in English and Ukrainian

The role of word stress is extremely great in the language. The character of stress, its strength and place influence all the phonetic phenomena of the sounding speech.

Word stress, as well as speech sounds and intonation, is one of the phonetical means of semantic expression and can change the meaning or the grammatical form of the word.