

# Introduction

## 0.1. The Proposal

The central theme of this thesis is the accentuation of languages with lexically determined stress, more specifically, the accentuation of Greek, Russian and Salish systems. The proposal is composed of two parts. First, I argue that a lexical accent is formally an abstract autosegmental feature that is phonetically realized as stress or pitch according to language-specific constraints. Even though the specification of lexical accents is free and unrestricted, independent prosodic constraints on word-form limit their distribution. As a result, lexically accented words have binary prosodic structure. The generalization that emerges from the examination of the empirical facts is that words in languages with unpredictable stress have predictable prosodic shape.

Second, I propose that when a conflict arises among lexical accents for prominence, the accent of the ‘morphological head’ of the word wins. Morphological heads are elements that assign a syntactic label to the word and determine its class and gender. The prosody-morphology interface centers around the principle of *prosodic compositionality*, which states that prosodic structure is built on a par with morphological structure. The interface is articulated in terms of a *theory of head dominance*: accents sponsored by morphological heads must be given priority over other accents in the word. In the constraint-based framework of Optimality Theory (Prince and Smolensky 1993) the theory of head dominance takes the form of the ranking HEADFAITH >> FAITH where the faithfulness constraint that refers to the lexical accent of the morphological head is ranked above the faithfulness constraint that refers to any lexical accent that is present in the word.

Accentual evidence from the case studies shows that the theory of head dominance, expressed with the simple ranking scheme HEADFAITH >> FAITH,

voids the need for the complex derivational machinery of cyclic and non-cyclic levels. Moreover, it offers a compelling counterproposal to the metaconstraint **ROOTFAITH** >> **SUFFIXFAITH** (McCarthy and Prince 1995), which holds that, in conflict situations, the lexical information of the root is preserved over that of the affix. The metaconstraint is stated instead as a type of ‘positional faithfulness ranking’ where the more specific **HEADFAITH** is ranked above the general **FAITH**. The predictions are the same when the root is the ‘head’ of the word: the accent of the root prevails over the accent of the suffix. However, the predictions diverge when derivational suffixes are involved. As opposed to inflectional endings, derivational suffixes have a head-status because they determine the syntactic category, class and gender of the word. Consequently, they are expected to be accentually prominent, a prediction that our account confirms but the metaconstraint fails to grasp.

### **0.1.1. Lexical accents and prosodic form**

Lexical accent systems raise important issues for the theory of stress because they have lexical marking as well as a fixed stress algorithm that is responsible for the accentuation of words that lack lexical accents. I give an outline of the most important claims made in this study about the prosodic aspect of lexical accent systems.<sup>1</sup>

In lexical accent systems, morphemes are equipped in the lexicon with an autosegment called ‘lexical accent’ or simply ‘mark’. A lexical accent is an abstract entity that does not provide any cues about its phonetic manifestation. If it is qualified by the system to bear prominence, it can be phonetically realized as stress or pitch. As an autosegment, a lexical accent can be associated to a vocalic peak of the morpheme that sponsors it, or be floating.

A rather innovative claim is that marks have valences; they can be ‘strong’ or ‘weak’. A strong accent corresponds to a prosodic head and is phonetically realized as stress in languages with dynamic stress or high tone in pitch-accent languages. A weak accent avoids prosodic prominence either by being in a weak prosodic position (i.e. foot-tail), or by hosting a low tone, or by having duration but no loudness. Weak accents never receive primary or secondary stress. In

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<sup>1</sup> Systems with lexically determined stress have been described in a number of studies (among others, Halle and Kiparsky 1977, 1981, Kiparsky 1973, 1982, Halle and Vergnaud 1987, Halle 1997 for Sanskrit and Russian; Melvold 1990 for Russian; Hill and Hill 1968, Alderete 1997 for Cupeño). Other issues that have been addressed in the literature relating to lexical accent systems are the representation of inherent accents (Kiparsky 1982, Tsay 1990, Idsardi 1992, Van der Hulst 1996) and the interaction of marks with syllable weight distinctions (Alderete 1997) and tones (Poser 1984, Haraguchi 1977, 1991).

Salish languages, for example, weak accents protect vocalic peaks that bear them from total reduction. Ample empirical evidence from the case studies supports this distinction.

Moreover, I propose that lexical marking is not always equal to ‘exceptional stress’. A distinction is drawn between marking that designates exceptional accentual patterns and marking that is the basic tool for accentuation. The two types of marking have the same autosegmental representation but differ in function.

The lexical specification of morphemes is free and uncontrolled, a lexical accent can occur in every possible vocalic peak of the morpheme that sponsors it. However, the distribution of lexical accents in the surface is prosodically controlled. Prosodic constraints and wellformedness principles force lexical accents to positions that create binary prosodic words called templates. In Greek and Russian, for instance, the pattern  $\sigma(\acute{\sigma})\sigma$  is an unacceptable prosodic shape for accented (inflected) words because it lacks binarity. This pattern consists of a foot and two adjoined syllables as opposed to the well-formed pattern  $(\sigma\sigma)(\acute{\sigma}\sigma)$ , which consists of exactly two feet. Similarly, patterns like  $(\acute{\sigma}\sigma)\sigma$  and  $\sigma(\acute{\sigma}\sigma)$  are also well-formed because they are composed of strictly two prosodic constituents, a syllable and a foot. This empirical observation implies that a lexical accent often moves to another vocalic peak than the one it is originally associated with in order to achieve prosodic wellformedness. In the abstract example  $(\sigma\sigma)(\acute{\sigma}\sigma)$ , the accent is moved from the antepenultimate vocalic peak to the penultimate one in order to conform to the desired binary template. This implies that we do not need to stipulate restrictions on underlying representations. Input forms come in a variety of metrical patterns and principles on prosodic form decide how words are to be shaped in the output. Marking that results in well-formed prosodic words is called *templatic marking*. This type of marking guarantees that words that do not have predictable stress will have predictable prosodic shape.

On the other hand, marking that designates exceptional stress, called here *diacritic marking*, is not subject to wellformedness constraints. It is mainly attested in loan words where it often reflects the stress pattern of the donor-language. Diacritic marking characterizes the accentual behavior of the foreign vocabulary that occupies peripheral strata of grammar. When foreign words undergo assimilation and penetrate more into the core grammar, diacritic accents are reshaped and eventually come to obey to the prosodic wellformedness constraints that restrict marking in the native vocabulary.

Finally, there is default stress, a fixed subsystem that takes charge of accentuation when there are no lexical marks in the word. As I show in the

course of the discussion, words stressed by default are less desired than words having lexical accents.

**0.1.2. Lexical accents and the prosody-morphology interface:  
‘Head(most) accent wins’**

As mentioned above, in lexical accent systems most morphemes have a prespecified metrical structure in their lexical representation called here ‘lexical accent’. In addition, word formation is pursued by elaborate rules of morpheme combinatorics. The combination of these two factors yields a complex output where often more than one morpheme carries inherent accentual properties. A conflict between input accents eventually arises when the language imposes the requirement that a word must have one prominent element only. One of the central claims of this thesis is that when such conflicts arise, prosody is determined by morphology: the head(most) accent wins. That is to say, prominence is assigned to the lexical accent carried by the ‘head’ of the morphological structure. It depends on the type of morphology (e.g. fusional or polysynthetic) as well as on the type of morphological construction (e.g. inflection, derivation, and so on), which element is considered to be a ‘head’ in the morphological hierarchy. The significant aspect of this proposal is that prosody has access to the internal constituency of words and, more importantly, establishes a head-to-head correspondence with morphology.

The principle that makes the interface between prosody and morphology possible is compositionality. I use the more involved term *prosodic compositionality* to indicate that the principle refers to the interaction between the prosodic and the morphological component of the grammar. This principle, borrowed from formal semantics (Montague 1974), states:

- (1) *prosodic compositionality*  
The prosody of a complex form is a function of the prosodies of its parts and of the morphological rules by which they are combined.

I will explain how the principle in (1) is implemented in this study with an example. Observe the words in (2) from Russian. The first one, (2a), is composed of a root and a nominative singular inflectional suffix. As indicated by the form in between slashes, both morphemes have a prespecified lexical accent. The presence and the exact position of the lexical accent are taken for granted here. Later in the thesis both issues are addressed in detail. The derived formation in (2b) is also composed of marked morphemes. The outcome of the

input forms in (2) is stress on the lexical accent of the root in (2a) and stress on the lexical accent of the derivational suffix in (2b).

- |     |               |              |                           |
|-----|---------------|--------------|---------------------------|
| (2) | a. čečevíc-a  | /čečevíc-á/  | ‘lentil-NOM.sg’           |
|     | b. gorl-ást-a | /górl-ást-á/ | ‘loud-mouthed-NOM.sg.fem’ |

According to the principle in (1) prosody can access the internal structure of both constructions. This implies that if there is a morphological rule that combines two morphemes and, moreover, the mode of combination is that of a dominator and a dominee, then prosody can be sensitive to this system of relations.

The root is the dominant constituent in (2a) because it is the ‘morphological determinant’ of the word; it determines syntactic category, class and gender. In (2b), this role is undertaken by the derivational suffix which, among other things, changes the base from a neuter noun (*górlo* ‘mouth’) to an adjective. Inflection, on the other hand, fills in the syntactic features of number and case, but it never changes the subcategorization frame of the base.

In this study I take the morphological determinant to be the ‘head’ of the word. The notion of morphological headedness proves to be crucial for the interpretation of the stress facts in (2). If the root in (2a) and the derivational suffix in (2b) are heads, then the generalization is that the lexical accent of the head is assigned stress prominence.

Examples like *jámišča* ‘pit (augm)’ derived from underlying /jám-išč-á/, do not contradict the generalization just reached. The augmentative suffix /-išča/, together with other evaluative suffixes, does not exhibit any of the characteristics of headedness. It is transparent to the syntactic category, gender and class of the base to which it is attached. It forms neuter nouns from neuter bases, feminine nouns from feminine bases, and so on. In other words, it behaves like an inflectional, rather than a derivational suffix. This morphological information is exactly reflected in the prosody. The structural weakness of the suffix is conveyed to the prosodic component of the grammar which then assigns prominence to the accent of the dominant element in the structure, namely the root.

The internal organization of the word and the hierarchical relation between its constituents becomes visible to prosody because one structure is shared by both components. The function that performs the mapping translates morphological prominence to prosodic prominence, using marking as a guide. Theoretically, this function has an infinite pool of interpretations. It can express prominence as stress, pitch or harmony (Lehiste 1970, Van Heuven and Sluijter 1996), or assign prominence to non-head constituents of the word. It can also be

'blind' to lexical accents and actualize the interface by simply assigning stress or tonal prominence to some syllable of the head. Or, it can even ignore the head/non-head distinction altogether and assign prominence to an edgemost syllable of the word.

It is advantageous that the interface is articulated as *head dominance*. Recent phonological theories (among others, Dresher and Van der Hulst 1997) point out that the notion 'head' is a central linguistic concept. It is the element that shows the maximum complexity allowed by grammar. In all the languages examined in this study, the prosody-morphology interface is always realized as head dominance. In Optimality-based terms, head dominance takes the form of the ranking:

- (3) *head dominance*  
HEADFAITH >> FAITH

Faithfulness refers to the lexical accent and briefly states that an input lexical accent must have a corresponding accent in the output and vice versa. However, the general faithfulness constraint is outranked by a more specific faithfulness constraint, namely head-faithfulness. This constraint confines the correspondence relation to lexical accents that belong to morphological heads. More specifically, it states that an accent sponsored by a morphological head must have a correspondent accent in the output and vice versa.

To conclude, I propose that head dominance, expressed as HEADFAITH >> FAITH, is the core feature of accentuation in all lexical accent systems. A positive aspect of head dominance is that it restates McCarthy and Prince's (1995) metaconstraint ROOTFAITH >> SUFFIXFAITH as a type of positional faithfulness ranking where the more specific HEADFAITH is ranked above the general FAITH. When the root is the head of the word, both head dominance and the metaconstraint make the same predictions, but when derivational suffixes are involved, only the former approach proves to be empirically right. Derivational suffixes have a head-status and, according to the theory of head dominance, are expected to preserve their inherent accent. On the contrary, the metaconstraint treats without any distinction all suffixes as subordinate to the root, excluding the possibility that derivational suffixes can be accentually dominant.

This is a brief sketch of the interface theory advocated in the present study. The core of the thesis focuses on how head dominance applies to a variety of morphological structures in languages with lexical accents. The center of attention are two languages with fusional morphology, namely Greek and Russian, and four languages with polysynthetic morphology, namely Thompson,

Moses-Columbia, Spokane and Lillooet Salish. For languages with fusional morphology, I will be interested in exploring how head dominance is realized in inflected and derivational constructions. For polysynthetic languages, I will be concerned with head dominance effects in grammatical suffixation, which derives transitive clauses and aspectual or modal phrases, and lexical suffixation, a formation that is very close to incorporation.

The present view on compositionality must be distinguished from analyses that relate compositionality to cyclic effects. A large body of work in phonological theory since Chomsky and Halle (1968) lends strong support to the view that computation of the phonological structure of complex inputs must proceed in some sense ‘from the inside out’: phonological structure is built on a par with morphological structure. In this sense, the computation of complex phonological structures is derived in a compositional way. This tradition of compositionality and cyclic analysis has culminated in the theory of Lexical Phonology (Pesetsky 1979, Kiparsky 1982, Mohanan 1982, 1986).

In a cyclic-derivationalist view, the reason why phonological properties of a morphological subdomain are mirrored in the output phonological form as a whole, lies in the cyclic application of the relevant rules to larger and larger parts of the input form. Rules apply sequentially as morphological structure is built up. For instance, stress in the Russian examples in (2) is pursued in the following way (adjusted from Melvold 1990):

- (4)
- |    |               |   |               |   |          |
|----|---------------|---|---------------|---|----------|
| a. | [čečevíc + á] | → | čečevíca      |   |          |
| b. | [jám + íšč]   | → | [jámišč + á]  | → | jámišča  |
| c. | [górl + ást]  | → | [gorlást + á] | → | gorlásta |

In (4a), a root is combined with an inflectional ending, and the function that performs the mapping of this morphological constituent into a prosodic one, assigns prominence to the leftmost accent. Let us call this function *f*. Function *f* accounts for the stress pattern of the form in (4b). Here it applies in two stages, first, after the formation of the stem, [root+augmentative suffix], and second, after the addition of the inflectional morpheme, [[stem] +inflectional suffix]. The function *f* is associated with what is broadly known as the non-cyclic (or level II) stratum of the grammar.

In (4c), however, the derivation is different. At the stage where the derivational suffix joins the root, the function that carries out the mapping deletes the accent preceding the newly added morpheme and assigns prominence to the accent of the derivational suffix. This function is different from the previous one because it is associated with the cyclic (or level I) stratum of the grammar. I call it function *g*. At the final stage of this derivation, the

stem, [root+derivational suffix], combines with an inflectional suffix creating the environment in which function  $f$  applies. In short, there are two functions,  $g$  and  $f$ , each one applying to a specific morphological domain called cyclic (or level I) and non-cyclic (or level II), respectively.

To conclude, in a cyclic-derivationalist view, different functions, not necessarily related to each other (Orgun 1996), are associated with morphological domains that belong to different strata (levels) of the grammar.

In the model advanced here, a different route is taken. It is not necessary to motivate cyclic and non-cyclic strata with independent functions in order to derive the correct accentual result. There is one function (one ranking, HEADFAITH >> FAITH) that is sensitive to the structural roles of morphemes and not to the scope in which phonological operations take place. This function maps morphological heads to prosodic heads, and not morphological domains to prosodic domains. Prosodic compositionality allows the prosodic component to scan the morphological tree, detect the established hierarchical relations and translate them into prosody. In this procedure, lexical marking guides the prosodic component because only accented morphological heads are visible to prosody.

The proposed model is more economical because it does not presuppose different morphological domains with different functions. The ranking HEADFAITH >> FAITH can efficiently account for the accentual facts of all three case studies without resorting to extra stipulations, rules or levels. More importantly, in many cases it has more explanatory power because it can provide an analysis for facts that the cyclic approach cannot account for.

It becomes clear from this short overview of the thesis that the notion of ‘conflict’ plays a pivotal role in lexical accent systems. First, there is a struggle for prominence between marked morphemes and more specifically, between heads and the remaining constituents of the word. Second, there is a conflict between prosodic wellformedness principles, which force a lexical accent to appear in specific positions, and the accent itself, which prefers to remain faithful to its lexical vocalic association. Optimality Theory offers an explicit theoretical framework to account for conflicting demands and hierarchically ordered preferences by means of constraint-rankings. It is not accidental, therefore, that it is employed for the analysis of the empirical facts examined in this thesis.

Before closing this section, a parenthetical remark is in order. One of the questions I was faced with while writing this thesis was ‘why do systems with lexical accents exist?’ or the more casual variant ‘why is Greek stress not like Dutch or English stress?’. It is still unclear to me why Greek chooses to follow a different route from Dutch or English. However, in this thesis I try to show in



what respect Greek and languages similar to Greek are different from systems like Dutch or English. Moreover, I also show that the presence of lexical marking is not necessarily a drawback for a language. A lexical accent is an autosegment like tone. Seen from this perspective, it does not pose more problems for learnability than tonal contours in a common tone language. In addition, we will see that languages find ways to alleviate the undesired aspects of marking. Prosodic wellformedness principles and various structural constraints are put into force to restrict the freedom of lexical accents. More importantly, what one should take into consideration is the function that marking has in such systems: by mapping morphological headedness onto prosodic headedness it serves as a cue for morphological structure. For these reasons, I suggest that the question that must be put forward while reading this thesis is not why Greek has marking, but what it can do with it.

## **0.2. Organization of the Thesis**

Chapter 1 presents a typology of stress and locates lexical accent systems on the stress map. Two major categories of stress systems are recognized: fixed systems and interface systems. In the former system, stress results from purely phonological principles, whereas in the latter system stress shows dependence on morphological structure. Lexical accent systems belong to the interface category. Several varieties of interface systems are distinguished depending on the way and the degree in which morphology interferes with prosodic factors. Chapter 1 also introduces the basics of Optimality Theory and the families of constraints that are advanced for the analysis of the accentual phenomena discussed in this thesis.

Chapter 2 presents the theory of lexical accents. Some of the questions that this chapter addresses are the following: What exactly is a lexical accent? Is it an autosegmental feature introduced by the vocalic peak of a morpheme, or an inherent prosodic role that is transferred to the surface through segment correspondence? How is it represented? What does it mean within the Optimality Theoretic model to have specified metrical structures in the lexicon? A comparison with other theories of marking completes this chapter.

Chapter 3 primarily concentrates on the distinction between templatic and diacritic marking based on the examination of Greek and Russian inflected words. It is acknowledged that templatic marking is subject to well-formedness constraints. On the other hand, diacritic marking identifies exceptional stress of the foreign vocabulary that lies at peripheral strata of grammar. Another issue that is addressed here is the relation of marking with the default constraints. In

general, this chapter gives emphasis to the prosodic aspects of lexical accent systems.

Chapter 4 develops a theory of prosody-morphology interface based on empirical evidence from Greek and Russian, both languages with fusional morphology. The core idea is that when there is a conflict for primary stress between accents, the accent belonging to the 'head of the word' prevails. The theory of interface is tested in inflected and derived constructions. This chapter also entertains the idea that the distinction between cyclic and non-cyclic suffixes is redundant given the proposed theory of interface. Finally, it sheds some light on the key question of the thesis: why is lexical marking so important in lexical accent systems?

The interface theory advanced in chapter 4 for fusional languages is extended in Chapter 5 to polysynthetic languages, namely the Salish language family. Following Baker (1988), who claims that morphological structure in these languages is built in the syntax, I argue that the (morphosyntactic) head is also accentually prominent. Moreover, I show that Salish languages show a stricter form of head-dependence than the other lexical accent systems of this study.

The Summary and Conclusions review the main points of the thesis and offer the final conclusion: dependence on morphological headedness is a central component in the accentuation of all these systems. Even though the languages examined here differ in their morphological and rhythmic make-up, head-dependence is shared by all of them.

I close the introduction to this thesis with a few instructions to the reader. Chapters 1 and 2 provide background information that is essential for the understanding of the analysis in the remaining chapters. Chapter 3 focuses on the prosodic aspects of marking in Greek (first half) and Russian (second half) and is interesting for the reader who wants to be informed about the restrictive impact prosodic constraints have on marking, the role of default constraints, and so on. Chapter 4 introduces the theory of the prosody-morphology interface and shows its application to two languages of similar morphological make-up, Greek (first half) and Russian (second half). The reader who is interested in getting a complete picture of Greek stress is advised to consult the first part of Chapter 3 and Chapter 4. A complete picture of Russian stress will be obtained by reading the second part of the aforementioned chapters. Chapter 5 can be read independently from chapters 3 and 4 because it deals with the accentuation of polysynthetic languages.