

Research project objectives: performing an acoustic analysis of correlates of secondary stress in multisyllabic words, fixed phrases and compounds. The assessment of results will allow for constructing a coherent multivalued model of stress for General British and General American English. The model is based on a research hypothesis claiming that constructing a coherent model of English stress requires the distinction of three levels of syllable stress: primary (tonic) stress, secondary stress, and tertiary stress. The fourth type of syllable lacks prominence is considered unstressed.

#### Primary research.

The primary research will involve a verification of the model within a corpus of approx. 200,000 units (incl. multisyllabic words, fixed phrases and compounds containing a variable level of secondary stress) compiled at the initial stage of this project. A carefully selected portion of the corpus (units of the highest frequency-of-occurrence coefficient, most representative of each stress pattern) will be subjected to an acoustic analysis with the use of a computer software Praat. The results of the acoustic analysis will be used to automatically assign the final stress pattern for each unit of the corpus according to 1-4 scale (S1: primary stress, S2: secondary stress, S3: tertiary stress, S4: weak stress). The assignment of stress values will reflect the measurements of variables determining the level of prominence of each syllable (such as loudness, pitch, vowel length).

#### Reasons for choosing the research topic.

The main reason for undertaking this research is to expand the understanding of the functioning of the complex stress system in English. The expected results include a contribution into the general theory of stress within the so called metrical phonology. Naturally, explaining phonological foundations of prosodic phenomena is itself an interesting task from the cognitive point of view, but it also has far-reaching consequences for phonetic studies and their implementation. First of all, the levels of stress postulated by phonologists are treated with skepticism by phoneticians. In order to illustrate the problems occurring at the meeting point of phonology and phonetics, one may quote the practice employed in pronunciation dictionaries (as well as many mono- and bilingual dictionaries). Although a varied level of prominence of syllables in English is rather universally acknowledged, the commonly used binary mode of stress assumes that a syllable may be either stressed or unstressed, while among unstressed syllables, one may distinguish syllables containing a form of a reduced vowel and ones in which a full vowel is preserved. Syllables with full vowels are, nevertheless, treated as unstressed. In pronunciation dictionaries, such syllables are somehow distinguished by the phonetic transcription which uses the symbol of a full vowel. However, the lack of consistence is particularly striking in the case of compounds (which require the marking of word stress in the elements occurring to the right of the tonic stress), as well as non-compound words in which the tonic stress is directly preceded or followed by unreduced syllables. In the case of compounds, the binary marking of stress seems particularly inconsistent, because compounds with the second element being a monosyllabic word (e.g. LPD: <laptop>) are not marked for secondary stress and so it is presumed that they contain an unreduced vowel, while compounds in which the second element is a multisyllabic word are marked for secondary stress (e.g. LPD: <after-party> 'af.tə.pa.ti), which is necessary to show the word stress pattern of that element, although it violates the principle that secondary stress does not occur in English after the primary stress. Such marking results in yet another inconsistency – the disappearance in compounds of secondary stress present in the basic form before the primary stress (e.g. LPD 'dʒen.ə.reɪ.f{ə}n / 'mi dʒen.ə.reɪ.f{ə}n). The lack of distinction of variable prominence of secondary stressed syllables in pronunciation dictionaries is also inconsistent in multisyllabic words containing multiple subordinate stresses (<disambiguation> 'dis æm.bi.gju 'eɪ.f{ə}n), where – contrary to the suggested marking – the 2<sup>nd</sup> and 3<sup>rd</sup> syllable seem to have an equal, lower level of prominence, while the 1<sup>st</sup> and 5<sup>th</sup> syllable are audibly more prominent. Such words will also be included in the primary research.

This situation is particularly unfortunate in the case of dictionaries which do not show the phonetic transcription, but do show the marking of stress. In such a spelling notation, syllables containing a full vowel but not stressed primarily or subordinately, are not marked for stress. It should be noted here that the environments in which vowel reduction does not occur, cannot be defined in simple and coherent rules, and the situation is complicated even further by the process of lexicalization, which results in the reduction of vowels in syllables that one would expect to contain a full vowel. Considering that the number of non-native speakers of English worldwide, whose competence of English results from learning rather than acquisition, is many times higher than that of native speakers of English, the marking of varied levels of secondary stress confirmed by an acoustic study is physically accurate, psychologically and pedagogically useful, and it solves the problems of inconsistency. The marking of varied levels of secondary stress also provides a substantially useful cue for constructing speech recognition and speech synthesis algorithms.