



UNIUNEA EUROPEANĂ



Fondul Social European
POSDRU 2007-2013



Instrumente Structurale
2007-2013



OIPOSDRU



ACADEMIA ROMÂNĂ

Investește în oameni !

FONDUL SOCIAL EUROPEAN

Programul Operațional Sectorial pentru Dezvoltarea Resurselor Umane 2007 – 2013

Axa prioritară nr.1 „Educația și formarea profesională în sprijinul creșterii economice și dezvoltării societății bazate pe cunoaștere”

Domeniul major de intervenție 1.5 “Programe doctorale și post-doctorale în sprijinul cercetării”

Titlul proiectului: “**Cultura română și modele culturale europene: cercetare, sincronizare, durabilitate**”

Beneficiar: **Academia Română**

Numărul de identificare al contractului: POSDRU/159/1.5/S/136077

Scientific PhD. Research Report

**Coordinating Professor:
Prof. dr. Gabriela PANĂ DINDELEGAN**

**PhD Student:
Carmen-Mădălina RĂRIȘ-FIERBINȚEANU**

Bucharest, 2015



UNIUNEA EUROPEANĂ



Fondul Social European
POSDRU 2007-2013



Instrumente Structurale
2007-2013



MINISTERUL
EDUCAȚIEI ȘI
CERCETĂRII
ȘTIINȚIFICE

OIPOSDRU



ACADEMIA ROMÂNĂ

Secondary stress in Romanian - an OT approach (summary)

**Coordinating Professor:
Prof. dr. Gabriela PANĂ DINDELEGAN**

**PhD. Student:
Carmen-Mădălina RĂRIȘ-FIERBINȚEANU**

Această lucrare a fost realizată în cadrul proiectului “Cultura română și modele culturale europene: cercetare, sincronizare, durabilitate”, cofinanțat de Uniunea Europeană și Guvernul României din Fondul Social European prin Programul Operațional Sectorial Dezvoltarea Resurselor Umane 2007-2013, contractul de finanțare nr. POSDRU/159/1.5/S/136077.

Bucharest, 2015

INTRODUCTION 6

1.	Stress from the perspective of traditional phonetics/phonology	8
1.1.	Definition of stress	8
1.2.	Diachronical aspects	9
1.2.1.	Stress in Latin	9
1.3.	Types of stress	14
1.3.1.	Terminological clarifications	14
1.3.2.	Intensity stress (dynamic, tonic, expiratory, of force)	16
1.3.2.1.	Classification criteria of intensity stress	17
1.3.2.2.	Acoustic properties of secondary stress	19
1.3.2.2.1.	State of the issue in the Romanian literature	19
1.3.2.2.2.	State of the issue in foreign literature	20
1.4.	Stress position	21
1.4.1.	Stress position variation: stress pairs	22
1.4.1.1.	Literary stress pairs	22
1.4.1.2.	Non-literary stress pairs	23
1.4.1.3.	Stress pairs in DOOM1 and DOOM2	23
1.4.1.4.	Current standard regarding stress position	24
2.	Stress in an OT account (regarding secondary stress)	26
2.1.	OT components	27
2.2.	Types of constraints	30
3.	Secondary stress in PRAAT	33
3.1.	PRAAT - general presentation	33
3.2.	Other functions of PRAAT	34
3.2.1.	Speech analysis in PRAAT	34
3.2.2.	Speech annotation in PRAAT	34
3.2.3.	Speech synthesis in PRAAT	34

3.2.4.	Speech manipulation in PRAAT	35
3.2.5.	Graphics in PRAAT	35
3.2.6.	Scripting in PRAAT	35
3.2.7.	Other features of PRAAT	35
3.3.	PRAAT workflows	36
3.4.	Using PRAAT in current phonetics and phonology	36
4.	Secondary stress in Metrical phonology	38
4.1.	Metrical foot	40
4.2.	Stress analysis methods	42
4.2.1.	Metrical tree	42
4.2.2.	Metrical grid	43
4.3.	Stress properties	44
5.	Secondary stress in Romanian words that have different internal, syllabic, metrical and lexical structure	46
5.1.	Acoustic analysis	46
5.1.1.	[aktivitate]	49
5.1.2.	[radioaktivitate]	56
5.2.	Interpretation in an OT framework	64
5.2.1.	[aktivitate]	64
5.2.2.	[radioaktivitate]	64
5.3.	Interpretation in the Metrical Phonology framework	65
5.3.1.	[aktivitate]	65
5.3.2.	[radioaktivitate]	65
6.	Conclusions	67
7.	Bibliography	69

In Romanian, phonetic stress represents a complex phenomenon, which hasn't been studied in detail. Romanian phonetic studies have taken into account different aspects, like (i) the evolution of stress in a romance context, (ii) statistical analysis with the purpose of finding the pattern of Romanian stress, (iii) synchronic aspects, in situations of stress variation, (iv) the existence of stress pairs, literary or non-literary (cases in which, under pressure from common usage, the standard has accepted new forms which were initially considered non-literary), (v) the role of stress in rhymes (where the interest was its placement effect on metrical organization of the verses).

The paper *Secondary stress in Romanian - an OT approach* means to present an analysis of secondary stress in contemporary Romanian, made from an OT (Optimality Theory) perspective, explaining the secondary stress of words with different types of internal, syllabic, metrical and lexical structure.

Another step in the analysis is underlining the features of secondary stress from a Metrical Phonology point of view (theory which was developed as an alternative to the generative approach of phonology), by presenting the metrical structures specific to Romanian, with the help of an analysis instrument provided by metrical phonology, the metrical grid.

The two phonological analysis methods used are justified by an acoustic analysis, made after a socio-phonetic inquiry, which consisted of recording some phrases and isolated words read by participants to the experiment. The recorded data was then analysed with the help of the program PRAAT.

Picking this study subject is justified, in the first place, by the absence of a paper that targets Romanian stress from an OT point of view. In international linguistics, the field of optimality phonology is very current, with different research centers where varied aspects of language are studied from an OT point of view, like the one from the Rutgers University. The use of the program PRAAT for acoustic analysis of the materials that are the subject of this research, as well as current bibliography used as documentation, which includes top papers in the fields of OT and Metrical Phonology, also represent the novelty of this study regarding the subject.

The theoretical framework provided by OT, used in the analysis, is considered in linguistics the most important theory developed on top of generative grammar in the 90's. The principles offered by it posit that there is an universal set of constraints that can be hierarchized in a unique way for each language, with the purpose of explaining certain linguistic phenomena.

The only papers that study Romanian from the perspective of optimality phonology are those of Ioana Chițoran, *The Phonology of Romanian: A Constraint-Based Approach* (2002) and *The phonology and morphology of Romanian glides and diphthongs: A Constraint-Based Approach* (1997), which constitute the starting point of this study, along with the PhD thesis of Alexandra Loizo (2009), *Production of consonant groups of the Hellenic language by adult native speakers of Romanian*.

The corpus of the paper is formed from Romanian words, with the mention that no account was made of their etymology (internal creations, inherited words, borrowed words), but used the principle which was the basis of selection in the academic treaty on word formation, whose purpose is the possibility of formal identification of the suffix in analyzable and semi-analyzable words, regardless of their origin (v. FC I: XII–XIII; FC III: 6). These were then recorded, and acoustic measurements were made of the relevant parameters for stress (intensity, pitch and duration) in PRAAT, which later were the basis of the OT analysis. It's worth mentioning that the analysis was only made at the word level (including compound words).

The first chapter of the study presents stress in Romanian, from a phonetic and phonological traditional setting. We consider this to be important, as different researchers had different opinions regarding stress. It presents definitions for stress as well as all the meanings with which this concept is used in linguistic studies. Another section of the first chapter contains diachronical aspects of stress, when evolving from Latin to Romanian. It also presents the types of stress, insisting on intensity stress (the type Romanian displays). For this type of stress, it mentions classification criteria, acoustic properties and the way it was analyzed in foreign as well as Romanian studies. The last aspects taken into consideration are the position of stress and its variation, by looking at literary and non-literary pairs that were discussed, in different papers, by Romanian linguists.

The second chapter is concentrated on presenting OT, the theoretical framework used in the analysis. The linguistic context which led to its development is presented, which is based on the concept of constraints that can be violated, not on the concept of rules, which was specific to generative grammar. It mentions the main components of OT and the type of constraints that act on primary and secondary stress in Romanian.

An important point to be made in the analysis is that there is a different set of constraints that can be used for the primary stress, as opposed to the set used for secondary

stress (primary stress does not follow constraints related to metrical parsing, according to Ioana Chițoran, a view which is shared by this study).

The third chapter presents PRAAT (software whose main function is acoustic analysis of speech, by generating oscillograms and spectrograms, which are graphical representations of sound), used for the acoustic analysis of the words. A general presentation of the software is made, as well as a more in depth presentation of some of the functions it has (it's a complex program, but also accessible to researchers), by underlining the way the software was used in this study as a tool for acoustic analysis (by measuring the values of intensity and pitch of the analyzed words).

The fourth chapter is dedicated to Metrical Phonology, by detailing its characteristics and ways in which secondary stress can be analyzed in a nonlinear theoretical framework, which is superior to the generative model. In 1975, Liberman was the one that lays the foundation of this theoretical model, in *The Intonational System of English* which was later developed with Alan Prince (1977) in *On Stress and Linguistic Rhythm*. Metrical Phonology was then adopted by many researchers in this field, by applying it to a large number of languages, trying to extract universal phonological features. The second part of this chapter contains a detailed description of the way formalization is done in nonlinear analysis, by presenting the main types, the metrical tree and the metrical grid. The two types are not mutually exclusive, but complementary.

The last chapter of the study presents the state of secondary stress in two selected words, which according to the standard only contain primary stress. In the first part of the chapter the way the inquiry was made is presented (18 subjects were recorded, 9 men and 9 women, native speakers of standard Romanian, all from Bucharest), with the purpose of gathering data, which were then analyzed in PRAAT. The next part presents the spectrograms of the selected words, and the tables of data extracted, with the averages of the values for intensity, pitch and duration (the relevant parameters for stress). It was noticed that duration plays the main role, while pitch does not represent a fundamental characteristic in determining stress presence on a particular syllable. Also, large values of duration of certain syllables justify placing a secondary stress in the analyzed words, although in the dictionary they are marked only with primary stress.

The next section of the chapter is dedicated to analyzing the selected words in OT, using the constraint hierarchy proposed by Ioana Chițoran (2002). After the analysis, the

optimal candidates contain one or two secondary stresses on the same syllables considered marked by the acoustic analysis.

The last part is the interpretation from a Metrical Phonology perspective of the words, by using the metrical grid, which highlights the relationship between the constituent parts of the word (and implicitly between the different stress categories - some stresses remain as secondary stresses, while one is promoted to a superior level, becoming the main stress of the word).

Considering the mentioned aspects, the present paper represents just a starting point for further research. By doing a socio-phonetic inquiry to also investigate spontaneous conversations, we can determine characteristics of stress at levels higher than just word level. Other things, which were only briefly mentioned in the paper, can also become subject of further research: stress pairs in Romanian; diphthongization influence on placing stress; analysis of vowel length based on their features (rounded/unrounded, opened/closed, front/back); statistical analysis on a larger set of data to establish the frequency of secondary stress in actual usage; a comparison across romance languages from a stress point of view, in order to obtain a typology of stress.