Headmost Accent Wins

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Head Dominance and Ideal Prosodic Form in Lexical Accent Systems

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Στην οικογένειά μου και
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Abbreviations

ASP	aspect
ACC	accusative
AUT	autonomous
CAUS	causative
COREF	coreferential
CTR	control
DAT	dative
DESID	desiderative
DEM	demonstrative
DIM	diminutive
DR	directive
DS	distributive
DUR	durative
DVL	developmental
FV	final vowel
FUT	future
GEN	genetive
HBT	habitual
IMP	imperative
IMPERF	imperfective
INCH	inchoative
INDIC	indicative
INDIR	indirective
INF	infinitive
INSTR	instrument(al)
INTERR	interrogative
INTENS	intensifying
IT	iterative
ITR	intransitive
LOC	locative
MIDDLE (MDL)	middle
MOD	modal
NCS	non-coreferential subject
NEC	necessitative
NEG	negation
NON-CTL	non-control
NOM	nominative
NOM	nominalizer
OBL	oblique
OC	out-of-control
PA	primary affix
PASS	passive
PAST CONT	past continuous
PERSEV	perseverative
POSS	possessive
POTEN.PRES	potential present
PREP	preposition
PRES	present
REC	reciprocal
RED	reduplication
REL	relational
REP	repetitive
RFL	reflexive

STAT	stative
SUBJ	subjunctive
TR	transitive
TRANSLOC	translocational
S	subject
O	object
TopO	topical object
1sg	a’ singular person
1pl	a’ plural person
InflS	inflectional suffix
DerS	derivational suffix
LexS	lexical suffix
UnM(ark)	unmarked
Acc	accented
UnAcc	unaccentable
Pre-Acc	pre-accenting
masc	masculine
fem	feminine
neut	neuter
§	section
[...]	template
{..}	template pool

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.[1]

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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[1] 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 σ(σ́σ)σ 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 (σσ)(σ́σ), which consists of exactly two feet. Similarly, patterns like (σ́σ)σ and σ(σ́σ) 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 (σσ)(σ́σ), 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-íšč-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 mor-phological 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) metaconstaint 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.

1 A Typology of Stress Systems

1.1. Introduction

This chapter offers a typology of stress systems and locates lexical accent systems on the ‘stress map’. The typological patterns discussed here offer a number of criteria for treating lexical accent systems as members of a broader family of accentual systems.

One of the oldest notions in stress typology is that of *fixed* versus *free* stress languages. Fixed stress is predictable in its location, and usually derived by an algorithm, while free stress is unpredictable and must be lexically listed.

In fixed systems, stress is primarily determined by phonological factors that build prosodic structure based on syllable weight and prominence, limitations on the distance between stresses, and between stress and word boundaries. On the other hand, in free systems, stress can practically occur anywhere in the word because morphological constituency interferes with prosodic factors in stress assignment. Lexical accent systems are considered to be a subgroup of free systems (Hayes 1995:32).

In this chapter I claim that it is not quite accurate to refer to languages whose stress is not entirely the byproduct of phonological principles as free-stress languages. Instead, I propose that such systems must be viewed from the perspective of a prosody-morphology interaction. Therefore, I suggest the term *interface systems* which, as I show, is both theoretically and empirically justified.

The first part of this chapter aims at establishing the exact status of interface systems in general, and lexical accent systems in particular, in the stress typology. The second part of this chapter familiarizes the reader with the basic characteristics of interface systems and formalizes the stress typology by means of constraint rankings based on the theoretical model of Optimality Theory (Prince and Smolensky 1993).

1.1.1. Fixed-stress systems

A first variety of fixed accentuation is documented in languages which have primary stress very close to a word edge. For instance, stress in Turkish is predominantly on the final syllable (Lees 1961, Sezer 1981, Inkelas 1994), as shown in (1a), whereas stress in Finnish is on the initial syllable of the word (Sovijärvi 1956, Anttila 1995), as shown in (1b). Syllable structure or weight distinctions do not play any role in determining stress location. This means that both languages have a quantity insensitive system, which is only concerned with the assignment of prominence to a vocalic peak at the right and left edge of the prosodic word, respectively. It is natural, therefore, to use the expression *edge-oriented quantity insensitive systems* to refer to systems with the characteristics just described. In such systems, stress is a parsing cue for (the beginning and the end of) word boundaries.

(1) *edge-oriented quantity insensitive systems*

a.	Turkish:	σσσσ́	araba-dá	‘car-LOC’
b.	Finnish:	σ́σσσ	lémmikki	‘pet’

Murik, on the other hand, a lower Sepik language of New Guinea, stresses the leftmost heavy (2a-c); otherwise the leftmost syllable (2d) (Abbott 1985, Walker 1996). Heavy syllables are those with long (CVV) vowels. All unstressed long vowels are phonetically shortened. As a result, two long vowels never surface in a single word.

(2) *edge-oriented quantity sensitive system: Murik*

a.	H́H	sáːk^{h}o	‘wait’
b.	LLLH́	anəp^{h}arɛ́ːt^{h}	‘lightning’
c.	LLH́H	numaɾóːgo	‘woman’
d.	LĹL	dák^{h}anɨmp	‘post’

In Murik, it seems that both weight and word edge are of importance for the location of stress. Theoretically, the combination of word edge with syllable quantity generates four logical possibilities, all of which are attested. Aguacatec stresses the rightmost heavy or the rightmost light, in the absence of a heavy (McArthur and McArthur 1956, Walker 1996). Komi has prominence to the leftmost heavy, otherwise to the rightmost light syllable (Itkonen 1955, Lytkin 1961, Hayes 1995), whereas Chuvash (Krueger 1961) is the exact mirror image of Komi (Hayes 1995:296). Such languages are called *edge-oriented quantity sensitive systems* or *prominence-driven* stress systems.

To sum up, what is relevant for stress in these systems is word edge, vocalic peaks and, occasionally, quantity. Often edge-oriented systems are called *unbounded* because no scope limitations are imposed on stress. Although accentuation is based on an algorithm, stress can practically occur anywhere in the word. For instance, stress in Murik can be on the first syllable as in (2a) and (2d), the final one as in (2b), or the penultimate one as in (2c). One may wonder how we can tell with confidence that languages like Turkish, for example, are unbounded. In such cases words with an exceptional stress pattern can prove illuminating. For Turkish, specifically, there is a handful of words that display stress in the non-final position, e.g. *gít-me-meli* 'go-NEG-NEC' (Inkelas 1994). The unboundedness of the system is suggested by the fact that stress in the aforementioned word does not occur on one of the last two or three syllables of the word. However, for many languages there is no sufficient empirical evidence to decide whether a system with fixed initial or final stress is unbounded or not.

Next to edge-oriented systems, there are also languages with another form of fixed stress. In such systems, word edges anchor a foot. To illustrate with an example, most Polish words have fixed stress on the penultimate syllable (Rubach and Booij 1985, Hammond 1989). This is because a trochaic foot is built at the right edge of the word. As shown in (3a), the two last (rightmost) syllables of the word are parsed into binary groupings with left-headed prominence, (σ́σ). Slavic Macedonian (Hammond 1989) has a similar pattern with the important difference that in this case the last syllable must be left unfooted. The language has final syllable extrametricality symbolized as <σ>. An example is given in (3b). Languages like Polish and Slavic Macedonian are called *foot-based quantity insensitive* because syllable quantity is irrelevant for footing.

(3) *foot-based quantity insensitive systems*

a.	Polish	σσ(σ́σ)	hipopótam	'hippopotamus'
b.	SlavMac	σ(σ́σ)<σ>	vodéničar	'miller'

When footing is exhaustive, that is, when all syllables of the word are parsed into feet, a *rhythmic (foot-based) system* is created. Cavineña (Key 1968, Van de Vijver 1998) is an example of a rhythmic system with completely predictable stress. Primary stress is on the penultimate syllable and secondary stress on every other syllable preceding main stress, as shown in (4a). Badimaya (Dunn

1988, Van de Vijver 1998) has a similar stress algorithm but with the difference that primary stress here is on the first syllable and every other syllable thereafter, as illustrated in (4b).

(4) *rhythmic quantity insensitive systems*

	Cavineña (Van de Vijver 1998:15)	
a.	kiríka	‘paper, book’
	atàtawáha	‘a kind of bee’
	Badimaya (Van de Vijver 1998:16)	
b.	wánara	‘long, thin’
	ŋángaŋùwa	‘to choke on something’

In many languages, footing can be sensitive to weight distinctions. Cahuilla (Seiler 1957, Hayes 1995:134) is such a case. In this language, heavy syllables (CVV) constitute a foot by themselves and often carry primary stress, e.g. *qáːnkìčem* ‘palo verde (pl)’.

Often foot-based systems are called *bounded*. This is because primary stress falls within a particular distance of the word edge or another stress. We have seen that the majority of the vocabulary in Polish has stress on the penultimate syllable. A small set of primarily foreign words, though, has stress on other syllables than the penultimate one. Interestingly, the exceptional patterns are limited to the antepenultimate as in *univérsitet* ‘university’ and final syllable as in *rezím* ‘regime’ adducing solid proof that the system is bounded or, more casually, has a three-syllable window.

To summarize so far, fixed stress is the byproduct of edgemost rules or rules that parse syllables into feet. More varieties arise when these two prosodic factors interact with syllable structure, quantity distinctions, extrametricality, exhaustivity of footing, and so on. As any typological distinction, also the one presented here is rarely manifested in a clear form. Many languages have characteristics from different varieties of accentual systems.

Having established a basic classification for fixed systems, let us proceed to the most important category of stress languages for this study, the so-called free-stress systems.

1.1.2. Free-stress systems or rather, *interface systems*

The typology of stress distinguishes a category of languages with *free* stress (Hayes 1995, Van der Hulst 1996, among others). The main reason for calling these systems ‘free’ is that stress often occurs in random positions within the word, mainly because it is to the greatest extent determined in the lexicon. However, this thesis in general, and this section in particular, aims at clarifying the somewhat misconceived picture main stream phonology has about these systems. More specifically, I argue that the idiosyncrasy of free stress systems relies on their deeply morphological character. Stress is the result of a sophisticated system of interactions between morphology and prosody. This is the reason that, from now on, I use the term *interface systems* to refer to what other studies call free-stress languages. Let us have a closer look at what exactly the interface systems are.

As shown in the previous section, prosodic constituency in fixed systems is constructed on the basis of purely phonological principles (e.g. edgemost rules, feet, syllabic structure, vocalic peaks, etc.). Generally speaking, these phonological constituents and principles are at the disposal of phonology which, depending on the language, combines them in a particular modus in order to derive stress. However, what happens when the morphological mode of combination in a language intervenes and, moreover, moderates the prosodic mode of combination? Or, when prosodic constituency is part of the lexical specification of a morpheme and not the result of prosodic constraints? In this case an interface system is created.

In some languages the morphological domain in which stress is performed, the type of suffixation, or the status a morpheme has in the morphological structure, play an important role in accentuation. In those cases, being prosodically prominent is not dependent on whether you are heavy or close to the right edge of the word, but on whether you are a suffix of a particular class, a nominalizing or an aspectual morpheme, or a root that has a lexically prespecified metrical structure. The latter remark hints at a very important property that many interface systems have, namely *lexical marking*.

Often, being a foot-head (or, similarly, a foot-tail) does not flow from phonological principles, but is an inherent characteristic of a morpheme, part of its subcategorization matrix. In this case we say that the morpheme is marked with a ‘lexical accent’.[1] Marking is an identifying feature for many interface systems, and especially for the lexical accent systems that are the subject of this thesis.[2]

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[1] I follow Van der Hulst (1996) in assuming that *accent* is an abstract property of a unit such as a word that does not provide any information about phonetic cues. It can be phonetically manifested as stress or pitch (Lehiste 1970, Van Heuven and Sluijter 1996). I come back to this issue in Chapter 2.

[2] In this thesis the terms ‘mark’, ‘marking’, ‘markedness’ have a strict reading. They refer to the property of a morpheme to have a lexically prespecified accent.

Another shared attribute of all interface systems is that prosody is a parsing cue for morphological structure and not for word boundaries. Stress pinpoints the hierarchical relations between morphemes such as the subordination or domination of one morpheme to another, or highlights the morpheme that controls the syntactic or grammatical identity of the form.

Let us start our presentation with a system that represents a transitional stage between the fixed and the interface variety. I choose Spanish as the language of exemplification. In Spanish, regular (fixed) stress falls on the penult:

(5) *penultimate stress in Spanish*

a.	monéda	‘coin’	c.	termíno	‘finish-PRES.1sg’
b.	trabájo	‘work’	d.	Tolédo	‘Toledo’

However, the language displays two deviant accentual patterns. First, there are nouns with invariant antepenultimate and final stress (6a-b), whereas, in a number of verbal paradigms, stress occurs on the first vowel after the root i.e., the thematic vowel, producing final or antepenultimate stress, depending on the size of the following suffix (6c-d) (Roca 1988, 1992, 1996, Harris 1983, 1995, Hammond 1995). The only restriction that limits stress both in verbs and nouns is the ‘three-syllable window’: stress is bound to the last three syllables from the right edge of the word.

(6) *antepenultimate and ultimate stress in Spanish*

nouns			verbs		
a.	pájaro	‘bird’	c.	termin-é	‘finish-PAST.1sg’
b.	sofá	‘sofa’	d.	termin-áb-amos	‘finish-IMPERF-1pl’

The Spanish facts lead to the following two observations: First, stress can occur in more than one position. The only limitation is imposed by the highly respected requirement of boundedness to the last three positions. Second, different word classes are subject to different stress rules. In nouns, regular stress is on the penultimate syllable, whereas deviant stress patterns, exhibited mostly, but not exclusively, by loan words, have to be listed in the lexicon. In verbs, penultimate stress is also the norm, but in a handful of verbal classes the accent of the thematic vowel decides on the position of stress (Roca 1992). It is evident that a fixed-stress algorithm which assigns penultimate stress cannot adequately account for the Spanish stress facts. Reference to the internal structure of words, and, especially, to the accentual properties of morphological elements is also required.

In sum, trochaic footing, edgemost rules and class-specific marking derive Spanish stress. I propose the name *morphology-dependent* (interface) system to describe the stress pattern of a language like Spanish. It is not so much the stress dichotomy between verbs and nouns that classifies Spanish into this stress group as the genuinely morphological nature of verbal stress. Grammatical markers, and not just arbitrary morphemes, are lexically prespecified to prevail over other constituents in the word.

Pashto, an Indo-Iranian language spoken in Afganistan, is also a morphology-dependent system. Several oblique and direct grammatical cases, as well as past and present tense verbal suffixes, are marked. Unlike Spanish, Pashto reveals marking in roots as well. Consider the examples in (7) taken from Penzl (1955) and Shafeev (1964):

(7) *morphology-dependent system: Pashto*

a.	sar̩-í	‘man-DR.pl’	class III masculine nouns
b.	sar̩-éyu	‘man-OBL.pl’	
c.	melgér-u	‘friend-OBL.pl’	class IV masculine nouns
d.	t̩ek-ú	‘point-OBL.pl’	
e.	ǰor̩éž-əm	‘to convalesce-PRES.1sg’	
f.	ǰor̩ed-ə́m	‘to convalesce-PAST.1sg’	
g.	ǰor̩ed-ə-láːy[3]	‘to convalesce-POTEN.PRES.1sg’	

Class III masculine nouns are always stressed on the suffix; if the suffix is monosyllabic, stress is final (7a), but with disyllabic suffixes stress is on the penultimate syllable (the first syllable of the suffix), (7b). Class IV nouns have members with final stress on the root such as (7c) and also members with final stress such as (7d).

These facts are interpreted as follows: first, accented suffixes are prosodically prominent; this explains why there are no nouns with stress on the root in class III masculine nouns (7a-b). Second, the accent of the root prevails when there is no other marked element following (7c). Third, in the absence of marked morphemes, default stress is on the final syllable (7d).[4] The verbal examples in (7e-g) lead to the same conclusion. The root is accented, but every time an accented suffix is added, stress is on the suffix.

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[3] Vowel length is irrelevant for stress, e.g. *shpaːné* ‘shepherd-OBL.sg’, *meːlmaːné* ‘guest-DR.pl’.

[4] One could argue that final stress in (7d) is triggered by the root /t̩ek-/, which is accented but chooses to place its inherent accent on the suffix. However, the marked-unmarked opposition in this case is neutralized by the default, which also assigns final stress in Pashto.

To sum up, both in Spanish and Pashto prosodic structure is built on a par with morphological structure. On the one hand, morphemes of a particular class or grammatical category influence accentuation by having an inherent accent. On the other hand, prosodic principles are at play determining which 'special' morpheme will win or, otherwise, which syllable will bear stress. Often the prosodic principles that decide on the conflict between lexical accents as well as default prominence blur accentual contrasts. In Pashto, for example, final stress can originate either from a marked suffix, or a root that assigns an accent on a following morpheme or, finally, by an edgemost rule which assigns stress on the final peak of the word.

There is variation within morphology-dependent systems. Hayes (1995) gives English as an example of a morphology dependent system in which stress serves to elucidate the morphological structure of the word. Often, a particular syllable of the root bears main stress and affixes are subordinated to the root by being stressless or bearing secondary stress. Thus, antepenultimate stress in *un-bound-ed-ness* has nothing to do with rhythmic principles, but reflects the fact that the stressed root is preceded by two stress-neutral suffixes.

Lexical accent systems form another group of interface systems. Greek, Russian and some languages of the Salish family, namely Thompson, Spokane, Moses-Columbia and Lillooet Salish are all lexical accent systems[5] whose analysis constitutes the core of the present study. From these languages, Greek, Russian and Lillooet Salish are metrically organized in trochees,[6] whereas Thompson, Spokane and Moses-Columbia are unbounded systems. Here I present a general description of lexical accent systems, postponing a more detailed presentation of their properties and characteristics till the next section.

In lexical accent systems, primary stress shows a high degree of dependence on morphological structure. A first indication of the morphological orientation of stress is the pervasive presence of marking. The vast majority of morphemes (i.e. roots, inflectional suffixes, derivational suffixes) in these languages have a prespecified metrical structure in the lexicon. A morpheme can bear an accent or assign an accent to neighboring morphemes. Check the examples in (8) from Greek. The lexical specification of morphemes is given between slashes.

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[5] Other lexical accent systems are: Sanskrit (Kiparsky 1982), Ancient Greek (Oikonomou 1984), Japanese (Haraguchi 1977, 1991, McCawley 1968, Poser 1984, Beckman and Pierrehumbert 1986), Byelorussian (Mayo 1976, 1993), the Basque dialect of Gernika (Hualde and Bilbao 1993, Hualde 1996).

[6] I have not encountered any lexical accent system with an iambic rhythm. Although the existence of iamb as a foot type has been challenged (Van de Vijver 1996, 1998), I cannot exclude the possibility that there are lexical accent systems organized in an iambic fashion, given that our knowledge of these systems is very limited.

Marked morphemes are represented as ‘σ́’ when the accent is located on some syllabic position, or as ‘´σ, σ´’ when the accent is directed to a following or preceding morpheme. Accents with conflicting directionality as in (8j) are indicated with the sign ‘⇆’.

(8) *lexical accent system: Greek*

a.	stafíða	/stafíð-a/	‘raisin-NOM.sg’
b.	stafíðon	/stafíð-ón/	‘raisin-GEN.pl’
c.	θálasa	/θalas-a/	‘sea-NOM.sg’
d.	θalasón	/θalas-ón/	‘sea-GEN.pl’
e.	γónðola	/γónðol-a/	‘gondola-NOM.sg’
f.	γónðolon	/γónðol-ón/	‘gondola-GEN.pl’
g.	aγorá	/aγor´-a/	‘market-NOM.sg’
h.	aγorón	/aγor´-ón/	‘market-GEN.pl’
i.	uranós	/uran -os/	‘sky-NOM.sg’
j.	uranú	/urán⇆ú/	‘sky-GEN.sg’
k.	ánθropos	/anθrop-os/	‘man-NOM.sg’
l.	anθrópu	/anθrop-´u/	‘man-GEN.sg’

The root in (8a) is lexically accented on the last syllable. We reach this conclusion by comparing this root with the root /θalas-/ in (8c). The latter shifts stress to the ending in genitive plural (8d), whereas the former preserves its stress on the penultimate syllable. If the root in (8a) is accented, then /θalas-/ must be unmarked (8c). Unmarked roots are stressed by default[7] on the antepenultimate syllable when they combine with unmarked suffixes. However, when they are escorted by a marked suffix, the latter morpheme wins over the default (8d).

The root in *γónðol-a* (8e) also has an inherent accent on the initial syllable because it preserves its stress in genitive plural. On the other hand, the word *aγorá* in (8g) is stressed on the suffix. The discussion above suggested that the suffix /-a/ cannot be accented; otherwise we would expect final stress when it combines with unmarked roots as in *θálas-a*. We assert, therefore, that the final stress of *aγorá* must be triggered by the root. Indeed, there are many roots in Greek and other languages that impose their inherent accent on the following

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[7] Default here is used as a cover term to express the fixed subsystem that takes charge of accentuation only in the absence of marked morphemes.

morpheme. Such roots are known as ‘post-stressing’ or ‘post-accenting’[8] (Kiparsky 1982, Halle and Vergnaud 1987). In (8j), the root /uran-/ is also post-stressing, but here it is combined with a pre-stressing suffix, a suffix that requires the preceding syllable to be stressed (8l).

The second mode in which morphology interferes with accentuation is when accents compete for stress. Primary stress results from the interplay of the inherent marks of roots and the accentual properties of suffixes. The examples in (8) make clear that there are two underlying accents, but in each case only one survives and bears stress. It is evident from the facts above that, unlike Spanish and Pashto, an edgemost rule cannot derive the correct results because in (8b) and (8f) the leftmost accent wins, whereas in (8j) the rightmost accent wins. The generalization is that the accent imposed by the root prevails in both cases. The accent of the suffix (8d) and the default pattern (8c) have a chance to emerge when there is no conflict, and more specifically, when the root is unmarked.

One of the most important proposals in this study is that stress in systems like Greek (and Russian) is sensitive to morphological headedness. The accent that prevails belongs to the ‘head of the word’. In other words, a morphological head becomes a prosodic head, provided that it is marked. In languages with fusional morphology like Greek and Russian, the notion ‘head of the word’ must be read as the element that determines the categorial status of the word. Derivational suffixes are almost always heads because they define the lexical category, class or gender of the derived form, e.g. *agel-os* (noun) ‘angel’ > *agel-ik-os* (adjective) ‘of angels’. In polysynthetic languages like Salish, the notion ‘head’ refers to the (functional) head in the syntactic tree. The head in aspectual and modal phrases is the aspectual and modal marker, respectively. In incorporated constructions, the root is the head and the suffix, which serves as the argument of the root and incorporates to it, is the complement of the head.

According to this proposal, it is also expected marked derivational suffixes to override root-accent and inflectional suffix-accent. This expectation is indeed fulfilled; marked roots prevail over marked inflectional suffixes in (8b) and (8f) but in the derived word *γonðoliéris* ‘gondolier’ < /γónðol-a/, the accent of the derivational suffix /-iér-/ outweighs the accent of the root.

It is important to keep in mind for the moment that the notion ‘head of the word’ is important for the accentuation of such languages. Elements other than heads can influence accentuation only when the head lacks inherent accentual

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[8] In this thesis I adopt a different view on post-accentuation. Post-accenting morphemes are just morphemes with an unlinked (floating) lexical accent. Cf. Chapter 2 for a detailed discussion of this proposal.

properties. Since stress is mainly, but not exclusively, dependent on the lexical accent of the morphological head of the word, I name these systems *head-dependent systems with lexical accents*.

Thompson Salish operates like Greek within the lexical stem domain. Roots are often conjoined with lexical suffixes (suffixes with lexical referents) into an incorporated construction (Gerdts 1998). In such formations, the incorporated lexical suffix satisfies the argument structure of the verb (root). With respect to stress, the accent of the root prevails over the accent of the lexical suffix which, in turn̄, prevails over the default leftmost stress. This stress pattern is shown in (9a) through (9c). The examples are taken from Thompson and Thompson (1992, 1996). I use ‘=’ to indicate a morpheme belonging to the lexical suffix category and ‘/’ to symbolize a prefix directly before the root.

(9) *head-dependent system with lexical accents: Thompson* (stem level)
a. ʔes/ƛ̄’áq’ʷ=yeqʷ /ʔes/ƛ̄’áq’ʷ=éyeqʷ/ ‘a nail nailed into the tree’
STAT/ROOT=LEXS *stress on accented root*
b. ɬac=úʔs-m /ɬac=úʔs-əm/ ‘to poultice one’s back’
ROOT= LEXS-MDL *stress on accented LexS*
c. ɬác=kst-m /ɬac=akst-əm/ ‘to poultice the hand’
ROOT=LEXS-MDL *stress on leftmost V*

The dominance of root-accent over lexical suffix-accent can be easily accounted for if we take into consideration the morphosyntactic structure of the above constructions. The root is the head of the VP to which the lexical suffix incorporates. Lexical suffixes in Salish serve as arguments within the context of the sentence in which the Root=LexS predicate occurs. They are semantically interpreted as themes, instruments or locatives (cf. Chapter 5). We assert that, as in Greek, marked heads prevail over other marked constituents. Default constraints apply to assign prosodic structure to accentless strings.

Interestingly, Salish languages have polysynthetic morphology. This means that word formation takes place in the syntax. When aspectual and modal suffixes are added to the verbal base to form intransitive words, they are always stressed. This is shown in (10).

(10) *head-stress system with lexical accents: Thompson* (word level)
a. ʔuqʷeʔ-nwéɬn /ʔuqʷeʔ-nweɬn/ ‘manage to get a drink’
ROOT-NON-CTL
b. ʔuqʷeʔ-úɬ /ʔuqʷeʔ-uɬ/ ‘s.o. who always drinks’
ROOT-HBT

c.	ʔuqʷeʔ-úluɬ	/ʔuqʷeʔ-uluɬ/	‘go out to drink’
		ROOT-TRANSLOC	
d.	k’ʷenmeh-úɬ	/k’ʷénmeh-uɬ/	‘always criticizing’
		ROOT-HBT	

Aspectual and modal suffixes are functional heads of aspectual and modal phrases, respectively. Seen from this perspective, it is not so surprising that they attract stress. As claimed above, morphemes that are dominant in the morphosyntactic structure are prosodically dominant as well. The difference is that at the word level, heads attract stress even when they are deprived of accents. That heads are lexically marked is shown by aspectual markers like the resultative suffix /-e/, which emphasizes the recent completion of an activity or change of state. This suffix has an inherent accent that is realized on a neighboring morpheme, e.g. *ʔes-t/xə́ɬ-e kn* ‘I feel refreshed’. We understand from this example that preserving the accent of the head is deemed more important than stressing the head. Languages like Thompson are called in this study *head-stress systems with lexical accents*. Such systems allow the lexical contrasts of morphological heads to surface but they assign prominence to morphological heads even when they are accentless.

We conclude that, at the level of the stem, Thompson Salish is a head-dependent system, but at the level of the word it converts to a head-stress system. Head-dependent systems are very close to head-stress systems, which also display a one-to-one correspondence between prosody and morphology. In both varieties prosodic structure serves as a parsing cue about morphological structure and not the beginning or end of word boundaries.

Tahltan, an Athapaskan language spoken in British Columbia and southern Yukon, is also a representative head-stress system with lexical accents. There are no weight sensitivities in the accentual system of Tahltan. In general, the location of the accent cannot be predicted by purely phonological principles. As shown in the examples (11a-d), marking is a necessity for roots in Tahltan. Note that the accent in this language is phonetically manifested as high tone. Affixes usually host rhythmic accents on every other syllable, following the accented syllable of the root, as shown in (11e-f). The rhythmic pattern is disrupted when an affix, which is preeminent in the morphological structure of the word, such as the deictic marker /kiθ-/, attracts stress, (11g). We conclude that morphological constituents that have a specific function in the morphological structure claim accentual prominence. The examples are taken from Cook (1972) and Nater (1989).

(11) *head-stress system with lexical accents: Tahltan*

a.	ɬédih	‘sweet’	(Nater 1989:30)
b.	keyéh	‘town’	
c.	náːtθ’et	‘it has fallen off’	
d.	taːq’áƛ	‘needle’	
e.	hodéθiː-déːh	‘we talk’	(Cook 1972:231)
f.	hóde-séːh	‘I talk’	
g.	k’íθhédeːs-déːl	‘they three or more run’	

Another example of a head-stress system is Hua, a dialect of Yagaria, a language of the Gorokan family of East New Guinea (Haiman 1980, Hendriks 1996).

An example of a *head-stress system without lexical accents* comes from the Yupik languages. The forms in (12) come from the dialect of Norton Sound (Jakobson 1985, Van de Vijver 1998) and show that the root is always stressed. Without going into the details of accentuation, it is evident that stress is not dependent on marking. Closed (CVC) syllables attract stress (12a), otherwise stress falls on the second light (CV) syllable of the root, (12b). Phonologically long vowels are prohibited in this language. An open syllable in the root is closed in order to guarantee stress on the root, (12c). Suffixation in (12c), for example, causes the final consonant of the root to be syllabified as an onset, *ku.vuq*, triggering stress on the suffix, in violation of the head-stress requirement. To avoid this result, the vowel of the root must become bimoraic and attract stress. Since the vowel may not lengthen, the only way in which the syllable can become bimoraic is by closing it (Van de Vijver 1998:131).

(12) *head-stress system without lexical accents: Norton Sound Yupik*

a.	ang-yamini	[áŋyamíːni]	‘his own boat’
b.	qaya-ni	[qayáːni]	‘his own kayak’
c.	kuvə-uq	[kúvvuq]	‘it spills’

Kobon, a member of the Kalam family of the East New Guinea Highlands Stock (Davies 1980, Hendriks 1996), is another head-stress system without lexical accents. In this language stress is on the penultimate syllable (13a-b) unless this syllable is of a lesser prominence than the final one, then the final syllable is stressed (13c). The following vowel hierarchy applies: a/au/ai > o/e/u/i > ʌ/ɨ. However, suffixes that mark tense, mood and non-coreferential subject (NCS) bear primary stress irrespective of their vowel quality, (13d). The examples are taken from Hendriks (1996:228-30).

(13) *head-stress system without lexical accents: Kobon*

a.	aláfʌ	‘tree species’
b.	kɨjɨ́gɨɬ	‘tattoo’
c.	kɨdolmáŋ	‘arrow type’
d.	pakʌ́	‘you strike and he ...’
	/pak-ʌ/	strike-NCS.2sg/3sg
	gaibʌ́p	‘he will be doing and he...’
	/g-ai-bʌp/	do-DUR-COREF-FUT.3sg

Another head-stress system without lexical accents is Chukchee (Krause 1979).

To summarize, the interaction of prosody with morphology is expressed in different ways. Some languages choose to assign special prosodic status to specific morphemes or grammatical markers, and some others choose to assign important prosodic roles to elements that stand in important morphological positions. More specifically, in morphology-dependent systems, roots, thematic vowels, and other grammatical elements are prosodically distinguished in the word structure. Next to these elements, however, purely prosodic constraints that refer to footing and edgemost prominence have their share in defining the prosodic structure of a word. In head-dependent systems, the prosody-morphology interface is expressed as dominance of the head element. But, when the head is accentless, prosodic principles and inherent accentual properties of other constituents take charge of accentuation and determine stress. In head-stress systems the prosody-morphology interface is expressed in a more direct way: heads are always prominent, even when they lack inherent accentual properties.

The short excursion on accentual systems encountered around the world is completed at this point. The greatest effort of metrical theory has been put into describing rhythmic influences on stress. Interface systems and especially the ones with lexical accents have played a less significant role in the development of stress theory, mainly because they are considered to be devoid of rhythmic principles. In this study, I try to show that the examination and analysis of this class of systems is essential for any theory that aspires at developing a universal grammar for stress. As mentioned earlier, the largest part of the thesis is devoted to the accentuation of head-dependent systems with lexical accents, or in short, lexical accent systems. Head-stress systems with lexical accents will be given some extra attention in Chapter 5 where the Salish languages are discussed.

In the remainder of this chapter I introduce the theoretical framework the analysis will be based on and formalize the stress typology presented in the previous two sections.

1.2. Optimality Theory and Stress Typology

1.2.1. Optimality Theory

The constraint-based framework of *Optimality Theory* (OT) (Prince and Smolensky 1993, McCarthy and Prince 1993a, 1994), has dramatically changed the way linguists view phonology. OT shifts the explanatory burden of linguistic theory from input-based rewrite rules to output-based constraints. Instead of taking an underlying form and transforming it stepwise to its associated output, OT allows for the specification of a large set of candidate outputs. The candidate set is evaluated by the system of constraints, which selects the actual output from the available candidates. Schematically, the grammar is like this:

(14) *an Optimality-based Grammar* (McCarthy and Prince 1993b)
Gen(in_i)= {cand_1, cand_2, ...}
Eval ({cand_1, cand_2, ...}) → cand_k (the output, given in_i)

The function Gen (for Generator) associates each input with a (possibly infinite) pool of ‘output’ candidates. Free generation implies that input forms are provided with all conceivable syllabifications, prosodic constituency, and so on. The function Eval (for Evaluator) is defined by a system of constraints, which assesses the various candidate output forms, ordering the candidates by how well they satisfy the constraint system of the language. Eval selects one candidate as the actual *optimal* output. The evaluation of all candidates is accomplished with the help of a ranked set of *universal constraints* (Con). Individual grammars are constructed by imposing a ranking on the entire universal constraint set. The central proposal of OT is that constraints are ranked in a hierarchy of relevance. Lower-ranked constraints can be violated in an optimal output form when such violation secures success on higher-ranked constraints. The higher ranked a constraint, the more forceful it is.

To illustrate with an abstract example; suppose that a language has the constraints A, B and C ranked in the following order (in an OT notation): A >> B >> C. If the candidate set of outputs generated by Gen is cand 1, cand 2 and cand 3, the evaluation takes the form presented in the following tableau:

(15)

input	A	B	C
cand 1	*!		
cand 2		*	***!
☞ cand 3		*	**

An asterisk in the box means that the candidate in the horizontal row violates the constraint in the vertical column. The optimal candidate, cand 3, the one that occurs in the language, is indicated with the sign '☞'. Fatal violations of a constraint are marked with an exclamation mark '!'. Cand 1 is excluded because it fatally violates the high ranked constraint A, though it respects the other constraints of the string. Cand 2 and cand 3 equally violate constraint B. The decision for the optimal output rests on constraint C which deems cand 3 as the actual output because it incurs less violations of the lower ranked constraint C. To be precise, cand 2 violates the relevant constraint three times whereas cand 3 violates it only two times.

1.2.2. Constraints and stress typology

The brief overview of stress systems revealed that stress is the byproduct of prosodic principles, marking and morphological factors. In fixed systems, stress assignment is almost exclusively controlled by prosodic constraints. In interface systems, on the other hand, morphological structure and lexical marking interact with prosodic principles to derive stress. In Optimality Theory, crosslinguistic variation arises by different constraint rankings. In this section I first show that marking, prosodic principles and morphological conditions are formalized as constraint statements and second, that the variety of stress systems can be derived by different constraint rankings.

Optimality Theory distinguishes, among others, two major families of constraints: faithfulness and structural constraints. Faithfulness constraints demand a tight relation between the input and the output. More specifically, they require the output to be identical to the input and vice versa. Structural constraints, on the other hand, are constraints on output structural configurations, which may favor modification of the input, contravening faithfulness. Domination of structural constraints over faithfulness con-straints results in modification of the input form, whereas domination of faithfulness constraints results in preservation of the underlying structure of the input.

Prosodic principles that determine footing, edgemost-rules and weight sensitivity take the form of structural constraints such as RHYTHMTYPE, EDGEMOST-L/R and WEIGHT-TO-STRESS (Prince and Smolensky 1993). These constraints are short statements about the way input forms are footed, the inherent prominence of bimoraic rhymes, the directionality of foot-prominence, and so on. Depending on how they are ordered they can derive an assortment of stress patterns.

Lexical marking is a vital apparatus for many interface systems. The inherent accentual properties of morphemes take the form of faithfulness constraints. These constraints demand output forms to adhere to information that is specified in the input and vice versa. McCarthy and Prince (1995) and McCarthy (1997) argue that the set of elements that can be referred to by faithfulness constraints is not limited to segments; those elements may include autosegmental features like moras, tones and, by extension, lexical accents.[9]

(16) FAITH (LA) (McCarthy and Prince 1995)
A lexical accent in the input has a correspondent in the output (MAX(LA)).

A lexical accent in the output has a correspondent in the input (DEP(LA)).

Morphological constituency, and especially the notion of headedness, is crucial for the majority of interface systems. In the Introduction, I presented a brief overview of the theory of interface advanced in this thesis. More specifically, I argued that the mapping of morphological structure to prosodic structure is pursued in a compositional way. This means that prosodic structure is built in parallel with morphological structure. If the morphological mode of combination in a construction is that of a head and a complement, then the prosodic mode of combination can be a function that assigns some sort of prominence to the head-element. The function that performs the prosody-morphology interface is expressed as *head dominance* in lexical accent systems: morphological heads are prosodically prominent. I propose briefly here, and more extensively in the remaining chapters, that head dominance enriches Universal Grammar with the *family of head constraints*.[10] This family constitutes part of a broader family of interface constraints, which allow a direct

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[9] Faithfulness constraints are phrased in terms of a correspondence relation (McCarthy and Prince 1995) holding between input-output lexical accents (cf. the discussion surrounding faithfulness constraints in Chapter 2).

[10] One may wonder whether non-head constituents can have a similar role in accentuation. This issue is extensively addressed in Chapter 4. It is enough to mention here that studies on head-dependent asymmetries have established the special status of head constituents (Dresher and Van der Hulst 1997).

relation between prosodic elements and morphological constituents such as, for example, lexical accents and morphological heads. Two types of head constraints are important in this study: *head-faithfulness* and *head-stress* constraints. The former constraint demands input heads to preserve their accent in the output and vice versa; the latter constraint simply states that heads must be stressed.

(17) a. HEADFAITH (LA)
A lexical accent sponsored by a morphological head in the input has a correspondent in the output (HEADMAX(LA)).

A lexical accent hosted by a morphological head in the output has a correspondent in the input (HEADDEP(LA)).

b. HEADSTRESS
Morphological heads are stressed.

Now, we can derive the stress patterns of the languages reviewed in §1.1.1 and §1.1.2 by simply ranking structural constraints (S), faithfulness constraints (F) and head constraints (HF, HS). The rankings in (18) have a certain degree of abstractness. Natural languages are complex and have many idiosyncratic characteristics. So, often other constraints intervene, motivating the ranking between constraints. For instance, FAITH and HEADFAITH in (18bii) do not in principle conflict with each other. Their conflict in Greek, for example, is established by intervening constraints, which are left out of the discussion here (cf. Chapter 3). The factorial typology of stress systems and a list of abstract tableaux that exemplify each type of accentual system are given in the Appendix at the end of this chapter. Note that a comma ‘,’ between constraints denotes that they can be ranked either way (A,B=A >> B and B >>A). Structural constraints mainly comprise default stress, which takes charge when marking is lacking.

(18) *stress typology*
a. fixed-stress systems
Ranking: S >> F, HF, HS (Appendix A)
Pattern: No head dominance effects, no lexical accents.
Examples: Turkish, Finnish, Polish, etc.

b. interface systems
(i) morphology-dependent

Ranking: F>> S >> HF, HS (Appendix Ba)
Pattern: Lexical accents but no head dominance effects.
Examples: Spanish,[11] Pashto, etc.

(ii) head-dependent with lexical accents
Ranking: HF >> F >> S >> HS (Appendix Bb I)
Pattern: Head accent wins; (non-head) accent surfaces; otherwise, default.
Examples: Greek, Russian, Thompson Salish (stem level), Sanskrit

(iii) head-stress with lexical accents
Type I Ranking: HS >> HF >> S, F (Appendix Bc I)
Pattern: Head accent wins but not if it is post-accenting; (non-head) accent does not surface; otherwise, stress is on the head on a syllable determined by S.
Examples: Tahltan, Hua

Type II Ranking: HF >> HS, S, F (Appendix Bc II)
Pattern: Head accent wins even if it is post-accenting; (non-head) accent does not surface; otherwise, stress is on a syllable determined by S.
Examples: Thompson Salish (word level)

(iv) head-stress without lexical accents
Ranking: HS >> S >> HF, F (Appendix Bd)
Pattern: The head is always stressed and the position of stress is determined by the default. No lexical accents are present.
Examples: Yupik languages, Chukchee, Kobon

Fixed-stress systems are governed by purely prosodic principles due to high ranking of structural constraints. Intertwined with each other these constraints derive an assortment of fixed stress systems. I abstain from giving a more

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[11] We have seen that, in Spanish, the trisyllabic window controls the distribution of lexical accents suggesting that FAITH is in fact dominated by a structural constraint that defines the window (S_1) and that it dominates itself a structural constraint (S_2) that determines default penultimate stress.

specific illustration of such rankings, since they easily can be found in recent studies on rhythmic stress.

In interface systems, structural (default) constraints are ranked low. Morphology-dependent stress emerges due to high ranking of faithfulness constraints (18bi). However, head constraints are ranked lower than the other constraints and, consequently, are inert. Structural constraints determine the winning candidate when conflicts arise. On the contrary, the ranking of HEADFAITH above FAITH is crucial in head-dependent (lexical accent) systems (18bii). Accents belonging to heads prevail over other accents in the word. However, the necessity for obligatory prominence of the head is relaxed because FAITH and STRUCTURAL outrank HEADSTRESS. Reranking of STRUCTURAL and HEADSTRESS derives a system like Tahltan, which displays lexical accent contrasts only in heads (18biii, Type I). Notice that placing FAITH above STRUCTURAL has no effect on stress when HEADSTRESS and HEADFAITH are top-ranked. In this way, the faithfulness requirement of other morphological elements is consistently suppressed by the requirement of having a stressed head. Interestingly, a simple reranking between HEADFAITH and HEADSTRESS derives a second variety of head-stress systems in which post-stressing heads can surface (18biii, Type II). A head that requires its accent on a neighboring constituent would survive the competition because HEADSTRESS is ranked low. Unmarked heads behave as in the previous system. Thompson word level accentuation is an example of a head-stress (with lexical accents) system. Finally, having HEADSTRESS top-ranked and FAITH and HEADFAITH below STRUCTURAL derives systems with obligatory stress on the head (18biv). The exact position of stress is determined by the structural constraint in effect; faithfulness is powerless from the rank it occupies.

Employing Optimality Theory has a number of advantages. Most importantly, the idea of having ranked constraints successfully grasps the fact that there are hierarchically ordered preferences in stress systems. With respect to lexical accent systems in particular, the typology makes explicit why priority is given to marking over the default subsystem and, further, within marking, why accentual properties of heads dominate inherent accentual properties of other elements.

Before bringing this section to an end it is important to mention that the distinction between fixed-stress and interface systems is rarely manifested in pure form; most systems are a mix of the two. The simple stress pattern of Finnish cannot save the language from a number of thorny problems related to secondary stress and allomorphic variation in the inflectional system of nouns (Anttila 1995, 1997). On the other hand, even morphological systems might have rhythmic aspects. For example, Spanish and Lillooet Salish have rhythmic secondary stress (Halle and Kenstowicz 1991, Roca 1992, Roberts 1993) whereas marking in lexical accent systems like Greek and Russian is governed by prosodic wellformedness principles (cf. Chapter 3).

1.3. Conclusions

In Optimality Theory, a grammar of a language is a particular ranking of the constraints supplied by Universal Grammar. Permutation is therefore a crucial test of any proposed subtheory of constraints: are all the rankings of the constraints attested grammars, or at least possible ones?

In this chapter I showed that a set of four archetypical constraints predicts several attested accentual systems. The factorial typology is presented in the Appendix where it is shown that most rankings are attested grammars. There are few gaps but, given the limited knowledge we have on interface systems, they do not pose any serious problem for the theory advanced here. Moreover, the predicted grammars are close variants of the attested ones and can be possible grammars.

In general, there are two major types of systems. At the one pole are the pure phonological systems where accentuation shows few, if any, signs of morphological dependencies. Prosodic constraints build structure based on syllable weight, word edges, binary groupings with left or right-head prominence, and so on. At the other pole stand the pure interface systems. Here accentuation depends totally upon morphological structure. The prosody-morphology interface is expressed in the most transparent and direct way: by making the dominant morphological element prosodically dominant as well. Only morphological heads are prominent and moreover, if there is no marking, the prominent position is decided by prosodic constraints (i.e. stress the initial/final syllable or the heavy syllable of the head, and so on).

Between the two poles there are many other varieties, two of which are relevant to the discussion in this chapter: morphology-dependent and head-dependent stress systems. Both are close to, and at the same time distant from, each other. They share a fixed (sub)system and, to some extent, marking and dependence on morphological structure but they come apart in head dominance effects.

At this point the presentation of the main characteristics of lexical accent systems is completed. Full argumentation and empirical evidence for many of the claims made here is provided in the rest of this thesis.

Appendix: Factorial Typology of Stress Systems

Archetypical constraints:
S: STRUCTURAL (=EDGEMOST-R)
F: FAITH
HF: HEADFAITH
HS: HEADSTRESS

Note: I assume here that HF and F are violated in post-accenting morphemes when the accent is realized within the vicinity of the morpheme that sponsors it. Post-accenting morphemes are discussed in Chapter 2.

Types of marking:

Accented:	σσ́
Post-accenting:	σσ´
Unmarked:	σσ

Notational conventions:

σσ$_{H}$:	head of the word
σσ-:	root
-σ:	suffix

A. Fixed Stress Systems: Turkish, Finnish, Murik

S >> F >> HF >> HS
S >> F >> HS >> HF
S >> HF >> F >> HS
S >> HF >>HS >> F
S >> HS >> F >> HF
S >> HS >> HF >> F

No head dominance effects, no lexical accents.
Stress is in the position determined by S

T1 σσ́$_{H}$-, -σ́	S(R)	F	HF	HS
a. σσ́-σ	*!	*		
☞ b. σσ-σ́		*	*	*

T2 σσ́$_{H}$-, -σ	S(R)	F	HF	HS
a. σσ́-σ	*!			
☞ b. σσ-σ́		**	*	*

T3 σσ$_{H}$-, -σ	S(R)	F	HF	HS
a. σσ́-σ	*!			
☞ b. σσ-σ́				*

B. Interface Systems

a. *morphology-dependent systems*: Spanish, Pashto
F >> S >> HF >> HS Lexical accents but no head dominance effects
F >> S >> HS >> HF

T1 σσ́$_{H}$-, -σ́	F	S(R)	HF	HS
a. σσ́-σ	*	*!		
☞ b. σσ-σ́	*		*	*

T2 σσ́$_{H}$-, -σ	F	S(R)	HF	HS
☞ a. σσ́-σ		*		
b. σσ-σ́	*!*		*	*

T3 σσ́$_{H}$-, -σ	F	S(R)	HF	HS
a. σσ́-σ	*	*!	*	
☞ b. σσ-σ́	*			*

T4 σσ$_{H}$-, -σ	F	S(R)	HF	HS
a. σσ́-σ		*!		
☞ b. σσ-σ́				*

b. *head-dependent systems with lexical accents*

Type I: Greek, Russian, Sanskrit
F >> HF >> S >> HS Head accent of any type wins (T1-T3);
HF >> F >> S >> HS (non-head) accent surfaces (T4); otherwise,
default (T5).

T1 σσ́$_{H}$-, -σ́	HF	F	S(R)	HS
☞ a. σσ́-σ		*	*	
b. σσ-σ́	*!	*		*

T2 σσ́$_{H}$-, -σ	HF	F	S(R)	HS
☞a. σσ́-σ			*	
b. σσ-σ́	*!	*		*

T3 σσ$_{H}$´-, -σ	HF	F	S(R)	HS
a. σσ́-σ	*!	*	*	
☞ b. σσ-σ́		*		*

T4 σσ$_{H}$-, -σ́	HF	F	S(R)	HS
a. σσ́-σ		*!	*	
☞ b. σσ-σ́				*

T5 σσ$_{H}$-, -σ	HF	F	S(R)	HS
a. σσ́-σ			*!	
☞ b. σσ-σ́				*

Type II

F >> HF >> HS >> S HF >> F >> HS >> S	Head accent of any type wins (T1-T3); (non-head) accent surfaces (T4); otherwise, stress is on the head on a syllable determined by S (T5).

T1 σσ́$_{H}$-, -σ́	HF	F	HS	S(R)
☞ a. σσ́-σ		*		*
b. σσ-σ́	*!	*	*	

T2 σσ́$_{H}$-, -σ	HF	F	HS	S(R)
☞ a. σσ́-σ			*	*
b. σσ-σ́	*!	*		

T3 σσ´$_H$-, -σ	HF	F	HS	S(R)
a. σσ́-σ	*!	*		*
☞ b. σσ-σ́		*	*	

T4 σσ$_H$-, -σ́	HF	F	HS	S(R)
a. σσ́-σ		*!		*
☞ b. σσ-σ́			*	

T5 σσ$_H$-, -σ	HF	F	HS	S(R)
☞ a. σσ́-σ				*
b. σ́σ-σ				**!
c. σσ-σ́			*!	

Type III

F >> HS >> S >> HF

F >> HS >> HF >> S

Head accent wins (T1, T2) but not if it is post-accenting (T3); (non-head) accent surfaces (T4); otherwise, stress is on the head on a syllable determined by S (T5).

T1 σσ́$_H$-, -σ́	F	HS	S(R)	HF
☞ a. σσ́-σ	*		*	
b. σσ-σ́	*	*!		*

T2 σσ́$_H$-, -σ	F	HS	S(R)	HF
☞ a. σσ́-σ			*	
b. σσ-σ́	*!	*		*

T3 σσ´$_H$-, -σ	F	HS	S(R)	HF
☞ a. σσ́-σ	*		*	*
b. σσ-σ́	*	*!		

T4 σσ$_H$-, -σ́	F	HS	S(R)	HF
a. σσ́-σ	*!		*	
☞ b. σσ-σ́		*		

T5 $\sigma\sigma_{H}$-, -σ	F	HS	S(R)	HF
☞ a. σσ́-σ			*	
b. σσ-σ́		*!		

c. *head-stress systems with lexical accents*

Type I: Tahltan
HS >> HF >> S >> F
HS >> F >> HF >> S
HS >> F >> S >> HF
HS >> HF >> F >> S

Head accent wins (T1, T2) but not if it is post-accenting (T3); (non-head) accent does not surface (T4); otherwise, stress is on the head on a syllable determined by S (T5).

T1 $\sigma\acute{\sigma}_{H}$-,-σ́	HS	HF	S(R)	F
☞ a. σσ́-σ			*	*
b. σσ-σ́	*!	*		*

T2 $\sigma\acute{\sigma}_{H}$-,-σ	HS	HF	S(R)	F
☞ a. σσ́-σ			*	
b. σσ-σ́	*!	*		*

T3 $\sigma\sigma\acute{}_{H}$-, -σ	HS	HF	S(R)	F
☞ a. σσ́-σ		*	*	*
b. σσ-σ́	*!			*

T4 $\sigma\sigma_{H}$-, -σ́	HS	HF	S(R)	F
☞ a. σσ́-σ			*	*
b. σσ-σ́	*!			

T5 $\sigma\sigma_{H}$-, -σ	HS	HF	S(R)	F
☞ a. σσ́-σ			*	
b. σ́σ-σ			**!	
c. σσ-σ́	*!			

Type II: Thompson Salish (word level)

HF >> HS >> S >> F HF >> HS >> F >> S	Head accent wins (T1, T2); post-accenting heads win as well (T3); (non-head) accent does not surface (T4); otherwise, stress is on the head on a syllable determined by S (T5).

T1 σσ́$_H$-, -σ́	HF	HS	S(R)	F
☞ a. σσ́-σ			*	*
b. σσ-σ́	*!	*		*

T2 σσ́$_H$-,-σ	HF	HS	S(R)	F
☞ a. σσ́-σ			*	
b. σσ-σ́	*!	*		*

T3 σσ´$_H$-, -σ	HF	HS	S(R)	F
a. σσ́-σ	*		*	*
☞ b. σσ-σ́		*!		*

T4 σσ$_H$-, -σ́	HF	HS	S(R)	F
a. σσ́-σ			*	*
☞ b. σσ-σ́		*!		

T5 σσ$_H$-, -σ	HF	HS	S(R)	F
☞ a. σσ́-σ			*	
b. σ́σ-σ			**!	
c. σσ-σ́		*!		

Type III

HF >> S >> HS >> F HF >> S >> F >> HS	Head accent wins (T1, T2); post-accenting heads win as well (T3); (non-head) accent does not surface (T4);[12] otherwise, default (T5).

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[12] A suffix can be stressed only when S is EDGEMOST-R.

T1 σσ́$_H$-,-σ́	HF	S(R)	HS	F
☞ a. σσ́-σ		*		*
b. σσ-σ́	*!		*	*

T2 σσ́$_H$-, -σ	HF	S(R)	HS	F
☞ a. σσ́-σ		*	*	
b. σσ-σ́	*!			*

T3 σσ́$_H$-, -σ	HF	S(R)	HS	F
a. σσ́-σ	*!	*		*
☞ b. σσ-σ́			*	*

T4 σσ$_H$-, -σ́	HF	S(R)	HS	F
a. σσ́-σ		*!		*
☞ b. σσ-σ́			*	

T5 σσ$_H$-, -σ	HF	S(R)	HS	F
a. σσ́-σ		*!		
☞ b. σσ-σ́			*	

d. *head-stress systems without lexical accents*: Yupik, Chukchee
HS >> S >> HF >> F Head is always stressed on a syllable
HS >> S >> F >> HF determined by S (T1-T5).

T1 σσ́$_H$-, -σ́	HS	S(R)	HF	F
☞ a. σσ́-σ		*		*
b. σ́σ-σ		**!		*
c. σσ-σ́	*!		*	*

T2 σσ́$_H$-, -σ	HS	S(R)	HF	F
☞ a. σσ́-σ		*		
b. σσ-σ́	*!		*	*

T3 σσ́$_{H}$-, -σ	HS	S(R)	HF	F
☞ a. σσ́-σ		*	*	*
b. σσ-σ́	*!			*

T4 σσ$_{H}$-, -σ́	HS	S(R)	HF	F
☞ a. σσ́-σ		*		*
b. σσ-σ́	*!			

T5 σσ$_{H}$-, -σ	HS	S(R)	HF	F
☞ a. σσ́-σ		*		
b. σ́σ-σ		**!		
c. σσ-σ́	*!			

2 The Theory of Lexical Accents

2.1. Introduction

This chapter develops a theory for the lexical specification of morphemes. Underlying metrical information is given the name ‘lexical accent’ or just ‘mark’.[1] In this thesis I argue that a lexical accent is an autosegmental feature that does not provide any clues about its phonetic manifestation. A lexical accent is liable to the demands of the phonological constraints of the grammar and, if qualified, it will be phonetically assigned duration, pitch and intensity.

This chapter starts with an outline of the theory of marking. Based on empirical evidence, I establish that it is better to view lexical accents as autosegmental features and not as prosodic roles (McCarthy and Prince 1995, McCarthy 1995, 1997). I further propose that the mapping between lexical accents and the vocalic peaks that sponsor them is established in terms of universal constraints and, more specifically, in terms of faithfulness constraints.

The chapter continues with a brief review of other approaches on marking. There is little consensus in the literature on the nature of lexical stress. Three mainstream theories of lexical specification are examined. First, there are theories that argue that the mark is a prosodic constituent that is assigned to a morpheme in the lexicon. Two approaches are examined, Inkelas’s (1994) theory of exceptional stress in Turkish and Alderete’s (1997) theory of lexical

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[1] The terms ‘mark’, ‘marking’ and ‘markedness’ in this thesis refer to the lexical accent and the property of some morphemes to have accents in their lexical representation. This use of the terminology should not be confused with the role that markedness theory plays in OT. That is, except for faithfulness constraints, all other constraints evaluate the markedness of the output structures. The mark (*), given in the tableau cells, is not just a typographical symbol, but indicates how ‘marked’ the structure being evaluated is. One of the main results of OT is that there is no necessity for a separate ‘markedness theory of grammar’, because OT is itself a markedness theory.

accentuation in Cupeño. Inkelas (1994) argues that lexical marking is encoded as a trochaic foot which is lexically affiliated with a morpheme. Alderete (1997) views marking as pure prominence. Lexical stress is encoded as an intrinsic feature of an underlying sponsor which has no phonetic realization. These two approaches are very similar to the theory of marking advanced in this study.

Second, on what appears to be the standard approach, the lexical accent is also pre-assigned in the lexicon but it is a prosodic constituent such as a head or a syllable boundary which is projected onto the stress plane by an idiosyncratic property of the syllable (Halle and Vergnaud 1987, Idsardi 1992, Halle and Idsardi 1995, Van der Hulst 1996).

Finally, there are theories which advocate that marking is the byproduct of subgrammars. Marked words belong to a subsystem which is governed by its own rules and parameters (Tsay 1990) or word/morpheme-specific constraints (Hammond 1995) or constraint-rankings (Revithiadou 1997a).

This preview roughly reflects the organization of the chapter. In §2.2 I outline the theory of marking advanced in this study. Occasionally, aspects of the theory are clarified by using examples from Greek, Russian and Thompson Salish. In §2.3, I present some other theories of marking. More specifically, in §2.3.1 and §2.3.2, I discuss the basic principles of Inkelas's (1994) and Alderete's (1997) models, respectively. In §2.4, I sketch out the theories that view marking as an inherent property of a syllable. Idsardi's (1992) model is given some extra attention because at first sight it appears to share a few properties with the marking theory adopted here. As I show, the two theories substantially differ. The last section, §2.5, reviews works that treat marked accentual patterns as part of a subgrammar.

Before moving on, a caveat is needed. In most of the models discussed in this chapter, lexical marking is tantamount to 'exceptional stress'. In the Introduction I mentioned that marking in lexical accent systems is a fundamental apparatus of accentuation, the tool for the prosody-morphology interface and not just a mechanism that derives exceptional stress patterns. In Chapter 3, I show that we must make a distinction between two types of marking which have the same representation but different functions. Since marking as a mechanism of underlying metrical representation is uniform, no distinction between types of marking that differ in function is made here.

2.2. The Theory of Lexical Accents

2.2.1. What is a lexical accent?

A lexical accent has an independent status in this study. It is an abstract entity, an autosegment like tone, that it is sponsored by a morpheme but provides no cues about its phonetic manifestation. If the autosegment is included in the prosodic organization of the word, it is assigned a phonetic interpretation, which is stress in a stress-accent language or pitch in a pitch-accent language.[2] As an autosegmental feature a lexical accent can be associated to the sponsoring morpheme or be floating.

Another property of a lexical accent is that it has two valences, it can be ‘strong’ or ‘weak’. A strong accent corresponds to a head and is phonetically realized as stress in languages with dynamic stress or high pitch in pitch-accent languages. In Greek, for example, which is a foot-based language, a strong accent always defines the head position of a foot, σ(σ́σσ. If qualified by the stress rules of the language, it also defines the position of the primary stress of the word, σσ(σ́σ)σ (by rightmost-foot stress). In Thompson, a language that lacks feet, a strong accent defines the possible position of the head of a word, σσ́-σ́ and, indeed, if qualified, it carries primary stress, σσ́-σ.

A weak accent, on the other hand, is an accent that lacks prominence. Two forms of weak accents are distinguished. In foot-based languages like Greek and Hua,[3] a weak accent avoids prominence by being parsed as the weak part of a foot. In other words, it is an accent that takes a dependent position in the

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[2] Languages in which the accented syllable is pronounced with pitch obtrusion, greater duration and intensity are traditionally called ‘dynamic stress languages’ or ‘stress-accent systems’. Languages that mark the accented syllable by a change in pitch are called ‘pitch-accent languages’. In the latter systems, tones or tone melodies are lined up with the segmental structure by means of an accent that is present in the lexical representation of the word (Beckman 1986, Van Heuven and Sluijter 1996).

[3] Hua, is a foot-based pitch-accent system (Haiman 1980, Hendriks 1996). Trochaic feet are assigned from left to right. The foot that hosts a lexical accent (ia) and the leftmost foot in the word (ib) are assigned a high tone. The topic marker *-mo* in (ic) is of interest because it induces a high tone to the syllable that precedes it, (ic). This is because the suffix *-mo* is marked to be a foot-tail, thus forcing the word to be parsed as *zuʔ(víʔmo)*, and not as **(zuʔviʔ)mo*.

(i)	a.	kenagámo	‘a long time ago’
	b.	hígaʔda	‘he did and I...’
	c.	zuʔvíʔ-mo	‘in the house’

metrical structure, namely a foot-tail. In unbounded systems, a weak accent is realized either as low tone or as grave accent. In a pitch-accent system like Fore, for example, a weak accent is always a low tone.[4] In a stress-system like Thompson, a weak accent is just a grave accent, that is an accent that has duration but no loudness. Grave accents in Thompson protect vocalic peaks that bear them from reduction, but they never bear primary or secondary stress themselves. The strong and weak distinction between accents is illustrated with a few examples in the following paragraphs.

Greek is a trochaic system (cf. §3.2). In this language, syllables are parsed into syllabic trochees as indicated by the patterns *kro*(*kóði*)*los* ‘crocodile’, (*ánθro*)*pos* ‘man’. Some inflectional suffixes in Greek such as the genitive singular /-u/ attract stress to the preceding syllable. Take for granted for the moment that the root /anθrop-/ is unmarked. (Full argumentation is provided in Chapter 3.) When this root combines with an unmarked suffix, stress is by default on the antepenultimate syllable (1a). However, with the genitive suffix stress shifts to the penultimate syllable (1b).

(1) *weak lexical accent in Greek*

a.	ánθrop-os	‘man-NOM.sg’
b.	anθróp-u	‘man-GEN.pl’

The suffix /-u/ creates an ‘island’ in the word that contains it. When parsing mechanisms apply to metrify the string of syllables, it imposes the restriction that it has to be parsed in a weak position, more specifically, as the dependent of a foot, e.g. (kroko)(ðíl**u)**.[5] It is important to mention that a suffix with a foot-tail specification imposes no claims on the position of the foot-head. Where exactly primary stress falls, is decided by the overall accentual system of the language. In Greek, the effects of weakly marked suffixes are revealed because of a stress

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[4] Fore, another language from New Guinea, is an unbounded pitch-accent system (Nicholson and Nicholson 1962). In this language a strong accent hosts a high tone, (iia), whereas a weak accent hosts a low tone (which spreads to the right), (iib).

(i)	a.	waníne		‘water-INDIC’
	b.	aogiwanine	/aogì -waníne/	‘(it is) good water’

Other lexical accent systems with tones are Japanese (Haraguchi 1977, 1991, Beckman and Pierrehumbert 1986) and Ancient Greek (Oikonomou 1984).

[5] If the suffix was unmarked the string would have been parsed as *kro*(*koði*)*lu* by the system of default constraints in Greek.

rule that demands the rightmost foot to be the head of the prosodic word (cf. §3.5.3). In Russian, on the other hand, the effects of preaccentuation are concealed because the language has primary stress on the leftmost vocalic peak (cf. §3.13). I use a right foot bracket, ‘)’ or a dot ‘.’ to denote a weak accent in Greek.

Thompson shows that a weak lexical accent surfaces as weak prominence. Some examples of weak accents are listed in (2). Weak prominence is different from secondary stress. Secondary stress is rhythmic, at least in the lexical accent systems examined here, whereas weak prominence is not. Moreover, weak accents are not audible. The criterion to detect a weak lexical accent is vowel reduction. Unstressed vowels in Salish reduce to zero. The only situation in which vowel reduction fails to apply is when a vocalic peak has a grave accent. This accent is phonetically expressed with duration but no loudness. The examples are taken from Thompson and Thompson 1996 (henceforth Th in the examples).

(2) *weak lexical accents in Thompson*

a.	kàwpúy	‘cowboy (English loan)’	(Th 82)
b.	címèɬ	‘be first’	(Th 30)
c.	c’ènéc’	‘bullhead’	(Th 53)
d.	=úsyèp’	‘firewood (LexS)’	(Th 543)
e.	x^{w}əsə́l’èc	‘tree-fungus’	(Th 522)

In short, the vowels in (2) have an accent that has segmental content but lacks prosodic prominence. I use a grave accent ‘ˋ’ or a dot ‘.’ to indicate a weak accent in Salish.

To sum up, morphemes with weak accents are called *weakly accented* because they never bear primary prominence. I also use the term *pre-accenting* to refer to morphemes which have a tail specification.

When the lexical accent is strong, it is realized as a head, *stafíð-*, *-ón*, in Greek and *ƛ’áq’^{w}*, *k^{w}én* in Thompson Salish. In this case the morpheme that sponsors the accent is called *accented*. A strong accent is represented with an asterisk (*). However, for typographic simplicity I also use a left-foot bracket, ‘(’ to represent a strong accent in Greek and an acute accent ‘ˊ’ to represent a strong accent in Salish. A left or right foot boundary does not have any theoretical weight in this study. It is just a notational convention that helps us visualize a strong and a weak accent in a foot-based language like Greek.

I also adopt a uniform representation by letting ‘σ’ stand for both underlying vocalic peaks and surface syllables, although vocalic peaks are the hosts of marks in the lexicon but on the surface syllables are. Roots are represented with a hyphen at the right edge, σσ-, and suffixes with a hyphen at the left edge, -σ. The abstract examples in (3) illustrate how marked morphemes are represented in this study.

(3) *marked morphemes*

accented weakly accented

$$\begin{array}{c} * \\ | \\ \sigma \end{array} \qquad\qquad \begin{array}{c} . \\ | \\ \sigma \end{array}$$

Legenda: The typographic notation for accented morphemes is (σ (for Greek, Russian and Lillooet Salish) and σ́ (for Thompson, Spokane and Moses-Columbia). The typographic notation for weakly accented morphemes is σ) (for Greek and Lillooet) and σ̀ (for Thompson).

As an autosegment, a lexical accent has the possibility to float. The next step will be, therefore, to explore whether there are floating accents. Greek and Russian have post-accenting or else, post-stressing morphemes. This term is used to describe, for instance, roots that locate an accent on the first syllable of the following suffix. An example of postaccentuation is the root /uran-/ in the Greek word *uran-ós* 'sky-NOM.sg'. As shown in (4), stress is on the suffix throughout the paradigm.

(4) *paradigm of uranós* 'sky'

NOM.sg.	uranós	/uran-os/	post-acc root+unmarked suff
GEN.sg	uranú	/uran-u)/	post-acc root+pre-acc suff
ACC.sg.	uranó	/uran-o/	post-acc root+unmarked suff

However, one could cast doubt on this view by arguing that postaccentuation is just an effect imposed by morphological structure. Let us assume that a root like /uran-/ just chooses to boot an inherent lexical accent out of its morphological domain. In other words, the root is just *unaccentable*. Now, if the root prohibits a lexical accent from its domain and provided that all words in a language like Russian or Greek must be stressed on some syllable, then the only physically available host for lexical accent and consequently, stress, is the inflectional suffix /-os/. As expected, the outcome is postaccentuation.

A more telling example comes from the Thompson language of Salish. In this language the default algorithm assigns prominence to the leftmost full vowel, *ɬác-e-s* ‘he poultices it’; otherwise, to the rightmost schwa, *s/ƛ’eʔk=xə́n*[6] ‘footprint’. However, the roots in (5) are never accented despite the fact that they have a full vowel. Instead, stress falls on the following suffix (5a), even when this suffix includes a schwa (5c-d). I argue that these roots are unaccentable.

(5) *unaccentable roots in Thompson*

a.	n/wen-ím-s-es	‘make s.o. get up early’	(Th 373)
b.	meloq’w-e-s-t-és	‘knock s.o. out’	(Th 194)
c.	q^{w}in-ə́m	‘serve as a spokesman’	(Th 295)
d.	cuwes=xə́n	‘measure another shoe’	(Th 43)

Under the present proposal we predict that, if the morphological structure is such that an unaccentable root is preceded by a prefix, the resultant word may well be accented on the prefix. Unfortunately, prefixation for the systems I examine here is not very illuminating because most prefixes fall outside the prosodic domain of the word.[7] Moreover, in Russian, prefixation is highly unproductive in nouns and in Greek the three-syllable-window limitation hardly ever permits stress on prefixes. Fortunately, we can test this hypothesis in derived formations.

A derivational suffix in languages with fusional morphology is usually flanked by a root and an inflectional suffix. If our assumptions about unaccentability are correct, then we expect the accent of an unaccentable derivational suffix to link to any position of the word other than the derivational suffix itself, namely the root or the inflectional suffix. This prediction is borne out in Greek.

In Greek, the derivational suffix /-ik-/ is unaccentable. Derivations with this suffix show the following accentual allomorphy: *túrk-ik-os* and *turk-ik-ós* ‘Turkish’. It is evident from these examples that the accent avoids landing on the derivational suffix. At the same time it exploits both permissible positions for stress. I leave aside exactly how accentuation is pursued because it is not relevant at this point of the discussion. What is of importance here is that the morphological make-up of words has an effect on the position of stress when unaccentable morphemes are involved.

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[6] In Thompson and other Salish languages schwa /ə/ becomes an /e/ before a glottal stop /ʔ/.

[7] The asymmetry in the behavior of prefixes and suffixes is attributed in Van Oostendorp (1997) to syllabification. Suffixes often lean to roots in order to obtain the required onset and acquire a well-formed syllabic structure, in contrast with prefixes, which are more autonomous in this respect.

To sum up, the facts we have reviewed show that that there are marked morphemes whose accent is pushed outside their segmental territory. In a way, this accent is free to flop to the right or the left side of a morpheme. The few examples presented here, and more evidence that will be presented later, suggest that an accent that is free to move away from its sponsor must be floating. The lack of association with the source morpheme permits the accent to flop to the left or right edge, as shown in (6). The sign '▿' indicates the possible landing positions of the accent.

(6) *floating accent*
*
▿ -ik- ▿

In the Appendix and in the next section I delve more into the issue of unaccentability. I show that many phenomena in grammar, such as the Kikuyu tone shift, the tone assignment in Chichewa and Sukuma, and so on, show that morphemes, word edges or even prosodic constituents such as feet, often avert association with a tone. In all these cases unaccentability is closely associated with the floating nature of a tone or a lexical accent. An accent or a tone that is not locally linked can, by definition, operate on a wider scope. Only then can it have a global distribution and hence be realized outside the domain of the morpheme that sponsors it.

One could claim that preaccentuation is nothing more than a form of unaccentedness. Inflectional suffixes sponsor a floating accent which lands on the root. This way we need not distinguish between strong and weak accents in languages like Greek. There are several reasons that prevent us from adopting this view. I mention two reasons here and some more in Chapter 3. First, we would need two different devices in order to explain that the floating accent of the suffix /-on/ in *praktóron* /prak$_{\mathrm{R}}$-tor$_{\mathrm{DerS}}$-on$_{\mathrm{InflS}}$/ lands on the final syllable of the stem, whereas the floating accent of the verbal class morpheme /-u-/ in *ðjavázune* /ðjaváz$_{\mathrm{R}}$-u-ne$_{\mathrm{InflS}}$/ 'read-PRES-3pl.' lands on the final syllable of the root.[8] In the former example, a device that links the lexical accent to the stem is needed, whereas in the latter example, a device that links the accent to the root is needed. If we assume that the suffix has a weak accent, both examples can be uniformly accounted for. Second, there are languages like Hua (cf. fn 3) and

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[8] Penultimate stress in the verbal paradigm is triggered by the thematic vowel which indicates verb class and tense, e.g. *ðjaváz-i-s* 'read-PRES-2sg', *ðjaváz-u-me* 'read-PRES-2pl' Verbal roots in Greek lack inherent accentual properties.

Turkish (Inkelas 1994)[9] which both lack unaccentable morphemes but have pre-accenting ones.

We conclude that the difference between a marked accented morpheme and a marked unaccentable one is that the former morpheme is linked to the accent it introduces (7a), whereas the latter is not (7b). On the other hand, an unmarked morpheme is contrasted to both types of marking by lacking an accentual specification (7c).

(7) *accents and morphemes*

	*	.	
	|	|	
a.	σσ-	-σ	*accented*
	*	.	
b.	σσ-	-σ	*unaccentable*
c.	σσ-	-σ	*unmarked*

The representations in (7) raise an important question. If unaccentable morphemes are similar to accented ones, the only difference being that the underlying accent is not linked to a vocalic peak, are there unaccentable morphemes that introduce a weak accent? Unfortunately, this type of marking is not attested in the languages studied in this thesis.[10] This gap, however, relates to another question: how common is it to have morphemes other than inflectional suffixes marked with a weak accent? The empirical facts suggest that it is not very common to have morphemes other than inflectional suffixes marked with a weak accent. If Richness of the Base[11] (Prince and Smolensky 1993) is a fundamental tenet of Optimality Theory, every imaginable lexical

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[9] Pre-accenting suffixes in Turkish (Inkelas 1994) such as the suffix /mI/ are also problematic if they are treated as unaccentable. Two devices must be employed to account for the fact that a floating accent lands on the root in *arabá-mɨ* /araba-mI)/ 'car-INTERR' but on the suffix in *araba-lár-mɨ* /araba-lar-mI)/ 'car-pl-INTERR'. An analysis that takes the suffix /-mI/ to bear a tail specification, on the other hand, can account for the Turkish facts in a more economical and efficient way.

[10] There is a suffix with a weak floating accent in Cupeño. I present the relevant example in §2.3.2 and §5.2.4.

[11] Richness of the Base advocates the lack of constraints on the input. Inputs are potentially infinite as the candidate set; the constraints in *Eval* must be ranked in a way that impossible outputs never surface.

representation is possible; the grammar decides which one yields actual surface forms. Thus, there is nothing wrong in employing floating weak accents in underlying representations.

This gap can be understood from the following points of view: First, in the interaction of constraints that refer to lexical accents (faithfulness constraints) with the other constraints of the language. For instance, the window in Greek, that is the restriction of stress to the last three syllables of the word, would hide the effects of a derivational suffix, $-\sigma_i$, that introduces a weak floating accent to a morpheme at the left, $(\sigma\sigma)_{\sigma i}-\sigma_i-\sigma$. Structural constraints, responsible for parsing syllables to feet and assigning prominence to the rightmost one, cast out the form $(\acute{\sigma}\sigma)(\sigma-\sigma)$ because it violates the three-syllable-window. On the other hand, if the floating accent moves to the right, $\sigma\sigma-(\sigma_i-\sigma)_{\sigma i}$, structural constraints would trigger stress on the preceding constituent, namely the derivational suffix itself, creating the same effect as having an underlying foot-head.[12]

Second, if compositionality and head-dominance indeed require a one-to-one correspondence between prosodic and morphological headedness, then it is justifiable to expect elements that are morphological heads such as roots or derivational suffixes to be marked with a strong lexical accent. This way the head-morpheme guarantees itself a good chance to become the prosodic head of the word as well. On the other hand, it is expected that non-dominant elements such as inflectional suffixes to have ‘weak’ accents (or no accents).

Third, the disadvantage of a weak accent is that it does not entail a positive statement about the position of the head. As mentioned earlier, prosodic headedness in Greek words like *anθrópu* is determined by the structural constraints that assign primary stress to the rightmost foot of the word. This makes up another reason that justifies why foot-tailness is not such a favorite type of marking.

Before closing this section, it must be noted that unaccentable morphemes in this thesis are given in underlined font. This is only a notational convention in order to make ‘unaccentability’ visually perceptible. I repeat here that the foot brackets do not have any significant theoretical weight; they are just the visual translations of strong and weak accents. The table in (8) summarizes all types of marking.

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[12] The floating accent cannot be realized locally because the suffix is unaccentable. An outcome such as $\sigma(\sigma-\sigma)_i-\sigma$, in which the floating accent is located on the derivational suffix, is ruled out.

(8)

Unmarked	**Marked**	
	Accented	*Unaccentable*
σσ	*strong*: σ(σ, σσ́	$\underline{\sigma\sigma}$
	weak: σ)σ, σσ̀	

To recapitulate, unmarked morphemes lack any inherent metrical organization. Marked accented roots and suffixes have a lexically pre-specified head on some vocalic peaks, depending on the language. As I show in Chapter 3, in some languages the position of a lexical accent in a word is almost predictable. When the marked morphological element forms a word and parsing mechanisms apply to metrify the string, a peak with a strong lexical accent claims stress prominence. A weak lexical accent, on the other hand, never receives primary prominence nor assigns prominence to preceding constituents. As pointed out above, preaccentuation is the byproduct of many factors cooperating towards this direction.

2.2.2. Correspondence Theory and prosodic faithfulness

McCarthy and Prince (1995) claim that *faithfulness* constraints demand that the output be as close as possible to the input. Derivation is determined to a large extent by the interaction between faithfulness constraints, demanding identity, and constraints on output structural configurations. The latter may favor modification of the input, in violation of faithfulness. The Theory of Correspondence is introduced by McCarthy and Prince into OT to define types of constraints on elements that stand in correspondence, giving emphasis to distinct realizations of constraint-types for each domain in which correspondence plays a role. Correspondence is itself a relation between two structures such as an input and an output and is defined as follows:

(9) *Correspondence* (McCarthy and Prince 1995:262)
Given two strings S_1 and S_2, **correspondence** is a relation $\mathfrak{R}$ from the elements of S_1 to those of S_2. Elements $\alpha \in S_1$ and $\beta \in S_2$ are referred to as **correspondents** of one another when $\alpha \mathfrak{R} \beta$.

In a correspondence-sensitive grammar, candidate outputs are subject to evaluation together with the correspondent input. Each candidate pair (S_1 S_2) comes from Gen equipped with a correspondence relation between S_1 and S_2

that expresses the relation between S_1 and S_2. Eval then considers each candidate pair with its associated correspondence relations, assessing the completeness of correspondence in S_1 and S_2. McCarthy and Prince (1995) and McCarthy (1997) argue that the set of correspondent elements that can be referred to by faithfulness constraints is not limited to segments; those elements may include autosegmental features like moras, tones and, by extension, lexical accents.

Our task now is to phrase the relation between the lexical accents in (7) and the morphemes that sponsor them, in terms of universal constraints, with focus on faithfulness. For the representations in (7a), two faithfulness constraints are relevant: first, faithfulness to the lexical accent and second, faithfulness to the position of the lexical accent, that is the association of a lexical accent with the vocalic peak that bears it. I leave aside at the moment the representations with floating accents in (7b) in which the lexical accent is not associated to a vocalic peak.

Faithfulness to correspondent elements is a matter of obedience to constraints like MAX-seg, DEP-seg.[13] With respect to the autosegmental feature of lexical accent, the faithfulness constraints in (10) make direct reference to the lexical accent and account for the fact that in the absence of an overriding constraint, an input representation does not change.

(10) *faithfulness constraints*

a. MAX(LA)
A lexical accent of S_1 (input) has a correspondent in S_2 (output).

b. DEP(LA)
A lexical accent of S_2 (output) has a correspondent in S_1 (input).

Formally, MAX(LA) penalizes the deletion of a lexical accent and DEP(LA) the insertion of a lexical accent.[14] Given the dichotomy into strong and weak lexical accents the faithfulness constraints in (10) can be more specific, namely MAX/DEP(HEAD) and MAX/DEP(TAIL) or MAX/DEP(GRAVE).[15] In short,

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[13] In this thesis faithfulness to the vocalic segment that bears the lexical accent is taken for granted. I do not give a more detailed formulation of the relevant faithfulness constraints here.

[14] This refers to situations in which a lexical accent, which is originally sponsored by a root, for instance, is realized on the inflectional suffix in the output.

[15] MAX(HEAD): Every head accent of S_1 has a correspondent in S_2.
DEP(HEAD): Every head accent of S_2 has a correspondent in S_1.

MAX/DEP are prosodic faithfulness constraints that demand faithful-ness to the lexical accent.

As mentioned in Chapter 1, another family of faithfulness constraints is of importance in this study, namely the head-faithfulness constraints. These are faithfulness constraints to accents that belong to morphological heads. HEADFAITH constraints militate against the deletion or insertion of a lexical accent that belongs to a head:

(11) *head-faithfulness constraints*

a. HEADMAX(LA)
A lexical accent sponsored by a head in S_1 (input) has a correspondent in S_2 (output).

b. HEADDEP(LA)
A lexical accent hosted by a head in S_2 (output) has a correspondent in S_1 (input).

These constraints become important when there is competition among lexical accents for primary stress. Chapters 4 and 5 illustrate how HEADFAITH constraints operate in lexical accent systems.

Input autosegmental associations between segments and lexical accents in a representation like (7a) are enforced in the output by a constraint that demands conservation of these associations. This constraint is *FLOP (McCarthy 1997, Alderete 1997):

(12) *FLOP (LA)
Let χ_i be a lexical accent, ζ_j be a vocalic peak, S_k phonological representations
$S_1 \Re S_2$,
χ_1 and $\zeta_1 \in S_1$, χ_2 and $\zeta_2 \in S_2$,
$\chi_1 \Re \chi_2$ and $\zeta_1 \Re \zeta_2$,
if χ_1 is associated with ζ_1, then χ_2 is associated with ζ_2.

As defined in (12), *FLOP is a prosodic faithfulness constraint that demands lexical accents to remain faithful to their lexical association. In general, *FLOP belongs to a family of constraints that militate against deletion or movement of

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MAX(TAIL/GRAVE): Every tail/grave accent of S_1 has a correspondent in S_2.
DEP(TAIL/GRAVE): Every tail/grave accent of S_2 has a correspondent in S_1.

association lines in other kinds of autosegmental association such as tone or segmental features.

The question now is how unaccentable morphemes score with respect to the aforementioned constraints. And, more importantly, what triggers the realization of a lexical accent outside the morpheme that sponsors it.

The morphemes in (7b) introduce a lexical accent and, consequently, are subject to prosodic faithfulness. *FLOP, however, seems to be irrelevant here simply because the lexical accent is not underlyingly fixed to any position. But what prohibits the accent from being linked to the morpheme it belongs to?

I claim that the constraint that prevents local realization of floating accents is *DOMAIN. This constraint is based on Carleton and Myers's (1996) *DOMAIN, which is originally proposed to account for the fact that the tones of a certain group of affixes in Chichewa are never realized within their morphological domain (cf. (3) in the Appendix). The *DOMAIN constraint states that a lexical accent should not be associated to the morphological domain that sponsors it:

(13) *DOMAIN:

$$\begin{array}{c} {*}\mathrm{LA}_{\alpha} \\ | \\ [\ldots\sigma\ldots]_{\alpha} \end{array}$$

*DOMAIN expresses the need of accents to globalize, to extend beyond the restricted domain of a morpheme and become a property of the word. This constraint is controlled by *FLOP in lexical accent systems. As a consequence, a linked accent remains fixed to its lexical position.[16]A floating accent, on the other hand, is not subject to such a restriction; consequently, it can accomplish its goal and move beyond its underlying sponsor.

To sum up, there are three types of prosodic faithfulness constraints: faithfulness to the lexical accent of a morpheme, faithfulness to the lexical accent of a morphological head and faithfulness to the position of the lexical accent. Unaccentability is the result of constraint interaction between the anti-migration constraint *FLOP and the structural constraint *DOMAIN. The abstract tableaux in (14) show how hypothetical outputs are evaluated with respect to the above constraints. Constraint ranking is irrelevant in this tableau. What is important is which constraint is violated by each output.

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[16] In the Appendix I discuss a few tone languages in which *DOMAIN is high ranked giving rise to systems whose tone is always realized outside the domain of the morpheme that sponsors it. An accentual system with S(R) and high ranking of *DOMAIN exhibits primarily final stress and neutralizes lexical contrasts to the greatest extent.

(14)

σ(σ$_{H}$-σ	HEADFAITH	FAITH	*FLOP	*DOMAIN
a. σ(σ-σ				*
b. (σσ-σ			*	*
c. σσ-(σ		*	*	
d. σσ-σ	*	*		

(15)

σσ$_{H}$-(σ	HEADFAITH	FAITH	*FLOP	*DOMAIN
a. σσ-(σ				*
b. σ(σ-σ	*		*	

In the first tableau, candidate (14a) only violates *DOMAIN because it realizes the inherent accent within its morphological domain. Candidate (14c) moves the lexical accent to the suffix triggering two violations of faithfulness. First, *FLOP is violated because the lexical accent shifts away from its lexically pre-assigned position and, second, the lexical accent of the head is inserted to an underlyingly unmarked suffix causing violation of FAITH. *DOMAIN and *FLOP are violated in (14b) as well. The accent remains within the vicinity of the head but shifts to another vocalic peak. Finally, (14d) violates HEADFAITH (and FAITH) because the inherent accent of the morphological head is lost in the output.

In the second tableau, candidate (15a) violates *DOMAIN for the same reasons as (14a), whereas (15b) violates both HEADFAITH and *FLOP. The accent moves outside the suffix and, eventually, lands at the right side of the head, which is now added to a lexical accent (HEADDEP violation).

With the help of these constraints we will be able to analyze the accentual phenomena in this study. In Chapter 3, I show that in Greek and Russian prosodic faithfulness constraints occupy different ranks in the constraint hierarchy. Faithfulness to the lexical accent is ranked higher than faithfulness to the position of the accent. More importantly, the latter constraint is dominated by constraints that condition the prosodic shape of the word. *FLOP, however, dominates the structural constraint *DOMAIN, banning the migration of linked accents outside the territory of the morpheme they belong to. Moreover, this study provides ample empirical evidence in favor of a dichotomy in prosodic faithfulness between head faithfulness and simple faithfulness constraints.

2.2.3. Lexical specification and the lexicon

In Optimality Theory, Richness of the Base advocates the absolute absence of constraints on the input forms; *all* inputs are possible. This means that the theory can handle all putative inputs, those that contain accents and those that do not, without resorting to any stipulations about the structure of the lexicon. Prince and Smolensky (1993) and Itô, Mester and Padgett (1995) recognize the need for a more restrictive theory of the lexicon and propose that parses of different inputs are compared as to their relative *harmony*, where one is chosen which incurs the least violations of the high ranked constraints of the grammar. This is a consequence of Lexicon Optimization, which accomplishes two tasks: first, it leads the learner to choose the right inputs as underlying forms and second, it produces the right outputs.

In a language like Greek with high ranking faithfulness constraints (cf. Chapter 1 and Chapter 3), Lexicon Optimization entails that a root with a lexical accent such as /sta(fið-/, for example, will be preferred over a root with no lexical accent, /stafið-/, if the output is a word with a marked root, namely *stafíða*. Consequently, a Greek learner would choose the form which is closest to the output as an input because the Greek grammar deems the enriched input as more harmonic than an input without any accentual specifications.

The question that arises now is what exactly is stored in a Greek speaker's lexicon. Are all putative inputs actively present or only the most harmonic ones?

I assume that the speaker stores harmonic inputs as active part of the lexicon. Richness of the Base does not mean that there are no fixed input forms in the lexicon. Non-harmonic inputs are filtered out and only those that best satisfy the constraints are stored as active part of the lexicon. Given the fact that in Greek and the other lexical accent systems in this respect, faithfulness constraints are ranked high, inputs which best satisfy faithfulness are considered to be more harmonic than others and consequently, are stored in the lexicon. As a result, the largest part of the Greek vocabulary comes with a rich metrical structure.

Undoubtedly, this is an essential subject in Optimality Theory and more work needs to be done in pursuing this idea. Unfortunately, space and time pressure deter us from pursuing this question in detail.

2.2.4. Lexical accent: an autosegment or a prosodic role?

McCarthy and Prince (1995) and McCarthy (1995, 1997) discuss some cases of prosodic faithfulness in which a surface (output) form is prosodically faithful to the underlying (input) representation. In particular, McCarthy (1995), based on Inkelas's (1994) analysis of exceptional lexical stress in Turkish (cf. §2.3.1), suggests instead of treating faithfulness to a lexically pre-assigned foot as an all-or-nothing affair, to make faithfulness sensitive to foot-internal positions occupied by segmental material.

Within a foot, a head and a tail part can be distinguished. The idea is now that marked morphemes are assigned a foot-head or a foot-tail role in the lexicon. Let us illustrate this with some examples from Greek. The last syllable of the accented root /stafið-/ in *sta*(*fíð-a* ‘raisin-NOM.sg’ is lexically pre-assigned with the prosodic role of a foot-head. The genitive suffix /-u/ in *anθrop-u*) ‘man-GEN.sg’, on the other hand, is prespecified to have a foot-tail role.

The underlying prosodic role of foot-head carried by the segments /fið/ in *sta*(*fið-a* is a feature that is transferred to the surface through a correspondence relation between the segments that constitute /fið/. Similarly, the lexically assigned feature of foot-tailness of the genitive suffix /-u/ in *anθropu*) is transmitted to the surface through segment correspondence as well. In other words, prosodic faithfulness is always mediated by the segments bearing the particular prosodic roles.

However, problems arise as soon as unaccentable or else, post-accenting morphemes are taken into consideration. The fact that a morpheme is specified to assign a foot-head role on segmental material that is not present until word formation will always pose a serious problem for the theory of correspondent prosodic roles.

At this point, the presentation of the theory of marking advanced in this thesis is brought into conclusion. In the remainder of this chapter, I present other theories of marking. Three approaches on lexical marking are distinguished in the stress literature. According to the first approach, conventionally named here *Lexical Constituency* (§2.3.), lexical stress[17] is an autonomous prosodic element that is affiliated to morphological or segmental material. As representative examples of this theoretical view, I present the marking theory proposed by Inkelas (1994) for the analysis of the Turkish exceptional vocabulary and the theory developed by Alderete (1997) for the analysis of Cupeño lexical stress.

According to the second view, which is given the conventional name *Lexical Representation* (§2.4), marking is the projection of intrinsic metrical structure from vocalic peaks. Halle and Vergnaud (1987) argue that syllables idiosyncratically project a head onto the stress plane, whereas Idsardi (1992) and Van der Hulst (1996) view marking as the idiosyncratic projection of syllable boundaries and foot-boundaries, respectively.

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[17] Most of these studies refer to lexical accent as ‘lexical stress’.

The third theoretical model, called here *Parameters and Constraints* (§2.5), is in favor of a mixed stress grammar in which marked words are not assigned metrical structure in the lexicon, but they constitute a subgrammar which is different from the grammar that derives regular stress. I discuss some representative theories along this line of thinking and, more specifically, Tsay’s (1990) parametric theory of exceptional stress and Hammond’s (1995) parochial constraint theory on lexical stress.

2.3. Lexical Constituency

2.3.1. Lexical marking as pre-assigned feet

Inkelas (1994) in a survey of Turkish stress and, specifically, exceptional stress patterns triggered by lexically marked suffixes, argues in favor of a prespecification account in which a marked morpheme is affiliated in the underlying representation with a foot. This foot interacts with a body of other factors to determine the stress pattern of the word that contains it. For the moment, what is of interest is that a trochaic foot is pre-assigned to a morpheme. Accented morphemes, roots and suffixes, have the representations in (16a-c). Pre-stressing suffixes can also be accounted in this model, as shown in (16d).

(16) *lexical marking as pre-assigned feet*

a.	(* .) penalti	‘penalty’	c.	(* .) -Iyor	‘PROGRESSIVE’
b.	(* .) pendʒere	‘window’	d.	(* .) -mI	‘INTERROGATIVE’

To elaborate on this model of lexical specification, an inherently stressed morpheme is underlyingly affiliated with a trochaic foot. In (16a-c) we see that both the head and the tail of the foot dominate segmental material. There are suffixes, however, like the one in (16d), in which the head of the trochee is left unfilled until it unifies with material of the base. This segmentally unsupported head resembles a catalectic syllable (Kiparsky 1991, Kager 1995, Van de Vijver 1998) although here the catalectic part of the foot is a head and not a tail. The lexical foot interacts with constraints of the grammar to determine primary stress.

An important advantage of this approach is that all exceptional morphemes have a uniform representation: they are lexically equipped with a trochee. Moreover, in this theory the lexical foot has an independent status; it is a prosodic constituent that is sponsored by a morpheme.

The independent nature of the lexical foot in this theory resembles the autosegmental analysis I propose for lexical marking. There are few less attractive aspects in this view. It is impossible, for instance, to have post-accenting morphemes in a trochaic system. Greek, however, falsifies this prediction. Moreover, it is unclear how morphemes that impose an accent beyond the neighboring syllables can be represented in this theory. (The next section shows that such morphemes are empirically attested.)

2.3.2. Lexical marking as inherent prominence

In the analysis of the lexical stress of Cupeño, Alderete (1997) represents lexical stress as pure prominence. More specifically, lexical stress is encoded as an intrinsic feature of an underlying sponsor which has no phonetic realization until it is projected onto the grid where it is aligned with prosodic constituents (Alderete 1997:3). Some examples from Cupeño are given in (17). The root in (17a) has an inherent prominence as opposed to the root in (17b), which is stressed on the initial syllable by default. The suffix *-nuk* in (17c) has a floating accent (represented here for typographic simplicity with an accent ‘´’ before the sponsoring morpheme). This accent is linked to the right edge of the root by language-specific alignment constraints.

(17) *lexical marking as prominence*

a.	təmál	/təmá-l/	‘ground’
b.	máxan	/max-an/	‘give it to me’
c.	wəná-nuk	/wəna-´ nuk/	‘having put in’

Alderete’s proposal is along the lines of the model advanced in this study. The only difference is that in the present study a lexical accent has two valences; it is realized as high and low tone in pitch-accent systems (Fore, Japanese), as head and tail in lexical accent systems with a foot organization (Greek, Russian and Lillooet Salish), and as head and grave accent in prominence systems (Thompson Salish). An advantage of the approach promoted here is that it can also account for accents that have duration but no prominence. There are some marked morphemes in Cupeño whose accent protects the vowel from reduction, but it does not have prominence:

(18) *suffixal weak prominence in Cupeño* (Hill and Hill 1968:236)
ʔísi-l^{y}ə-yə → ʔísȉ-l^{y}ə-yə [ʔís**i**-l^{y}i] ‘coyote (objective case)’

In this example the suffix /-yə/, which marks objective case, imposes an accent on the last syllable of the root. This accent protects the last vowel of the root from reduction or deletion.

2.4. Lexical Representation

There are three major trends in the Lexical Representation approach. Marks, as abstract entities, can take the form of pre-assigned heads (§2.4.1), foot-brackets (§2.4.2) or syllable-boundaries (§2.4.3). In the following subsections, I sketch the basics of each model. Special attention is given to the syllable-boundaries approach since this theory has been applied to lexical accent systems as well.

2.4.1. Lexical marking as prespecified heads

In his analysis of Vedic accent, Kiparsky (1982) develops a unified analysis of stress according to which word accent is compositionally derived by general phonological rules that do not refer to specific morphemes or classes of morphemes. The essential features of this analysis are based on the assumption that some morphemes bear a lexical accent on some syllable in their underlying representation. Halle and Vergnaud (1987), elaborating on this idea, suggest that marked morphemes are supplied with ‘asterisks’, which are projected onto the stress line. According to their theory, stress is represented on an autosegmental line as a sequence of abstract positions or slots associated with the stress-bearing units on the line of phonemes. An asterisk represents each stress-bearing unit, (*). The line of phonemes, which is designated as *line 0*, mediates the correspondence between stress-bearing units and the stress line, *line 1*, as exemplified in (19).

```
(19)    * . * . * .     line 1
        * * * * * *     line 0
        σ σ σ σ σ σ
```

In the abstract form in (20), the string of stressable elements is analyzed into a sequence of binary constituents whose boundaries are indicated with parentheses. Each stress domain contains exactly one position that is distinguished from all others as more prominent. This stressed element is the *head* of each binary grouping and is designated by an asterisk on line 1. The abstract form in (20) depicts the derivation.

(20) * . * . * . line 1
(* *)(* *)(* *) line 0
σ σ σ σ σ σ

In short, stressed elements are identified by occurrences on the higher line of the same asterisk that is used to identify the stress bearing element on line 0. Crosslinguistic variation in stress results from a limited number of parameter settings that generate metrical constituency in the fashion just sketched. The position of primary stress is determined by a language-specific rule.

Coming back to our discussion, a marked morphological element in this theory has a prespecified head, which is projected onto the stress line. A word like *gáva* 'cow-INSTR.sg', for example, in Sanskrit, composed of two marked morphemes, /*gáv-á*/, has the representation in (21).

(21) *lexical marking as head projection on the grid*

* * line 1
(*) (*) line 0
gav- a 'cow-INSTR.sg'

The language-specific word-stress rule applies to assign primary stress to one of the two competing heads. In our example, the accent of the root is eventually assigned prominence. The exact way accentuation is pursued in Sanskrit falls outside the scope of the present discussion. Similar representations of marking have been adopted by a number of other scholars (Halle (1973), Halle and Kiparsky (1977, 1981) for Russian; Steriade (1988) for Ancient Greek; Melvold (1990) for Russian; Bat-El (1990, 1993) for Modern Hebrew).

For Halle and Vergnaud, accents are input to a certain set of stress rules. The most important aspect of this approach is that purely phonological principles decide on the future of marks. It is the overall stress algorithm of the language that determines whether a particular accent will surface or not. However, the approach seems to have a problem with the representation of more sophisticated forms of marking like preaccentuation and unaccentability which both imply, in some way or other, accent on neighboring syllables. Under Halle and Vergnaud's approach, we must assume that in these types of marking the marked syllable has the ability to assign its asterisk/diacritic on other syllables of the stress plane. However, it is hard to explain on what grounds it is decided whether the syllable will project its inherent stress onto its own grid or the grid of some other syllable. The theory has to improvise extra rules or limitations for marking.

Another less attractive aspect of the theory is that it cannot represent weak accents. Empirically, we have seen that there are marked syllables in the string that do project an asterisk onto the grid lane, but this asterisk must always be weak. The Greek pre-accenting suffixes and the Thompson grave accent, discussed in §2.2.1, are empirical instantiations of this theoretical possibility.

Apart from lexical specification, problems also arise when the word stress rule cannot guarantee the desirable results for all words. Once more, Greek provides the crucial example. At this point, let us assume that the words *uranú* 'sky-GEN.sg' and *stafíðon* 'raisin-GEN.pl' have the underlying representations /*urán-ú*/ and /*stafíð-ón*/, respectively. (Cf. Chapter 3 for justification of these marking patterns.) This means that within the same language, prominence is both right-headed, *u*(*ranú*), and left-headed, *sta*(*fíðon*).

In the next section, I present a modified version of this theory that represents marks in the form of pre-assigned brackets.

2.4.2. Lexical marking as prespecified brackets

Van der Hulst (1996) compares lexically assigned marks to syllable weight. Marks partition the syllables of a string into two categories, those which can attract stress and those which cannot attract stress (or they attract stress only in the absence of marked syllables). This highly resembles the behavior of heavy syllables towards light ones; heavy syllables are by nature stress-attracting whereas light ones are given this opportunity only in the absence of heavy syllables. For this reason, he refers to marks as *diacritic weight*.

Under the influence of Idsardi's (1992) theory (cf. §2.4.3.), marks are represented by means of foot-brackets that marked syllables project onto the grid. A left foot-bracket '(' or an asterisk (*) indicate diacritic weight. This notational convention is used indistinctly with the asterisk '*'. This model designates lexical marking of extrametricality by using the right-foot bracket ')'. Let us see how it accounts for the Polish words with exceptional antepenultimate and final stress.

(22) *lexical marking as prespecified brackets*

					*
	)		(* *)		(* *)
a.	gramatyk-a	→	gramatyk-a	→	gramatyk-a

```
                                *
        (       *      (*)     (*)
    b.  rezim or rezim → rezim → rezim
```

Stress on the antepenultimate syllable arises from extrametricality of the final syllable which is marked as such by a right foot-bracket at its left, (22a). Similarly, final stress is derived by having either a left-foot bracket (or an asterisk) at the left of the marked syllable, (22b). Needless to say, main stress is assigned to marked words by the same principles as those that assign stress to unmarked ones (e.g. binary trochaic feet, word stress on the rightmost foot, etc.)

The problem with this approach is that it appears to be inconsistent with respect to the use of the right-foot bracket. The right-bracket marks not only extrametricality but also a possible position of accent. For example, in the word *gramátyk*, penultimate stress is derived as follows:

```
(23)                          *
             )      (* *)      (* *)
      gramatyk → gramatyk → gramatyk
```

In (23), the right foot-bracket marks penultimate stress and not extrametricality. However, the only reason that motivates the use of a right foot-bracket is the parallel existence of the form *gramátyka*, (22a). We have seen above that this form necessitates extrametricality of the inflectional ending and is marked with a right foot-bracket. However, in our example the correct pattern could be reached by using a left foot-bracket as well, *gra*(*mátyk*.

Moreover, the two brackets do not have the same theoretical weight. In fact, their function is rather asymmetric. The right bracket has a restrictive function; it restrains the scope in which stress rules apply. For instance, the bracket at the right edge of the word in (23) reveals nothing about the possible position of stress. This is decided by the stress algorithm. On the other hand, a left foot-bracket denotes the position of stress in a more straightforward way, as shown by the example in (22b).

The model has some other inconsistencies. The equation ‘(’=‘*’ holds only when the mark occupies the final or pre-final syllable of the word, in other words when there is available space for hosting exactly one (monosyllabic or disyllabic) foot. If we use the left foot-bracket to other than the last two syllables of the word/morpheme, the wrong stress pattern arises. This is illustrated in (24). Keep in mind that monosyllabic feet are allowed in marked words as suggested by *rezím* in (22b).

(24)

			*
(	(* .)	(* .)(*)	(* .)(*)
universitet →	universitet →	universitet →	universitet

The advantages of the foot-bracket theory are that, first, it accounts for accentual stability in the paradigm (*gramátyk*, *gramátyka*) in a uniform way. Second, the use of foot-brackets offers the appropriate tools needed for the representation of post- and pre-accenting morphemes.

2.4.3. Edge, parenthesis and head parameters

2.4.3.1. The theory

Idsardi (1992) and Idsardi and Halle (1995) develop a stress theory which can uniformly account for a wide range of stress patterns including the exceptional varieties of fixed systems as well as the lexical accent variety of free systems. Here, I am only interested in the applications of the theory to marked patterns of stress. The general premises of the theory are presented in the following paragraphs.

The theory constructs a phonological plane, the metrical grid, familiar from Prince (1983) and Halle and Vergnaud (1987). Metrical constituents are created by placing boundaries on the metrical grid. Grid marks are projected onto the metrical plane by special rules of projection. The emphasis of this theory is on the placement of metrical boundaries. Metrical boundaries have the form of parentheses which are elements with their own entity on the grid. In this theory a left parenthesis ‘(’ indicates that the material to its right up to the next parenthesis comprises a constituent; and, similarly, a right parenthesis ‘)’ indicates that the material to its left comprises a constituent. In a way, parentheses act as junctures. As already noted, special rules will project the stress-bearing morphemes, that is, the heads of the syllables, onto the metrical plane.

(25) *line 0 mark projection*
Project a line 0 element for each syllable head.

Moreover, Idsardi (1992) argues that in many languages syllable boundaries play a role in the computation of stress as well. A rule called the Syllable Boundary Projection Parameter is responsible for projecting syllable boundaries onto the metrical grid. This rule is given in (26).

(26) *syllable boundary projection parameter*
Project the left/right boundary of certain syllables onto line 0.

The projection of syllable boundaries in (25) is different from the projection of grid marks in (26). All languages invoke some form of (25) but only some languages invoke (26). It depends on the specific language whether (26) is triggered by a heavy or an accented syllable. To illustrate the theory described so far I borrow Idsardi's (1992:2) example of Koya. The stress rule for Koya is described in (27).

(27) Stress falls on the head of every closed or long syllable (CVX) as well as on the head of the initial syllable. Main stress is on the initial syllable.

This language projects the left boundary of heavy syllables onto the metrical grid, according to the rule in (26), as shown in (28).

(28) x x (x x (x line 0
CV CV CVX CV CVX

However, like heavy syllables, the first syllable has increased prominence. Therefore, the first syllable must also correspond to a constituent edge. To achieve this, a left parenthesis must be placed before the leftmost element of the string. Universal Grammar, according to Idsardi, provides a parameter that allows us to place a parenthesis at an edge of a form. This is the Edge-marking Parameter, given in (29).

(29) *edge-marking parameter*
Place a left/right boundary to the left/ right of the left-/rightmost element in the string

Koya sets Edge:LLL, that is, it places a LEFT boundary to the LEFT of the LEFTmost element, producing the grid in (30).

(30) (x x (x x (x line 0
CV CV CVX CV CVX

Now we still need to add prominence to the first element in each constituent formed by a boundary. This is controlled by the Head Location Parameter:

(31) *head location parameter*
Project the left/right-most element of each constituent onto the next line of the grid.

This parameter designates a grid-internal interface between layers of the grid: to build further layers of the grid, certain elements must be again projected. Koya sets the Head Parameter on line 0 to ‘left’, Head:L, generating (32).

```
(32)      x        x         x
         ( x    x  ( x     x   ( x          line 0
         CV CV CVX CV CVX
```

The final step is to apply the Edge-marking and Head Parameter to line 1. In Koya the line 1 settings are the same as those in line 0. Thus, the settings Edge:LLL and Head:L yield the grid in (33):

```
(33)      x
         (x        x         x              line 1
          x    x  ( x     x    (x           line 0
         CV CV CVX CV CVX
```

To complete the model I must introduce one more parameter, namely the Iterative Constituent Construction Parameter (ICC), which is responsible for iterative effects of stress:

(34) *iterative constituent construction parameter*
Insert a parenthesis every two elements starting from the
right/leftmost element.

Having given a general picture of Idsardi’s framework, let us move on how this systems accounts for marked patterns in the lexical accent system of Russian.

2.4.3.2. Lexical marking in Russian

In this section, I examine how Idsardi’s theory applies in lexical accent systems. I choose Russian to be the language of exemplification. Most morphemes in Russian are lexically marked with special parentheses-settings. Consequently, roots and suffixes, but not whole words, belong to different classes: unstressed, stressed and post-stressing. Unstressed mor-phemes have no prespecified Edge settings and stressed morphemes have a variety of Edge parameter values depending on the position of stress in the string of syllables. Finally, in post-stressing morphemes the parameters are set up in a configuration that renders a left syllable boundary at the end of the morpheme. This classification corresponds to various types of lexical Edge marking, as shown in (35). Notice that it is always a left parenthesis that is projected onto the string.

(35)

Unstressed	xxx	No Edge
Post-stressing	xxx(	Edge:LRR
Stressed	(xxx	Edge:LLL
	x(xx	Edge:LRL
	xx(x	Edge:LLR

The parameter settings for word stress are Edge:LLL and Head:L. This means that a word composed of unmarked morphemes displays initial stress. Implementing the described parameters to words composed of marked morphemes, we get the derivations in (36) (Idsardi 1992:53). In the following table the roots of the first two examples are inherently equipped with metrical information. The third root is unmarked. In all three cases the inflectional suffix is stressed. Although the word-stress rule assigns primary prominence to the leftmost bracket, the result is different for each example because of the idiosyncratic Edge specification in line 0.

(36)

Examples	Edge:LLR *rabóta* ‘work-NOM.sg’	Edge:LRR *gospozá* ‘lady-NOM.sg’	Edge: ∅ *borodá* ‘beard-NOM.sg’
Lexical Edges	x (x (x rabot - a	x x ((x gospoz -a	x x (x borod - a
Line 1 Head:L Edge:LLL	x (x x x (x (x rabot - a	x x x x ((x gospoz - a	x (x x x (x borod - a

The above derivations make clear that, putting aside the projection of lexically determined values for the Edge parameter, marked words share with unmarked ones the parameter settings for word stress. However, this is true only for inflected words, words composed of a root and an inflectional suffix. In derivation, some stressed suffixes have the property of attracting primary stress from roots as, for example, the suffix /-an/ in *bratán* > /brát-án/ ‘big brother’.

To account for this Idsardi has two options: either to insert a special rule that deletes the parenthesis of the root, or to change the parameter settings for line 1. The first option employs theoretically unmotivated rules of parenthesis insertion/deletion. The second option implies that specific derivational suffixes are equipped with intricate markedness properties; they must have lexically marked Edges both for line 0 and line 1.

Another drawback of Idsardi's model is that it overgenerates; it produces the same patterns by a combination of different parameter settings. As mentioned earlier, Idsardi suggests that three-syllable stressed roots have the Edge specifications in (37). However, a disyllabic root with final stress, σσ́, can be marked either as Edge:LLR or Edge:LRL.

(37)

Stressed	(xx x(x	Edge:LLL Edge:LRL or Edge:LLR

The redundancy in the representation becomes more apparent in trisyllabic morphemes. One can argue in favor of the representations in (38) which, with the aid of the Iterative Constituent Construction parameter, can correctly derive the very same stress patterns as the principles in (35).

(38) *new representation*
xxx) Edge:RLR
xx)x Edge:RRR
(xxx Edge:LLR

(39) *example*

Project Lexical Edge:RRR	x x x) σ σ σ
ICC:Right to Left	x (x x) σ σ σ
Line 1 Head:L Edge:LLL	x (x x(x x) σσ σ

Finally, the model cannot account for four-syllable roots of the accentual form σσσ́σ. Such roots do exist in Russian but they are usually borrowings from other languages, e.g. *ginekólog* ‘gynecologist’, *temperáment* ‘temperament’. Idsardi (1992:52) arbitrarily stipulates that these forms are polymorphemic, without, however, spelling out how they are marked within the representational schema he proposes for Russian. It is obvious that in Idsardi’s model, a left parenthesis needs additional assumptions such as extrametricality of the final syllabic constituent to derive the desired outcome for four-syllable or even longer words.

It is evident that Idsardi was influenced by Halle and Vergnaud’s theory of marking. Marked syllables are projected onto the grid and participate in the stress algorithm in both theories. The difference is that in Idsardi’s theory, syllables project boundaries[18] and not vocalic peaks. This point of divergence, however, has a dramatic consequence for the way the two theories account for accentual phenomena. In the first theory, syllables project headedness, ‘*’. In the second theory, syllables project boundaries, ‘)’, ‘(’, and headedness relies on other parameters, most of the time.

More importantly, it seems that syllable boundaries do not have the same theoretical weight. The asymmetry between a left and a right boundary, first observed in Van der Hulst’s model (§2.4.2), holds for this theory as well. A left boundary is equivalent to headedness as opposed to a right boundary that usually defines the domain in which stress parameters apply. Idsardi (1995:15) assumes that the Polish words *gramátyk* and *rezím*, for example, are marked with a right boundary at the right side of the word, *gramátyk*) and a left boundary at the left side of the final syllable, *re*(*zím*, respectively. Although in the second form the left boundary already decides for the position of stress, in the first one the boundary entails nothing about the position of stress. The application of ICC, together with the Edge and Head parameters (line 0), determine stress. Interestingly, the inherent asymmetry between syllable boundaries leads to another type of asymmetry. A left boundary can be used independently from the ICC parameter, whereas a right boundary presupposes the ICC parameter. Assuming that the ICC parameter creates effects similar to footing, a broader generalization would be that a left boundary can be used for foot-based languages, as well as languages that have peak prominence, while a right boundary can be only used for foot-based systems.

Finally, what remains is to examine how our theory balances in relation to Idsardi’s model. Right and left-foot brackets do not have any theoretical weight in this thesis. They are the typographical notation for strong and weak lexical accents. Moreover, the value of our model relies basically on two points: first, it employs a marking apparatus that can apply to all languages in a uniform way as

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[18] I leave unquestioned here the theoretical weight of notions such as ‘syllable boundary’ and the content of rules having syllables projecting their boundaries on the grid.

opposed to Idsardi's marking model that is dependent on the overall algorithm of the language. Second, our marking abstracts away from the problem of having words with similar stress pattern derived by different marking settings. To illustrate with an example, according to our model marked words in Polish have the representations in (40). From a learnability point of view, this marking mechanism is easier to compute; both pairs in (40) have an underlying (foot)head.

(40) a. gra(mátyk gra(mátyka
b. re(zím re(zímu

This chapter is rounded off with a short examination of theories that view marking as part of a subgrammar.

2.5. Parameters and Constraints

It has been proposed that marked words are nothing more than small subsystems in the overall stress grammar of the language. This view has been expressed in two ways: marked words are the result of different parameter settings (§2.5.1) or 'parochial' constraints or constraint rerankings (§2.5.2).

2.5.1. Lexical marking as variable parameters settings

Tsay (1990) introduces a parametric theory of stress according to which the same parameters are used for assigning regular, as well as exceptional stress, but for each case the parameters are set to different values. She motivates her proposal based on the observation that exceptional stress in Polish and Slavic Macedonian is not radically different from the regular stress pattern, but it 'falls into systematic patterns' in the sense that it occurs only in specific syllabic positions in the word.

Within this account, the difference between regular and exceptional stress is just a difference in the values of some parameter. Morphemes are marked underlyingly as to which parameters are chosen. To exemplify, words with exceptional antepenultimate stress in Polish set on the parameter of extrametricality. However, the parameter of extrametricality is set off for regular penultimate stress. Changing the foot-headedness parameter from left-headed to right-headed, we derive the difference between (ante)penultimate stress, *gra*(*máty*)*ka*, *hipo*(*pótam*), and final stress, (*rezím*).

This approach seems to gain ground in cases of morphology-dependent stress as in Spanish or English. We can argue that different parameter settings are associated with different morphological classes or categories. For instance, in English extrametricality is on in nouns but off in verbs.

The disadvantage of this approach is that it cannot account for phenomena related to the stability within the paradigm. For instance, we will have to assume different parameter settings for the paradigm of the Polish word *gramátyka* 'grammar-NOM.sg', *gramátyk* 'grammar-GEN.pl' because the former has antepenultimate stress whereas the latter has penultimate stress.

In addition, by setting different parameters on and off, the theory becomes too powerful since it can predict radically different accentual patterns for exceptional words. For example, by setting the parameters in particular values, one could predict a language that has regular stress on the penultimate syllable and exceptional stress on the leftmost heavy syllable of the word. A possible route would be to define a constrained system of principles that are hierarchically ordered according to the importance that a specific language assigns to them. This is something that Tsay's systems cannot account for, as opposed to the system developed in this thesis.

Finally, a more general problem with this model is that it cannot decide which parameter setting is preferred in cases where two morphemes with conflicting parameters are met. As mentioned earlier, there are morphemes in Greek that demand final stress (e.g. uran-) and suffixes that invoke penultimate stress (e.g. -u). The empirical facts suggest that in this case the root wins over the suffix (e.g. *uranú*). However, it is difficult to imagine how the parametric theory can be formulated in order to account for these facts.

2.5.2. Lexical marking as 'parochial' constraints and constraint-reranking

With the blooming of the constraint-based framework of Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993a, 1994), some scholars experimented in encoding exceptional or marginal metrical information in terms of different constraint rankings.

The notion of *family of constraints* is crucial for Optimality Theory. One of the constraint families is *Generalized Alignment* (McCarthy and Prince 1993b) which includes constraints that figure how constituent-edges are aligned in morphological and phonological processes. Generalized alignment demands that a designated edge of each prosodic or morphological constituent of a certain category coincide with a designated edge of some other prosodic or morphological constituent. For example, ALIGN (σ, L, PrW, L) requires the left edge of a syllable to be aligned at the left edge of the prosodic word, and ALIGN (σ, R, Ft, L) requires the left edge of a syllable to be aligned at the right edge of a foot.

Hammond (1995) uses alignment constraints to analyze marking patterns in Spanish. For him, each word bearing a marked stress pattern has its own alignment constraint, crucially ranked above the other constraints of the language. For example, Hammond suggests the following constraint for the word *sofá*: ALIGN (sofa, R, Head (Ft), R), which means that the specific word *sofa* aligns its right edge with the right edge of the head of the foot. Similarly, an exceptional word such as *pajaro* is escorted by the constraint ALIGN (pajaro, L, Head (Ft), L), which is read as follows: "align the left edge of the word *pajaro* with the left edge of the head of the foot". Hammond calls these constraints 'parochial constraints' and argues that they take priority in ranking compared to the constraints that determine the regular (default) penultimate stress of the language.

Garrett (1996) points out an important problem in Hammond's proposal: parochial constraints are language specific and their use leads to a system containing hundreds of constraints that are completely unordered with respect to each other.

Another proposal, in the spirit of Tsay's parametric theory of marking but formulated in terms of constraints is Revithiadou's (1997a) analysis of marked words in Greek, Russian and Modern Hebrew. She argues that marks target positions that lead to the construction of templatic, strictly binary prosodic words. (This idea was introduced in the Introduction and is fleshed out in Chapter 3 where the interested reader will find all argumentation). More specifically, there is a set of constraints that control the prosodic form of the word:

(41) *prosodic form constraints*
  a. F(OO)TBIN(ARITY) (Prince and Smolensky 1993)
    Feet must be binary.
  b. PARSE-σ (McCarthy and Prince 1993a)
    All syllables must be parsed into feet.
  c. ALIGN (Ft, L/R, PrW, L/R) (McCarthy and Prince 1993b)
    Align the left/right edge of the foot with the left/right edge of the prosodic word.

To give an example, the stress variability in Greek: *ánθropos* 'man', *fantáros* 'soldier', *uranós* 'sky', is derived by ranking the constraints in (42) in different hierarchical orders. The list of rankings is given in (42).

(42) a. *ranking* A ≻ ánθropos: ALIGN-L >> ALIGN-R, FTBIN >> PARSE-σ
b. *ranking* B ≻ fantáros: ALIGN-R >> ALIGN-L, FTBIN >> PARSE-σ
c. *ranking* C ≻ uranós: ALIGN-R >> ALIGN-L, PARSE-σ >> FTBIN

For words like *ánθropos* it is more important to have a binary foot aligned at the left edge of the prosodic word, (*ánθro*)*pos*, than parse all syllables of the string into feet, *(*anθro*)(*pós*). A word like *fantáros* imposes the same requirements with the difference that the foot should be aligned at the right edge of the word, *fan*(*táros*). However, words of the type *uranós*, align the foot at the right edge of the prosodic word but also allow the parsing of syllables into unary (monosyllabic) feet, (*ura*)(*nós*). This constraint ordering results in final stress.

The constraint-based approach appears to be more restricted than Tsay's parametric theory on marking because of the notion of 'ranking'. The parameters now take the form of constraints, and are ranked with respect to each other in a specific way: the language makes use of three rankings only.[19]

However, this theory has some unpleasant aspects. Most paradigms in Greek have stable stress on one of the three permissible syllabic positions. However, this generalization does not hold for words with antepenultimate stress and accentual alternations within the paradigm. More specifically, three different accentual paradigms are exhibited by words with antepenultimate stress, all given in (43). The paradigms of *klívanos* and *stafíða* in (43a) have fixed stress in singular and plural. The paradigm of *ánθropos* in (43b) has stress on the penultimate in genitive and antepenultimate stress elsewhere. Finally, *θálasa*-type nouns, (43c), have initial stress in all grammatical cases except the genitive plural which displays final stress.

(43) *accentual patterns of words with antepenultimate stress*
a. klívanos (NOM.sg), klívanu (GEN.sg), klívani (NOM.pl)
stafíða (NOM.sg), stafíðas (GEN.sg), stafíðon (GEN.pl)

b. ánθropos (NOM.sg), anθrópu (GEN.sg), ánθropi (NOM.pl)
c. θálasa (NOM.sg), θálasas (GEN.sg), θalasón (GEN.pl)

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[19] Cf. Anttila (1995, 1997) for a constraint-based account of variation in grammar, Nouveau (1994) for a similar approach to exceptional stress patterns in Dutch and Drachman, Kager and Malikouti–Drachman (1997) for a constraint-reranking approach on prosodic allomorphy in Greek.

One way to account for the facts in (43) is to assume that the class of words with antepenultimate stress is further divided into three subclasses. However, this proposal does not explain why this divergence is only attested in words with antepenultimate stress and not in words with (pen)ultimate stress.

Another route that can probably account for this question is to argue that morphemes, and not words, are associated with specific rankings. In this spirit, antepenultimate stress in (43b) is triggered by the root or the suffix. It is more economical to assume that the triggering morpheme is the root.[20]

Now, we can further argue that penultimate stress in (43b) is caused by the genitive singular inflectional suffix /-u/ which, as opposed to other suffixes, is lexically associated with ranking B. If penultimate is the stress pattern of the output word, then the ranking of the suffix (ranking B) outranks the ranking of the root (ranking A) that endorses antepenultimate and not penultimate stress. Similarly, ultimate stress in (43c) is due to the constraint ranking C introduced by the genitive plural suffix /-on/. However, this solution is not successful either. If a marked suffix imposes its own ranking to the root, then how can we explain that the genitive /-u/ does not trigger penultimate stress in the paradigm of *uranós* and, similarly, the genitive suffix /-on/ does not trigger ultimate stress in the paradigm of *stafíða*? Why can the corresponding genitive suffixes in these examples not outweigh the ranking of the root? Moreover, there are many technical problems in defining how the ranking should be modeled in words which are composed of morphemes with conflicting accentual demands. We conclude, therefore, that this theory cannot really offer satisfactory answers to crucial aspects of accentuation in lexical accent systems.

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[20] An opposite approach that attributes the accentual difference between *ánθropos*, *fantáros* and *uranós* to a suffix must admit the existence of at least three accentual classes for the suffix *-os*; a first class that introduces ranking A as in *ánθropos*, a second class that introduces ranking B as in *fantáros*, and a third one that triggers ranking C as in *uranós*. Moreover, it must employ a special rule to combine a root with a particular accentual type of suffix.

Appendix: Evidence for Unaccentability from Tone Languages

Carleton and Myers (1996) analyze the phenomenon of tonal transfer in Chichewa, a Bantu language spoken mainly in Malawi. The verb stem in Chichewa consists of a root, followed by any number of suffixes called ‘extensions’, and an obligatory inflectional or nominalizing suffix called the ‘final vowel’ (FV). Here and throughout this section, morphemes that introduce a high tone are underlined. The acute accent designates a high tone. When necessary, the stem is delimited from the remaining formatives of the word with square brackets.

The high tone is realized on the final syllable when it belongs to the root (1a) or the extension (1b). If the verb stem includes more than one high-toned morpheme, only one high tone is realized (1c). No high tone appears when the stem does not sponsor a high tone (1d). If the high tone belongs to some other morpheme within the word as, for example, the present habitual marker /-ma-/ in (1e), then it is realized on the penult. Notice that there are morphemes that introduce a high tone and are associated to it, such as the subjunctive /-e/ in (1f) and the stem in (1g).

(1) *Chichewa verb stems* (Carleton and Myers 1996:43-45)

a.	tambalal-á	stretch out legs-FV	‘stretch out your legs!’
b.	phik-its-á	cook-INTENS-FV	‘really cook’
c.	tambalal-its-á	stretch out legs-INTENS-FV	‘really stretch out your legs!’
d.	sangalal-a	enjoy-FV	‘enjoy yourself!’
e.	ndí-ma-[sangalál-a]	I-HBT-be happy-FV	‘I am happy’
f.	sangalats-é	we-please-SUBJ	‘let’s please’
g.	yékha		‘alone’

There are also cases in which the high tone occurs in the verb stem because of a preceding inflectional morpheme. Some prefixes with this behavior are the recent past *na* in (2a) and the infinitival *ku* in (2b):

(2) *Chichewa prefixed forms* (Carleton and Myers 1996:46)

a.	ndi-na-[sángalats-a]	I-PAST-please-FV	‘I pleased (recent past)’
b.	ku-[sángalats-a]	INF-please-FV	‘to please’

None of the morphemes in (1) and (2) bears the high tone itself. The high tone migrates to a neighboring morpheme of the verbal formative. Thus, in (1c) both the high tone of the root and the high tone of the extension land on the final vowel of the stem, whereas in the examples in (2), the high tone of the prefix sites on the initial syllable of the tone-free root. In other words, there are morphemes that introduce a high tone but they cast it off their morphological domain.

Carleton and Myers are particularly concerned with the tonal behavior of the prefixes in (2). They posit the morpheme-specific constraint *DOMAIN to account for the fact that the tones of a certain group of morphemes are never realized within their morphological domain. The constraint is given in (3).

(3) *DOMAIN:

$$\begin{array}{c} *\mathrm{H}_{\alpha} \\ | \\ [\ldots\ \sigma \ldots]_{\alpha} \end{array} \qquad (\alpha\text{=RECENT PAST, INF, etc.})$$

The examples just described evidence the existence of ‘unaccentable’ morphemes in Chichewa. Roots and suffixes introduce a lexically assigned high tone, which is realized outside their morphological domain. It is not hard to grasp the similarity with the Greek examples. Unaccentable morphemes in Greek introduce a lexical accent which is realized on a morpheme other than the sponsoring one, e.g. *uran-ós* ‘sky’.

The next case of unaccentability comes from Sukuma, a Bantu language spoken in Tanzania. The core feature of this language is the rightward shift of high tones. Some examples of Sukuma accentuation are listed in (4) (Sietsema 1989:242-69).

(4) *Sukuma verbal tone*

a.	ku-laal-á	‘to sleep’
	ku-tonol-á	‘to pluck’
b.	ku-sol-a	‘to choose’

Sukuma verbs are either lexically specified with a high tone (4a) or have a default low tone (4b). Within the verbal words, the high tone is always realized outside the domain of the sponsoring morpheme, as shown in (4a).

Interestingly, the high tone is not always on the syllable immediately following the sponsor morpheme. The distance between the leftmost syllable of the sponsor morpheme and the syllable that the high tone lands onto is two moras.

(5)

a.	ku-bon-aníj-a	‘to see simultaneously’
b.	ku-su-aníj-a	‘to spit simultaneously’

Stems are not the only source of high tones in verbal words. Object markers (6a) and subject markers (6b) may have high tones as well; these tones shift two moras when combined with the toneless verb stem *sol* ‘choose’. If both a high-toned object marker and a high-toned subject marker are present in the verbal word, the distance of shift of the high tone that belongs to the subject marker is reduced to one mora (6c-d). A similar one-step shift of the high tone is also witnessed when there is a high-toned verb following (6e-f).

(6) *Sukuma one- and two-step tone shift*

a.	a-ku-ba-sol-á	‘he will choose them’
b.	ba-ku-sól-a	‘they will choose’
c.	ba-kú-ba-soléla	‘they will choose them for someone’
d.	ba-kú-ba-alúla	‘they will dress them up’
e.	ba-kú-laal-á	‘they will sleep’
f.	ba-kú-tonol-á	‘they will pluck’

Two major observations are drawn from the examples in (6). First, the morpheme that introduces a high tone never bears the high tone within its domain. Second, and more importantly, every sponsor creates a binary foot domain (two syllables or moras) within which the high tone cannot be realized. This domain may include either the sponsor-morpheme itself (7d-f) or it can even be extended to include syllabic material from the following morpheme (7a-b). As a result, the high is always aligned to the first available element outside the ‘opaque’ foot domain created by the morpheme introducing the high. Binarity is violated when two high-toned morphemes follow each other with only one syllable intervening (7c-f).

(7) *foot-domain unaccentability in Sukuma*

a. a-ku-(ba-sol)á
b. (ba-ku)-sóla
c. (ba)-kú-(ba-so)léla
d. (ba)-kú-(ba-a)lúla
e. (ba)-kú-(laal)á
f. (ba)-kú-(tonol)á

To summarize so far, Sukuma has both high-toned and toneless morphemes. High-toned morphemes create a binary domain, either within their own morphological domain or, if necessary, by incorporating material from neighboring morphemes. The high tone is banned from this binary metrical domain and is realized in the immediately following segmental material. There is one case in which the opaque domain is not binary: when there is a danger the high tone not to be realized at all as, for example, in (7c). Here, by creating a binary domain, the first high tone would have to land on the first syllable of the following morpheme, /ba-/, which is also a sponsoring morpheme and hence an unaccentable domain.[21] However, there is also the possibility of two high-tone morphemes to follow one after the other. In this case one of the high tones is lost, as shown in (8).

(8) *high tone loss*
a. a-ku-ba-bon-elá ‘he will find them’ (*a-ku-bá-bon-elá)
b. ba-kú-ba-bon-elá ‘they will find them’ (*ba-kú-ba-bón-elá)

Sukuma is another instantiation of the effects of unaccentability in grammar. In this case the unaccentable domain extends beyond the morphological borders of the sponsor. The importance of Sukuma relies on the fact that opacity to high tone can also be a property of metrical domains such as the foot.

In Kikuyu the left edge of high-toned verbal formatives is opaque to the sponsored high-tone. This is illustrated in (9).

(9) *Kikuyu left-edge unaccentability*
a. to-hetók-aγa ‘we go’
b. to-mo-tom-áγa ‘we send him/her’

Bickmore (1996) argues that such displacement effects are due to a high ranked constraint that prohibits the alignment of the high tone with the left edge of the sponsor-morpheme. This constraint, named *ALIGN, is stated in (10) (Bickmore 1996:15).

(10) *ALIGN (high, L, So, L)
The left edge of a high tone span must NOT align with the left edge of the lexical source.

To summarize the discussion, we have seen various forms of unaccentability in the languages described along the above lines. The most important corollary is that unaccentability can be both an idiosyncratic as well as a general characteristic of an accentual system. In Chichewa and in Greek, it is expressed

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[21] The reason why the high tone of *ba* is not realized in the domain of the following morpheme, namely *bon*, is that high tones on adjacent vowels are fused into a single high (Sietsema 1989:257), which consequently, belongs to both unaccentable morphemes. This is shown in (i).

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(i)     ba-ku-ba-bon-ela
        |       \   /
        H         H
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as the property of certain morphemes to cast an accent out of their morphological domain. In Sukuma, unaccentability results both from idiosyncratic properties of morphemes as well as metrification rules. The foot that hosts an unaccentable morpheme is the domain a high tone is excluded from. In Kikuyu unaccentability is the effect of a general prohibition against having a high tone at the edge of a morpheme.

In all these cases, unaccentability indicates nothing more than the globality of tone and lexical accent. This is exactly what the constraint *DOMAIN in (13) expresses: the desire of a lexical accent or a tone to extend itself beyond its lexical affiliation and become a property of the whole morphological construction. Notice that *DOMAIN, as stated in (13), is different from Carleton and Myers's (1996) *DOMAIN in (3). The former is a general structural constraint whereas the latter is a morpheme-specific constraint. The reason for choosing the definition in (13) is that parochial constraints like *DOMAIN in (3) are language specific; there is always a different set of morphemes in each language that initiates *DOMAIN. Moreover, adopting a constraint like (3) implies that the weight of lexical specification is moved from the lexicon to the grammar. Each morpheme is associated with a specific constraint in the lexicon but this constraint must be ordered above the other constraints of the system, in order to guarantee the desired outcome. (Cf. also the discussion in §2.5.)

Before closing up this section, a parenthetical remark is needed. In the Introduction I claimed that one of the most important aspects of lexical accent systems like Greek is that the morphological organization of the word is projected onto the prosody: the lexical accent that belongs to the head element of the word prevails. Unaccentable morphemes seem to pose a problem for this claim. Unaccentable roots, for example, have an accent that is not realized within their domain. Stress surfaces on some other element of the structure, namely the inflectional suffix in the word *uran-ú* 'sky', giving the impression that it is on the non-head element. This is not quite correct, however. In this example final stress is triggered by the root/head of the word and not from the suffix /-u/ which is inherently pre-accenting. This means that the marking property of the root prevails over the marking property of the suffix. In this sense, morphological headedness is indeed reflected in the prosody. Consequently, prosody serves as a cue for morphological structure in unaccentable morphemes as well. The deviation is that in *uran-ú* the accent negatively demarcates the domain of the head constituent, by designating the beginning of the non-head.

To sum up, in this section I showed that various forms of unaccentability are attested across languages. Morphological and metrical domains (Greek, Chichewa, Sukuma) or morpheme edges (Kikuyu) are defined by means of a tone that demarcates the borders of neighboring morphological or prosodic domains.

3 Lexical Accents and Prosodic Form

3.1. Introduction

Pervasive presence of marking and competition of lexical accents for stress are the characteristics that primarily identify a lexical accent system. This chapter focuses on the prosodic aspects of lexical accent systems and especially those that relate to lexical marking. The case studies are Greek and Russian. The competition between lexical accents in these languages is examined in Chapter 4.

The central proposal of this chapter is that a language that does not have predictable stress has predictable prosodic shape. Lexically accented words in Greek and Russian display variable accentual patterns but invariable prosodic structure. Lexical accents are not randomly dispersed along the string of vocalic peaks. On the contrary, they chose positions that guarantee that the prosodic form of the output word will be binary. In other words, accented words are not smaller than a foot or longer than two feet.

Another important issue addressed in this chapter is the relation between marking and default accentuation. In lexical accent systems, next to marked words there is a handful of unmarked ones with regular (fixed) stress. Although these two subsystems come apart in many respects, I show that they are not radically different from each other. Both lexical marking and the default submit to certain phonological principles that determine the overall accentual behavior of Greek and Russian words. The following section briefly sketches the main ideas advanced in this chapter.

3.1.1. Theoretical explorations in Chapter 3

The data from Greek and Russian show that marking has a dynamic presence in the accentual systems of these languages. The vast majority of the vocabulary is targeted by lexical accents and not the default. This empirical observation makes one wonder why marking is so wide-spread if it is nothing more than an uncontrolled device that derives unpredictable and arbitrary patterns of stress. This claim, however, is not quite correct. In the present chapter I argue that languages that have pervasive marking develop mechanisms to control it. More specifically, I propose that marking in lexical accent systems is restricted by prosodic-form constraints.

Prosodic faithfulness constraints urge an inherent accent to be realized in the output. Structural constraints, on the other hand, enforce other, more rhythmic patterns. The effects of marking become evident only by having structural constraints on foot-form (FOOTFORM),[1] which enforce rhythmic accentual patterns, outranked by faithfulness constraints, which encourage the realization of underlying prosodic structure in the output. This means that marking arises when FAITH >> FOOTFORM (cf. the ranking in Chapter 1).

The central claim here is that lexically assigned metrical information in Greek and Russian is not free. Prosodic faithfulness is restricted by constraints that determine the prosodic shape of the word. To be more explicit, there is a split in prosodic faithfulness. Faithfulness to the lexical accent is always high ranked to guarantee that lexical information will not be superseded by rhythmic constraints. Prosodic faithfulness constraints that refer to the exact position of a lexical accent, however, are dominated by word-form constraints: WORDFORM >> FAITH TO POSITION OF LA >> FOOTFORM. Thus, prosodic faithfulness has both a dominated and a dominating position in the network of constraints which together regulate lexical marking. Consequently, the ranking is shaped as follows:

(1) *ranking for restricted accentual contrasts*
FAITH TO LA, WORDFORM >> FAITH TO POSITION OF LA >> FOOTFORM

This type of marking, with restricted lexical contrasts, is called *templatic* in this study because the principles which condition prosody lead to the formation of templates (McCarthy and Prince 1993a, 1995, Kager 1994a). Templates are considered to be prosodically ideal forms because they are maximally binary (i.e. [σ+F], [F+σ], [F+F]). Marks that are controlled by WORDFORM constraints,

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[1] Under this label are grouped constraints such as FOOTBINARITY, PARSE-σ (Prince and Smolensky 1993), and some other constraints. I use this term here to emphasize the contrast between constraints that determine the prosodic shape of the word and constraints that control the construction of lower prosodic constituents such as feet. These constraints form together the DEFAULT that assigns prosodic structure in the absence of lexical accents.

namely templatic marks, occur in positions which ensure that a given morphological structure will be binary.

To conclude, lexical accents limit their arbitrariness by restricting themselves to prosodically predictable positions. Such a restricted theory of lexical prosody has a number of important theoretical implications. First, the possible, though not exact, position of inherent marks can be predicted. There are few positions in a word that can lead to well-formed prosodic structure and hence be targeted by templatic marks. Second, lexically determined stress is now derived from input-output constraints and not from stipulating restrictions on underlying representations.

Next to templatic marking there is also *diacritic marking*, which is insensitive to the phonological conditions that control the construction of ideal prosodic words. Diacritic marking characterizes the accentual behavior of loan forms which exhibit a variable degree of assimilation to the phonological, prosodic and morphological principles of the native language. This is the type of marking that characterizes, for instance, exceptional stress in Polish (*rezím* 'regime', *univérsitet* 'university') and Spanish nouns (*pájaro* 'bird', *sofá* 'sofa'). I show that the distinction between templatic and diacritic marking is not an artifact of the analysis but reflects the *core/ periphery* organization of lexicons in natural languages (among others, Itô and Mester 1995a,b). According to this theory, elements in the core of the lexicon fulfill all constraints of the Grammar. However, moving towards less central areas there are loan words which respect only a subset of these constraints. Exceptional stress patterns stand at the periphery of the Greek and Russian grammar. Such patterns are regularized when the loan form is assimilated more and more to the principles that govern the accentuation of native words. When the core grammar is reached, diacritic accents succumb to prosodic wellformedness constraints and reform to templatic.

The two types of marking have the same phonological representation but differ in function. Technically, the functional difference between templatic and diacritic marking is encoded as different constraint rankings.

The discussion of the various types of marking highlights significant aspects of the default accentuation as well. It points out that marking and the default are not unrelated and distant to each other systems. On the contrary, they converge to a great extent since they both yield to general phonological restrictions that govern the languages examined here. In Greek for example, the three-syllable-window limitation holds for accented as well as accentless words.

The discussion of the accentual facts of Greek and Russian reveals an important generalization: root-faithfulness seems to be more important than suffix-faithfulness. The suggested domination order is given a principled interpretation in Chapter 4 where it is shown that in fact it expresses a more fundamental property of lexical accent systems, namely head dominance (HEADFAITH >> FAITH).

This chapter sheds light on other issues such as the rhythmic aspects of lexical accent systems and their interaction with prosodic faithfulness, the nature of unaccentability and foot-tailness, the predictable position of accent in disyllabic inflectional suffixes in Russian, and so on.

Before closing up this introductory part I should make clear that the analysis of this chapter solely focuses on the accentual behavior of inflected nouns with one lexical accent or no accents at all. There is not enough space to provide an exhaustive presentation of the stress facts in other syntactic categories than the noun. Therefore, apart from a short description no further mention of adjectival and verbal stress will be made.

The ideas promoted in this chapter are roughly organized as follows: The first part of this chapter deals with Greek. In §3.2, I give some background information on Greek. Previous analyses of Greek stress are briefly reviewed in §3.3. In §3.4, I introduce the empirical facts that concern us in this chapter and in §3.5 I argue that marking is templatic. Default stress is the subject of §3.6. In §3.7, I claim that there are also some loan words with diacritic marking. A short summary of stress in adjectives and verbs is presented in §3.8. The main points of Greek stress are summarized in §3.9.

The second part concentrates on Russian. A short introduction to the phonological and morphological characteristics of the language is provided in §3.10. §3.11 gives a flavor of the empirical facts that are examined in the second part of this chapter and §3.12 continues with the analysis. Default stress is examined in §3.13. Exceptional stress in Russian is the subject of §3.14. A summary of stress in adjectives and verbs is given in §3.15. The main points of Russian accentuation in words with one lexical accent or no accent at all are presented in §3.16. In §3.17, I summarize the central ideas of this chapter and offer an overview of Greek and Russian stress by pointing out the differences and similarities between the two systems. In the Appendix, one can find information on rhythmically conditioned vowel reduction and exhaustive parsing in Russian.

Greek

The idea explored in the first part of this chapter is that accented words in Greek have ideal prosodic form but unpredictable stress pattern as opposed to accentless words which have fixed antepenultimate stress but variable prosodic shape. Before proceeding, it is wise to give a step-by-step presentation of how this idea develops in the following sections.

After the introduction of the main phonological and morphological characteristics of Greek (§3.2. and §3.3), I provide a list with lexically accented and accentless words. The study of the patterns displayed by the listed forms leads to the conclusion that some prosodic shapes are missing and some others are less preferred (§3.4).

Starting from the unattested patterns, which mainly concern accented words, it is argued that lexical accents are under the spell of wellformedness constraints that define the prosodic form of a word. Some patterns are excluded by a constraint that limits stressable positions to the last three syllables of the word and some others are excluded by a constraint that limits lexical accents to positions that guarantee strict binarity between prosodic constituents of the word (§3.5.1). In other words, the former constraint rejects patterns like (σ́σ)(σσ) which have stress further than the antepenultimate syllable and the latter constraint rejects patterns like σ(σ́σ)σ which form a non-binary prosodic word. Restricted lexical contrasts in marked words are expressed with a ranking in which prosodic faithfulness to the lexical accent dominates prosodic form constraints which, in turn, dominate faithfulness to the position of a lexical accent. The examination of marked patterns originating from roots (§3.5.2) and inflectional suffixes (§3.5.3) reveals another split in faithfulness. There is strong evidence that inherent accentual properties of roots are given priority over accentual properties of suffixes. The segregation between root-faithfulness and suffix-faithfulness is given a principled interpretation in Chapter 4.

Less favored patterns, which are mainly associated with unmarked words, are accounted for in §3.6. Words stressed by default have predictable stress but variable prosodic shape. Moreover, they are hampered by accentual mobility within the paradigm caused by the fact that unmarked roots are combined with accented suffixes in some grammatical cases and unmarked suffixes in other grammatical cases. The examination of Greek stress is completed with a brief examination of stress in loan words (§3.7) and the remaining syntactic categories (§3.8).

3.2. Background Information on Greek

Accent in Greek is phonetically manifested as stress. The acoustic correlates of word stress are duration, amplitude and pitch. Stressed syllables have longer duration and higher amplitude than unstressed ones and are associated with F0 rises (Arvaniti 1991). Greek syllable structure lacks distinctions of phonological weight; all syllables are of equal phonological weight (Joseph and Philippaki 1987).

Greek is a bounded system; the scope of primary stress is limited to the last three syllables of the word. Feet in Greek are trochaic. As I show in the following sections, antepenultimate stress is analyzed with a syllabic trochee and extrametricality of the final syllable. More importantly, stress shifts triggered by semivocalization show a rightward movement, e.g. *trapezíu* > *trapezjú* 'table-GEN.sg'. According to Halle and Vergnaud (1987), rightward stress movement emerging from the loss of the stressed vowel indicates a left-headed (trochaic) grouping of syllabic constituents.

Malikouti−Drachman and Drachman (1989) and Drachman and Malikouti−Drachman (1996) have argued that Greek lacks word minimum, therefore monosyllabic feet under primary stress are permitted (Hayes 1995, Kager 1995). There are some monosyllabic verbal forms, e.g. *ðés* 'see-2sg.IMP', *pés* 'say-2sg.IMP', *zó* 'live-1sg.PRES' and a few archaic nouns, e.g. *fós* 'light', *kó* 'Kos (name of island)-ACC.sg'.

Greek is a language with fusional morphology. Words usually consist of several morphemes such as, for instance, a root and an inflectional ending.[2] Nominal roots are followed by a suffix that designates number and case, e.g. *ánθrop-os* 'man', and verbal roots are followed by an aspectual morpheme and a personal suffix, e.g. *aγap-ús-a-me* 'love-PAST CONT-1pl'. As in all fusional languages, a single suffix can represent number and case simultaneously. For example, the ending /-o/ in *ánθropo* indicates accusative case and singular number and the ending /-on/ in *anθrópon* indicates genitive case and plural number.

It must be made clear right from the beginning that in this thesis I treat the vowel /-o-/ in forms like *ánθrop*<u>*o*</u>*s* as part of the inflectional suffix and not as part of the root (as it used to be in Ancient Greek). There are a number of reasons that suggest this segmentation.

First, if we consider the vowel /-o-/ to be part of the root, *ánθropo-s*, we have to implement a truncation rule to account for the fact that in most cases of the paradigm, as well as in derivation, this vowel is lost:

(2)	a.	anθrópu	/anθropo-u/	'man-GEN.sg'
	b.	anθropinós	/anθropo-in-os/	'human'

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[2] Greek does not assign inflection to unassimilated loan words. There is also a class of neuter nouns ending in /-ma/ which have zero inflection in some grammatical cases, e.g. *kíma* (NOM.sg) but *kímat-os* (GEN.sg) 'wave' (Ralli 1994).

c.	anθropákos	/anθropo-ak-os/	‘little man’
d.	anθropévo	/anθropo-ev-o/	‘humanize’

As obvious from the above examples, the thematic vowel /-o-/ is always truncated. One would expect the thematic vowel to surface at least in some cases, namely before consonant initial suffixes. However, it is puzzling that the majority of suffixes are vowel initial. If roots had thematic vowels, it would have been natural to expect at least some consonant initial suffixes. The fact that all Greek suffixes are vowel initial indicates that the thematic vowel has been morphologically reanalyzed and introduced as part of the suffix.[3]

Second, in compound words of the type [[root + synthetic vowel + root] suffix], roots are consonant final, therefore, the synthetic vowel /-o-/ intervenes to connect them. Note that the synthetic vowel /-o-/ can also occur with feminine roots of the *-a* class, e.g. *petr-o-kéras-o* ‘type of cherry’ from *pétr-a* ‘stone’ (class *-a* feminine noun) and *kerás-i* ‘cherry’ (class *-i* neuter noun). The point becomes clearer when the aforementioned example is compared to the compound *makrimális* ‘long-haired’. Here there is no need for a synthetic vowel because the root has the thematic vowel /-i-/, *makri-s* (NOM.sg.masc), *makri-a* (NOM.sg.fem) *makri-i* (NOM.pl.masc) ‘long’.

The theoretical assumptions just presented receive additional support from current views on the morphological structure of Greek words, expressed in the work of Ralli (1986, 1988, 1993) and Anastasiadi (1993). It should be mentioned though, that a different morphological segmentation that accepts the independent notion of thematic vowel does not contradict the accentual analysis proposed in the following sections. It only implies a different representation for unaccentable (post-stressing) morphemes according to which the morpheme at issue is just accented on the thematic vowel. However, for the reasons just presented, I assert that the vowel /-o-/ is part of the inflectional suffix and not the root.

Before delving deeper into the analysis of the Greek facts I give an overview of previous analyses of Greek stress in §3.3. The analysis of Greek advanced in this study is set out in §3.4.

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[3] One may wonder why the thematic vowel is taken as a unit with the inflectional suffix. There is little, if any, gain from the segmentation /anθrop-o-s/ since each thematic vowel must choose a particular set of inflectional endings. For example, /-o-/ chooses the endings {-s, -u, -∅, -i, -n, -us} whereas /-a-/ chooses the endings {-∅, -s, -∅, -es, -on}.

3.3. Previous Analyses of Greek Stress

The literature on Greek accentuation offers a variety of proposals regarding the assignment of word stress. The core idea in these analyses is that primary stress cannot be straightforwardly accounted for on purely phonological grounds. Morphologically equivalent words such as *ánθropos* ‘man’, *fantáros* ‘soldier’ and *uranós* ‘sky’, for instance, exhibit phonologically unmotivated differences in stress. The complexity of the system is further enhanced by accentual alternations that take place within the paradigm as in *ánθropos* (NOM.sg), *anθrópu* (GEN.sg). The analyses available in the literature motivate the different accentual behavior of such examples by means of rules that are related either to specific grammatical categories (Philippaki–Warburton 1976), or morphological principles (Ralli 1988, Ralli and Touradzidis 1992) or different grammars (Malikouti–Drachman and Drachman 1989, Drachman and Malikouti−Drachman 1996). The specifics of the aforementioned analyses are presented in this section. It is better to mention in advance, that the main purpose of this brief reference to other approaches to Greek stress is mainly to highlight the diverse nature of Greek stress and not to compare viewpoints or theoretical frameworks.

3.3.1. Philippaki–Warburton (1976)

Philippaki–Warburton (1976) emphasizes the mixed nature of Greek accentuation in her analysis. Stress in verbs is conditioned by rules that refer to specific morphological categories or classes, whereas stress in nouns is primarily marked in the lexicon. Starting from verbs, different stress rules apply to different verbal forms. For instance, a rule is responsible for the antepenultimate stress in past tense forms (*órisa* ‘define-PAST.1sg’), and another rule assigns penultimate stress in present tense forms (*orízo* ‘define-PRES.1sg’) and imperatives (*orísu* ‘define-MIDDLE.PAST.2sg.IMP’). On the other hand, the best way to analyze stress in nouns and adjectives is to assume that the respective morphemes are inherently marked. Lexical accents mark one of the last three positions of the word because Greek is a three-syllable-window language. For example, stress is on the antepenult in *ánθropos*, the penult in *fantáros* and the ultimate in *uranós*. In addition to marking, two rules that trigger stress shifts are employed in nominal accentuation.

The first stress shift rule is phonological: it applies when the addition of a suffix violates the three-syllable-window as in *timímatos* (GEN.sg) from *tímima* (NOM.sg) ‘price’. The second stress shift rule is morphologized: it moves stress one syllable to the right in specific morphological environments. For example the rule applies in the genitive singular of masculine nouns in *-os* deriving *anθrópu* from the nominative singular *ánθropos*. This accentual allomorphy results from the loss of vowel length in Post-Classical Greek, the original conditioning factor in the ancient language.

The value of this proposal centers on the recognition of the diverse nature of Greek stress, and specifically, the dichotomy in the accentual behaviour of nouns and verbs. However, the proposed model lacks uniformity. The fact that rules and marking are independently employed for the analysis of distinct grammatical categories of one and the same language is problematic. It is equivalent to saying that two different grammars coexist in the language and there is nothing in the theory that explains this specific combination of grammars or precludes the presence of other possible grammars. Another less inviting aspect of the analysis is that the morphologized rule of stress shift applies to a non-natural group of morphological environments ranging from the genitive and accusative case of masculine nouns in *-os* (for example, *anθrópu* (GEN.sg) vs. *ánθropos* (NOM.sg) 'man') to the nominative and accusative plural cases of nouns in *-is* (for example, *pritánis* (NOM.pl) vs. *prítanis* (NOM.sg) 'dean') and some imperative forms (for example, *aγáp-a* 'love-2sg.IMP'). Moreover, the analysis abstracts away from a large number of cases where the morphologized rule fails to apply as in *klívanos* (NOM.sg), *klívanu* (GEN.sg) 'kiln'.

3.3.2. Ralli (1988), Ralli and Touradzidis (1992)

Pursuing the idea that stress in Greek is driven by morphology, Ralli (1988) and Touradzidis (1992) propose that all morphemes are listed in the lexicon as being inherently accented, unmarked or triggers of stress shifts. Primary stress is assigned by means of the *Righthand Head Rule* (Williams 1981) and *Percolation Principle* (Selkirk 1982). More specifically, when morphemes come together in word formation, stress is determined by the accentual properties of the rightmost head node, and, more precisely, by the metrical information specified in the inflectional or derivational suffix depending on the construction. For instance, in *anθropáki* /ánθrop-áki/ 'little man' both the root and the suffix have an inherent accent, but only the accent of the rightmost constituent surfaces as primary. If the suffix-head lacks an accent, then the accent of a non-head node is given the chance to percolate up to the word and become primary. For example, in *ánθropos* the suffix /-os/ is unspecified for stress but the root is lexically listed with initial stress, /ánθrop-/. Since the head is unmarked, the inherent specification of the root percolates up to the word. When the head node is marked to trigger an accentual shift, percolation guarantees that the property of the head defines word stress. In *anθrópu* penultimate stress is triggered by the genitive singular suffix /-u/ which is stress shifting.

Many positive properties distinguish this approach. First, it proposes a unified analysis for stress by means of lexical marking. Second, it acknowledges the crucial role morphology has for stress. Stress is mainly resolved by morphological structure, it is the head of the word that decides for the position of stress. This idea has been adopted and further exploited in the present study (cf. Chapter 4). There are, however, some technical issues that refer to the accentual properties of morphemes. For example, it is unclear how we can account for the stress difference in pairs like *ánθropos-anθrópu* and *klívanos-klívanu*, or how a stress-shifting suffix is represented, and other similar questions.

3.3.3. Malikouti-Drachman and Drachman (1989), Drachman and Malikouti-Drachman (1996)

Malikouti-Drachman and Drachman (1989) give a metrical analysis of Greek stress. They argue that the default algorithm stresses the antepenultimate syllable and analyze this pattern with a syllabic trochee and extrametricality of the final syllable at the right edge of the word, e.g. *kro*(*kóði*)<*los*> ‘crocodile’. They account for the ‘deviant’ (pen)ultimate stress by means of morphological levels. Inherently accented words, resulting either from marking (*fantáros*) or stress shifts (*anθrópu*) are grouped in the first level of the grammar. Words stressed by the default rule occupy the second, more productive level.

In a recent article Malikouti-Drachman and Drachman (1996) propose a different account for Greek stress. They employ feet, extrametricality, alignment and marking to derive Greek stress.

Mobility of stress is a fundamental characteristic of Greek stress. The position of stress is relatively free. Stress occurs on one of the last three syllables of the word and often alternates from one syllable to the other within the paradigm. The first case of stress-shift is ‘transparent’; it is nothing more than an automatic stress adjustment imposed by the trisyllabic limitation of the language as in *timímatos* (GEN.sg) from *tímima* (NOM.sg) ‘price’. The second type of stress-shift is ‘opaque’; it takes place in specific morphological environments as in *ánθropos* (NOM.sg), *anθrópu* (GEN.sg). All three permissible positions of stress are exploited, as shown in (3).

(3)	a.	ánθropos (APU)	fantáros (PU)	uranós (U)	nouns in -os
		‘man’	‘soldier’	‘sky’	
	b.	θálasa	stafíða	aγorá	nouns in -a
		‘sea’	‘raisin’	‘market’	
	c.	ómorfos	meγálos	aγaθós	adjectives
		‘beautiful’	‘big’	‘naive’	
	d.	tíliksa	tilíγo	tilixθó	verbs
		‘wrap-PAST.1sg’	‘wrap-PRES.1sg’	‘wrap-MDL-SUBJ.1sg’	

Abstracting away from details that are beyond the scope of the present discussion, the analysis develops as follows: all inflectional endings are extrametrical leaving the root as the main domain of stress assignment. A binary trochaic foot is aligned at the right edge of the root in words that surface with antepenultimate stress and a unary (monosyllabic) foot is aligned at the right edge in words with penultimate stress. Final stress arises when the root is post-stressing. In this case the root is marked to assign an accent to the following inflectional ending which then loses its extrametrical status. The application of the proposal is shown in (4).

(4)		(* .) < >	(*) < >	(*)
	a.	anθrop-os	fantar-os	uran-os
	b.	omorf-os	meγal-os	aγaθ-os
	c.	tiliks-a	tiliγ-o	tilix-θ-o

However, there are more instances in which the ban of extrametricality is raised. A handful of inflectional endings, mostly in nouns and verbs, are inherently specified as non-extrametrical. As a result ‘opaque’ alternations emerge in the paradigmatic level, as illustrated in (5).

(5)	a.	NOM.sg	ánθrop-os$_{[+extr]}$	‘man’
	b.	GEN.sg	anθróp-u$_{[-extr]}$	
	c.	NOM.pl	ánθrop-i$_{[+extr]}$	
	d.	GEN.pl	anθróp-on$_{[-extr]}$	
	e.	ACC.pl	anθróp-us$_{[-extr]}$	

A second instantiation of ‘opaque’ stress-shifts is witnessed when the ending is marked to bear stress, as shown in (6). Extrametricality is canceled by the inherent stress property of the suffix.

(6) a. NOM.sg θálas-a$_{[+extr]}$ ‘sea’
b. GEN.pl θalas-ón$_{[+stress]}$

To summarize, in this model the basic unit for stress is the root. A trochaic foot is aligned to the right edge of the root. Whether the foot is binary or unary is an idiosyncratic selection of a specific root. Endings are most commonly extrametrical. Extrametricality of the final constituent is canceled either when the root is post-stressing or when the suffix is specified as non-extrametrical or is stressed itself.

The account offered by Malikouti−Drachman and Drachman is significant from many points of view. First, it gives a uniform interpretation of Greek stress, emphasizing at the same time its morphological character, and especially the sensitivity of the system to morphological units such as roots and suffixes. Second, ‘opaque’ alternations are treated not as fossilised rules of the past but as active feature of the system that, despite its idiosyncratic flavor, is prosodic in nature. However, the model implies a complicated theory of marking since different tools are used to mark idiosyncratic metrical information to roots and suffixes. Roots are lexically listed with a binary or unary foot, whereas suffixes are listed as being stressed or exceptions to extrametricality. Moreover, the same stress pattern is derived by more than one marking mechanism. Antepenultimate stress results from a binary foot at the right edge of the root as in the noun *ánθropos* ‘man’ but it can also be derived from a unary foot as in the verb *tilíγ-ume* ‘wrap-PRES.1pl’, depending on whether the following suffix is monosyllabic or disyllabic.

The analysis does not offer a clear-cut idea as to which pattern of marking represents the default case for Greek stress. It seems that the binary foot with final syllable extrametricality represents default stress. However, as argued by Drachman and Malikouti−Drachman, this is the default case for a specific class of nouns, namely nouns in *-os*, and most verbal forms. Other noun classes (i.e. feminine in *-a* such as *θálasa*) and adjectives statistically show a preference for penultimate stress, suggesting that penultimate must be considered the default pattern for these cases.

Such a dichotomy introduces extra complications in marking; the unary foot on the root is exceptional for masculine nouns in *-os* class but not for feminine nouns of the *-a* class. Finally, it is not clear whether in paradigms like *fantár-os* (NOM.sg), *fantár-u* (GEN.sg), *fantár-o* (ACC.sg), which are derived by a monosyllabic foot at the end of the root, the final syllable is included in the foot or is extrametrical. If the first scenario holds, that is *fan*(*táros*), then the ending is not extrametrical any more and is included in the prosodic structure. This, however, implies that the word is exceptional in two respects: it has a unary foot and revokes the extrametricality of the final suffix. If the foot is indeed monosyllabic the representation *fan*(*tár*)*os* is not well-formed according to current metrical theories (Hayes 1981, 1995, among many others). Foot monosyllabicity in quantity insensitive languages is never combined with final syllable extrametricality.

The analyses just described despite their differences converge to the following point: the mixed nature of Greek stress. This idea is further explored in the present chapter. Moreover, some more light is shed on cryptic and obscure aspects of Greek stress like the unexplained absence of certain accentual patterns, an observation that is telling for the dynamics and the overall constitution of the language. It must be mentioned that all previous studies have been invaluable sources of consultation and the proposal that unfolds in the following pages is in many respects inspired by them. The present analysis is couched in the light of a new theoretical model, namely the Optimality Theory, that provides more efficient tools for the description and analysis of the accentual phenomena in Greek. However, often the ideas trace back to the pioneering work of the aforementioned scholars. In the next section I proceed with the basic facts and the analysis of accented and accentless nouns.

3.4. Accentual Patterns in Nouns

3.4.1. The facts

This section presents the corpus of data that will be accounted for. An exhaustive presentation of Greek stress is beyond the goals of this thesis. I restrict the discussion to the accentuation of unmarked words and words with one lexical accent. I draw the examples from the two most productive classes of Greek nouns: the -*os* class of masculine (and feminine nouns) in (7) and the -*a* class of feminine nouns in (8). A small sample of non-native words follows in (9). The fact that we only focus on this data does not imply, however, that the analysis of accentual facts is incomplete. The classes examined here give a thorough picture of the variety of accentual phenomena attested in Greek. A short summary of stress in other syntactic categories is presented in §3.8.

(7) *masculine nouns in -os* (NOM.sg), -*u* (GEN.sg)

a. ánθropos	a’. anθrópu	‘man’
b. klívanos	b’. klívanu	‘kiln’
c. fantáros	c’. fantáru	‘soldier’

d.	servitóros	d’	servitóru	‘waiter’
e.	uranós	e’.	uranú	‘sky’
f.	xorós	f’.	xorú	‘dance’

(8) *femine nouns in -a* (NOM.sg), *-on* (GEN.pl)

a.	θálasa	a’.	θalasón	‘sea’
b.	γónðola	b’.	γónðolon	‘gondola’
c.	stafíða	c’.	stafíðon	‘raisin’
d.	θiγatéra	d’.	θiγatéron	‘daughter’
e.	aγorá	e’.	aγorón	‘market’
f.	forá	f’.	forón	‘turn’

Starting from nouns in *-os* listed in (7), stress occurs in all three permissible positions. The examples *ánθropos*, *klívanos*, *fantáros*, *uranós* are morphologically equivalent; they consist of a disyllabic root and a monosyllabic suffix. However, accentually they diverge. First, they are accented in different syllabic positions and second, stress in (7a) shifts from the antepenultimate syllable in the nominative to the penultimate one in the genitive. In the remaining examples in (7) stress is immobile. A similar situation is witnessed in (8a), with the difference that here stress shifts from the antepenultimate to the ultimate syllable. In general, the examples (7a) and (7b) and, similarly, (8a) and (8b) share the same accentual pattern in the nominative case but not in the genitive. Notice that in both pairs stress is on the antepenultimate syllable. This is a crucial detail for the interpretation of the facts.

One way to explain the stress patterns in (7-8) is to argue that the inflectional suffix of the nominative singular /-os/ has three accentual allomorphs: it is unmarked in (7a) and (7b), pre-accenting in (7c) and (7d) and accented in (7e) and (7f). In the same spirit, the genitive suffix is pre-accenting in nouns of the *ánθropos*-type but unmarked in nouns of the *klívanos*-type. The problem with this solution is that it implies a very complicated system of marking since each morpheme has to be specified in the lexicon for the accentual type of suffix it should be combined with. Given that the Greek paradigm is quite long and that there are at least ten different classes of nouns, we realize that probably this is not the best way to account for the accentual diversity.

A more economical option is to assume that roots are equipped with inherent accentual properties. To be more precise, one can claim that there are three accentual classes of roots: first, roots like /anθrop-/ that lack metrical prespecification; second, roots like /klívan-/ and /fantár-/ that bear a lexical accent on some syllable and, finally, roots like like /uran-́/ and /xor-́/ that push stress out of their domain.

This solution allows us at the same time to account for accentual alternations. An unmarked root is stressed by default when it combines with an equally unmarked suffix but it loses stress after an accented suffix. For instance, if we take /anθrop-/ and /θalas-/ to be unmarked roots, then we can attribute antepenultimate stress to the default and the accentual alternations in the genitive to the pre-accenting suffix /-u/ and the accented suffix /-on/, respectively. Consequently, the difference between *ánθropos* and *klívanos* and, similarly, *θálasa* and *γónðola* hinges on the fact that the former root in each pair is unmarked and therefore stressed by default, whereas the latter root is accented on the initial syllable.

One naturally assumes that often the distinction between default and marking is neutralized in some grammatical cases. Notice, however, that examples like *ánθropos* and *θálasa* lack the paradigmatic uniformity that marked words have. Unmarked roots are subject to accentual alternations every time they are combined with accented and accentless suffixes. This issue is further elucidated in Chapter 4.

Finally, a few loan words are listed in (9). Notice that loan words are uninflected and, moreover, some of them (9i-j) are stressed on the pre-antepenultimate syllable triggering violation of the trisyllabic window.

(9) *loan words*

a.	gól	‘goal’	f.	memorándum	‘memorandum’
b.	fául	‘foul’	g.	montgómeri	‘coat’
c.	mamúθ	‘mammoth’	h.	kalorifér	‘radiator’
d.	pulóver	‘pullover’	i.	kámeraman	‘cameraman’
e.	selofán	‘cellophane’	j.	kópirait	‘copyright’

3.4.2. Marked and unmarked patterns

Based on the data in the previous section, we assert that morphemes in Greek exhibit a wide variety of accentual patterns. They can lack inherent accentual properties (10a) or they can be marked with a strong (head) or a weak (tail) lexical accent (10b).

(10) *accentual properties of morphemes*

a. *unmarked*
anθrop- θalas-
-os -a

b. *marked*
accented/pre-accenting unaccentable
(klivan- fan(tar- uran-
(γonðol- sta(fið- aγor-
-u) -(on

In Chapter 2, I presented the basic principles of the theory of marking promoted in this study. According to this theory there are two accentual classes of morphemes, the unmarked and the marked one. Members of the former category lack inherent metrical specification. Words composed of unmarked morphemes are stressed by the ‘default’ algorithm. This is a fixed subsystem that operates in the language in order to assign a prosodic make-up to words that are accent-free. As mentioned earlier, default stress in Greek is on the antepenultimate syllable of the word. The specifics of the default accentuation are examined in §3.6. In the marked group, three subclasses are further recognized: accented, pre-accenting and unaccentable morphemes.

Marked morphemes, on the other hand, are prespecified with an autosegmental feature called lexical accent. Lexical accents can be strong or weak. In foot-based languages, the former type of accent is tantamount to a (foot-)head and the latter is tantamount to a (foot-)tail. According to the theory of marking developed in this thesis, an accented root such as /fantar-/ is equipped with a strong accent on its final vocalic peak. This accent is parsed as the head of the foot and is typographically indicated as: /fan(tar-/. Richness of the Base advocates that a lexical accent can be located on any possible position within the root. It depends on the overall constraint ranking of the language to derive the correct output by taking any imaginable representation as input. For example, the stress of *fantáros* can originate from an infinite pool of inputs. Representations such as (*fantar-*, *fan*(*tar-*, even *fantar-* are all possible input forms. Lexicon Optimization, introduced by Prince and Smolensky (1993) and further developed by Itô, Mester and Padgett (1995), will choose the representation that incurs the least constraint violations of high ranked constraints as the harmonic input. In our example, the form *fan*(*tar-* will be selected as the harmonic input for the form *fantáros*. Subsequently, each morpheme has one underlying representation, the one which better complies with the most important constraints.

Weakly-accented morphemes are represented with a right foot-bracket, e.g. *anθróp-u*). This bracket is a notational convention that denotes nothing more than a weak lexical accent. Weak accents in Greek avoid prominence by occupying the tail part of a foot. Weakly-accented suffixes do not impose a foot-head on the preceding morpheme. As I show in §3.5.3.2, the fact that suffixes marked for foot-tailness surface as pre-accenting is determined by the structural constraints of the language.

Prosodic faithfulness constraints have been introduced in Chapter 2. A constraint such as MAX(HEAD/TAIL) is violated by any foot-head/tail in the input that lacks a matching head in the output. To illustrate with an example, this constraint is violated when the foot-head in /fan(tar-/ is not present in the output form. Similarly, a DEP(HEAD/TAIL) constraint demands an output foot-head/tail to match input head/tail. This implies that an output with a lexical accent which has no correspondent accent in the input constitutes a violation of this constraint. In the discussion that follows, I refer collectively to MAX(HEAD/TAIL) and DEP(HEAD/TAIL) constraints as 'FAITH(HEAD/ TAIL)' when there is no reason to distinguish between them.

The anti-migration constraint *FLOP requires input-output faithfulness to the association between a lexical accent and its vocalic peak. The importance of *FLOP for accentuation is shown shortly when high ranked word-form constraints push the lexical accent away from its underlying position. *FLOP is irrelevant for the evaluation of candidate forms with floating accents since these accents are not linked to any specific vowel in the input. The migration of a floating accent to a neighboring morpheme is initiated by the structural constraint *DOMAIN.

3.4.3. Common patterns and gaps

The table in (11) summarizes all empirically documented patterns of roots and inflectional suffixes in Greek. Loan words exhibit richer accentual contrasts as opposed to native words which display a more restricted set of prosodic patterns. Recall that Greek does not assign inflection to words of foreign origin. Consequently, in loans roots are equivalent to words. There is another discrepancy between the native and the foreign vocabulary. Native underived words are usually no more than four-syllables long,[4] whereas loan words can exceed this length, e.g. *vulkanizatér* 'vulcanizer'.

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[4] Some assimilated loans are polysyllabic, e.g. *provokátoras* 'agent provocateur', *akuaréla* 'water-color', *tamperaménto* 'temperament'. The criteria for the distinction between assimilated and non-assimilated loan words are given in §3.7.

(11)

accentual pattern	1σ ROOTS	2σ ROOTS	3σ ROOTS	4σ ROOTS	SUFFIX
unmarked	xor-	θalas-	astraγal-		-os
marked accented	(kut-	sta(fið- (γonðol-	servi(tor- *σ(σσ- *(σσσ-	kalori(fer memo(randum mont(gomeri (kameraman	-(on
unaccentable	for-	aγor-	*σσσ-		
pre-accenting					-u)[5]

The table in (11) invites some very interesting observations. Starting from the native words, four-syllable words are never accented on the antepenultimate syllable. This means that there are no marked trisyllabic roots with prefinal accent, **ser*(*vítor-os*, **θi*(*γáter-a*. Moreover, no marked (native) words with pre-antepenultimate stress surface, rightfully so, because of the three-syllable-window. Interestingly, there are no trisyllabic unaccentable roots. Finally, preaccentuation is strictly restricted to suffixes. There is no evidence for pre-accenting roots. As mentioned before, the only way to test this hypothesis is by examining prefixed constructions. However, Greek is an instance of the prefix/suffix asymmetry; prefixes usually fall outside the domain of the prosodic word (Van Oostendorp 1997). Moreover, it is difficult for prefixes to host stress without violating the window. The gaps in (11) are accounted for in the following section.

Unassimilated loan words are special in many respects. The lack of inflectional paradigm together with the fact that they hardly participate in any morphological process makes it impossible to test the existence of unaccentable and unmarked patterns in such constituents. For example, it is hard to argue whether antepenultimate stress in examples like *montgómeri* 'coat' is due to the default clause or to marking. Interestingly, the loan vocabulary is the only part of the Standard Greek vocabulary that disrespects the trisyllabic stress limitation, e.g. (*káme*)(*raman*) 'cameraman'.[6] The accentuation of loan words is examined separately in §3.7.

It is impressive that 86% of the nominal vocabulary in my corpus (16.000 nouns in *-os* and *-a*) consists of marked words (67.5% accented roots, 18.5% unaccentable roots) and only 10.2% consists of unmarked ones.[7] The statistical

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[5] In §3.5.3.2, I explain why pre-accenting suffixes are not unaccentable.

[6] This word is not perceived as a compound by Greek speakers.

[7] The corpus is based on the *Reverse Dictionary of Modern Greek* [Antistrofon Lexikon tis

discrepancy between the marked and unmarked patterns is another important issue that must be accounted for. This question is undertaken in §3.6.1. What is important at this point is to explain the absence of certain accentual patterns from the native vocabulary and see how the native (marked and unmarked) words are stressed.

3.5. Accentuation of Nouns with One Lexical Accent

3.5.1. Marked feet in the pool

To explain the gaps displayed by marked (native) words, let us first take a better look at the patterns of prosody attested in these words. These patterns are listed in (12). For the sake of uniformity, I choose the accent of the marked examples to originate from the root.

(12) *marked words in Greek*

1σ WORDS	2σ WORDS	3σ WORDS
a. (kúta) b. fo(rá)	c. sta(fíða) d. (γónðo)la e. (aγo)(rá)	f. (servi)(tóros) g. *(σ́σ)(σσ) h. *σ(σσ)(σ́) i. *σ(σ́σ)σ j. *(σσ)σ(σ́)

Some preliminary remarks are necessary for understanding the prosodic forms in (12). First of all, parsing in Greek is exhaustive but degenerate feet are allowed only under primary stress as indicated by (12b). Malikouti−Drachman and Drachman (1981) argue that in normal speech, words containing two or more syllables to the left of the lexical stress show optional secondary (rhythmic) stress, e.g. (*pìre*)(*ás*) ‘Pireaus’, (*tràpe*)(*záki*) ‘small table’. Arvaniti (1991) objects to the audibility of rhythmic stress in Greek but she agrees that rhythmically stressed syllables are more prominent than unstressed ones because they often have higher amplitude integral. In addition, rhythmic stress provides the background for variation under casual-speech reduction as shown by the following examples from Malikouti−Drachman and Drachman (1981:284):

Neas Ellinikis] compiled by Kourmoulis (1967).

(13) *variation as the result of vowel reduction*
a. (*èfxa*)*ri*(*stó*) > *èfxr̩stó*
b. *ef*(*xàri*)(*stó*) > *fxàrstó* ‘to thank’

The second criterion that supports the exhaustivity of parsing in Greek is the reduction/deletion of high vowels in unparsed and weakly parsed syllables. In casual speech, high vowels that are in a foot-head position (other than the stressed one of course) display a smaller degree of reduction than high vowels that are unparsed or in foot-dependent position. For example, the /u/ in (*aku̲*)(*stíkan*) ‘they were heard’ reduces more than the /u/ in *a*(*ku̲sti*)(*ká*) ‘earpiece (pl)’ because the latter is the head of a (secondary) foot.

The phenomenon of vowel reduction/elision is more forcefully manifested in the Northern Greek dialects. The examples in (14) picture the interaction between stress and reduction. Standard Greek forms are given between slashes. All the examples come from the dialect of Siatista which has been meticulously analyzed in Margariti-Roga (1985).[8]

(14) *vowel reduction/elision in the Siatista dialect*

	present		past		
a.	fu(résu)	/foréso/	(fóri)sa	/fóresa/	‘to put on’
b.	ðu(rísu)	/ðoríso/	(ðórsa)	/ðórisa/	‘to donate’
c.	a(kúsu)	/akúso/	(áksa)	/ákusa/	‘to hear’
d.	sa(pún’)	/sapúni/	sap(n’ízu)	/sapunizo/	‘soap’, ‘to soap’

With these preliminaries out of the way, let us concentrate on the main theme of the section, namely the unattested patterns in (12). The lack of four-syllable marked words with initial stress, (σ́σ)(σσ), can be easily accounted for; the EndRule-R (ER-R), stated in (15), together with FootType: Trochee are high ranking in Greek. The former constraint assigns promi-nence to the rightmost foot of the word,[9] the latter is responsible for the trochaic patterning of stress in the language.

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[8] The empirical facts from Northern Greek are very important because they also provide evidence against the Iambic/Trochaic Law (Hayes 1995). More specifically, they show that unstressed vowel shortening is not only a characteristic of iambic languages. Trochaic systems can also reduce or even delete vowels in order to enhance the perception of the stressed syllable (Revithiadou and Van de Vijver 1997).

[9] In fact, as we will see later in this study, this constraint is responsible for the three-syllable-window in Greek.

(15) a. ENDRULE-R (Prince 1983, cf. EDGEMOST in Prince and Smolensky 1993)
The rightmost foot of the word is the head of the prosodic word.

b. FOOTTYPE:TROCHEE
Feet are left-headed: (σ́σ), (σ́)

However, there are still two unattested forms left: the system lacks four-syllable words accented on the antepenultimate or final syllable. Certainly, neither structure can be ruled out by ER-R, since both are legitimately right-headed. If the distribution of lexical accents is arbitrary and uncontrolled, why are certain positions deprived of lexical marks?

Descriptively, unattested forms lack binarity. They are either composed of a foot flanked by two syllables, σ+F+σ, or two feet and a syllable adjoined to their left, σ+F+F, or two feet and a syllable in between, F+σ+F. In contrast, the formations which are prevalent in the language have a strictly binary branching at the level of prosodic word. These forms have a *templatic* shape. But what exactly are *templates*?

Templates are prosodic shape requirements imposed on certain morphological formations (Itô and Mester 1992, McCarthy and Prince 1993a, 1995, Kager 1994a, Van de Vijver 1998). They are combinations of authentic units of prosody such as a syllable and a foot [σ+F], [F+σ] (Loose Minimal Word, LMW); or two feet [F+F] (Prosodic Compound, PrCpd). Any authentic unit of prosody defines a Strict Minimal Word (SMW), [F]. Templates have a strictly binary branching; they consist minimally of a foot and maximally of two feet. To put it simply, they are well-formed prosodic words.

The set of templates which together characterize a category forms a *template pool*. We can now naturally claim that the prevailing patterns of marking in Greek are drawn from a PrCpd pool. Disyllabic marked words form either a Strict Minimal Word [**(σ-σ)**] or a right-headed Loose Minimal Word [σ-**(σ)**]. Trisyllabic words exhibit a wider range of accentual possibilities: they are either parsed into a right-headed LMW [σ**(σ-σ)**], a left-headed LMW [**(σσ)**-σ] or a right-headed PrCpd [(σσ)**(-σ)**]. Interestingly, the only parsing possibility for marked four-syllable words is a right-headed PrCpd [(σσ)**(σ-σ)**]. This is because of boundedness. As evident from the patterns in (12b) and (12e), templates with final monosyllabic head are permitted as a marking choice. Greek lacks a word minimum (Drachman and Malikouti−Drachman 1996), and this might support a catalectic account of monosyllabicity. Another solution would be to assert that the system wants to exploit the three positions available for stress as much as possible, and therefore deems foot binarity less important. To conclude, I call marks which occur in prosodically unmarked positions *templatic marks*.

An important generalization emerges at this point: marked words have unpredictable stress but predictable prosodic shape, whereas unmarked words have predictable antepenultimate stress but invariable prosodic shape. For example, four-syllable long words have predictable binary branching, if accented, (*servi*)(*tóros*), or predictable antepenultimate stress, if accentless, *a*(*stráγa*)*los*.

A crucial task of the analysis will be to define the nature of constraints that control prosodic wellformedness, i.e. templatic marking. Itô and Mester (1992, 1995c) and Itô, Kitagawa and Mester (henceforth IKM) (1992, 1996) derive binarity as an upper and lower limit from more elementary principles like *hierarchical alignment*:[10]

(16) *hierarchical alignment*
Every prosodic constituent is aligned with some prosodic
constituent that contains it.

Hierarchical alignment is defined for constituents that stand in a containment relationship. The intuitive idea is that in prosodic structures with maximally binary branching, every constituent lies at the right or left edge of some larger constituent. In fact, the constraint is composed of small statements of the type: a syllable must be left/right aligned with the prosodic constituent that contains it, a foot must be left/right aligned with the prosodic constituent that contains it, and so on. Notice that hierarchical alignment is violated even when binarity is not satisfied at one of all prosodic levels. A prosodic word that contains two feet one of which is ternary, incurs a violation of the constraint in (16). Similarly, a prosodic word that is composed by a syllable and two feet is deemed equally ungrammatical by hierarchical alignment. The structures in (17) illustrate the

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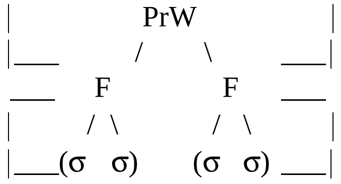
[10] Itô and Mester (1995c) choose hierarchical alignment instead of PRWBINARITY (Itô and Mester 1992) because this way binary branching is derived as a limit from more elementary considerations. The basic effects of hierarchical alignment at the foot-level and at the word-level are illustrated in the following diagram:

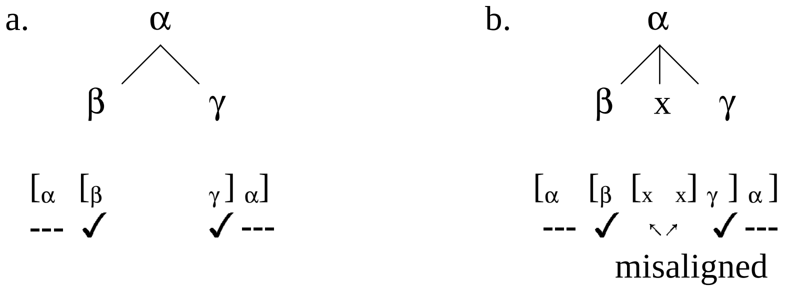


hierarchical alignment of F:
maximally binary PrW

hierarchical alignment of σ:
maximally binary feet

point. In (17a), β is left-aligned with α, and γ is right-aligned with α. In the ternary structure (17b), x is neither left- or right-aligned with α. If β, γ and x stand for a syllable and α for a foot, then the foot is binary in (17a), but ternary in (17b).

(17)



(IKM 1996:242)

For lexically marked words, hierarchical alignment refers to containment relationships between prosodic constituents starting from the lexical accent and moving upwards. More specifically, the constraint is composed of short statements of the following type: a lexical accent must be left/right aligned with the prosodic constituent that contains it, a syllable must be left/right aligned with the prosodic constituent that contains it, and so on. The constraint is violated when one or more of these shorter statements is violated. Notice that the revised definition of hierarchical alignment has a stricter reading; it only evaluates words that contain a lexical accent. It does not apply to words that lack a lexical accent. In (18) I give the revised version of hierarchical alignment:

(18) HIERARCHICAL ALIGNMENT (HIERAL) (*revised)*

A lexical accent is left/right aligned with the prosodic constituent that contains it, a syllable is left/right aligned with the prosodic constituent that contains it, a foot is left/right aligned with the prosodic constituent that contains it.

Weakly layered ternary structures like the ones constructed by the unattested forms, namely σ+F+F (12h), σ+F+σ (12i), and F+σ+F (12j) fare badly in terms of hierarchical alignment. In the first two forms there is an unaligned foot in the middle of the structure, and in the third one an unaligned syllable. The patterns derived by hierarchical alignment in Greek marked words are summarized in (19).

(19) *patterns derived by hierarchical alignment*

a. (σ́σ)	c. σ(σ́σ)	f. (σσ)(σ́σ)
b. σ(σ́)	d. (σ́σ)σ	g. (σ́σ)(σσ)[11]
	e. (σσ)(σ́)	

To summarize, in this section I have shown that marked words in Greek have an ideal prosodic structure: they form templates. As I show in the following section, in theoretic terms the emergence of ideal prosodic structures is expressed by means of a ranking that gives priority to hierarchical alignment over a constraint that urges accents to remain fixed to their lexical association. The major implication of the proposed model is that lexical contrasts are restricted. Section §3.5.2 presents the analysis of the patterns in (19) starting from words whose accent originates from a root and moving on to words whose accent originates from an inflectional suffix (§3.5.3).

3.5.2. Nouns with a marked root

3.5.2.1. Accented roots

One of the main proposals in this chapter is that marking in lexical accent systems is restricted by word-form constraints, i.e. constraints that control the prosodic shape of words. The examination of the patterns with lexical accents in Greek has clearly demonstrated that certain syllabic positions cannot host lexical accents because the resulting structure will not be strictly binary. Specifically, there is only one possible parsing for four-syllable words: a right-headed PrCpd.

I propose that semi-predictable stress or, rather, templatic marking emerges from a ranking in which hierarchical alignment (HIERAL) outranks faithfulness to the position of a lexical accent. Recall that FAITH, as defined in Chapter 2, defines the relation between correspondent lexical accents. MAX(HEAD) prohibits the deletion of a foot-head but does not impose any requirement with respect to the migration of the foot-head from one specific syllable of the input to another in the output. To explain, MAX(HEAD) is not violated when the foot-head moves from the initial syllable of the input root (*servitor*- to the final root syllable in the output, *servi*(*tor*-. Faithfulness to the position of a lexical accent is enforced by *FLOP. This constraint bans the migration of a lexical accent beyond its input sponsoring vowel.

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[11] As I have already mentioned, this pattern is ruled out by the three-syllable-window.

At this point, the most crucial ranking is between HIERAL, the structural constraint that demands prosodic wellformedness, and *FLOP, the faithfulness constraint that bans migration of the lexical accent. The proposed ranking is given in (20). Keep in mind that ENDRULE-R and TROCHEE are undominated in the system.

(20) *proposed ranking for templatic marking (first version)*
FAITH(HEAD/TAIL), HIERAL >> *FLOP

Let us take a word like *servitóros* ‘waiter’ which has an inherent accent on some syllable of the root. In the output form, the lexical accent lands on the penultimate syllable but this does not preclude that the accent cannot originate from another syllabic position. According to Richness of the Base (Prince and Smolensky 1993), it does not technically matter what kind of underlying representation is given to morphemes. Thus, the lexical mark of our example can be located either on the first (21a) or second (21b) or last syllable of the root (21c), or it can even be a floating accent (21d):

(21) *inventory of possible inputs for the root ‘servitor-’*
a. (servitor c. servi(tor-
b. ser(vitor- d. servitor-

In order to show that any representation from the pool of inputs can lead to a correct output, I choose the representation in (21b), *ser*(*vitor*-, to be a *possible input* for the derivation. The suffix is unmarked, therefore it does not invoke any faithfulness constraint. I also assume that PARSE-σ (Prince and Smolensky 1993)[12] is responsible for parsing a string of syllables into feet. This constraint is ranked, of course, below faithfulness in lexical accent systems. (Complete justification for this ranking is given in the derivation of the word *anθrópu* ‘man-GEN.sg’ §3.5.3.2). The ranking between FAITH and HIERAL is unclear at this point. As the tableau in (22) illustrates, the results of the ranking in (20), are straightforward.

---

[12] Parse-σ: A syllable is parsed into a foot.

(22)

possible input: ser(vitor-, -os	ER-R	Faith (head)	HierAl	*Flop	Parse-σ
☞ a. (servi)(tóros)				*	
b. (sérvi)(toros)	*!			*	
c. ser(víto)ros			*!		**
d. ser(vito)(rós)			*!	*	*

Candidate (22a) wins due to HierAl and ER-R. Any role that *Flop plays in eliminating competitors is not crucial. What is truly important is that the surface form should satisfy HierAl. Structural constraints such as ER-R are also valued highly in the system. The form in (22b) is doomed to fail because, besides *Flop, it fatally violates ER-R. The candidate, (22c), is also excluded from the competition because it sacrifices HierAl in favor of faithfulness to the input position of the foot-head. Moreover, it leaves two syllables unparsed but this is a minor violation given the ranking of the constraint. Being faithful to the input does not play any role for its survival. Finally, (22d) is also ungrammatical because it crucially violates HierAl.

The tableau in (22) suggests that the lexical accent eagerly migrates for the sake of the prosodic wellformedness of the word. The question now is how eager is a lexical accent to migrate when prosodic wellformedness requirements are satisfied. Answering this question is equivalent to establishing the ranking between the anti-migration constraint *Flop and the structural constraint *Domain, which promotes global realization of a lexical accent. For this purpose let us examine the accentuation of words like *stafíða* ‘raisin’.

As mentioned earlier, this word is composed of an accented root, /sta(fið-/, and an unmarked suffix, /-a/. By Lexicon Optimization (Prince and Smolensky 1993, Itô, Mester and Padgett 1995) the pattern /sta(fið-/, with a strong accent on the root-final syllable, is chosen as the most harmonic input. The fact that the accent in the output form remains anchored to the root that sponsors it makes evident that *Flop dominates *Domain: *Flop >> *Domain.

(23)

input: sta(fið-, -a	*Flop	*Domain
☞ a. sta(fíða)		*
b. (stafi)(ðá)	*!	

The examples discussed so far suggest that there is a split in prosodic faithfulness constraints. Prosodic faithfulness has both a dominating and a dominated position in the system of constraints. More specifically, faithfulness to lexical accent is high ranked but prosodic faithfulness to association lines is dominated by a prosodic wellformedness constraint. This ranking leads to the formation of marked words that have a templatic shape.

Such a theory of marking generates restricted lexical contrasts with important theoretical implications. First, marking is semi-predictable. There are few positions in a word that can lead to well-formed prosodic words and hence be targeted by templatic marks. Thus, the possible, though not exact, position of inherent accents can be predicted. Second, lexically determined stress is now derived from input-output constraints and not from stipulating restrictions on underlying representations.

The effects of word-form constraints in forming outputs are further examined in the following section.

3.5.2.2. Unaccentable roots

In this section, I come back to the issue of unaccentability and examine possible scenarios in order to account for the accentual behavior of these morphemes. Recall that unaccentability is manifested in words like *uranós* whose final stress does not originate from the inflection as in *xor-ón* 'land-GEN.pl' and *θalas-ón* 'sea-GEN.pl'. In §3.4.1, I argued that final stress in *uranós* is triggered by a marking property of the root. However, having established that an accent cannot exceed the territory of the morpheme it belongs to, the origin of lexical accent in *uranós* is still problematic. The answer must be found in some other property that unaccentable morphemes have.

A first hypothesis would be to claim that roots like /uran-/ are extrametrical. Under this assumption, the stress pattern of *uranós* emerges because the last syllable is the first element after the extrametrical domain created by the root and, consequently, the only available host for stress. Interestingly, this hypothesis implies that final stress in *uranós* is an instantiation of the default accentuation. The difference with other cases of default stress such as *astráγalos* lies on the extrametrical domain created by the root. An immediate consequence of this analysis is that words with extrametrical roots will not be subject to prosodic wellformedness constraints like hierarchical alignment. This predicts the existence of four-syllable words with final stress which are, however, unattested: **servitorós*. We conclude, therefore, that the proposed analysis cannot be correct.

There is a second hypothesis that can more successfully account for these facts. One can argue that the root is indeed equipped with a lexical accent but this accent is not fixed to any vocalic peak, it is floating. This proposal has two positive aspects. First, it attributes the lexical accent to the root, as desired, and second, it accounts for the non-local distribution of the lexical accent. A floating accent is not subject to the non-migration constraint *FLOP because it lacks association lines. With *FLOP out of play the structural constraint that enforces lexical accents to extend beyond the scope of their sponsors, namely *DOMAIN, is given a chance to take accentuation into its hands and determine the optimal output. Thus, the final accent of *uranós* results from the difference between a linked and unlinked accent and not from a marking mechanism or a rule that shifts stress from the root to the suffix.

An abstract example will help us understand how this constraint evaluates outputs. Take the form in (24) to be an unaccentable root like /uran-/. According to what has been argued so far, only the form in (24a) satisfies both FAITH and *DOMAIN. It preserves the lexical accent of the root and, more importantly, extends the scope of lexical accent from the morpheme to the whole word. The form (24b), on the other hand, is ungrammatical because the lexical accent is realized locally triggering a violation of *DOMAIN.

```
(24)     input form          output form
            *                    *           *
                                  \          |
          σσ-   -σ    >     a. σσ-σ      *b. σσ-σ
```

The picture is radically different when the input accent is associated to the sponsoring morpheme as in (25). Any realization of the accent beyond the root results in violation of *FLOP. This is illustrated by the form (25b) where the lexical accent of the root migrates to the suffix. Faithfulness here is violated when the lexical accent is not realized on the surface at all.

```
(25)     input form          output form
            *                  *              *
            |                  |               \
          σσ-  -σ     >    a. σσ-σ        *b. σσ-σ
```

An important observation must be pointed out. The optimal form (24a) suggests another split in FAITH. In order to both preserve the accent of the root and comply to *DOMAIN, a lexical accent is added to an unmarked inflectional suffix (in violation of DEP(HEAD)). In short, faithfulness to the suffix is deemed less important than faithfulness to the root. This is a crucial fact that comes up later in the accentuation of words with a marked suffix and, more importantly, in the accentuation of words with conflicting lexical accents. At the moment, I suggest to separate FAITH into two constraints: faithfulness to the lexical accent of the root, FAITH$_{R}$ and faithfulness to the lexical accent of the inflectional suffix, FAITH$_{InflS}$. I should make clear that this is a temporary distinction necessitated by the purposes of the discussion that takes place in this chapter. In Chapter 4, I show that in fact the former constraint, FAITH$_{R}$, is just faithfulness to morphological heads (HEADFAITH), which is ranked higher than simple faithfulness constraints.

To summarize, I propose that postaccentuation results from the combination of having a morpheme marked with a floating accent and a constraint that promotes global realization of a lexical accent. The accentuation of words with unaccentable morphemes suggests a split in faithfulness constraints; faithfulness to the root seems to be more important than faithfulness to the inflectional suffix.

Let us now examine how the stress patterns of the word *uranós* 'sky' is derived. The tableau in (26) illustrates the derivation. As mentioned above faithfulness is segregated into FAITH$_{R}$ and FAITH$_{InflS}$. The ranking between FAITH$_{R}$ and *DOMAIN is established by intervening constraints, namely, HIERAL and *FLOP. *DOMAIN dominates faithfulness to the inflectional suffix and specifically, DEP(HEAD)$_{InflS}$. Non-local realization of the lexical accent of the root is at the expense of the inflectional suffix to which a lexical accent is added in the output. Foot-binarity (FTBIN), a constraint that requires feet to be binary,[13] is ranked below faithfulness to the lexical accent of the root and *DOMAIN. More important demands push stress to the final syllable.

(26)

input: * uran-, -os	FAITH(HEAD)$_{R}$	*DOMAIN	DEP(HEAD)$_{InflS}$	FTBIN
* ☞ │ a. (ura)(nos)			*	*
* │ b. u(ranos)		*!		

---

[13] FTBIN: Feet are binary under syllabic or moraic analysis (Prince 1980, McCarthy and Prince 1986, Kager 1989, Hayes 1995).

Candidate (26a) surfaces despite the fact that a foot-head has been inserted in the (unmarked) inflectional suffix. Candidate (26b) realizes the accent within the root triggering a fatal violation of *DOMAIN.

The analysis just outlined can also easily account for the emergence of accentual variation when the unaccentable morpheme is a derivational suffix, as I show in Chapter 4. Analogous cases of morphemes with floating accents are exhibited by a number of languages. For instance, Russian and Thompson Salish also have unaccentable morphemes which are discussed in other parts of this thesis.

One may wonder whether words composed of morphemes with floating lexical accents are also subject to prosodic form constraints. The absence of four-syllable words with final stress such as **servitorós* indicates that words with inherently floating accents are indeed targeted by prosodic well-formedness constraints. More specifically, this gap is telling because it shows that not only FAITH(HEAD)$_R$ but also HIERAL is ranked higher than *DOMAIN. The tableau in (27) exemplifies the ranking.

(27)

input: * servitor-, -os	FAITH(HEAD)$_R$	HIERAL	*DOMAIN
* ☞ | a. (servi)(toros)			*
* \ b. ser(vito)(ros)		*!	

The most optimal output is the one that realizes the accent of the input and, moreover, complies with the principle of prosodic wellformedness despite the fact that the floating accent emerges within the domain of the root.

In Chapter 2, I provided some arguments against treating pre-accenting suffixes as unaccentable. I assume here that Greek lacks altogether unaccentable inflectional suffixes. In the following section, I present more evidence in support of this view.[14]

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[14] To my knowledge there is at least one lexical accent system with unaccentable inflectional suffixes. This language is Cupeño, a Takic language spoken in Southern California. In this language the present perfect plural subject /-wəə/ and the past imperfect plural subject /-wəənə/ are unaccentable. Their floating accent lands on the root final syllable. For example, the roots /yaaxa-/ and /maaza-/ are both unmarked but when they combine with one of the

The analysis up to this point suggested that the ranking in (28) accounts for the accentuation of words consisting of an accented or an unaccentable root and an unmarked inflectional suffix. In the following section, I show that the same ranking holds for words that are composed of unmarked roots and marked suffixes. Moreover, these cases shed some light on the ranking between FAITH(HEAD)$_R$ and HIERAL as well as the lower ranked foot-form constraints, namely FTBIN and PARSE-σ.

(28) ER-R, TROCHEE, FAITH(HEAD)$_R$, HIERAL >> *FLOP >> *DOMAIN >> DEP(HEAD)$_{InflS}$ >> FTBIN, PARSE-σ

3.5.3. Nouns with a marked inflectional suffix

3.5.3.1. Accented inflectional suffixes

The segregation of prosodic faithfulness into root and (inflectional) suffix faithfulness is also compelled by the accentuation of words whose lexical accent is introduced by the inflectional morpheme. Moreover, these facts shed light on the relation between HIERAL and FAITH$_R$.

It is expected that words with an accented suffix conform to prosodic wellformedness as well. However, this prediction is not borne out. Words with unmarked trisyllabic roots and an accented inflectional suffix, e.g. /abariz-(on/ 'prisoner's base (game)-GEN.pl' are stressed on the final syllable, e.g. *abarizón* and not on the penultimate, **abarízon*, as expected. Migration of a lexical accent from the suffix to the root triggers violation of DEP(HEAD)$_R$; the lexical accent of the suffix is inserted in the root. This is an illegitimate move, because faithfulness to the root is deemed more important than prosodic wellformedness. This is what the tableau in (29) illustrates.

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aforementioned suffixes they become accented, *yáaxa-wəə* 'they are saying', *čəmə-máaza-wəənə* 'we were giving' (cf. Hill and Hill 1968:236).

(29)

input: abariz-, -(on	FAITH(HEAD)$_{\mathrm{R}}$	HIERAL	FAITH(HEAD)$_{\mathrm{InflS}}$
* ☞ │ a. a(bari)(zon)		*	
* / b. (aba)(rizon)	*!		

We conclude that marking originating from inflectional suffixes does not adhere to hierarchical alignment simply because prosodic wellformedness cannot be at the expense of root-faithfulness. Consequently, lexical contrasts are restricted only when they originate from roots. In the light of the new facts, the ranking in (28) takes the following form:

(30) *ranking for templatic marking in Greek (final version)*
ER-R, TROCHEE, FAITH(HEAD)$_{\mathrm{R}}$ >> HIERAL >> *FLOP >> *DOMAIN >> DEP(HEAD)$_{\mathrm{InflS}}$ >> FTBIN, PARSE-σ

3.5.3.2. Pre-accenting inflectional suffixes

In this section, I focus on weakly-accented inflectional suffixes. For this purpose I analyze the words *astraγálu* 'ankle-GEN.sg' and *anθrópu* 'man-GEN.sg'. These examples offer us the chance to take a closer look at cases where MAX(TAIL) is at play and also establish the ranking between the structural constraints PARSE-σ and FTBIN. In addition, they reveal that the emergence of preaccentuation in a system is a consequence of high ranking structural constraints such as ER-R.

Among other grammatical cases, the genitive singular suffix /-u/ is pre-accenting. When this suffix combines with an unmarked root, accentual alternations arise within the paradigm. For instance, in the pairs *astráγa-los* (NOM.sg), *astraγál-u* (GEN.sg) and *ánθrop-os* (NOM.sg), *anθróp-u* (GEN.sg), antepenultimate stress alternates with penultimate between the nominative and genitive singular, respectively. If the root was accented, stress would have been immobile, e.g. *klívanos* (NOM.sg), *klívanu* (GEN.sg). Moreover, in *astráγalos* stress would have been on the penultimate syllable because according to what was argued before, marked four-syllable words do not exhibit antepenultimate stress. Thus, we conclude that penultimate stress must be triggered by the suffix and not by some property of the root.

In Chapter 2 and also at the beginning of this chapter, I claimed that pre-accenting suffixes are weak lexical accents which in a foot-based language like Greek take the form of tails. In other words, they are marked to be in weak foot position. However, this does not entail that they determine the position of the head of the foot. This is controlled by other principles of the language. More specifically, I argue that this is the result of a highly respected ER-R in combination with parsing mechanisms. First, the syllables are parsed into feet. At this point the inherent property of the suffix interferes demanding to be in the tail of a foot. Depending on the position of faithfulness with parsing mechanisms the demand of the suffix can be respected or not. Based on what has been argued before, in lexical accent systems faithfulness constraints are ranked higher than PARSE-σ and FTBIN, therefore the mark of the suffix prevails over constraints that may enforce some other parsing configurations. This is exemplified in the tableau in (31). Note that ER-R is undominated in Greek.

(31)

input: anθrop-, -u)	ER-R	MAX (TAIL)$_{InflS}$	FTBIN	PARSE-σ
☞ a. an(θrópu)				*
b. (àn)(θrópu)			*!	
c. (án)(θropu)	*!		*	
d. (ánθro)pu		*!		*
e. (anθro)(pú)		*!	*	

Candidate (31a) wins over candidates (31d-e) because it is the only form that respects the inherent tail role of the suffix and satisfies ER-R and FTBIN. Candidate (31d) violates faithfulness because the suffix loses its weak accent. Suffix faithfulness is also violated in (31e) because the suffix loses its accent and, in addition, is stressed. Candidates (31b-c) also respect suffix faithfulness but they are excluded because they violate structural constraints. More specifically, the latter candidate, (31c) fatally violates ER-R. It also violates FTBIN, but this is not so crucial because the constraint is ranked low. The ranking between FTBIN and PARSE-σ becomes relevant for the evaluation of candidate forms (31b) and (31a). They both satisfy faithfulness to the foot-tail accent of the suffix, but only the first is chosen as the most optimal output. Evidence against monosyllabic feet comes from phonetics: unparsed and weakly parsed vowels tend to be reduced in everyday speech and in the Northern Greek dialects, in contradistinction to vowels that head secondary feet (cf. the discussion in §3.5.1). Notice that foot binarity is ranked higher than the other foot-form constraints.

It is important to emphasize once more that the foot-head preceding the suffix /-u/ does not incur FAITH(HEAD)$_R$ violation[15] because it is the result of structural constraints such as ER-R, FTBIN and PARSE-σ and not a lexical accent imposed by the suffix. Pre-accenting suffixes create an ‘island’ in the string of syllables waiting to be parsed. All the suffix wants is to avoid prominence and be in a weak position. PARSE-σ and FTBIN will parse syllables into feet, nevertheless, taking into account that the prespecified syllable will be a foot-tail in the string. ER-R will stress the rightmost foot.

This analysis predicts that pre-accenting suffixes do not emerge in systems which assign prominence to leftmost feet. This is empirically documented in Russian which exhibits the same marked inventory with Greek with one exception: there are no pre-accenting suffixes. This discrepancy can be easily explained on the basis of the model advanced here. Under Richness of the Base, pre-accenting suffixes can be part of the inventory of marked morphemes but they never have a chance to surface because the word stress rule of the language prefers the left edge of the word.

One may wonder whether pre-accenting suffixes in Greek can be analyzed as unaccentable. Besides the reasons I presented in Chapter 2, there are two more arguments against this hypothesis. First, given the ranking in (30), the floating accent of the suffix will have to be realized locally. FAITH$_R$ will ban realization of the accent beyond the domain of the inflection. Second, there is empirical evidence from cliticization which shows that suffixes like the genitive singular /-u/ cannot be unaccentable. Observe the clitic formations in (32).[16]

(32) a. o uranós mu ‘my sky’
b. o klívanòs mu & o klìvanós mu ‘my kiln’
c. ton θàlasón mas & ton θálasòn mas ‘of our seas’
d. tu ànθropú mu & tu ánθropù mu &
?tu anθrópu mu ‘of my man’

---

[15] This is a violation of another type of faithfulness which demands input and output vocalic peaks to have identical featural specification (IDENT[F], McCarthy and Prince 1995). This constraint is violated every time a vowel is stressed, even when stress is assigned by the default. This constraint is very low ranked in the system, otherwise words would have been unstressed.

[16] For more information on clitic stress the reader is referred to Nespor and Vogel (1986), Malikouti−Drachman and Drachman (1991, 1992), Arvaniti (1991), among others.

Clitic stress shows that weakly-accented suffixes can bear rhythmic stress as in (32d). In fact, the form with final stress, *tu ànθropú mu*, is more preferred than the one with penultimate stress, *tu anθrópu mu*. If we assume that the genitive suffix /-u/ sponsors a floating lexical accent, then it is difficult to explain why other unaccentable morphemes as in (32a), never host clitic stress. Note that the prosodic mutation of *anθrópu* to *ánθropú mu* is not necessitated by rhythmic constraints governing clitic stress. Patterns like *fantáros mu* 'my soldier' are perfectly acceptable. Neither can it be attributed to morphological reasons. There is no difference between accented roots (32b) and accented inflectional suffixes (32c); they both host primary or secondary stress.

If we assume, on the other hand, that the suffix is pre-accenting we can at least claim that the rhythmic principles that govern the accentuation of clitics make a distinction between strong and weak accents. The former define possible positions for stress which must be respected by the prosodic constraints that control clitic stress. On the contrary, the latter do not make a clear statement about prosodic headedness. In this sense, they are easy target to forces that want to impose their own prosodic shape to clitic constructions. This explanation is lost if we assume that the suffix is unaccentable.

To conclude, the theory developed here implies that stress in Greek is semi-predictable. Prosodic restrictions refer only to the prosodic well-formedness of words. It seems that marks want to compensate for their 'arbitrariness' by placing themselves in prosodically predictable positions. I must emphasize that this claim is valid as long as inflected words are examined. In languages with morphologically oriented accentuation it is rightly expected accent placement to be dependent on a variety of mechanisms which, ideally, should reflect the morphological complexity of words. I complete the analysis of noun stress with the examination of words with unmarked morphemes.

A summary of the constraints controlling the accentual behavior of marked words is given in (33) together with the examples that justify the ranking at issue.

(33) *ranking for the accentuation of words with one lexical accent*

TROCHEE, ER-R,
FAITH(HEAD)$_R$
HIERAL
*FLOP
*DOMAIN
DEP(HEAD)$_{InflS}$, MAX(HEAD/TAIL)$_{InflS}$
FTBIN
PARSE-σ

• FAITH(HEAD)$_R$ >> HIERAL >> FAITH(HEAD)$_{InflS}$	abarizón	(29)
• ER-R, HIERAL >> *FLOP	servitóros	(22)
• *FLOP >> *DOMAIN	stafíða	(23)
• FAITH(HEAD)$_R$ >> *DOMAIN >> DEP(HEAD)$_{InflS}$	uranós	(26)
>> FTBIN	servitóros	(27)
• FAITH(TAIL) >> FTBIN >> PARSE-σ	anθrópu	(31)

3.6. Accentuation of Nouns with No Lexical Accents

Greek is a bounded system that limits the scope of its primary stress to the last three syllables of the word. This is due to ER-R which, together with TROCHEE, are undominated. The constraints that derive antepenultimate default stress are NONFIN(ALITY) and ALIGNPRW-R ranked as NONFIN(ALITY) >> ALIGNPRW-R, PARSE-σ.

(34) a. NONFIN (Prince and Smolensky 1993)
The head of the prosodic word should not stand in final position.

b. ALIGNPRW-R (McCarthy and Prince 1993)
Align the right edge of the prosodic word with the right edge of a foot (PrW, R, Ft, R).

These constraints are dominated by faithfulness. They take charge of accentuation only when a word is deprived of lexical accents. This is why the default accentuation is the ‘elsewhere pattern’. The accentuation of a word like *astráγalos* ‘ankle’ is illustrated in (35). The tableau makes clear that ALIGNPRW-R, being in a dominated position, has an effect only for the fourth candidate (35d). ER-R rejects the second candidate (35b) because it violates the three syllable restriction. NONFIN decides that the first candidate (35a) will surface. TROCHEE is respected by all candidates.

(35)

input: astraγal-,-os	TROCHEE	ER-R	NONFIN	ALIGN PRW-R	PARSE-σ
☞ a. a(stráγa)los				*	**
b. (ástra)(γalos)		*!			
c. (àstra)(γálos)			*!		
d. (ástra)γalos				**!	**

3.6.1. Default vs. marking

The accentual facts from Greek help us to have a better understanding of the statistics in §3.4.3 according to which marked patterns are more common than default. Under another theory, one would anticipate an opposite situation. Default is the ‘regular’ or ‘predictable’ pattern, therefore it should be more common. In our model the statistic disparity is not so surprising any more.

Templatic marking leads to words of ideal prosodic form. Marked words have a standard prosodic shape, they always have binary branching. In contrast, words stressed by default have invariant prosodic structure, e.g. *a(stráγa)los* ‘ankle’. Moreover, words composed of marked roots have accentually immobile paradigms, e.g. *fantáros* (NOM.sg), *fantáru* (GEN.sg), as opposed to unmarked words which must endure accentual alternations when combined with accented or pre-accenting suffixes, e.g. *ánθropos* (NOM.sg), *anθrópu* (GEN.sg). As I show in Chapter 4, the immobility of stress in marked words is derived by an asymmetry in the accentual behavior of roots and inflectional suffixes.

The tendency of the system to marginalize the default pattern is further supported by the results of an experiment performed by the author with the help of eighteen native speakers of Greek. Additional evidence comes from a synchronic process that takes place in everyday use of the language.

The purpose of the experimental research was to explore the prevailing preferences for the placement of stress in inflected words. Eighteen subjects (8 females and 10 males) between the age of 23 and 29 years old were asked to place stress on sixty three-syllable and sixty four-syllable nonsense nouns (and adjectives) of various declensions. The results of the survey provide support for the prevalence of the marking patterns. In the group of three syllable words, stress was invariably placed on each one of the three possible positions with a preference for the (ante)penultimate syllable. However, 98.2% of the participating words appears with immobile stress in the morphological environments of stress shifts, namely genitive singular and plural. More strikingly, in four-syllable words 99.17% of the total has fixed stress on the penultimate syllable, the most legitimate position of stress for words of this length, according to the theory presented in this study. (For more details the interested reader is referred to Revithiadou 1997c.) The results of this experiment make it very clear that marking is the productive or more preferred pattern and not the default pattern.

Another argument in support of the prevalence of marking patterns over default comes from a very popular synchronic process that takes place in everyday Greek. It is a very common tendency for Greek speakers to substitute an unmarked root with an accented one as, for example, in the pair *ánθropos* (NOM.sg), *anθrópi* (NOM.pl) instead of *ánθropi*. Wisely, Philippaki-Warburton (1976:264) comments “this alternation has not become established in the language because it involves changes that are counteracted by standardization and education [...] these forms are common among children and uneducated adults but are also used by educated adults who deliberately espouse the demotic idiom.” It is rightly observed that these forms are considered to be less formal and indicative of a non-sophisticated style of speech, a phenomenon that is vitally related to the lingering dissension between the archaic and demotic (popular) forces in the language. However, precisely this type of phenomena show the progressive propensities and the contemporary dynamics of the system.

3.7. Loan Words and Diacritic Marking

We mentioned in earlier sections that loan words exhibit richer accentual patterns than native Greek words. These words have entered the Greek vocabulary from other languages such as English and French but they are only partly adjusted to the native grammar. In Greek, unassimilated loan words are easy to detect because they lack inflection and they also abstain from derivational processes. They sometimes form compounds of the type [root [word]$_{\text{PrW}}$] $_{\text{PrW}'}$, e.g. *paljo-pulóver* ‘lousy pullover’ and cliticize, e.g. *o mànagér mu* ‘my manager’.

It is evident that a “hierarchy of foreignness” (Kiparsky 1968) can be detected by means of several criteria (i.e. morpheme combinatorics, applicability of phonological rules, etc.), a fact which leads to the conclusion that within the Greek lexicon there are subsets of lexical items called *strata*. It will take us too far afield to examine the process of assimilation of foreign vocabulary. Here, I focus on phenomena that are relevant for stress. The accentual patterns displayed by loan words are listed in (36).

(36) *accentual patterns of loan words in Greek*

a.	gól	‘goal’	f.	selofán	‘cellophane’
b.	fául	‘foul’	g.	kalorifér	‘radiator’
c.	mamúθ	‘mammoth’	h.	memorándum	‘memorandum’
d.	mánager	‘manager’	i.	montgómeri	‘coat’
e.	pulóver	‘pullover’	j.	kámeraman	‘cameraman’

Strikingly, stress in loan words can occur in every syllabic position even if this implies violation of the three-syllable window. I assume that loan words, also those with antepenultimate stress, always result from inherent accents. The reason is simple; these forms preserve the stress pattern of the language of origin.

The analysis that unfolds itself along the following lines concentrates on four-syllable words which prove to be enlightening for stress phenomena. The basic argument will be that the behavior of lexical accents in loan words is different from the behavior of accents in native Greek words. Following Itô and Mester (1995a,b), I argue that this difference is caused by the fact that foreign elements occupy peripheral strata in the Greek grammar and show a greater degree of resistance to the assimilatory (phonological/ morphological) processes of the host language.

To begin with, there are four-syllable words that pattern as σ+F+F (36g) and σ+F+σ (36j). It is apparent that both forms fail to form templates due to violation of hierarchical alignment. This is not a surprising observation. There is a crucial difference between loan words and native marked morphemes. Foreign words are stored in the Greek lexicon with a prespecified stress pattern that has been assigned to them by the mother-language. In other words, they are fully-formed words with a stress pattern assigned by a language-particular algorithm. On the contrary, marked elements in Greek are always morphemes, not (complete) words that bear a lexically assigned accent.[17] Although the origins of marking are radically different in these two cases, I assume the same autosegmental representation for accents.

Interestingly, the loan patterns reform when they succumb to the pressure of the assimilatory process of Greek. The history of some assimilated loans is presented in (37). In (37b-c) both the pre-assimilated and assimilated forms are given.

(37)	*loan words*		*assimilated loan words*
	a. aspirine		aspiríni
	b. cow-boy	káuboi	kaubóis[18]
	c. Mohammet	moxámet	moxamétis

It is obvious from the above examples that foreign words undergo a number of changes when becoming part of the native vocabulary. First, they are assigned an inflectional suffix. Second, and more crucial, the stress pattern, originally imposed by the rules of the mother language, is adjusted to the principles of Greek. Starting from (37a), the inherent mark of the foreign word shifts to the right. Due to suffixation, an extra syllable is added resulting in violation of the three-syllable window. Consequently, stress has to move to the right. Interestingly, stress moves two syllables to the right and not one which could also perfectly satisfy the window limitation. A similar stress shift occurs in (37b). This time the stress shift is not caused by the addition of the extra syllable of the suffix. The targeted form already ends in a vowel and morphological nativization is completed with the addition of the consonantal part of the suffix. As soon as an inflection is added to the base, the accent shifts to the right even though boundedness is not threatened, (37c).

Two questions are important: first, why does stress shift to the penultimate and not to the antepenultimate syllable (37a) and second, why does it shift even when the window is not violated (37b-c)?

I assume that when the form leaves the periphery and penetrates more into the core grammar, the inherent accent that represents the stress of the mother-language is dislocated from illegitimate positions and is placed in positions that are acceptable by the principles governing the accentuation of marked words in

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[17] I am not particularly concerned in this thesis with the historical details of the origin of marking in the languages examined. Inevitably, diachronic changes in the phonology of Greek (e.g. the loss of quantity sensitivity, the change from a tone accent to a stress accent system, etc.) play a crucial role in the present day accentual make-up of the language.

[18] This word is syllabified as /ka.u.bo.is./. Some speakers use the forms [kaubói] and [moxámet] and their assimilated counterparts, [káubois], [moxamétis].

Greek. This means that marked words of the form σ+F+σ are restructured into well-formed prosodic words, namely a PrCpd [F+F].

Kiparsky (1968) noted that not all phonological conditions of nativization are equally violable, there is a degree of resistance or foreignness. Itô and Mester (1995a,b), analyzing the loan phonology in Japanese, argue that there is a gradual transition from the *core* of the lexicon that includes the highly nativized or native strata to less nativized, *peripheral* strata of the lexicon. Core elements satisfy all requirements imposed by grammar. However, imported constituents lie on peripheral domains because they show a more intensive resistance to obeying or satisfying the native conditions. Such borrowed forms exhibit a tension between the need to retain structure of the source form (faithfulness constraints) and the need to conform to constraints of the host language. The degree of foreignness results from high ranking faithfulness constraints in the system. The higher the faithfulness constraints, the greater the resistance to assimilation. Thus, the transition from core to periphery is modeled as reranking of faithfulness constraints, where low faithfulness correlates with high nativization.[19] To conclude, variation in the degree of nativization reflects rerankings of faithfulness constraints; nativization never involves reranking of other constraint types. Several theoretical approaches dealing with the issue of co-existence of native and foreign strata in the lexicon follow the same path (cf. Pater 1994, Davidson and Noyer 1997, Inkelas, Orgun and Zoll 1997 for Optimality oriented approaches to loan assimilation).

With reference to Greek, the a-templatic prosodic shape of unassimilated words results from a constraint ranking in which hierarchical alignment and ER-R are both outranked by faithfulness to the inherent accent of the word (FAITH(HEAD)) and its position (*FLOP). It is more vital for foreign words to be faithful to the stress pattern imposed by the language of their origin than to undergo the rules provided by the Greek grammar.

The analysis of the words *kámeraman* and *kaloriférr* are presented in the following tableaux. For the former word, the crucial ranking is between ER-R and *FLOP, whereas for the latter the crucial ranking is between *FLOP and HIERAL. In both cases, the most optimal output is the one which is more faithful to the input.

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[19] In a recent study Itô and Mester (1998) shed more light on the structure of the phonological lexicon in Optimality Theory. They provide evidence and arguments regarding impossible nativizations, the relation between the structure of faithfulness constraints and the strata and the ranking across strata.

(38) *ranking of prosodic pre-assimilation (peripheral stratum)*

input: (kameraman	FAITH(HEAD)	*FLOP	ER-R
☞ a. (káme)(raman)			*
b. (kame)(ráman)		*!	

In (38) faithfulness to the lexical accent and its position is ranked above ER-R. The word is not completely assimilated because it violates the three-syllable window requirement. Similarly, in (39) the position of the mark does not lead to the formation of a well-formed prosodic word. This suggests that HIERAL is ranked lower than *FLOP; the loan form is still in the periphery of the grammar.

(39) *ranking of prosodic pre-assimilation (peripheral stratum)*

input: kalori(fer	*FLOP	HIERAL
☞ a. ka(lori)(fér)		*
b. (kalo)(rífer)	*!	

When the foreign element reaches the core grammar and is, therefore, completely assimilated, its prosodic pattern is substantially improved. This is exemplified in the derivation of the word *kaubóis* in tableau (40).

In such examples, the split in prosodic faithfulness has already taken place. The lexical accent is more eager to move to a position that satisfies both ER-R and HIERAL. The failure of candidate (40b) shows that ER-R moved up to a higher grade. Similarly, the failure of candidate (40c) shows that also HIERAL supersedes *FLOP. In short, at the point of complete assimilation the word-form constraint HIERAL comes between faithfulness to the lexical accent and faithfulness to the position of the lexical accent.

(40) *ranking of prosodic assimilation (core grammar)*

input: (kauboi-, -s	ER-R	FAITH(HEAD)	HIERAL	*FLOP
☞ a. (kau)(bóis)				*
b. (káu)(bois)	*!			
c. ka(úbo)is			*!	*

The behavior of marking in unassimilated loans is different from the behavior of marking in native words. First, it originates from stress rules and more specifically, from the algorithm of the language it comes from. Second, it is insensitive to prosodic wellformedness constraints till it reaches the core grammar; then it is prosodically reformed according to the constraints that control the accentuation of marked native words. The most important difference, however, is that there is no split in prosodic faithfulness constraints. Faithfulness to the lexical accent as well as to the position of the lexical accent are both ranked higher than any other constraints of the system and together evaluate the candidate set. As we have seen, prosodic faithfulness constraints in the core grammar are both in a dominating and a dominated position. The marking that is attested in borrowed words is named here *diacritic marking*. The ranking that yields diacritic marking is given in (41).

(41) *ranking for diacritic marking*
FAITH TO LA & FAITH TO POSITION OF LA >> WORDFORM
FAITH(HEAD), *FLOP >> ER-R, HIERAL

When the first signs of assimilation show up such as assignment of inflectional morphology or participation in derivational processes the prosodic make-up of the word conforms to the principles of templatic marking.

A positive result of this theory is that it correctly predicts that when foreign words assimilate they become part of the marked and not the default subsystem of the language. This is an argument that antepenultimate stress in borrowed words is not the outcome of default accentuation.

Diacritic marking is not a peculiarity of lexical accent systems. Polish and Spanish foreign vocabulary displays exceptional stress patterns as well. We have shown in Chapter 2 that ‘deviant’ accentual behavior (antepenultimate and ultimate stress) in these languages is closely related to foreign strata of the grammar. There, it was also pointed out that an underlying mark is equivalent to primary stress, although it is often restricted by principles that control window limitations on stress. In Polish, for instance, marks outside the window move to the right as in *univérsitet* ‘university’ or they are superseded by default as in *universitétu* ‘university (GEN.sg)’. We conclude, therefore, that diacritic marking is not an artifact of the analysis. On the contrary, it expresses the core/periphery organization of the vocabulary in natural languages and has correlates even in systems with rhythmic and morphological stress.

To sum up, in this section I introduced a type of marking which is ‘blind’ to prosodic wellformedness principles and characterizes the accentuation of foreign lexical strata. I attributed the ‘deviant’ patterns of foreign words to a core/periphery organization of the lexicon, according to which degrees of peripherality result from upgrading faithfulness over the constraints of the core grammar.

3.8. Accentuation of Adjectives and Verbs

The present day adjectival declension is more simplified, compared to nouns. Adjectives use a much more confined set of declensional endings for their formation and, interestingly, they often lack accentual alternations within the paradigm. An example of the *-os* (masc), *-a* (fem), *-o* (neuter) class is given in (42).

(42) *adjectives in -os* (masc), *-i* (fem), *-o* (neuter)[20]

		‘beautiful’	‘big’	‘naive’
a.	NOM.sg	ómorf-os	meɣál-os	aγaθ-ós
b.	GEN.sg	ómorf-u	meɣál-u	aγaθ-ú
c.	NOM.pl	ómorf-i	meɣál-i	aγaθ-í
d.	GEN.pl	ómorf-on	meɣál-on	aγaθ-ón

There are three accentual patterns: antepenultimate, penultimate and ultimate stress. However, in contradistinction to the corresponding nominal examples of this class, the adjectival paradigm lacks accentual alternations in the crucial morphological environments such as the genitive singular and plural. The absence of paradigmatic mobility in (42) can be interpreted in two ways: either all roots are marked (including roots of the type /(omorf-/) or the inflectional suffixes in adjectives lack inherent accentual properties. I see no real reason to prefer one solution to the other. One thing needs to be emphasized here; although all possible positions of stress are exploited, each paradigm exhibits only one stress pattern. This means that there is no arbitrary distribution of stress patterns within the paradigm depending on morphological case (i.e. nominative, genitive, etc.) or number (i.e. singular, plural). Adjectives in /-os, -a, -o/ draw their stress patterns from a Prosodic Compound pool. All templates of the pool, {SMW, LMW, PrCpd}, are employed for the accentuation of their members.

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[20] Lack of space prevents me from giving the full paradigm of all three genders. Therefore, I cite here only the masculine forms. The other genders decline in the same fashion as the corresponding feminine nouns in *-a* and neuter nouns in *-o*.

Stress in the verb is quite different from stress in other grammatical classes. The difference does not rely so much on fundamental properties of the accentual system, since the three-syllable-window restriction applies uniformly to all categories and the same stress patterns occur in the verb as well as in the noun and the adjective. The difference mainly focuses on how stress is distributed within each grammatical class. In verbs each stress pattern is associated with a particular tense, mood or conjugation. To put it in simple terms, stress in the verbal system is morphologized.

There are two conjugations in verbs, conjugation a’ and conjugation b’ (Philippaki–Warburton 1970). Their main difference is the formation of the Present tense. Besides the fact that they use different class vowels for the formation of Present (and Past) tense, conjugation a’ is primarily stressed on the final syllable of the root, whereas conjugation b’ is stressed on the class vowel (cf. Ralli 1988).

(43)

	a. *conjugation a’*		b. *conjugation b’*
1sg	aláz-o	‘change’	aγap-á-o and aγap-ó ‘love’
2sg	aláz-i-s		aγap-á-s
3sg	aláz-i		aγap-á-(i)
1pl	aláz-u-me		aγap-á-me
2pl	aláz-e-te		aγap-á-te
3pl	aláz-u-n and aláz-u-ne		aγap-á-n(e)

The picture of verbal stress is already quite different from what we have seen in nouns and adjectives. First, specific stress patterns relate to specific morphological constituents: the class vowel of the Present tense in conjugation a’ is pre-accenting, whereas the class vowel of the Present tense in conjugation a’ is accented. Verbal roots are unmarked, as shown by the past forms *álak-s-a* ‘change-PAST-1sg’ and *aγáp-i-s-a* ‘love-CLASS VOWEL-PAST-1sg’.

3.9. Assessment and Conclusions of Greek Accentuation

The examination of Greek stress made clear that there is a split in the accentual characteristics of unmarked and marked nouns. The former have fixed antepenultimate stress but a variable prosodic pattern and a mobile paradigm. The latter have strictly binary prosodic shape and fixed stress within the paradigm but variable stress across the vocabulary.

We have seen that unmarked words have predictable stress on the antepenultimate syllable as in *astráγalos*, *ánθropos* but mobile stress within the paradigm. Accentual alternations take place when the inflection has an inherent metrical specification as in *astraγálu*, *anθrópu*. Moreover, long words lack binary prosodic structure; they consist of a foot flanked by two syllables, *a*(*stráγa*)*los*.

On the other hand, marked words are always binary at the level of the prosodic word. Although three-syllable words display all possible accentual patterns, there is only one accentual possibility for longer words: penultimate stress. Thus, stress is not completely 'free'; it is restricted by word-form constraints as well as the window limitation of the language. Another desired property that marked words share is paradigmatic stability. Stress is on the same syllable throughout the paradigm when the root has a lexical accent, e.g. *fantáros*, *fantáru*, *fantáro*, etc. This issue is extensively addressed in Chapter 4.

To conclude, marked words have 'free' stress but a restricted pool of prosodic shapes. On the contrary, unmarked words (stressed by default) have fixed stress but invariable prosodic structure. Boundedness to the last three syllables is shared by all patterns. The generalization made here strongly supports the view that the language tries to restrict the freedom of marking and make it more accessible to its speakers. The variable stress of *servitóros*, *fantáros*, *uranós*, is balanced by the templatic structure of these words, whereas the fixed stress of *astráγalos* is hammered by its a-templatic shape.

Greek also shows that a language with marking can have 'exceptional' stress. Stress in loan words is not hampered by word-form and other structural constraints that operate in the native vocabulary. Any position in a word is a possible host for stress, e.g. *kámeraman*, *montgómeri*, etc. These words are lexically marked as well, but their mark reflects the stress assigned to the word by the canonical stress rules of the donor-language. In other words, diacritic accents are not subject to the prosodic wellformedness constraints of Greek. Loan patterns are still under the influence of their mother-language and hence in peripheral strata of Greek grammar. When the foreign forces yield to the pressures of the core grammar, diacritic marking reforms to templatic.

Once again, I emphasize that the two forms of marking have the same representation but different function, which is expressed as different constraint rankings. In templatic ranking, prosodic faithfulness constraints are split by intervening word-form constraints, whereas in diacritic marking they form an undominated cluster.

(44) a. *templatic marking*
FAITH TO LA >> WORDFORM >> FAITH TO POSITION >> FOOTFORM

b. *diacritic marking*
FAITH TO LA & POSITION >> WORDFORM, FOOTFORM

Greek accentuation gave us the chance to explore the nature of unaccentability and its relation to preaccentuation. Both forms of lexical specification impose stress on a neighboring morpheme. However, as I claimed, their similarity is an epiphenomenon created by the interaction of morphological structure with the prosodic constraints of the language. Postaccentuation arises when the floating accent introduced by the root links to the inflectional suffix. The realization of the floating accent outside the domain of its sponsor is enforced by a structural constraint that urges accents to get over the borders of the morpheme they belong to and become a property of the whole word. On the other hand, preaccentuation is mainly the result of structural constraints. A weakly-accented suffix makes no statement about the position of the prosodic head. This is decided by parsing mechanisms, edgemost rules and the other constraints of the system.

An important conclusion drawn from this brief contact with Greek stress is that there is a split in faithfulness constraints. Faithfulness to the lexical properties of the root is deemed more important than faithfulness to the lexical properties of the inflectional suffix. In Chapter 4, I show that dispersion of prosodic faithfulness constraints reflects morphological differences between these two constituents and more specifically, the fact that the root is the head of the morphological construction, whereas the inflectional suffix is not. We will see that the actual ranking hiding behind FAITH$_R$ >> FAITH$_{InflS}$ is HEADFAITH >> FAITH.

In the second part of this chapter, I examine stress in Russian inflected words with one lexical accent or no lexical accent. The similarities between the two systems are worth looking at.

Russian

Russian is another lexical accent system of the Indo-European family. In this section, I argue that the principles that determine stress in Russian are similar to the ones proposed for Greek. More specifically, I show that marked words are subject to wellformedness constraints, unless they are loans, in which case they preserve the stress pattern of the mother-language until they start assimilating to the native grammar. I present an overview of how these ideas are structured in the second part of Chapter 3.

After the introduction of the main phonological and morphological characteristics of Russian (§3.10), I provide a list of lexically accented and accentless words (§3.11.1). The study of the patterns displayed by the listed forms leads to the conclusion that some prosodic shapes are missing and some others are less preferred (§3.11.2).

Starting from the unattested patterns, which mainly concern accented words, it is claimed that lexical accents are under the spell of principles that define the prosodic form of a word. More specifically, these patterns are excluded by a constraint that limits lexical accents to positions that guarantee strict binarity between prosodic constituents of the word. Restricted lexical contrasts in marked words are expressed with a ranking in which prosodic faithfulness to the lexical accent dominates prosodic form constraints which, in turn, dominate faithfulness to the position of a lexical accent. The examination of marked patterns originating from roots (§3.12.2) and inflectional suffixes (§3.12.3.) reveals another split in faithfulness. There is strong evidence that inherent accentual properties of roots are given priority over accentual properties of suffixes. The segregation between root- and suffix-faithfulness is given a principled interpretation in Chapter 4. The split in faithfulness is supported by another accentual phenomenon. In Russian only monomoraic suffixes display accentual contrasts. Bimoraic and disyllabic suffixes have predictable initial stress. This is because a structural constraint that imposes a specific accentual pattern to bimoraic and disyllabic suffixes dominates inflectional suffix-faithfulness.

Less favored patterns, which mainly concern unmarked words, are accounted for in §3.13. Words stressed by the default subsystem have predictable stress but are hampered by accentual mobility within the paradigm. This is caused by the fact that unmarked roots are combined with accented suffixes in some grammatical cases and unmarked suffixes in other grammatical cases. The examination of Russian stress is completed with a brief examination of stress in loan words (§3.14) and the remaining syntactic categories (§3.15). The basic facts of Russian accentuation are summarized in §3.16. This chapter is concluded in §3.17.

3.10. Background Information on Russian

The position of stress in Russian cannot be predicted on the basis of the phonological properties of the word or syllable structure. There are numerous examples of homophonous words with contrasting stress, e.g. *glaskí* ‘peepholes’ vs. *gláski* ‘little eyes’. Evidently, there is no contrast between long and short vowels, although all stressed vowels are longer. Besides stress, the length of any vowel in Russian is affected by its position in relation to stress, its occurrence in an open or a closed syllable, the type of consonant closing the syllable, and so on. More attention to this issue is given in the Appendix.

As with other Slavic languages, Russian has underlying vowels, known as ‘yers’ or ‘fleeting’ vowels, which either surface as mid-vowels or delete depending on the environment, e.g. *kukol* (GEN.pl) vs. *kúkla* (NOM.sg) ‘doll’. As the aforementioned example shows, yers are realized in word final positions or before other yers, but delete when a full vowel follows. For an extensive discussion on yers the reader is referred to Lightner (1965, 1972), Kenstowicz and Rubach (1987), Melvold (1990) and Rowicka (1999). I do not provide an analysis of yers here but I follow Kenstowicz and Rubach (1987) in assuming that yers are floating vowels. When it is necessary, some aspects of interaction between yers and stress are discussed.

Russian is a fusional language like Greek. This means that nominal roots are almost always accompanied by an inflectional ending and, moreover, a single morpheme such as the suffix /-a/ expresses gender, number and case. All words take an inflectional ending. Nouns and adjectives inflect for number, case and gender, and verbs inflect for person, number and tense. Some examples of inflected words are listed in (45).

(45) *Russian inflected words*

a.	golová	(NOM.sg)	golóv	(GEN.pl)			‘head’
b.	mólod	(masc)	molodá	(fem)	mólodo	(neut)	‘young’
c.	vížu	(1sg)	vídit	(2sg)	víd’at[21]	(3pl)	‘see’

Underived words in Russian are composed of a root and an inflectional suffix. However, due to the changeable status of inflectional suffixes with yers, some roots appear to be uninflected as, for example, *golóv* in (45a). The nominative and accusative singular form of masculine and neuter nouns has zero inflection as well, e.g. *vólos* ‘hair’. I propose a morphological segmentation for Russian in which the vowel following the root belongs to the inflectional suffix rather than to the root. First, most suffixes in Russian are vowel initial. Second, if we assume that the vowel /-a/ in *borodá* is part of the root, then we must also invoke a rule of truncation, as shown in (46).

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[21] The notation C’ indicates a palatalized consonant.

(46)	a.	borodý	/boroda-y/	‘beard-GEN.sg’
	b.	borodáč	/boroda-ač/	‘bearded man’
	c.	borodíšča	/boroda-išča/	‘little beard’

Finally, the base for adjective formation is a bare root. In masculine forms the root is uninflected, e.g. *mólod* ‘young’ but in feminine and neuter forms the root is escorted by the ending /-a/ and /-o/, respectively, e.g. *molodá*, *mólodo*. An analysis that treats the last vowel in the aforementioned examples as part of the root necessitates the existence of three bases for the formation of the adjective, /molod-/, /moloda-/, /molodo-/, and an extra rule of vowel truncation that deletes thematic vowels before vowel initial suffixes like the plural /-y/, *mólod-y*. An alternative analysis that treats the final vowel as part of the suffix is certainly more economical. There is only a bare root in the lexicon which combines with various inflectional suffixes to form the adjectival paradigm.

Native roots are not longer than three syllables. Loan words are sometimes polysyllabic, e.g. *eksperimént* ‘experiment’, *ideólog* ‘ideologist’. Unlike Greek, Russian has a bimoraic word minimum. Monosyllabic words occur in the language but they always constitute a closed syllable, (C)VC. A few examples are listed in (47).

(47) *monosyllabic words in Russian*

a.	ád	‘hell’
b.	vól	‘ox’
c.	kón’	‘horse’

We infer from the lack of monomoraic content words that mora catalexis is ‘off’. However, final stress in words like *golóv* ‘head-GEN.pl’ suggests that syllable catalexis must be ‘on’ (Kiparsky 1991, Kager 1995, Van de Vijver 1998). Therefore, this pattern is analyzed with a monosyllabic trochee, *go*(*lóv*) ‘head-GEN.pl’, *go*(*rý*) ‘mountain-GEN.sg’.

Halle and Vergnaud (1987) and Melvold (1990) analyze Russian as an iambic language. Their main argument is that when a stressed vowel deletes, stress is transferred to the nearest stressable element to the left. The directionality of stress shift suggests an iambic grouping of syllables. For example, in the word *zajóm* ‘loan’, the yer vocalizes because it stands in word-final position. When, however, the genitive inflection is added, /zájOm-a/, the yer is forced to vanish but not the lexical accent it introduces. Instead, the inherent accent is transferred to the left, /zájma/, suggesting that constituents in Russian are grouped in right-headed feet. However, the example Halle and Vergnaud use in support of right-headedness of feet, is an isolated case. It is related to a general phenomenon found in Russian called ‘stress retraction’. Stress moves from the final syllable in the singular to the penultimate syllable in the plural, e.g. *kolesó* (NOM.sg), *kol’ósa* (NOM.pl)[22] ‘wheel’ (cf. Chapter 4). Idsardi (1992) correctly observes that alternations such as *otéc* (NOM.sg) *otcá* (GEN.sg) ‘father’, in which the stress of the unvocalized yer is transferred to the right, are much more common. Such alternations indicate a trochaic grouping of syllables. Moreover, secondary stress clearly reveals a trochaic pattern. The examples in (48a-b) are taken from Jones and Ward (1969:61) and the example in (48c) is taken from Loginova (1995:175).

(48) *secondary trochaic stress*

a.	(fòto)gra(vjúra)	‘photogravure’
b.	(mòto)pe(xóta)	‘motorized infantry’
c.	(rèvo)l’u(ciónnyj)	‘revolutionary’

The controversial issue of vowel reduction in Russian also suggests a trochaic metrical organization of the language. Barinova (1971:101) and Kenman (1975:55) present some examples of extreme reduction in rapid speech. The verb *napisát’* ‘to write’ has several possible pronunciations. One of them is [nʌpsát’] with loss of the unstressed syllable in pre-tonic position. The vowel in the first syllable is preserved because it is the head of the (secondary) foot, (*napi*)(*sát’*). The second pronunciation is even more extreme, [nəpsát’]. Here only the stressed vowel remains unreduced. The word *universitét* ‘university’ would normally be pronounced [universitét] but it is further reduced to [unirstét], a prosodic word composed of exactly two feet, (*unir*)(*stét*). A similar reduction process takes place with acronyms. Here, however, when unstressed vowels are not reduced a secondary stress appears on the initial syllable (Barinova 1975). For example, SSSR ‘USSR’ is pronounced in careful speech as [èsəsesér] and in less careful or formal speech as: [èsəsəsér] or even [əsér]. It is obvious that the foot-form is a trochee[23], and vowels in non-head positions are reduced to a schwa.[24] Vowel reduction in Russian is examined in the Appendix.

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[22] Stressed /e/ is pronounced as [o] with palatalization of the preceding consonant.

[23] The trochaic analysis of Russian stress defended here contradicts approaches which claim that Russian is not a foot-based system (Van der Hulst 1996).

[24] Compare these reduced forms with the outputs of reduction in a trochaic language like Dutch (Booij 1997, Van Zonneveld 1980, Kager 1989, Van Oostendorp 1995, among others):

/fonologí/	[fonoloγí]	*formal*	[fonələγí]	*informal*
‘phonology’	[fonəloγí]	*semi-formal*	*[fonoləγí]	

Unlike Greek, Russian does not impose any limitation in the position of stress. Later, I argue that in marked words some positions are more preferred than others. When there is no lexical accent, default stress assigns prominence to the leftmost vowel of the word: *skóvorody* 'frying pan-NOM.pl'. Special attention to the accentuation of accentless words is given in §3.13..

The primary sources for Russian in this study are Halle (1973), Melvold (1990) and a corpus that I compiled from articles, dictionaries and informants. Unless otherwise indicated, the data listed in this chapter (and Chapter 4) is drawn from the aforementioned sources. Important works in Russian stress include Dybo (1981), Illič-Svityč (1963), Halle and Vergnaud (1987), Zaliznjak (1980, 1985), Idsardi (1992), Halle and Idsardi (1995), Halle (1998).

3.11. Accentual Patterns in Nouns

3.11.1. The facts

Russian is a root-inflected language. This means that nominal roots are almost always accompanied by an inflectional ending. Feminine nouns fall into two declensions depending on whether the nominative singular ends in a consonant or the /-a/ inflection. For the purpose of the present discussion, I draw most examples in (49) and (50) from neuter class *-o* nouns and feminine class *-a* nouns. This small sample, however, gives an overall view of the attested accentual patterns in the Russian noun. I also included a number of loan words in (51) which shed some more light on important aspects of Russian stress.

(49) *neuter nouns in -o* (NOM.sg), *-a* (NOM.pl)

a.	zérkalo	a'.	zerkalá	'mirror'
b.	právilo	b'.	právila	'rule'
c.	bolóto	c'.	bolóta	'swamp'

The comparison between (49a) and (49b) is telling. Both have initial stress in the singular forms but diverge in the plural forms; the former example shifts stress to the ultimate whereas the latter preserves stress on the initial syllable. Stress is stable in (49c) as well, although here it lies on the penultimate syllable. We conclude from the above that first, some paradigms are alternating and some others are not, and second, stress can occur in more than one syllable in the word.

The alternating patterns in (49a) suggest that the root is unmarked and hence stressed on the initial syllable by default. However, the nominative plural suffix seems to be stress-attracting because stress moves from the (default) initial position to the ending. The stability of stress in the other examples is due to the accent of the root. The examples also suggest that when the accent of the root conflicts with the accent of the suffix as in (49b’) and (49c’), it prevails. Such cases are elaborately examined in Chapter 4. In this chapter, the focus is on words with one accent like the ones listed in the leftmost column. Neuter nouns in /-o/ also have members with final stress such as *oknó* ‘window’. However, stress shifts to the penultimate syllable in plural, *óknam* (DAT.pl). This type of accentual shift is of a different nature than the ones described here because it is not triggered by the suffix. These and other similar cases of accentual allomorphy are allotted a special section at the end of Chapter 4. Some more information needs to be introduced in order to fully understand this phenomenon. Now, feminine nouns pattern as follows:

(50) *feminine nouns in -a* (NOM.sg), *-y* (NOM.pl)

a.	skovorodá	a’.	skóvorody	‘frying pan’
b.	golová	b’.	gólovy	‘head’
c.	rýba	c’.	rýby	‘fish’
d.	jáščerica	d’.	jáščericy	‘lizard’
e.	rabóta	e’.	rabóty	‘work’
f.	čečevíca	f’.	čečevícy	‘lentil’
g.	lad’já	g’.	lad’jí	‘rook’
h.	gospožá	h’.	gospoží	‘lady’

The first two examples, (50a) and (50b) have mobile stress; the nominative singular suffix is accented, whereas the plural ending and the root are unmarked. A word composed of unmarked morphemes is stressed on the initial syllable by default. The examples in (50c-f) have stable stress on a syllable of the root, indicating that the root is accented. The words in (50g-h) are also interesting. Stress is on the ultimate syllable suggesting that the root is unmarked as in (50a) and final stress is probably assigned by the suffix. However, the consistent occurrence of stress on the final syllable throughout the paradigm suggests that the root is unaccentable like the Greek root /uran-/. More on this issue is presented in §3.12.2.2.

Another important characteristic of these examples is the absence of four-syllable words with antepenultimate stress. This gap proves once more to be crucial for the analysis. Antepenultimate stress is found, however, in loan words mainly of Greek origin, as demonstrated in (51). There also some other loans with final stress. More attention on this part of the vocabulary is provided in §3.14.

(51) *loan words*

a.	antropólog	a’.	antropólogi	‘anthropologist’
b.	psixólog	b’.	psixólogi	‘psychologist’
c.	istórija			‘history’
e.	múzyka			‘music’
f.	eksperimént			‘experiment’
g.	akvarél’			‘water-color’
h.	balerína			‘ballerina’

The inherent accentual properties of the morphemes reviewed in (49) and (50) are set out in (52). Morphemes in Russian can be unmarked (52a) or marked (accented or unaccentable) (52b).

(52) *accentual properties of morphemes*

a. *unmarked*

zerkal-	skovorod-	golov-
-o	-y/-i	

b. *marked*

accented		unaccentable
(pravil-	bo(lot-	lad’-
(ryb-	ra(bot-	gospož-
(jaščeric-	čeče(vic-	
-((j)a		

Some interesting gaps are observed; there are no pre-accenting suffixes. More importantly, the marked/unmarked opposition is only witnessed in monosyllabic suffixes. Disyllabic suffixes (for example, *-aja* (NOM.sg.fem), *-oje* (NOM.sg .neuter)) and suffixes of the shape -VC (for example, *-am* (DAT.pl), *-ax* (LOC.pl), *-ov* (GEN.pl.masc)) are stressed on their initial peak (provided that the root is unmarked). As I show in the following sections, restricted accentual patterns in inflectional suffixes is a simple matter of ranking a structural constraint above faithfulness.

Marked accented morphemes have a prespecified lexical accent which in a foot-based system can function as a foot-head, if strong, or as a foot-tail, if weak. The latter category of marking does not surface in Russian for reasons that will become clear soon. The prosodic faithfulness constraint that demands preservation of an input lexical accent is MAX(HEAD/TAIL). This constraint is satisfied when a lexical accent is preserved in the output and violated when it is lost. DEP(HEAD/TAIL), on the other hand, is a constraint that prohibits insertion of a lexical accent. It is violated when a lexical accent (from neighboring morphemes) is inserted in a root or an inflectional suffix. As in Greek, I refer collectively to both constraints as 'FAITH(HEAD/TAIL)' when there is no reason to distinguish between the two.

Russian also has unaccentable morphemes, that is morphemes equipped with a floating accent. The floating accent is usually realized outside the morpheme that sponsors it, unless there is no available segmental material. In this case the accent lodges at the right edge of its sponsor as in *gospóž* 'lady-GEN.pl'. The migration of a lexical accent is enforced by *DOMAIN, whereas the specific edge a lexical accent anchors to is determined by an alignment constraint.

3.11.2. Common patterns and gaps

The table in (53) summarizes all empirically attested patterns of roots and inflectional suffixes in Russian. As a first remark, native words have a more restricted set of accentual choices compared to loan words. Also structurally the two vocabularies diverge; loan words often exceed the size of native words.

(53)

accentual pattern	1σ ROOTS	2σ ROOTS	3σ ROOTS	4σ ROOTS	SUFFIX
unmarked	zub-	golov-	skovorod-		-y/-i
marked accented	(ryb-	ra(bot- (pravil-	čeče(vic- (jaščeric- *σ(σσ-	eksperi(ment antro(polog i(storija ?(σσσσ	-(a -ami
unaccentable	lad'-	gospož-	*σσσ-[25]		

A few observations are drawn from the table in (53). Four-syllable words hardly ever have antepenultimate stress, *če(čevic-. This pattern occurs only with words of foreign origin such as the Greek *istórija* 'history'. Stress in words of foreign origin seems to have more freedom, since it readily occurs in every possible syllabic position. It is surprising, though, that examples with initial stress are not found. This can be explained if one takes into consideration that foreign words bear the stress of another language. Most words are imported from Greek, English or French, all languages that limit stress to the right edge of

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[25] I found two examples in which the root is polysyllabic and unaccentable: *karandáš* (NOM.sg) 'pencil' and *sekretár'* (NOM.sg) 'secretary'. I treat these forms as exceptions to the generalization proposed here.

the word. On the other hand, based on what is argued for Greek, it is more plausible to assume that foreign words enter with a mark (that is, the stress assigned by the language of origin) rather than to argue that they are stressed by default. The latter presupposes some degree of assimilation that usually foreign words obtain only with time. In fact, if Russian behaves like Greek, our theory predicts that when loan words assimilate, their prosodic structure is similar to the prosodic structure of native words that have a lexical accent. Assimilation will not target patterns produced by the default because the foreign elements are introduced right from the beginning with a mark.

According to Levin (1978), the vast majority of nouns, namely 92.02% (approximately 30.000, including derived nouns) have fixed accent on some syllable of the root. However, 150 nouns composed of unaccentable ('post-accenting') roots exhibit the following alternations from the singular paradigm to the plural one: *kolesó* (NOM.sg), *kolesú* (DAT.sg) but *kol'ósa* (NOM.pl), *kol'ósam* (DAT.pl) 'wheel' instead of the expected **kolesá* and **kolesám*. These alternations indicate that the floating accent of the root moves from the suffix to the root in the plural paradigm. Final stress originating from unaccentable roots is less preferred; only 6.7% (2.200 nouns) exhibit this pattern. Unmarked words constitute a marginal group in the nominal vocabulary. Only 350 lexical items (1.07%) are composed of unmarked roots. From this percentage, some unmarked roots convert to accented in plural, e.g. *ózero* (NOM.sg), *ózeru* (DAT.sg) but *oz'óra* (NOM.pl) 'lake' instead of the expected **ozerá*. (Special emphasis on these alternations is given in Chapter 4.) The statistical discrepancy between marked and unmarked words is examined in some detail in the following sections and especially, at the end of this chapter. For the moment it is more important to explain why some patterns are preferred to others.

3.12. Accentuation of Nouns with One Lexical Accent

3.12.1. Templatic marking in Russian

Native Russian words have a templatic shape. They exhibit a range of prosodic templates ranging from SMW to PrCpds. The table in (54) presents the templatic patterns of marked words in Russian. Unattested patterns are also indicated in this table. The pool for the Russian marked nouns is a Prosodic Compound.

(54) *prosodic compound pool in marked words*

a. (rýba) b. la(d’já)	c. ra(bóta) d. (právi)lo e. (gospo)(žá)	f. (čeče)(víca) g. (jášče)(rica)
		g. *σ(σ́σ)σ i. *σ(σσ)(σ́) j. *(σσ)σ(σ́)

In the previous section we established the trochaicity of Russian; a handful of phenomena, ranging from secondary stress to vowel reduction and directionality of stress shifts caused by vowel deletion, underline the need of the trochee in the language. The existence of monosyllabic feet under primary stress is not surprising given that the language allows for monosyllabic words. As in Greek, monosyllabic feet result from inherent marking properties of morphemes. Monosyllabic feet in other than the primary stressed position are prohibited, e.g. *(σ)(σ́σ). In short, syllables are parsed into binary feet unless faithfulness requirements to a lexical accent enforce a monosyllabic foot. The reader can find more information on trochaic footing as well as the phenomenon of vowel reduction in Russian in the Appendix at the end of this chapter.

To conclude, lexical marks occur in unmarked positions in Russian as well. This implies that wellformedness constraints restrict the possible positions of lexical accents. In the next section, I proceed with the analysis of the patterns in (54).

3.12.2. Nouns with a marked root

3.12.2.1. Accented roots

As in Greek, I propose that templatic marking results form the ranking Faith to LA >> WordForm >> Faith to the position of LA >> FootForm. More specifically, the wellformedness constraint HierAl, as defined in (18), outranks *Flop, the constraint that keeps an accent fixed to its lexically pre-assigned vocalic peak. The proposed ranking is given in (55). Keep in mind that Trochee in Russian is undominated.

(55) *proposed ranking for templatic marking (first version)*
Trochee, Faith(head), HierAl >> *Flop

Let us see how the ranking in (55) accounts for the stress pattern of *čečevícy* ‘lentil-NOM.pl’. I take the nominative plural form to be our case study because the core theme of this chapter is the accentuation of words with one mark. The marked element in our example is the root. A small set of potential input roots drawn from a theoretically infinite pool is given in (56).[26]

(56) *inventory of possible inputs for the root ‘čečevic-’*

a. če(čevic-
b. čeče(vic-
c. čečevic-

Let us take the form *če(čevic-* (56b) as a possible input. To derive the correct output with (56b) as input, HIERAL must occupy a rank from which it can influence the position of lexical accent. This is accomplished when HIERAL >> *FLOP. If the proposed constraint ranking is correct, then the right result is achieved with any of the other bases as an input form.

(57)

input: če(čevic-, -y	FAITH(HEAD)	HIERAL	*FLOP
☞ a. (čeče)(vícy)			*
c. če(čevi)(cý)		*!	*
b. če(čévi)cy		*!	

The tableau in (57) makes clear that the correct pattern arises when HIERAL dominates *FLOP. Candidate (57a) wins over candidates (57b) and (57c) because it is binary: it consists of exactly two binary feet.

It is not clear from the tableau in (57) whether it is a general tendency of lexical accents to move to other positions of the word or whether migration is necessary for the sake of wellformedness. Words like *rabóty* ‘work-NOM.pl’, however, suggest that the lexical accent is not eager to move when its lexical position complies with hierarchical alignment. This suggests that *FLOP dominates *DOMAIN although it is dominated by HIERAL. The effects of this ranking are shown in (58).

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[26] Richness of the Base maintains that a lexical accent can be located to any possible position within the word. Lexicon Optimization (Prince and Smolensky 1993, Itô, Mester and Padgett 1995) will choose the representation that incurs the fewest constraint violations of high ranked constraints as the most harmonic input. Thus, the representation /(jaščeric-/ will be preferred over /jašče(ric-/ for the output form *jáščerica* and similarly, /ra(bot-/ will be preferred over /(rabot-/ for the output form *rabóta*.

(58)

input: ra(bot-, -y	*FLOP	*DOMAIN
☞ a. ra(bóty)		*
b. (rabo)(tý)	*!	

To conclude, the examples presented in this section make clear that there is a split in faithfulness: faithfulness to the lexical accent is high ranked but faithfulness to the lexical position of an accent is dominated by hierarchical alignment, a constraint that requires every prosodic constituent in a marked word to be properly aligned with the prosodic constituent that contains it. The result of the ranking in (55) is a restricted number of accentual contrasts and predictable prosodic shape for marked words. There are positions that can never host a lexical accent.

The restrictive effects of hierarchical alignment are evidenced by words composed of unaccentable roots which are the subject of the following section. Moreover, the facts discussed below show that a floating accent sites at the right edge of its sponsor when there is no available segmental material to host it.

3.12.2.2. Unaccentable roots

In some roots the lexical accent is not linked to a particular vocalic peak. This accent is floating. A floating accent is not subject to the anti-migration constraint *FLOP and hence can be realized anywhere in the word. As in Greek, *DOMAIN ensures that the best position for a floating accent is the inflectional suffix, or at least a morpheme other than its sponsor. Thus, most unaccentable roots have their accent located on the inflection as in *gospoží* ‘lady-NOM.pl’. Interestingly, the Russian examples shed some new light on the issue of unaccentability. Some grammatical cases have zero inflection. The absence of inflection forces the floating accent to land on the root. Thus, the genitive plural form of *gospoží* is shaped as *gospóž*.

Two generalizations are drawn from the above form. First, the lexical accent must be realized in the output and not vanish. Thus, MAX(HEAD) must be high ranking. With FAITH in high ranks, the constraint responsible for the global distribution of the floating accent, namely *DOMAIN, cannot exert any force to thwart its violation. The low ranking the latter constraint occupies in the hierarchy discards any possible scenario towards its satisfaction. No other constituent than the root itself can harbor the floating lexical accent.

Second, the same form reveals the preference for rightmostness. When there is no other place to go, the lexical accent settles at the right edge of the word. Rightmostness is triggered by the following constraint:

(59) ALIGN-R(LA, PrW, R)
Align a lexical accent to the right edge of the prosodic word.

The facts from inflectional morphology do not reveal whether ALIGN-R is in conflict with *DOMAIN. This becomes clear later when derived words are examined. The ranking between FAITH(HEAD), however, and *DOMAIN is fixed; the lexical accent should not get lost, even if this implies that it has to link to its sponsor. (The ranking between FAITH(HEAD) and ALIGN-R is established by intermediate constraints like *FLOP which must dominate ALIGN-R because in the word *rabóta* stress remains fixed on the root.) Let us examine now the accentuation of the word *gospóž.*

In (60), we see a concrete instance of the effects of ALIGN-R. Note that the constraint evaluates gradiently, counting syllables. Since the two candidate forms tie on FAITH(HEAD) by respecting it, and on *DOMAIN by violating it, the decision between them depends on the rest of the hierarchy. ALIGN-R is the constraint that appoints the first candidate, (60a), as the most optimal one. Candidate (60c) deletes the underlying lexical accent and is stressed by default (leftmost stress) on the initial syllable.

(60)

input: * gospož-	FAITH(HEAD)	ALIGN-R	*DOMAIN
* ☞ | a. go(spož)			*
* | b. (gospož)		*!	*
c. (góspož)	*!		

To conclude, with zero inflectional suffixes the floating lexical accent is realized at the right edge of its sponsor. If ALIGN-R was not in force, we would expect the form **góspož* with initial stress to emerge under the influence of the low ranked default constraints (cf. §3.13).

We continue with the accentuation of the word *gospoží*. This form provides evidence for another split in prosodic faithfulness. In order to preserve the lexical accent of the root and comply to *DOMAIN, a lexical accent is inserted in the inflectional suffix. This suggests that faithfulness to the root is deemed more important than faithfulness to the suffix. A similar situation is witnessed in Greek where I also proposed that faithfulness constraints must be divided into FAITH$_{\text{R}}$ and FAITH$_{\text{InflS}}$ with FAITH$_{\text{R}}$ top-ranking. This segregation is also motivated by the accentuation of words with conflicting accents where the lexical accent of the root is given priority over the lexical accent of the inflectional ending. In fact, in Chapter 4 the ranking FAITH$_{\text{R}}$ >> FAITH$_{\text{InflS}}$ is restated as HEADFAITH >> FAITH. Faithfulness to the morphological head is deemed superior to simple faithfulness.

The tableau in (61) presents the accentuation of the word *gospoží*. Notice that FTBIN is sacrificed for the sake of FAITH and *DOMAIN. It has a limited power to form outputs from the rank it occupies.

(61)

input: * gospož-, -i	FAITH(HEAD)$_{\text{R}}$	*DOMAIN	DEP(HEAD)$_{\text{InflS}}$	FTBIN
* │ ☞ a. (gospo)(ž-i)			*	*
* │ b. (gospo)ž-i		*!		
c. góspož-i	*!			

The proposed ranking brings out the correct result. The candidate-comparison shows that underparsing of the lexical accent, as in candidate (61c) (which is stressed by default on the initial syllable), can never bring the form into agreement with FAITH(HEAD)$_{\text{R}}$ because in this case there is no accent in the output. Moreover, *DOMAIN must dominate suffix faithfulness (DEP(HEAD)$_{\text{InflS}}$). This way the floating accent can be allotted a position outside its sponsor. The ranking between HIERAL and *DOMAIN is shown in (62). This tableau presents the accentuation of the word *čečevícy* 'lentil-NOM.pl' with an unaccentable root as input this time. The result is always a word with penultimate stress in compliance with the principle of prosodic wellformedness.

The second candidate, (62b) is properly aligned but stumbles on prosodic wellformedness, enforced through dominant HIERAL. The third candidate, on the other hand, is both misaligned and a-templatic. The winner (62a), is chosen by minimal violation of ALIGN-R.

(62)

input: * čečevic-, -y	FAITH (HEAD)$_R$	HIERAL	ALIGN-R	*DOMAIN
* | ☞a. (čeče)(vicy)			*	*
* | b. (čeče)vi(cy)		*!		
* | c. če(čevi)cy		*!	**	*

At this point, the analysis of Russian words with marked roots is complete. We have seen that the same set of constraints in almost unaltered domination order, accounts for the accentuation of marked words in Russian as well as in Greek. As I show in §3.13, the differences between the two accentual systems relate to their rhythmic aspects. The next section deals with the accentuation of words composed of unmarked roots and marked suffixes. Before concluding this section, I present in (63) a summary of the constraints and their respective rankings as they have been established by the facts reviewed so far.

(63) *ranking for templatic marking in Russian*
TROCHEE, FAITH(HEAD)$_R$, HIERAL >> *FLOP >> ALIGN-R, *DOMAIN >> DEP(HEAD)$_{\text{InflS}}$ >> FTBIN

3.12.3. Nouns with a marked inflectional suffix

From all inflectional suffixes in Russian only monosyllabic ones of the shape -V exhibit lexical contrasts. Disyllabic suffixes as well as ones with a closed syllable lose stress after marked roots but attract stress from unmarked ones. It is not so reasonable to assume that all -VCV and -VC are marked because their 'markedness' is predictable by their prosodic shape. In this section, I propose that restricted accentual contrasts in inflectional suffixes arise from domination of FAITH$_{\text{InflS}}$ by a structural constraint which enforces predictable stress to suffixes of a specific prosodic make-up. Once more, the facts suggest a split between root-faithfulness and inflectional suffix-faithfulness. Before exploring the accentual patterns of these suffixes let us first have a closer look at words composed of an unmarked root and an accented monosyllabic (-V) inflectional suffix.

3.12.3.1. Accented inflectional suffixes

In order to show that prosodic wellformedness does not apply to marked suffixes I will take the form *skovorodá* ‘frying pan-NOM.sg’ as an example. Obviously, this word does not conform to binarity. It consists of a foot, a syllable and another foot, (*skovo*)*ro*(*dá*).[27] This pattern can be easily explained if we take into account FAITH$_{\text{R}}$; satisfaction of HIERAL implies the insertion of a lexical accent to the root but this is an illegitimate move given the ranking FAITH$_{\text{R}}$ >> FAITH$_{\text{InflS}}$. There is no way to comply to HIERAL and FAITH$_{\text{R}}$ at the same time. Since the output form is a-templatic we assert that FAITH$_{\text{R}}$ must be ranked higher than the word-form constraint. This is illustrated by the tableau in (64).

(64)

input: skovorod-, -(a	FAITH (HEAD)$_{\text{R}}$	HIERAL	FAITH (HEAD)$_{\text{InflS}}$	FTBIN
☞ a. (skovo)ro(dá)		*		*
b. (skovo)(róda)	*!			

Even if the input specification of a suffix is a floating accent, (64a) would still be the optimal output. FAITH$_{\text{R}}$ in combination with ALIGN-R would favor a word with the accent on the suffix.

To conclude, templatic marking does not apply to accents originating from roots. Top-ranking of FAITH$_{\text{R}}$ bans the insertion of suffixal accents, which strive to satisfy prosodic wellformedness.

3.12.3.2. Bimoraic inflectional suffixes

As noted above, not all suffixes have unpredictable stress. Disyllabic suffixes (65a-c) and suffixes that consist of a closed syllable (65d-e) are stressed when combined with unmarked roots: *golov-ámi* ‘head-INSTR.pl’, *skovorod-áx* ‘frying pan-LOC.pl’, *molod-ája* ‘young-NOM.sg.fem’, *molod-óje* ‘young- NOM.neut.sg’, etc.

(65) *-VCV and -VC suffixes*

a. -ami	‘INSTR.pl’	d. -ax	‘LOC.pl’
b. -aja	‘NOM.sg.fem’	e. -ov	‘GEN.pl’
c. -oje	‘NOM.sg.neut’		

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[27] Cf. the Appendix for justification of the footing (*skovo*)*ro*(*dá*) instead of *sko*(*voro*)(*dá*).

Instead of stipulating that all these suffixes are equipped with a lexical accent by coincidence, I propose a different solution. Both groups of suffixes share one property: they are bimoraic. In other words, they have the shape of a SMW. Consequently, the generalization is that bimoraic suffixes, or suffixes that have the size of a SMW, are stressed. I express this generalization with the constraint in (66).

(66) SUFFIX=SMW > ALIGN-L

The constraint in (66) is in fact composed of two independent constraints that stand in implicational coordination (A > B):[28] If SUFFIX=SMW (A suffix has the size of a SMW), then ALIGN-L (Align a peak at the left edge of a suffix). If a candidate passes constraint A (SUFFIX=SMW) then it is evaluated with respect to constraint B (ALIGN-L). If it passes B, it moves to the next constraint of the hierarchy. But if it fails B, it is cast out of the competition. If a candidate fails A, it is then rejected even if it satisfies B. (Cf. Crowhurst and Hewitt 1997 for a theory of coordinated constraints.)

Having the constraint in (66) above, $\text{FAITH}_{\text{InflS}}$ guarantees predictable stress for bimoraic suffixes but unpredictable stress for monomoraic inflectional suffixes. The tableau in (67) shows how the constraint at issue eliminates lexical contrasts for the suffixes in (65).

Assume that the suffix /-ami/ in *gubámi* 'lip-INSTR.pl' is accented on the final syllable, -a(mi. Its accent will never survive in the output. The coordinated constraint casts out the second candidate because it crucially violates SUFFIX=SMW. Note that this constraint evaluates gradiently, counting syllables and not segments. FAITH is not given a chance to determine the output. The result rests totally upon the coordinated constraint.

(67)

input: gub-, -a(mi	SUFFIX=SMW > ALIGN-L	$\text{FAITH(HEAD)}_{\text{InflS}}$
☞ a. gu(bámi)		*
b. (guba)(mí)	(*) *! *	

Note that the winning candidate does not violate *FLOP although it deletes the underlying accent of the suffix. Faithfulness to the association line is relevant only when a lexical accent and the vocalic peak that bears it stand in

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[28] Two constraints can be coordinated only when they share the same 'focus', that is a linguistic object referred to directly in the statement of the constraint (Crowhurst and Hewitt 1997). The suffix is the focus of the coordinated constraints here.

correspondence. In candidate (67a) the vocalic peak that bears the accent in the input, namely /-i-/, is not in correspondence with its lexical accent in the output simply because the lexical accent is lost.

It is evident from the above that a momomoraic suffix can never pass SUFFIX=SMW and, consequently, be evaluated by ALIGN-L. It has to move to the next constraint of the hierarchy, namely FAITH in order to be evaluated. This explains why lexical contrasts are restricted to monomoraic suffixes.

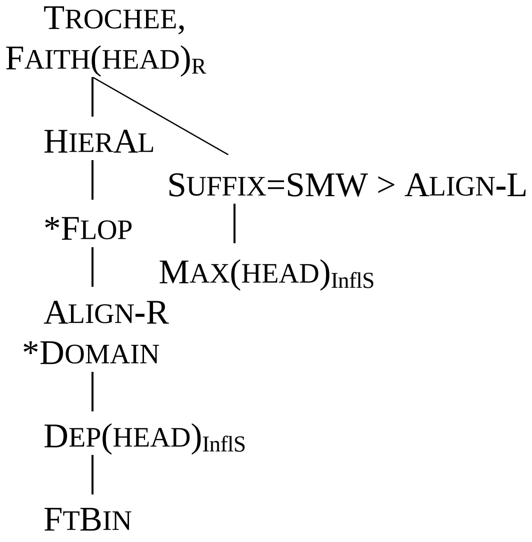
FAITH$_R$, on the other hand, outranks the coordinated constraint. Stress in bimoraic suffixes gives way to the lexical accent of the root. This is shown in (68).

(68)

input: (ryb-, -ami	FAITH(HEAD)$_R$	SUFFIX=SMW > ALIGN-L
☞ a. (rýba)mi		(*) *
b. ry(bámi)[29]	*!	

In (69) I present a tree with the domination order of all constraints participating in the accentuation of nouns. The same hierarchy holds for the other grammatical categories as we will see later in this study. The numbers refer to the tableau in which the ranking at issue is established or examples that demonstrate the effects of a particular constraint.

(69) *ranking for the accentuation of words with one lexical accent*



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[29] A candidate output in which the lexical accent of the root /ryb-/ moves to the suffix /-ami/ is ungrammatical because it violates *FLOP.

• FAITH(HEAD)$_R$ >> HIERAL	skovorodá	(64)
• HIERAL >> *FLOP	čečevícy	(57)
• *FLOP >> ALIGN-R, *DOMAIN	rabóty	(58)
• FAITH$_R$ >>ALIGN-R, *DOMAIN >> DEP(HEAD)$_{InflS}$	gospóž	(60)
>> FTBIN	gospoží	(61)
• HIERAL >> ALIGN-R, *DOMAIN	čečevícy	(62)
• SUFFIX=SMW > ALIGN-L >> FAITH(HEAD)$_{InflS}$	gubámi	(67)
• FAITH$_R$ >> SUFFIX=SMW > ALIGN-L	rubámi	(68)

3.13. Accentuation of Nouns with No Lexical Accents

As already mentioned, the default option in Russian is leftmost stress. This stress pattern is enforced by the constraint in (70).

(70) EDGEMOST-L
A peak of prominence lies at the left edge of the word.

This constraint is ranked below faithfulness because it takes effect only when there are no lexical accents in the string. The same constraint is responsible for secondary stress on the initial syllable in words like *rèvol'uciónnyj* 'revolutionary' (the specific conditions are spelled out in the Appendix).

The tableau in (71) illustrates the accentuation of the unmarked word *skóvorody* 'frying pan-NOM.pl'. TROCHEE is undominated rejecting candi-dates with no trochaic patterning such as (71c). EDGEMOST-L is decisive; violation of this constraint casts out candidate (71b) and appoints the first candidate, (71a), as the winner.

(71)

input: skovorod-, -y	TROCHEE	EDGEMOST-L
☞ a. (skóvo)(rody)		
b. sko(vóro)dy		*
c. (skovó)rody	*!	*

I have argued several times in this study that pre-accenting suffixes cannot surface in Russian. Here I show why this is the case. Recall that suffixes marked for tails do not introduce a strong accent. They are just specified to be in the dependent position of a foot. Let us assume for the sake of the argument that the plural suffix /-y/ has a weak accent. As the tableau in (72) makes clear, the foot created by the suffix will never host stress because EDGEMOST-L assigns a peak to the leftmost syllable of the word. The foot that hosts the suffix is given no chance to surface.

(72)

input: skovorod-, -y)	TROCHEE	FAITH(TAIL)	EDGEMOST-L
☞ a. (skovo)(rody)			
b. (skovo)(rо́dy)			*!

To conclude, marking in Russian is more forceful than default in assigning primary stress. The majority of words in lexical accent systems have prominence on an inherent accent and not on a syllable determined by the default algorithm. An analogous situation is witnessed in Greek. A number of reasons justify the statistical disparity. I repeat here the most important ones. First, marked words have unpredictable stress but a limited pool of prosodic shapes. This is because prosodic form constraints control the distribution of lexical accents. Second, marked words dispense with the problem of accentual alternations within the paradigm. Accented roots guarantee columnar paradigmatic stress.

These reasons together with other ones that are brought to light in the remaining chapters of this study, suggest that it is not so remarkable that marked words are favored more than others. One may wonder though, whether marked words become unmarked. To my knowledge, such accentual alterations have not been attested. In Chapter 4, I argue that marking in head-dependent systems aims at reflecting morphological structure to prosody. Thus, usually the changes that take place in the Greek and Russian system are in conformity to this basic goal of the language. Now, it is time to look into the accentual behavior of Russian loan words.

3.14. Periphery and Diachrony: Keys for Synchrony

We have seen that foreign words in Russian exhibit richer accentual patterns than native words. For instance, words such as *psixólogi* ‘psychologist-NOM.pl’ are obviously non-binary at the level of prosodic word. Unlike Greek, Russian morphology seems to be more liberal since it assigns inflectional endings to all loan words. Consequently, only phonological criteria (i.e. stress, phonotactics, syllable combinatorics, etc.), can be used to check the degree of nativization that a loan word exhibits. Below I list the accentual patterns displayed by foreign words in Russian.

(73) *accentual patterns of loan words in Russian*

a.	gáz	‘gas’	e.	xarákter	‘character’
b.	sféra	‘sphere’	f.	akvarél’	‘water-color’
c.	effékt	‘effect’	g.	polítika	‘politics’
d.	múzyka	‘music’	h.	balerína	‘ballerina’
			i.	eksperimént	‘experiment’

Four-syllable words (73g-i) attract our interest. Evidently, shorter forms are prosodically well-behaved. The non-binary data in (73) call for some explanation. First, the pattern σ(σ́σ)σ in (73g) is displayed mainly by Greek borrowings ending in /-ika/ and Greek compounds. Some examples are given in (74).

(74) *loan words from Greek*

a. dinámika
b. genétika
c. akústika
d. ideólog
e. zoólog
f. etnólog

I propose that the above words are lexically prespecified with an accent. Even though it is not known to me how complex Russian speakers consider these words, it is definite that morphological structure plays some role in the position of stress. In compounds, for example, stress is on the synthetic vowel /-o-/. However, words like *dialóg* ‘dialogue’ and *prológ* ‘prologue’ are stressed on another syllable simply because they are not compounds. We assert, that the ‘deviant’ prosodic pattern of the words in (74) is at least consistent. All Greek words of this form are stressed alike. Clearly, the position of the mark denotes the stress pattern that has been assigned to these forms by the language of origin.

There are more ‘exceptional’ σ+F+σ patterns. A handful of loan words lack templatic prosodic structure, e.g. *xarákter-y* ‘character-NOM.pl’, *parláment-am* ‘parliament-DAT.pl’, and so on. Loan words often comply to word-binarity, e.g. (*bale*)(*rína*), (*doku*)(*méntam*), (*instru*)(*méntam*), (*limo*) (*nádam*).

Interestingly, there are no loan words marked on the initial syllable. This characteristic in combination with the fact that a number of prosodic re-adjustments have been documented in the history of loan words, show that HIERAL and ALIGN-R gradually took charge of accentuation. Let us have a look at the examples in (75). The form in the left column gives the synchronic prosodic shape of the word, whereas the form(s) in the right column present stages of its history. The examples are taken from Kiparsky (1962).

(75)

	present form	*past form*	
a.	magazín	magázin[30]	‘magazine, shop’
b.	patrontáš	patróntaš	‘ammunition belt’
c.	instrumént	instrúment	‘instrument’

When assimilation started, a shift of accent to the rightmost edge of the word took place. In (75) the accent shifted to a position that ensures the prosodic wellformedness of the word. Thus, the non-templatic *ma*(*gázin*)-*y* and *pa*(*trónta*)*š*-*i* have been reformed to the templatic (*maga*)(*zín*-*y*) and (*patron*)(*táš*-*i*), respectively.

As in Greek, I assume that loan words in Russian occupy peripheral strata in grammar. Shifts like the ones exhibited by the examples in (75) clearly indicate that when the foreign form penetrates into the core grammar, the lexical mark is displaced from its original position to create a more agreeable prosodic structure.

The non-templatic form originates from a hierarchy that gives top-ranking to faithfulness to the lexical accent of the foreign form and its position. Thus, FAITH(HEAD), *FLOP >> HIERAL. However, when the form is reconstructed according to the prosodic principles of the host language, *FLOP is degraded to a rank below HIERAL. The tableaux in (76) and (77) illustrate the procedure of prosodic assimilation.

(76) *ranking of prosodic pre-assimilation (peripheral stratum)*

input: ma(gazin-, -y	FAITH(HEAD)	*FLOP	HIERAL
☞ a. ma(gázi)ny			*
b. (maga)(zíny)		*!	

The second candidate in (76) loses over the first one because it violates *FLOP; the lexical accent is realized in another vocalic peak in the output than the one it is affiliated with the input. In the next tableau, on the other hand, HIERAL must dominate *FLOP compelling abandonment of candidate (77c), the previous winner, in favor of (77a).

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[30] The question still is what explains the stress pattern of the past forms. It seems that some of the loan words have final stress in the language of origin but they are recorded with penultimate stress. A possible explanation could be that since in Russian the pre-stressed syllable is often heard with greater loudness than the stressed one, the position of primary stress was ambiguous for the new loans and often the pre-stressed syllable was confused with the stressed one. Later when the form started assimilating, stress regularized to an agreeable position for the native grammar.

(77i) *ranking of prosodic assimilation (core grammar)*

input: ma(gazin-, -y	FAITH(HEAD)	HIERAL	*FLOP
☞ a. (maga)(zíny)			*
☞ b. (mága)(ziny)			*
c. ma(gázi)ny		*!	

However, even this ranking does not lead us to the correct result. The first two candidates equally satisfy HIERAL. The system needs a constraint that would cast the candidate with initial stress out of the competition. This constraint is nothing else but ALIGN-R which comes into the scene to ensure the correct result. This is shown in (77ii).

(77ii) *ranking of prosodic assimilation (core grammar)*

input: ma(gazin-, -y	FAITH(HEAD)	HIERAL	*FLOP	ALIGN-R
☞ a. (maga)(zíny)			*	
b. (mága)(ziny)			*	*!
c. ma(gázi)ny		*!		

To sum up, in this section I introduced a type of marking for Russian which is ‘blind’ to prosodic wellformedness principles and characterizes the accentuation of foreign lexical strata. The ‘deviant’ accentual patterns of foreign words were attributed to a periphery-to-core organization of the lexicon. Different degrees of foreignness result from upgrading the constraints of the core grammar over faithfulness to the inherent mark of the lexical item. In (78), I give the ranking for diacritic marking. As is known by now, prosodic faithfulness constraints are united and ranked higher than all other constraints of the system.

(78) *ranking for diacritic marking*
FAITH TO LA & FAITH TO POSITION OF LA >> WORDFORM
FAITH(HEAD), *FLOP >> HIERAL, ALIGN-R

I complete the analysis of Russian stress in the next section with a brief presentation of stress in other grammatical categories.

3.15. Accentuation of Adjectives and Verbs

Stress in adjectives and verbs can be accounted for along the lines of the analysis already proposed for nouns. In this section, I sketch the accentual patterns in these two categories.

Adjectives in Russian fall into two types: the long form adjectives and the short form adjectives. The former can function as attributes or predicates while the latter have a predicative role. Short form adjectives have the following number and gender agreement markers: -*E* (masc), -*a* (fem), -*o* (neut), -*y* (pl). Some examples are given in (79). These examples are drawn from Melvold (1990:184).

(79) *accentual patterns of short form adjectives*

a.	bogát	bogát-a	bogát-o	bogát-y	‘rich’
b.	zdoróv	zdorov-á	zdorov-ó	zdorov-ý	‘robust’
c.	mólod	molod-á	mólod-o	mólod-y	‘young’

All possible accentual configurations are encountered in short form adjectives. The examples in (79a) and (79b) are composed of marked roots, accented and unaccentable, respectively. The accentual properties of suffixes are hidden. Only when they are conjoined with unmarked roots, is the accentual status of the suffixes revealed. Besides the feminine formative, all other suffixes are unmarked.

Long form adjectives are fully declined; they agree with the noun they qualify in number, gender and case. Two types of stress are found among long form adjectives: stress is fixed either on the root or on the inflection. Some illustrative cases, also taken from Melvold (1990:189), are given in (80).

(80) *accentual patterns in long form adjectives*

a.	bogát-aja	(NOM.sg.fem)	bogát-oje	(NOM.sg.neuter)
	bogát-yj	(NOM.sg.masc)	bogát-yje	(NOM.pl)
b.	blažn-ája	(NOM.sg.fem)	blažn-óje	(NOM.sg.neut)[31]
	blažn-ój	(NOM.sg.masc)	blažn-ýje	(NOM.pl)
c.	molod-ája	(NOM.sg.fem)	molod-óje	(NOM.sg.neut)
	molod-ój	(NOM.sg.masc)	molod-ýje	(NOM.pl)

Looking at the paradigm with the unmarked root, (80c), we understand why only two out of the three possible patterns are documented in long form

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[31] blážn, -á, -ó ‘capricious’.

adjectives. The inflectional formatives are all bimoraic and hence attract stress from unmarked roots. With unaccentable roots, stress is also on the bimoraic suffix as suggested by the ranking in (69).

According to Levin (1978) there are thousands of adjectives with fixed stress on the root. On the other hand, the number of adjectives with unmarked roots comes up to a third. Strikingly, there are only ten adjectives with unaccentable roots. The largest part of the adjectival vocabulary prefers to have a lexical accent on some syllable of the root. The desire for root stress is emphasized by the phenomenon of stress retraction that has been shortly reviewed in nominal accentuation.

Often adjectives that share the same stress pattern in the short form exhibit different stress patterns in the long form. More specifically, there are approximately thirty adjectives which shift stress from the ending to the last syllable of the root. They all consist of unaccentable roots. An example is presented in (81a). In the same morphological context, another alternation takes place; over two hundred unmarked roots convert to accented, (81b). Finally, there are somewhat more idiosyncratic patterns given in (81c). According to Levin (1978) there are 19 examples of this type, all of which consist of roots that are one or two syllables long. As mentioned earlier, special attention to accentual allomorphy is given in Chapter 4.

(81) *accentual allomorphy in adjectives*

	<u>short form</u>	<u>long form</u>	
a.	svež-á, -ó	svéž-ij, -aja, -oje	‘fresh’
b.	dolg-á, dólg-o	dólg-ij, -aja, -oje	‘long’
c.	vesel-á, vésel-y & vesel-ý	ves’ól-yj, -aja, -oje	‘merry’

The Russian verb has much simpler morphological structure than the Greek verb. Before examining the stress paradigms, I would like first to familiarize the reader with the morphology of verbal formations. Verbs in Russian consist simply of a root and an inflection. These are traditionally referred as ‘athematic’ verbs. We will be looking at two tenses: present and past. Both tense inflections consist of a tense suffix and an agreement suffix. In the present tense, the agreement suffix represents person and number, while in the past tense it represents gender and number. Moreover, the agreement suffixes of the past are identical to those in the short form adjectives. For example, the past form of *lézt’* ‘to climb’ is *léz* (masc), *lézla* (fem), *lézlo* (neut), *lézli* (pl). Athematic verbs exhibit the same three stress patterns as inflected nouns and adjectives. Some examples, taken from Melvold (1990:81-82) are listed in (82).

(82) *accentual patterns in athematic verbs*

a.	léz-u, -eš, -et	‘to climb-PRES’
	léz, -la, -lo, -li	‘to climb-PAST’
b.	pek-ú, peč’-óš, -ót	‘to bake-PRES’
	pék, -lá, -ló, -lí	‘to bake-PAST’
c.	živ-ú, živ’-óš, -ót	‘to live-PRES’
	žíl, žilá, žílo, žíli	‘to live-PAST’

Verbs like (82a) have fixed stress on the root throughout the paradigm suggesting that the root is accented. Unaccentable roots as in (82b) are responsible for invariable final stress. Finally, alternating stress as in (82c) is triggered by the unmarked accentual status of the root. However, a small number of verbal roots which present themselves as unmarked in the formation of the present tense change to accented in the past tense, (83).

(83) *accentual allomorphy in verbs*

a.	strig-ú, strіž’-óš, -ót	‘to shear-PRES’
b.	stríg, -la, -lo, -li	‘to shear-PAST’

3.16. Assessment and Conclusions of Russian Accentuation

Russian stress in inflectional morphology is parallel in many respects to Greek stress. There is a disparity between unmarked and marked words here as well. The former have fixed initial stress and mobile paradigm, whereas the latter have columnar stress, ideal (strictly binary) prosodic shape but variable accentual patterns across the vocabulary.

Starting from unmarked patterns, we have seen that default stress is on the leftmost syllable. In previous analyses (Van der Hulst 1996), the edgemostness of default clause was put forth as an argument for the absence of feet in the language. Here, I claim that vowel reduction, secondary stress and other phenomena indicate a trochaic organization of the language. Initial stress results from EDGEMOST-L, a constraint that is also responsible for secondary stress.

In marked words, lexical contrasts are restricted by HIERAL, a word-form constraint that promotes maximally binary prosodic structures. More specifically, two faithfulness constraints are distinguished: faithfulness to the lexical accent and faithfulness to the lexically prespecified position of the accent. The former is undominated but the latter is dominated by HIERAL. This domination order results into marked words of ideal prosodic shape.

There is a second split in faithfulness. The accentuation of unaccentable roots and accented suffixes as well as the accentual behavior of bimoraic suffixes suggest that faithfulness to the lexical accent of the root is considered more important than faithfulness to the lexical accent of the inflectional suffix. In Chapter 4 I show that the ranking FAITH$_R$ >> FAITH$_{InflS}$ is the predecessor of a nuclear ranking for lexical accent systems, namely HEADFAITH >> FAITH. An immediate result of this split in prosodic faithfulness is that wellformedness holds for accents stemming from the root but not for accents stemming from the inflectional suffix. A suffixal accent cannot impose itself on the root for the sake of binarity. Consequently, only accents sponsored by the root lead to binary prosodic structures.

On the other hand, lexical contrasts are also restricted in suffixes. The marked/unmarked opposition is displayed only by monomoraic suffixes. This is because a structural constraint that assigns stress to bimoraic suffixes (SUFFIX=SMW > ALIGN-L) dominates FAITH$_{InflS}$. But even from this already restricted marked set, only accented suffixes show their effects. Pre-accenting suffixes are neutralized by the default.

Finally, Russian evidences that a language with marking can have ‘exceptional’ stress. Stress in loan words is not restricted by wellformedness principles or other structural constraints until the process of assimilation starts. Only when the form reaches the core grammar, lexical accents follow the same accentual principles as the accents of the native vocabulary.

We understand from the above that Greek and Russian diverge in their rhythmic properties but come very close in marking. Both languages employ prosodic principles to limit the arbitrariness in the distribution of lexical accents. Russian appears to be more effective because it allows only one marking pattern for inflectional suffixes.

In the final section of this chapter, I summarize the main properties of marking in Greek and Russian and give an overview of the similarities and differences between the two languages.

3.17. Summary and Conclusions of Chapter 3

This chapter concentrates on the prosodic aspect of lexical marking and more specifically, its interaction with prosodic form and other structural constraints. Two main points are made. First, marking in lexical accent systems is not tantamount to exceptional stress. Second, languages with lexical accents have unpredictable stress but predictable prosodic shape. Lexical marking in Greek and Russian is restricted by wellformedness and other prosodic constraints. Moreover, marked words in these languages compensate for their variable stress by having fixed paradigmatic stress and invariable prosodic structure. The last two characteristics are missing from accentless words. A more general conclusion that can be drawn from the examination of the accentual facts presented here is that Greek and Russian operate in parallel ways with respect to lexical marking but they diverge in rhythmic aspects such as default accentuation and secondary prominence.

First, there is a split in faithfulness constraints. Faithfulness to the position of the lexical accent, namely *FLOP, is dominated by hierarchical alignment (HIERAL), a word-form constraint that aims at structures with strictly binary prosodic shape. The ranking HIERAL >> *FLOP restricts marks in positions which guarantee that the output word will have a templatic shape, [σ+F], [F+σ], [F+F]. This is why this type of marking is called templatic.

(84) *templatic marking in Greek and Russian*
FAITH TO LA >> WORDFORM >> FAITH TO POSITION OF LA
FAITH(HEAD) >> HIERAL >> *FLOP

A welcome result from the view taken in this chapter is that we don't need to stipulate restrictions on input representations because restricted marking arises from constraint ranking. Moreover, the fact that this ranking is shared by two unrelated languages shows that lexical accent systems find common ways to limit the distribution of lexical accents. If marked words cannot have invariable stress, they must at least have invariable prosodic shape.

Second, the two languages display a second split in faithfulness constraints. Obeying faithfulness to the root is more crucial than obeying faithfulness to the inflectional suffix. This is supported by the accentuation of words with unaccentable roots and words with unmarked roots and accented suffixes. All these cases show that a lexical accent introduced by a root freely emigrates to an inflectional suffix but not the other way round. Russian provides extra support for the dichotomy in faithfulness. Suffix-faithfulness is dominated by a structural constraint that assigns prominence to all bimoraic suffixes. Consequently, words composed of unmarked roots and bimoraic suffixes are never stressed by default on the initial syllable. Root-faithfulness, on the other hand, is immune to this constraint. Accented roots attract stress from bimoraic suffixes. Evidently, root-faithfulness occupies a higher rank. In (85), I summarize the rankings that show bifurcation in faithfulness.

(85) *root-faithfulness >> InflS-faithfulness in Greek and Russian*
a. unaccentable root + unmarked inflectional suffix
FAITH(HEAD)$_{R}$ >> *DOMAIN >> FAITH(HEAD)$_{InflS}$

b. unmarked root + accented inflectional suffix
FAITH(HEAD)$_{R}$ >> HIERAL >> FAITH(HEAD)$_{InflS}$

c. accented root + bimoraic inflectional suffix
FAITH(HEAD)$_{R}$ >> Suffix=SMW>ALIGN-L >> FAITH(HEAD)$_{InflS}$

Third, structural constraints often bring to light marked patterns that wouldn't have been able to manifest themselves otherwise. ER-R in Greek highlights suffixes marked for tailness. The foot-tail imposes a specific pattern of parsing, σσσ-σ) > (σσ)(σ́σ) instead of the default σ(σ́σ)σ. By giving prominence to the rightmost foot, stress lies on the syllable preceding the suffix, creating the impression of preaccentuation. The lack of a similar structural constraint in Russian conceals the effects of preaccentuation. This is not accidental of course. Preaccentuation is a form of marking that presupposes cooperation between structural and faithfulness constraints.

(86) *preaccentuation in Greek*
ER-R >> FAITH(TAIL) >> FTBIN, PARSE-σ

Finally, the two languages behave alike in the assimilation of exceptional stress patterns which are primarily attested in loan words. The degree of foreignness is determined by the ranking of structural and prosodic wellformedness constraints with respect to faithfulness to the inherent accent and its position.

(87) *diacritic marking in Greek and Russian*
FAITH TO LA & ITS POSITION >> WORDFORM, FOOTFORM
Greek FAITH(HEAD), *FLOP >> ER-R, HIERAL, ...
Russian FAITH(HEAD), *FLOP >> HIERAL, ALIGN-R, ...

An important difference between the two languages is that Russian has default stress on the initial syllable (due to EDGEMOST-L), whereas Greek has default stress on the antepenultimate syllable. In addition, Greek is a system that restricts stress to the last three syllabic positions of the word. Primary stress is determined by an end-rule that assigns prominence to the rightmost foot of the word, irrespective of whether it is marked or not.

Before closing this chapter a last remark needs to be made. One may wonder what explains the dynamic presence of marking in such systems or whether it can be plausible for default to elbow marking and take charge of accentuation. These and similar questions pertain to essential issues of lexical accent systems.

Based on the evidence exposed here it seems that marking has a well-founded logic. More importantly, in Chapter 4 I show that marking has a specific purpose in these systems: it is the tool to reflect morphological structure in prosody. To conclude, marked words exhibit properties that often puts them in a better position than default.

Appendix: Evidence for Exhaustive Parsing in Russian

1. The facts

In this study, Russian is analyzed as a trochaic system as opposed to other analyses that advocate an iambic organization of stress in the language. This chapter presents some arguments in support of the trochaicity of the system. Many aspects of the present discussion hinge on a very common, although controversial, subject of Russian phonology: the reduction of unstressed vowels. This phenomenon has been used in a number of studies (Jones and Ward 1969, Alderete 1995) as an argument for the iambicity of the language. Therefore, I would like here to establish that first, vowel reduction advocates a trochaic and not an iambic organization of stress in Russian and second, it provides evidence for the existence of feet other than the primary stressed one.

In Russian, vowels in unstressed positions are not pronounced the same as vowels in stressed positions. More specifically, the length of vowels varies depending on whether the vowel belongs to an accented syllable, a syllable immediately before the stressed one or a syllable in post-stressed or pre-pre-stressed position. Stressed vowels remain qualitatively intact and most often show a considerable degree of phonetic lengthening. On the other hand, vowels in unstressed positions reduce.

There are two degrees of reduction depending first, on the distance of an unstressed vowel from the stressed one and second, on the position (i.e. preceding or following) an unstressed vowel occupies in relation to the stressed one. More specifically, low and mid vowels, /a, o, e/, immediately preceding the stressed vowel undergo the first degree of reduction; /a/ and /o/ reduce to [ʌ] and /e/ to [i]. The difference between stressed high vowels, /i, u/, and their unstressed correlates is minimal. However, in pre-pre-stressed positions the reduction is more dramatic. All vowels reduce to a schwa. The examples in (1) help us visualize the two degrees of vowel reduction. For the sake of clarity only the relevant part of the word is phonetically transcribed. The data are primarily taken from Kenman (1975).

(1) *vowel reduction*

a. <u>stressed</u>

/a/	/o/	/e/	/i/	/u/
vod[á]	st[ó]l	fon[é]ma	kip[í]t	[ú]gol
‘water’	‘table’	‘phoneme’	‘it boils’	‘corner’

b. pre-stressed

t[ʌ]kím	v[ʌ]dá	l[i]žít	k[i]pít	[u]rók
‘such’	‘water’	‘lies’	‘it boils’	‘lesson’

c. pre-pre-stressed

p[ə]roxód	v[ə]dovóz	s[ə]konómit’	c[i]vilizácija	l’[u]dojéd
‘steamer’	‘water-man’	‘economize’	‘civilization’	‘cannibal’

Based on the fact that pre-stressed vowels are less reduced and, consequently, longer than vowels in other unstressed positions, Jones and Ward (1969), among others, draw the conclusion that the pre-stressed syllable is itself a host of secondary stress: *vodòvóz* ‘water-man’. This proposal implies, however, a quite odd metrical analysis. Polysyllabic words have audible secondary stress on the initial syllable, e.g. *fòtogravjúra*. According to their proposal the pre-stressed position has a secondary stress as well but this stress being in a clash, is not phonetically realized. In other words, the metrical configuration for the aforementioned example is: (*fò*)(*tograà*)(*vjúra*). Monosyllabic feet are permitted. However, if secondary feet are iambic, the question is why even longer words such as *zàpatentovát’* ‘to hold a patent’ have secondary stress on the initial and not the peninitial syllable, e.g. (*zapà*)(*tentò*)(*vát’*), as expected?

Kenman (1975) views the two-degree reduction as a transition from a non-stressed to a stressed element. The closer to the stressed vowel, the more complete a vowel is. Unstressed vowels are naturally shorter than stressed ones and hence only a part of the set of elements they consist of can be pronounced in time. This proposal is phonetically correct and relates in many respects to the analysis that is proposed in this study; pre-stressed positions have a special affiliation with the stressed ones.

Alderete (1995) argues that ternary patterns of vowel reduction imply an iambic analysis of the stress foot in Russian, e.g. *vo*(*dovóz*) ‘water-man’, *pa*(*roxód*) ‘steamer’. This way different domains of reduction are created. Vowels under stress, i.e. foot-heads, must retain their features intact. Mid vowels, however, are not permitted within the foot domain, therefore the mid vowel /o/ lowers to [a][32] when it is in the weak position of a foot. This means that often within the foot the mid/non-mid opposition reflects the head/non-head opposition, e.g. pa(r[a]xód). Vowels outside the domain of the iambic foot are less protected. They are subject to structural constraints that forbid the

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[32] According to my sources (Shapiro (1968), Jones and Ward (1969), Kenman (1975)) /o/ reduces to [ʌ] and not to [a]. In the analysis that follows, I assume the same.

realization of both [mid] and [low] features compelling total reduction of vowel contrasts outside the foot, e.g. v[ə](dovóz), p[ə](roxód). I present here a somewhat simplified version of Alderete's analysis of vowel reduction. The reader can consult the source where a constraint-based analysis of the description presented here is given. However, even from this short presentation of the analysis, some unwelcome side effects can be pointed out.

First, iambic languages show a strong tendency to maximize length contrasts within the foot. It is very often the case that the vowel in head position lengthens, or the vowel in a dependent position is deleted or reduced to a maximum. Revithiadou and Van de Vijver (1997) explain this phenomenon as the joint effect of two lengthening forces in languages: first, there is lengthening of stressed syllables (and reduction of unstressed ones); second, a lengthening process targets constituent-final elements such as syllables on final foot positions. Consequently, in iambic feet the stressed syllable is doubly lengthened because it is both stressed and foot-final. On the contrary, the dependent part of the foot has no extra length and, thus, it appears to be much more reduced.[33] It is, therefore, unusual that in Russian the maximum degree of length contrasts arise from a head vowel and an unparsed one and not from the constituents within the foot, i.e. the head and the non-head. Moreover, it could also be more natural to assume that constituents outside the foot domain that are parsed by a higher prosodic constituent must remain more intact compared to non-heads; the latter are licensed directly by the prosodic word which does not enforce any reduction processes in order to maximize length contrasts among its constituents (Kager 1989).

Second, the analysis abstracts away from the footing of disyllabic words with initial stress, e.g. *górod* [górət] 'town'. Here vowel reduction forces degenerate footing, (*gó*)*rod*. For the same purpose, the trisyllabic word *krásnaja* [krásnəjə]

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[33] According to Revithiadou and Van de Vijver (1997), trochaic syllables lack sharp length contrasts because the lengthening dynamics within the foot are more balanced. The stressed syllable of a trochee lengthens and, as it is natural, the unstressed one reduces. However, the length of the unstressed element that lies on foot-final position is recuperated by the extra lengthening force that affects constituent-final elements. The joint effects of stress- and final-lengthening are pictured as follows:

	(σ́σ)	(σσ́)
stress-lengthening	⇑⇓	⇓⇑
final-lengthening	⇑	⇑

This schema explains linguistically why there is a drift towards equal length in trochees and a drift towards uneven length in iambs.

‘red-NOM.sg.fem’ must be parsed as (*krá*)*snaja* leaving two stray syllables. Obviously, such an analysis makes extensive use of monosyllabic feet and it is, therefore, not preferred. According to the analysis proposed here, monosyllabic feet result from faithfulness constraints (and their interaction with other factors) and not from purely rhythmic factors.

As mentioned earlier, there are indications for the trochaicity of Russian external to vowel reduction (i.e. the directionality of stress shifts, secondary stress, fast speech reductions, etc.). I should be emphasized that reduction does not contradict trochaicity. On the contrary, I show that it provides evidence for the exhaustivity of footing.

The first piece of evidence in this direction comes from intonational phenomena. Odé (1989) argues that pitch movements in pre-stressed syllables affect the perception of stress. Often pre-stressed and stressed syllables must be considered together as ‘one perceptually relevant unit’. There is a rising pitch movement in the pre-stressed syllable which is followed by a fall when the vowel onset of the stressed syllable is reached. The rising and falling pitch situated in the pre-stressed and stressed syllable aims at enhancing the saliency of the stressed syllable. The figure in (2) depicts a falling movement.

(2) *a rising-falling movement in ‘varénymi’* (Odé 1989:35)

The accented syllable in *varénymi* ‘boiled’ is slightly higher than the pre-stressed syllable, yet a rising movement is perceived: pitch falls immediately after the accent and the pre-stressed syllable is realized at higher level. The falling movement is completed at the end of the word.

We conclude, that there is a special bond between the pre-stressed and stressed position. Based on this conclusion, one can further argue that the lesser degree of reduction in the pre-stressed position is owed to the rising-falling pitch that is associated with the accented syllable. A rising pitch needs time in order to be perceptually realized and this implies that the pre-stressed vowel that carries the pitch requires more vocalic content in order to fulfill this task. So, in order to be able to carry over the rising part of the pitch that accompanies the stressed syllable, the pre-stressed syllable needs to expand in time. In short, pitch protects pre-stressed vowels from total reduction. Since this issue relates to aspects of Russian accentuation that are not in focus here, pre-stressed vowels are not accounted for, neither they are evaluated in the tableaux that follow.

The examples in (3), mainly collected from Kenman (1975) and also from personal research, shed some more light on vowel reduction. Mid and low vowels, /a, o, e/, in pre-pre-stressed closed (CVC) syllables never exhibit the maximum degree of reduction; the vowels /a, o/ always reduce to [ʌ], as exemplified in (3a-c). Moreover, the examples in (3d-e) demonstrate that the front vowel /e/ raises to [i] in closed syllables (and under secondary stress, e.g. *r*[*ì*]*vol’uciónnyj*, as shown later).

(3) *vowel reduction in CVC syllables*

a.	s advokátom	s[ʌ]dvok[á]tom	‘with solicitor’
b.	v afganistáne	v[ʌ]fg[ə]nist[á]ne	‘in Afghanistan’
c.	podzyvát’	p[ʌ]dzyv[á]t’	‘to call up’
d.	bednotá	b[i]dnot[á]	‘the poor’
e.	predlagát’	pr[i]dlag[á]t’	‘to propose’

Interestingly, in post-stressed positions reduction is uniform: all vowels of both open and closed syllables reduce to [ə]. Check the examples in (4). The domain of reduction is a closed syllable. However, the closed syllable in the leftmost column is in word initial position, whereas the closed syllable in the rightmost column it is in medial or final position.

(4) *reduction in pre-pre-stressed and post-stressed positions*

		pre-pre-stressed		post-stressed	
a.	/a/:	s[ʌ]dvokátami (INSTR.pl)		sadvokát[ə]mi	‘solicitor’
b.	/o/:	p[ʌ]dzyvát’	‘to call up’	úg[ə]l	‘corner’
c.	/e/:	b[i]dnotá	‘the poor’	výš[ə]dšij	‘went out’

Looking at the forms in (4) a natural question is borne: why is reduction more dramatic in final (post-stressed) positions? The facts in (4) suggest a more extreme degree of reduction that unveils itself in environments with enough material to support an extra level of reduction. Closed syllables constitute such environments. How can this discrepancy be explained?

I assume that all the above facts point to the existence of secondary (trochaic) feet in the language. These feet are easy to detect only when the word contains closed syllables. Take as an example the word *s advokátom* s[ʌ]d.vo.k[á].t[ə]m., (4a). In this word there are two closed syllables and one open one. They are all reduced, even though the first (closed) syllable reduces to a lesser extent. The reason is that the featural specification of this syllable is protected by its prosodic role in the structure. This syllable is the head of a secondary foot, (*sadvo*)(*kátom*). Being a head implies that it can bear a greater amount of complexity compared to non-heads.[34] This explains the further reduction of the final syllable, /tam/, albeit closed. This syllable is not the head of a foot; on the contrary, it lies on a weak position. Inevitably, the reduction is much more dramatic here.

On the other hand, open syllables totally reduce, e.g. g[ə]lov[á] 'head' unless they contain a high vowel, e.g. k[i]pít 'it boils'. Thus, open (CV) syllables are prone to reduction regardless of the prosodic role they have in the structure.

In short, there is a scale of different degrees of reduction. Stressed syllables preserve their entire vocalic material. Closed syllables preserve most part of their vocalic content only when they are the head of the (secondary) foot, otherwise reduce to schwa. Open syllables reduce to all positions unless they contain a high vowel, /i, u/. Note that secondary stress is suppressed under clash and, more specifically, when the two stressed feet are adjacent to each other. The details of the analysis unfold in the following section. The hierarchy of reduction is depicted in (5).

(5) *hierarchy of reduction*
CV́C, CV́ > CVC$_{\text{foot-head}}$ > Ci, Cu > CVC, CV

2. The analysis

It is clear that stressed syllables retain their segmental material intact. This implies that featural correspondence between input and output material is preserved under stress. In other words, stressed vowels must be identical to their input counterparts. The notion of counterpart is fundamental to the theory of faithfulness proposed in McCarthy and Prince (1995). Faithfulness of input to output is embodied in a set of constraints on correspondent segments. The constraint in (6) involves input-output faithfulness with special reference to stressed positions.

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[34] Complexity has been a favored subject in linguistic theory (among many others, McCarthy and Prince 1995, Dresher and Van der Hulst 1997).

(6) STRESSσ-IDENT[γF] (cf. HEAD-IDENT McCarthy 1995, Alderete 1995)
Correspondent segments contained in a stressed syllable agree in value for feature F.
If $\alpha\Re\beta$, and α is [γF], and α is contained in a stressed syllable, then β is [γF].

Featural identity is disrupted by markedness constraints[35] that cast out /e, o, a/ when they are not supported by primary stress. For simplicity's sake I compile all three featural constraints into one, expressed here as *{a, o, e}. This constraint entails the following three statements:

(7) *featural markedness constraints*
a. *{a}: Avoid featural specification [low]
b. *{o}: Avoid featural specification [-hi, -lo, +rnd]
c. *{e}: Avoid featural specification [-hi, -lo, -rnd]

The constraints in (7), ranked below STRESSσ-IDENT (and above featural identity constraints) enforce reduction of syllables in unstressed positions. However, the lack of reduction in high vowels, /i, u/ (as well as the fact that unstressed /o/ never raises to [u]), indicate that identity to the high feature, IDENT[high], must be ranked relatively higher with respect to the other featural identity constraints, namely IDENT[round] and IDENT[low]. The ranking so far is as follows:

(8) STRESSσ-IDENT[γF] >> *{a, e, o} >> IDENT[high] >>
IDENT[round], IDENT[low]

The tableau in (9) illustrates the derivation of the word *urók* 'lesson'. The second candidate fatally violates faithfulness to the stressed syllable although it complies with the demands of the markedness constraint *{o} by discarding the roundness of the vowel. The decision between the first and third candidate relies completely on IDENT[high]. The candidate that is faithful to the high feature of the input (9a) prevails over the one that is not (9c).

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[35] Here the term 'markedness' refers to constraints that evaluate how marked output structures are (Prince and Smolensky 1993).

(9)

input: urók	STRESSσ-IDENT	*{o}	IDENT[high]
☞ a. urók		*	
b. urʌ́k	*!		
c. ərók		*	*!

However, the data in (2) and (3) show that reduction is not uniform. Besides the primary stressed syllable that preserves its segmental material intact, some positions discard less material, whereas some others display total loss of vocalic material. Let us have a closer look at these cases.

Closed syllables display modest reductions when they head secondary feet as in (**s[ʌ]d**vo)(kát[ə]m). Examples like this one suggest that closed syllables are prominent within the foot. The prominence behavior of closed syllables is expressed with the constraint in (10) which is based on Prince's (1990) Weight-to-Stress Principle.

(10) Weight-to-Prominence Principle (cf. Van de Vijver 1998)
Closed syllables are prominent in foot structure

Closed syllables that are in prominent metrical position resist total loss of their vocalic features and, consequently, preserve more segmental material than unparsed syllables or syllables in foot-dependent positions.[36] It is a well-known fact that structural complexity plays an important role in the interrelation between vowel reduction and prominence in general. The central conclusion here is that (closed) syllables that are heads, demand featural identity with their input counterparts, (11), like the primary stressed syllables.

(11) HEADσ-IDENT[γF] (cf. HEAD-IDENT McCarthy 1995, Alderete 1995)
Correspondent segments contained in a syllable that is a prosodic head agree in value for feature F.
If $\alpha \Re \beta$, and α is [γF], and α is contained in a head syllable, then β is [γF].

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[36] Several scholars (among others, Van der Hulst 1984, Van Oostendorp 1995, Redford 1998), argue that 'weak' positions, i.e. non-heads, tend to contain phonological material of 'weak' prominence. 'Weak' are considered to be prosodic positions that include either unstressed or light syllables, or syllables with lax vowels, schwas or empty vocalic positions. On the other hand, elements in 'strong' prosodic roles show an inclination towards having a 'strong', that is, more complex structure. Thus, often the head position of a foot is filled in with stressed, heavy or long syllables, or syllables with at least tense or low vowels.

The crucial difference with stressed syllables lies in the fact that the constraint in (11) that refers to faithfulness of prosodic heads is ranked below the markedness constraints in (7) but above markedness constraint that prohibit any featural specification, *[F].

(12) *ranking between faithfulness and markedness constraints*
Stressσ-Ident[γF] >> *{a, o, e} >> WPP, Headσ-Ident[γF] >> *[F]

As a result of this ranking, /o/ is forced to reduce to [ʌ]. Lowering to [a] is excluded as an option for /o/ by virtue of the dominant status of the markedness constraint *{a} which militates against the emergence of low vowels in general. The same markedness constraint forces the vowel /a/ to give up its low feature and raise to the mid [ʌ]. Similarly, /e/ raises to [i] in strong positions but reduces to [ə] in weak positions. This, combined with the fact that the high vowels /i, u/, are always faithful to their segmental content, suggests that Ident[high] is ranked lower than Headσ-Ident but higher than other featural identity constraints. However, let us first consider how the ranking system is modeled.

The tableau in (14) exemplifies the derivation of the example *sadvokátom* s[ʌ]dvocát[ə]m]. Two additional points must be taken into consideration. First, parsing of syllables to feet and foot-binarity are important indicating that FtBin and Parse-σ occupy a high rank in the system. Second, only closed syllables can inherently attract stress and be prosodic heads. Open syllables are parsed into binary feet but they do not attract stress. We conclude that the ranking in (13) is enriched with two constraints:

(13) *ranking between faithfulness and markedness constraints*
Stressσ-Ident[γF] , FtBin >> Parse-σ[37] >> *{a, o, e} >> WPP, Headσ-Ident[γF] >> *[F]

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[37] The ranking between FtBin and Parse-σ is established by examples like *šo*(*kíro*)*vat'* 'to shock'. This word is pronounced as [šəkírəvət'] suggesting the footing *šo*(*kíro*)*vat'*. An opposite parsing would allow monosyllabic feet at the expense of foot binarity, (*šo*)(*kíro*)(*vat'*), implying that the final closed syllable must be less reduced: [šəkírəvʌt']. This is not empirically correct, however, leading to the conclusion that the ranking between these two constraints is FtBin >> Parse.

(14)

input: s advokátom	STRESSσ-IDENT	FTBIN	*{a, o}	WPP	HEADσ-IDENT	*[F]
a. (s[a]dvo)(k[ʌ́]t[ə]m)	*!		a			**
b. (s[a]dvo)(k[á]t[ə]m)			a a!			**
c. (s[ə]dvo)(k[á]t[ə]m)			a		**!	*
d. (s[ʌ]dvo)(k[á]t[ʌ]m)			a		*	***!
☞ e. (s[ʌ]dvo)(k[á]t[ə]m)			a		*	**

The tableau in (14) is read as follows: Candidate (14a) fatally violates STRESSσ-IDENT. Candidate (14b) crucially violates the markedness constraint *{a}; not only the stressed syllable but also the heavy one has a full (low) vowel. The third candidate, (14c), is mainly excluded because the first closed syllable does not preserve any vocalic material.[38] The fourth candidate, (14d), has more vocalic content than it should: it preserves material in the closed syllable-head and material in the closed syllable that is not a head. The last candidate (14e) wins because it best satisfies the constraints.

HEADσ-IDENT is also decisive for the two candidates in (15). In the first candidate (15a), the closed syllable-head preserves more material than the second one (15b) which deletes all feature values.

(15)

input: bednotá	*{e}	HEADσ-IDENT	IDENT[high]
☞ a. (b[i]dno)(tá)		*	*
b. (b[ə]dno)(tá)		**!	

IDENT[high] is ranked above markedness constraints that prohibit any feature specification, *[F]. This is shown by the following two tableaux. The candidate that respects the high feature is deemed optimal.

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[38] In this tableau violations of HEADσ-IDENT and *[F] are reckoned in a gradual and not in an absolute way.

(16)

input: podzyvát’	IDENT[high]	*[F]
☞ a. (podz[i])(vát’)		*
b. (podz[ə])(vát’)	*!	

input: civilizácija	IDENT[high]	*[F]
☞ a. (c[i]vi)li(záci)ja		*
b. (c[ə]vi)li(záci)ja	*!	

For words with no closed syllables the WPP and HEADσ-IDENT constraint are inert and the decision relies completely on markedness constraints.

(17)

input: golová	*[F]
a. (g[ʌ]l[ə])(vá)	**!
☞ b. (g[ə]l[ə])(vá)	*

Loginova (1995) claims that a rhythmic stress rule is active in Russian polysyllabic words. This rule is accompanied by a qualitative vowel reduction and it is expressed by prolongation and slight lengthening of the prominent syllable. Some of the examples she includes in her paper are given in (18).

(18) *secondary stress in Russian*

a.	r[ì]vol’uciónnyj	/revol’ucionnyj/	‘revolutionary’
b.	z[ʌ̀]patentovát’	/zapatentovat’/	‘to hold a patent’

It seems that secondary stress emerges only in a non-clash environment, e.g. (*rèvo*)*l’u*(*ciónnyj*) where a syllable intervenes between the two feet. On the other hand, secondary stress is suppressed under clash as, for example in (*golo*)(*vá*). This implies that the constraint CLASH (Kager 1994b), which prohibits adjacent stressed feet, must be ranked above EDGEMOST-L (Prince 1983). As we have seen, this constraint assigns a peak on the leftmost syllable of the word.[39] Thus, it is not surprising that the effects of EDGEMOST were hidden in the examples we examined. In fact, the constraint is ranked higher than some other constraints we have reviewed, as the tableau in (19) shows.

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[39] Note that the same constraint is responsible for default initial stress in the absence of lexical accents.

However, its crucial domination by CLASH reveals its effects only in very long words. Let us have a look at the following tableau:

(19)

input: revol’ucionnyj	CLASH	ER-L	*{e}	HEADσ-IDENT	IDENT [high]
☞ a. (r[ĭ]vo)l’u(ciónnyj)				*	*
b. (r[ə]vo)l’u(ciónnyj)		*!			

The first candidate in (19) is the winner because it best satisfies the constraints compared to the others. Candidate (19b) violates ER-L and hence is doomed to fail.

In conclusion, although somewhat hidden, there are some convincing arguments that support the assumption that parsing in Russian is exhaustive. (20) summarizes the ranking that accounts for exhaustive parsing and vowel reduction in Russian.

(20) *ranking for exhaustive parsing and vowel reduction*

STRESSσ-IDENT[γF] , FTBIN , CLASH
| (19) | | (19)
*{a, o, e} PARSE-σ EDGEMOST-L
|
WPP,
HEADσ-IDENT[γF] (14), (15)
|
IDENT[high]
| (16), (17)
*[F], IDENT[round], IDENT[low]

4 Lexical Accents and Head Dominance in Fusional Languages

Greek and Russian

4.1. Introduction

What primarily identifies a lexical accent system is the notion of *competition* between lexical accents for primary stress. We have seen in Chapter 3 that for the greatest part of the vocabulary, prosodic structure is determined by the inherent properties of morphemes. Prosodic principles are only employed to restrict the freedom of marking. Still, given the fact that in the languages examined here one primary stress is allotted to each morphological word,[1] the question is how accentuation is pursued when more than one marked morpheme is present in a word. This question is undertaken in the present chapter, which focuses on the morphological aspect of lexical accent systems. More specifically, the proposal is that stress depends on morphological structure and especially, the hierarchical relations that hold between the elements of the word.

Given the fact that morphological structure plays a cardinal role for stress assignment, we expect languages that employ different morphological mechanisms to build up their words to diverge in the way they pursue accentuation. In this chapter, I am primarily concerned with lexical accent systems of fusional morphology and in particular with Greek and Russian. In Chapter 5, I focus on lexical accent systems of polysynthetic morphology.

In fusional languages, roots combine with several affixes to form words. As a consequence, words minimally consist of two morphemes, a root and an affix. Morphological complexity is an expected property in lexical accent systems. It is the rich morphology that brings to light the inherent accentual properties of

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[1] This is triggered by a high ranked constraint which, in general, states that each prosodic word has one prominent constituent. This constraint is low ranking in pitch-accent systems. For example, in Tahltan all accents in a word can bear a high tone, e.g. *k'íθhédeːs-déːl* 'they three or more run'.

morphemes and, eventually, the dependence of prosody on morphological structure.

4.1.1. Theoretical explorations in Chapter 4

This section provides a brief introduction to the main ideas advanced in chapter 4. As mentioned in the previous chapter, most morphemes are stored in the lexicon with a lexical accent. Moreover, inherent metrical information supersedes the phonological constraints that together constitute the 'default accentuation'. However, how is accentuation pursued in more intricate metrical constructions? What happens when two or three marked morphemes are present in the word? Which accent prevails as primary?

In Chapter 1, I claimed that head-oriented systems underline the significance of morphological structure by segregating head from non-head constituents and assigning prominence to heads. Generally speaking, there are two varieties of head-based systems; head-stress systems and head-dependent systems. In the former type, a morphological head is obligatorily assigned prominence, whereas in the latter type a head prevails only when it is marked. When the head lacks inherent accentual properties other marked constituents are given a chance to determine stress.

Marking and morphological structure, and particularly the notion 'head of the word', are vital components for the accentuation of head-dependent systems like Greek and Russian. The specifics of marking were examined in Chapter 3. The focus here is on the morphological component of lexical accent systems with special emphasis on the role of headedness for stress.

The central claim in this chapter is that competing accents represent competing morphemes. More specifically, when two accents occur in a word, the accent introduced by the *morphological head* is prosodically prominent.[2] Headedness must be interpreted in a strict fashion, meaning the ability of a morpheme to determine the word's syntactic category. A derivational suffix that changes the base it is attached to from nominal to adjectival is considered to be a head. In the same spirit, roots are heads in inflected words because they determine the syntactic category of the whole form (Zwicky 1985, Scalise 1988a, among others). Assigning primary stress to the morphological head means that the inherent accentual properties of roots outrank the inherent properties of inflectional suffixes in inflected constructions, but submit to the inherent metrical information of derivational suffixes in derived constructions.

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[2] This idea has been proposed for Greek stress by Ralli (1988) and Ralli and Touradzidis (1992) (cf. §3.3.2).

In short, there is a split in the accentual behavior of marked morphemes; heads are given priority for stress, provided that they bear an accent. This claim is supported by the empirical facts of Greek and Russian inflectional and derivational morphology.[3] I will illustrate the above with some examples. The Greek root /sta(fið-/ and the genitive plural inflectional suffix /-(on/ are accented. When these morphemes join to form a word, stress falls on the root, *stafíðon*. This implies that the accent of the inflectional ending yields to the accent of the root. On the other hand, an accented derivational suffix such as /-(ini/ attracts stress from the root *stafiðíni* 'raisin pulp' simply because in the new formative the suffix, and not the root, is the head.

If morphological structure is important for prosody, the main question is what principle allows the interface between these components of grammar.

I claim that the prosody-morphology interface centers around the principle of *compositionality*. This principle is borrowed from formal semantics (Montague 1974) and, intuitively, entails that the interface between two levels is established through one and the same structure. For instance, each time a syntactic rule applies to combine two lexical items, the semantic interpretation of the derived expression is determined by the interpretation of the two expressions combined. Similarly, when a morphological rule applies to combine two morphemes, the phonological interpretation of the derived expression is determined by the phonological interpretations of its parts.

In interface systems, compositionality or rather, *prosodic compositionality* simply implies that prosody can have access to morphological structure because the two components of grammar are built in a parallel fashion. It allows prosodic structure to interact with morphological structure and, more importantly, become sensitive to the morphological rules that apply to form various morphological formations (i.e. inflected or derived formations). For instance, because of prosodic compositionality prosody can become sensitive to the morphological rules that build up a head-dependent relation between a root and an inflectional suffix. In lexical accent systems in particular, the prosody-morphology interface is articulated in terms of a *theory of head dominance*, which states that the accent of the morphological head of the word prevails over other accents.

Head dominance enriches Universal Grammar with the *family of head constraints* which are part of a broader family of interface constraints. These constraints allow a direct relation between prosodic elements and morphological constituents such as, for example, lexical accents and morphological heads. Two

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[3] I take for granted that morphological constraints of affixation are high ranked in the languages examined in this study.

types of head constraints are important in this study: HEADFAITH and HEADSTRESS. Both constraints have been introduced in previous chapters. The former constraint states that a lexical accent sponsored by a (morphological) head should have a correspondent in the output and vice versa, a lexical accent hosted by a (morphological) head must have a correspondent in the input. The latter constraint simply states that a (morphological) head must be stressed. Later in this chapter, I show that head dominance is expressed by means of a 'positional faithfulness ranking' in which the more specific faithfulness constraint, HEADFAITH, dominates general faithfulness, FAITH: HEADFAITH >> FAITH.

Theoretically, the function that executes the prosody-morphology mapping has an infinite number of interpretations. Greek and Russian choose to phonetically interpret it as stress. Japanese and Hua, on the other hand, interpret prominence as a tonal contour, whereas Turkana realizes the mapping between phonology and morphology by means of harmony. A language may also choose to interpret this function as prominence of the non-head element of the word. However, to my knowledge there are no accentual systems that give systematic priority to non-heads. In this chapter, based on Dresher and Van der Hulst's (1997) theory of headedness, I make the stronger claim that such systems do not exist.

Prosodic compositionality as introduced above, predicts that different morphological structures will have a different impact on stress. This prediction is indeed borne out here as well as in Chapter 5. For instance, in derived words the (marked) derivational suffix prevails over the root and the inflectional suffix because it is the head. In incorporated constructions, on the other hand, the root is the head and the suffix is the complement that incorporates to the root/head. According to what has been proposed so far, in incorporated constructions an accented root will be prosodically dominant.

To summarize, prosodic compositionality is the principle that permits the interface between the prosodic and morphological levels of grammar. Prosodic compositionality is not a constraint nor a constraint ranking. It is just a method that defines how morphological and prosodic structures are mapped onto each other. In lexical accent systems, the function that performs the mapping is interpreted as head dominance. Head dominance is formalized with the ranking HEADFAITH >> FAITH. This ranking is central in the accentuation of lexical accent systems.

In addition, it is shown in this chapter that the theory of head dominance voids the need for the complex derivational machinery of cyclic and non-cyclic levels. Moreover, it directly derives the effects of the metaconstraint

ROOTFAITH >> SUFFIXFAITH (McCarthy and Prince 1995) and, more importantly, it accounts for the counterexamples to this metaconstraint.

An important outcome of the route taken here is that prosodic compositionality offers the correct theoretical framework to argue that the complexity of the system is not an impediment for learnability. The marginality of purely prosodic principles in combination with the highly marked nature of stress could often be considered to diminish the predictable aspects of the system and impede the process of learnability. However, such claims have no bearing under the analysis promoted here. Given the fact that prosodic structure is built on the basis of morphological information, it is expected that the acquisition of morphological information provides sufficient clues to the Greek or Russian learner to construct prosodic structure.

Finally, the framework advanced in this study predicts possible directions for the future development of lexical accent systems. Russian verifies the intuitions expressed at the beginning of this thesis that head-dependent systems are perhaps in a transitional stage towards stronger forms of prosody-morphology interface in which ‘head’ and ‘stress’ are in a one-to-one correspondence.

The chapter is divided into two parts; the first part examines Greek and the second part examines Russian. More specifically, in §4.2 I present the basic accentual facts of Greek inflected words which are composed of two marked morphemes. In §4.3, I introduce the principle of prosodic compositionality. The notion ‘head of the word’ is explored in §4.4. In §4.5, we see how head dominance derives the desired results for inflected words. In §4.6, I present the facts of Greek derivation. The possibility of accounting for stress in derived words based on theories that derive dominance effects by means of ordered strata or cyclicity is considered in §4.7. However, the analysis proposed in §4.8 seems to be superior in many respects. The main characteristics of Greek stress are highlighted in §4.9.

The facts from the inflectional morphology of Russian are presented in §4.10 and analyzed in §4.11. The facts from derivational morphology are set out in §4.12 and accounted for in §4.13. Some ‘deviant’ accentual patterns are examined in §4.14. §4.15 reviews other approaches to Russian stress, whereas §4.16 examines cases in which a lexical accent retracts from its original position in specific morphological environments. §4.17 summarizes the main points of Russian stress and §4.18 concludes this chapter.

Greek

4.2. Inflected Words: The Facts

The central theme of this section is the accentuation of inflected words. As already mentioned in Chapter 3, these are words composed of a simple root and an inflectional ending. The analysis sets out with the examination of the accentual patterns of nouns. An exhaustive presentation of all morphological classes of nouns is far beyond the scope of this thesis. I continue the discussion of the two most productive classes of Greek nouns: the *-os* class of masculine (and feminine) nouns and the *-a* class of feminine nouns. I want to stress once more that the classes examined here give a representative view of the variety of accentual phenomena attested in Greek.

Elaborate prosodic structures are exhibited by words composed of lexically marked roots and marked suffixes. The examples in (1) and (2) give us a flavor of the degree of complexity in the system. The inherent properties of roots are given in bold and the accentual properties of suffixes in italics. When two lexical accents are present in a word, the one in bold bears primary stress.

(1) *masculine nouns in -os* (NOM.sg), *-u* (GEN.sg)

	two marked morphemes		*one marked morpheme*		
	Acc Root + Pre-Acc InflS		Acc Root + UnMark InflS		
a.	klívanu	/(**kli**van-*u)*/	klívanos	/(**kli**van-os/	‘kiln’
b.	fantáru	/fan(**tar**-*u)*/	fantáros	/fan(**tar**-os/	‘soldier’
	UnAcc root + Pre-Acc InflS		UnAcc root + UnMark InflS		
c.	uranú	/**uran**-*u)*/	uranós	/**uran**-os/	‘sky’
d.	xorú	/**xor**-*u)*/	xorós	/**xor**-os/	‘dance’

(2) *femine nouns in -a* (NOM.sg), *-on* (GEN.pl)

	two marked morphemes		*one marked morpheme*		
	Acc root + Acc InflS		Acc root + UnMark InflS		
a.	γónðolon	/(**γon**ðol-*(on*/	γónðola	/(**γon**ðol-a/	‘gondola’
b.	stafíðon	/sta(**fið**-*(on*/[4]	stafíða	/sta(**fið**-a/	‘raisin’

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[4] The nouns *γinéka* ‘woman’, *fanéla* ‘flannel’ have final stress in genitive plural, *γinekón*, *fanelón*. I treat both as exceptions to the generalization presented in this chapter.

	UnAcc root + Acc InflS		UnAcc root + UnMark InflS		
c.	aγorón	/**aγor-***(on*/	aγorá	/**aγor-***a*/	‘market’
d.	forón	/**for-***(on*/	forá	/**for-***a*/	‘turn’

It is evident from the above examples that there are cases in which the accentual preference of the root complies with the metrical specification of the suffix. For instance, unaccentable roots together with accented suffixes in (2c-d) are such harmonic combinations. The root pushes its accent away to the suffix, which bears an accent as well. Another instance of cooperation between marks is the example in (1b). The root is accented on the final syllable agreeing in this respect with the accentual preference of the suffix, which is pre-accenting.

However, there is a conflict between the accentual properties of morphemes in the remaining examples. Starting from (1a), the root is accented on the initial syllable, in contrast to the suffix, which prefers an accent on the final syllable of the root. Similarly, in (2a-b), both roots and suffixes are accented, offering two possible landing positions for primary stress. In the aforementioned examples, it is always the leftmost accent that actually wins and surfaces as primary. Based on this observation, one may argue that this choice is triggered by an *edgemost* rule (cf. the *End Rule* of Prince 1983, Van der Hulst 1996), which, according to the language’s preference, opts to assign primary stress to the leftmost mark.

The suggested route, however, is not correct, as shown in (1c-d). In (1c) the unaccentable morpheme /uran-/ implies an accent outside its domain. The only physically possible position is the suffix giving underlyingly /uran-ú/. At the same time, the genitive singular suffix /-u)/ is pre-accenting, suggesting that the structural constraints of the language will parse the syllable preceding the suffix into a foot head, *urán-u*. In short, there are two conflicting positions for stress, the penultimate and ultimate, /uránú/. Since the word surfaces with final stress, *uranú*, we conclude that the rightmost accent bears primary stress. The same applies to the example in (1d).

We infer from the above that in (1a-b) and (2a-b) the rightmost accent is stressed but in (1c-d) the leftmost accent is stressed. Apparently, an edgemost rule cannot derive the right results for the Greek data just described. The solution must be found in some other property that these examples share.

A closer look at the examples in (1) and (2) reveals that what in fact prevails is the accent introduced by the root. The accentual properties of suffixes give way to the accentual markedness of roots. Technically, this observation implies that root-faithfulness outranks inflectional suffix-faithfulness, a ranking which was hinted at in Chapter 3.

(3) *ranking for inflected words in Greek*
FAITH$_{R}$ >> FAITH$_{InflS}$

The asymmetrical behavior of roots and suffixes has been pointed out in a number of analyses on reduplication (McCarthy and Prince 1995), stress (Alderete 1997) and assimilation (Van der Hulst and Kooij 1981). Crosslinguistically, roots display richer contrasts compared to suffixes. For example, suffixes seem to have reduced segmental inventories favoring coronal consonants or avoiding long vowels or geminates, even when roots permit them. On the other hand, there are no segment types or configurations that are only permitted in suffixes but are barred from roots.

Based on this observation, McCarthy and Prince propose that the ranking ROOTFAITH >> SUFFIXFAITH must be universally fixed and promoted into a *metaconstraint on ranking* (McCarthy and Prince 1995:364). However, this metaconstraint, as it stands, is too strong for the facts we are confronted with. There are derivational suffixes that do attract stress from roots. It is also problematic, in my opinion, that the metaconstraint emanates from a general crosslinguistic observation but is not established on the basis of a linguistic principle. For these reasons, I would like to provide more argumentation for the ranking in (3), which, I repeat, I hold to be true for inflected constructions.

The proposed ranking can receive a natural interpretation if we take into consideration the morphological structure of words. It is well-established in morphological theories that there is an asymmetry in the morphological behavior of roots and inflectional suffixes. More specifically, roots are considered to have a head-like status in the word as opposed to inflectional suffixes. I provide a full argumentation for this claim as well as a definition of the notion ‘head of a word’ in §4.4. Extending the idea of headedness from morphological to prosodic phenomena, one can further argue that the morphological head of the word is accentually prominent. However, if prosodic headedness is built on morphological headedness, what enables the interaction between two different components of grammar? There must be a principle that entitles prosody to communicate with morphology in such a way that it would not be a stipulation any more to argue that prosody mirrors morphological structure. This principle is compositionality.

4.3. Prosodic Compositionality

The empirical facts in the previous section suggest that competing accents in fact represent competing morphemes, and the competition is resolved in favor of the element that occupies the head position in the morphological structure of the word. However, in order to claim that there is a match between prosodic and morphological headedness, we must establish a principle that allows the communication between these two levels of grammar. This principle is *prosodic compositionality*,[5] stated in (4).

(4) *prosodic compositionality*

The prosody of a complex form is a function of the prosody of its parts and of the morphological rules by which they are combined:

$$g(F_M(A,B)) = F_P(g(A), g(B))$$

where:

g is a function that maps a morphological constituent into a prosodic constituent, F_M the morphological mode of combination, F_P the prosodic mode of combination, A and B morphological constituents

In formal terms, prosodic compositionality amounts to saying that the function g which maps a complex morphological constituent $F_M(A,B)=C$ into a complex prosodic constituent $g(C)$, is defined in terms of the independent prosodies of its parts (i.e., $g(A)$ and $g(B)$)[6] and the way A and B are combined by F_M. Prosodic compositionality enables prosody and morphology to communicate by means of one and the same structure. Moreover, it implies that for each type of morphological mode of combination F_M there is a particular type of prosodic mode of combination F_P that assigns prosodic structure to the complex constituent that F_M creates. For instance, if the morphological mode of combination is that of a head and a complement (non-head), then the prosodic mode of combination can be a function that assigns some sort of prominence to the head-element.

The function g in the Greek examples examined in (1-2) is indeed a function that assigns stress to the lexical accent of a head. In principle, however, g is a function that can be interpreted in a variety of ways. It could be the case that

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[5] Compositionality here should not be confused with recent developments within the theoretical context of Optimality Theory which view compositionality as a family of output constraints that hold between parts of a form and the form as a whole (among others, Benua 1995, Orgun 1996, Itô and Mester 1997).

[6] When all morphemes lack inherent metrical properties, F_P apparently has nothing to work on and, consequently, prosodic structure is decided by other principles of the language, such as the default constraints.

prominence is assigned to the non-head or both to the head and non-head constituents of the word. It depends on the choice a particular language makes. Japanese (Haraguchi 1977, 1991, Poser 1984) and Hua (Haiman 1980), for instance, choose to express prominence by means of tonal contours whereas Turkana (Dimmendaal 1983) does so by means of harmony (Lehiste 1970, Van Heuven and Sluijter 1996).

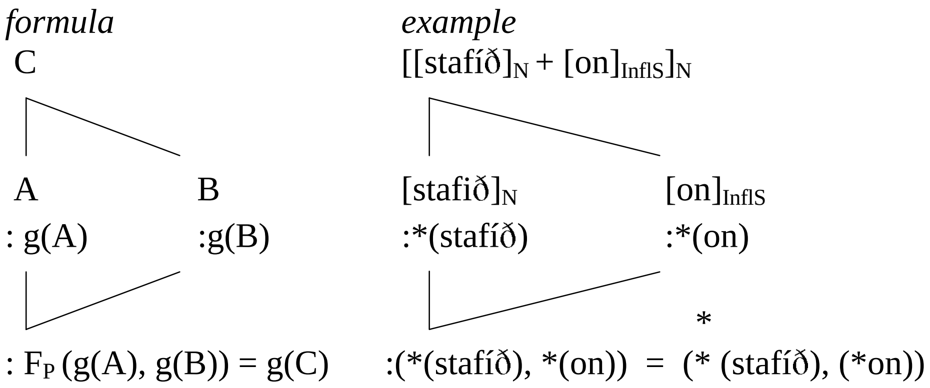
That Greek assigns prominence to the head is an expected, and somewhat desired situation, given recent theories on headedness. Dresher and Van der Hulst (1997) argue that the notion 'head' is a central linguistic concept. In case there is an asymmetry in grammar, the head is the element that always shows the maximum complexity. In this thesis, I expand on this claim and argue that when the distinction between heads and non-heads is vital for accentuation, heads are always given priority over non-heads. This view is empirically supported. To my knowledge, there are no lexical accent systems where in a similar conflict prominence is assigned to the non-head.

It is important to emphasize that prosodic compositionality is not a constraint or a constraint ranking. It is a method according to which grammar is organized. In interface systems, the dependence of phonology on morphology is shown by means of stress (or prominence in general). In morphology-dependent systems like Pashto and Spanish, the prosody-morphology interface is sensitive to inherent accentual properties of morphemes but also to edgemost rules and footing. In head-dependent systems like Greek and Russian as well as head-stress systems like Tahltan or Chukchee, the function that executes the mapping is expressed as head dominance. Prominence is assigned either to the accent of the head or some syllable of the head. In languages with fixed stress, however, accentual rules operate without consulting dependencies between morphological constituents. This does not mean, though, that such systems are not compositional. It is just that the function that performs the mapping does not give cues for the interface or that the interface is expressed by means of other phonological tools.

Let us illustrate with an example how prosodic compositionality works for inflected words in Greek. Take the root /stafið-/ and the inflectional suffix /-on/ (example (2b)). Each morpheme has an inherent lexical specification which, for the purpose of the present discussion, is represented with the sign of an asterisk preceding the relevant morpheme: *(*stafið-*), *(*-on*). Recall from Chapter 3 that the exact position of the accent is irrelevant. Other principles of the system account for that. What is important here is that each element has a markedness specification of some sort. On the other hand, there is a morphological rule F_M that combines these two expressions (i.e. the noun root (N) and the inflection (InflS)) into a unit, namely an inflected noun (N+InflS). Take for granted for the moment that the relation between these two morphological constituents, established by F_M, is that of a dominator (N) and a dominee (InflS). Complete argumentation on this claim is given in §4.4.1. According to what has been argued so far, prosodic compositionality allows prosody to inspect morphological structure and, moreover, requires a one-to-one correspondence between morphological modes of combination and prosodic modes of combination (i.e. $F_M^i \leftrightarrow F_P^i$, where *i* refers to the type of modus). Based on what we argued in the previous paragraphs, F_P assigns stress prominence to the inherent accent of the root/head, hence the word is stressed as *stafíðon*.

Notice that because of prosodic compositionality the only relevant notion for prosody is the morpheme and its inherent properties. Prosody looks only into morphological structure. The diagram in (5) portrays the system of relations just described. Prominence of the head constituent is conventionally represented with a column of two asterisks. The notation should not be confused with Halle and Vergnaud's (1987) grid mark theory.

(5)



To summarize, prosodic compositionality permits the mapping between morphological and prosodic structure. The function that performs the mapping is expressed as head dominance: the lexical accent of the head is assigned primary stress. Marking is the tool through which the prosody-morphology interface is accomplished in head-dependent systems. When the head is unmarked, accentuation is pursued in a different way. In that case, other marked morphemes or the default constraints take charge of accentuation. It is important to realize that this mapping can only be naturally stated in a compositional system as there is one relevant notion of structure; it would have been a mere stipulation under any other way in relating prosody to morphology. In the following section, I focus on the details of the interpretation of prosodic structure in Greek.

Before bringing this section to an end, it must be pointed out that one of the invaluable merits of prosodic compositionality is the economy of structure. Constituents carry fragments of metrical information that need to be learned as part of their subcategorization matrix. However, morphological rules apply to determine not only the morphological relation between the constituents but also the prosodic one. In the following section I spend some more time on evaluating the role of compositionality in grammar.

4.3.1. Compositionality in grammar

The principle of compositionality is 'borrowed' from formal semantics. Intuitively, compositionality requires that for the computation of the meaning of a derived form, the meanings of its parts must be sufficient. In the specification of formal languages, the principle is generally satisfied in the following way: the syntactic component consists of a list of basic expressions (lexical items) with specification of the syntactic category they belong to, and a set of recursive definitions (syntactic rules) which specify how expressions may be combined to form sentences. It is also assumed that for each syntactic rule there is a corresponding rule of semantic interpretation. Each time a syntactic rule applies to combine two expressions, the semantic interpretation of the derived expression is determined as a function of the interpretation of the two expressions combined.

Consequently, the correspondence between the syntactic structure of a formula and its semantic interpretation is in fact very tight. The syntax is built by a recursive specification, starting with a stipulation of the basic expressions of given categories and with recursive rules. The semantics is built by a parallel recursive specification, including a stipulation of the semantic values for the basic expressions and for each syntactic rule a single semantic one.

The application of compositionality to phonological processes is not an innovation here. In Categorial Phonology (Bach and Wheeler 1981, Wheeler 1981, 1988) the combinatorial operations with which phonological structures are assembled are based on the principle of compositionality. For instance, Wheeler (1981) argues that in the phonological component the set of basic expressions consists of the phonemes of the language. Next to basic expressions, namely phonemes, there are recursive definitions which specify how basic expressions may be combined to form larger constituents. These are the rules of phonological syntax which apply to combine phonemes or strings of phonemes into larger expressions. Rules of phonetic interpretation apply in conjunction with the rules of phonological syntax and specify how particular segments are to be phonetically interpreted. Generally speaking, the rules of phonological syntax are responsible for capturing the phonotactic constraints of the language in question, whereas the rules of phonetic interpretation account for the phonological alternations (Wheeler 1981). Now, the hierarchical organization of the segments into syllables follows from compositionality, for example. As expressions are combined such as an onset and a nucleus, the phonetic interpretation of the derived constituent, namely the syllable, is determined with reference to the interpretations of the constituents that are combined. Compositionality implies that if there is an assimilation process which applies to two segments in a syllable, the assimilation takes place as the two segments are combined rather than being an iterative rule which applies to the entire word. By the time a string corresponding to a word is built up compositionally, it is fully interpreted phonetically.

Compositionality has also been employed in phonology to account for intonational phenomena. Steedman (1991) claims that the pattern between spoken language and its interpretation is more direct than is implied by the standard theories. Syntax and semantics, on the one hand, and phonology and discourse information, on the other, have harmonic structural analyses and require interdependent processing. Syntactic structure and interpretation stand in close relation both to the prosodic structure of the intonational signal and to the concepts, referents and prepositions presented in the discourse context. As a consequence, compositionality makes it easier to use the information provided by all levels of grammar to filter out ambiguities.

This last remark brings up a general question about the functional role compositionality has in general, and what prosodic compositionality has in particular within grammar. What does it mean for the grammar to be endowed with a principle such as compositionality?

Compositionality arises when two components of grammar such as syntax and semantics or morphology and prosody communicate in the grammar. This principle guarantees that the best way to establish the interface between two units in communication is through one and the same structure. Obviously, compositionality is not the only way for two components to establish an interface relation, it is though the most economical one.

As Steedman (1991) correctly puts it, compositionality establishes a harmonic communication between levels of grammar allowing us to access instantly information constructed in either of them. Having at hand information related to both levels makes it easier to filter out the ambiguities that arise during processing.

Compositionality entails not only economy in communication between two structures but also economy in the way constituents are structured, that is how they are put together to form larger structures. For example, a theoretically infinite set of meanings are encoded in a finite lexicon, and meanings are attributed to larger phrases according to the principle of compositionality. It is sufficient to know the independent meanings of morphemes and the mode in which they are combined in order to derive the meaning of the word. To bring the example closer to the main theme of this section, knowledge of the independent prosodies of a complex form is sufficient in order to construe its prosodic structure. The mode of combination of prosodic properties is determined by the way morphological rules apply to define the mode of combination between morphological constituents. In other words, the learner is led to both components of grammar along one and the same path.

Besides the general points that render compositionality a desirable principle in any sort of interface relationship, there are some other positive outcomes related to this specific application of compositionality. As the analysis proceeds with the examination of more complex structures, the notion of compositionality is more finely shaped finer shaped and its effects become more lucid. Another matter needs to be elucidated in order to proceed to the analysis of the inflected words in (1-2): the clarification of the notion 'head of the word'.

4.4. The Notion 'Head of the Word'

This section focuses on the notion 'head of the word'. I first start with examining which element is considered to be a 'head' in inflected words (§4.4.1) and later I move on to explore what is considered to be a head in derived words (§4.4.2.).

4.4.1. Inflectional suffixes and headedness

I adopt a central aspect of a number of current theories that assign internal structure to affixed words: the notion of *head*, which is intended to account for the relation between the properties of a word as a whole and the properties of its parts. The basic idea is that the head of a word should be that one of its constituent parts that determines its properties. Properties of the head should be inherited by (or 'percolate to') the word as a whole, while properties of non-heads are not inherited.

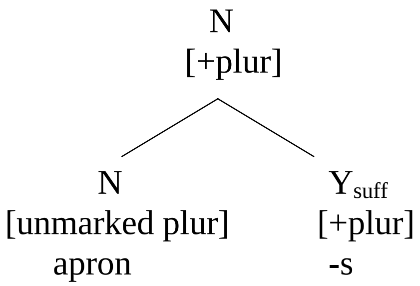
Headhood as defined in the above lines raises some questions: Which are the exact properties that a word inherits from a head but not from a non-head? Is it true that non-heads do not attribute any properties to the word? In short, is it possible to argue that elements that are non-heads with respect to some property

A, can be heads with respect to some other property B? This and other questions are addressed in the ensuing paragraphs.

It has been argued by various scholars (Selkirk 1982, Scalise 1988a,b, Anderson 1992) that in inflected constructions the distributional properties of an inflected verb or of an inflected noun, for instance, are determined by the lexical category itself and not by the inflectional morphemes. The main argument is that inflectional suffixes, as opposed to derivational ones, do not change the syntactic category or the general list of information attached to the base. According to this view, a head is the dominant element within the word and the one which determines the word's grammatical behavior. This definition instantly disqualifies inflectional suffixes from being heads.

Selkirk (1982), for instance, develops a theory of *Percolation* (further enriched by Lieber 1989) according to which the feature specification of the root/head percolates up to the mother node and becomes a property of the whole word. Featural properties of the (non-head) inflectional suffix percolate up to the word only when the head is unspecified for them. So, in a word like *aprons* in English, the root determines the syntactic category and the inflectional suffix the plurality of the whole form. The syntactic label percolates up from the mother node to the word. The unmarkedness of the root with respect to number gives a chance for the inflection to percolate its specification for number, as shown in (6).

(6)



(Selkirk 1982:74)

The non-headedness of inflectional suffixes is questioned in Williams (1981). Williams argues that inflectional morphemes are heads, and moreover, he defines the head of a morphologically complex word to be the righthand member of that word (*Righthand Head Rule*). The principal characteristic of an inflectional suffix is that it must appear outside derivational suffixes. This fact about inflectional morphology follows from the notion of 'head of the word'. A suffix must determine the properties of its word and, therefore, appear in the ultimate head position. This explains why inflectional suffixes are located outside derivational suffixes. Morphemes that bear 'syntactically relevant features' like [tense] and [case] must appear in the head position of words;

otherwise, this feature will not float (via inheritance through heads) to the syntactic level. Head position of a complex word is the final (rightmost) position.

Williams's ideas about headedness have been criticized by a number of scholars (Zwicky 1985, Scalise 1988a,b, Anderson 1992, among others). The appearance of morphological determination is simply the result of the fact that rightmost elements in words are inflectional loci. Morphological principles locating inflectional morphemes seem always to refer to margins and never to morphological constituents that would constitute heads on any criterion other than this one. However, inflectional suffixes are not morphological determinants because they do not determine the categorial features of the construct. It is wrong, for example, to say that the plurality of the suffix *-ness* in *sadnesses* determines the plurality of the whole word. Instead, the plurality of the whole word is expressed by inflectional marks located on the rightmost element (Zwicky 1985).[7]

On the other hand, categorial grammarians (Hoeksema 1985, Steele 1988) cast doubt on the value of the notion 'head of the word' altogether. They propose that the formation of inflected and derived words is a mapping process, a function between a base and a suffix. The element that is responsible for this mapping process is called a *functor*. This is the element that carries information about its combination with other constituents. The functor is an incomplete expression that receives as an *argument* an element that is chosen on the basis of its subcategorization information.

Based on the principles of categorial grammar, Ralli (1993) argues that in Greek inflectional morphology the root is a functor. The root, being underspecified for some feature values such as case and number, is the element that determines the constituent that it needs to be combined with in order to form a word. In the same line of thought, derivational suffixes are functors in derived constructions. According to Ralli's analysis, the functor percolates its characteristics up to the word by means of a Percolation principle similar to the one proposed by Selkirk (1982). Underspecified features of the functor-root are filled in by the argument.

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[7] Di Sciullo and Williams (1987) substitute the notion of head with that of *relativized head* (head_F), according to which the head of the word is the rightmost element marked for the feature F. This new notion of head permits the possibility that words could have two heads, a head_{F1} and a head_{F2}, where F1 and F2 are different features. In inflected structures, for instance, inflectional suffixes do not determine the syntactic category of the word. Consequently, the head of the grammatical class must be the root, while the inflectional suffix will still be the head of inflectional features such as case, number, and so on.

In the following diagram, for example, the root determines that the word will be a noun (of a particular class) and the rest of the information, namely number and case are filled in by the inflectional suffix. According to Ralli (1986), the gender is also determined by the root and not by the inflectional suffix. This is why, the *-os* class of nouns includes feminine nouns next to masculine nouns such as *oðós* ‘street’, *leofóros* ‘boulevard’, and so on.

(7) N: *fantáros*

syntactic category:	noun
gender:	masc
class:	2
case:	nominative
number:	singular

N_{root} Y_{suff}

	fantár-	-os
syntactic category:	noun	
gender:	masc	
class:	2	
case:	?	nom
number:	?	sg

We infer from the above discussion that inflectional suffixes cannot determine the distributional properties, argument structure, etc. of the word. For this reason, I assume that inflectional suffixes can never be heads in the intended sense. The ‘morphological determinant’, that is, the element that carries information about its combination with other elements and, moreover, determines the category of a construction, its class and gender, constitutes the ‘head of the word’. All the theories presented in the above paragraphs converge to the conclusion that the morphological determinant in inflectional constructions is the root.

I will not go into the similarities and differences of the morphological theories discussed here. Whether or not inflectional suffixes are arguments or non-heads, or even heads with respect to some other properties, is an interesting question which, unfortunately, falls outside the scope of the present study. The question whether the properties of individual morphemes percolate up to the word or are assigned by rules is also left open. To sum up, the root is the morphological determinant, the element that gives the morphosyntactic label to the whole word. Inflectional suffixes fill in other sorts of information.

4.4.2. Derivational suffixes and headedness

Derived words in languages with fusional morphology have the morphological structure: [Root+DerS+InflS]. In derivation the morphological constituent that intuitively 'dominates' its co-constituents and so 'determines' the category of the construction is the derivational suffix. Zwicky (1985:18) makes the sense of 'determination' more precise:

> "(t)he idea is that in some construct of category *Z* one of the constituents, of category *X*, is largely restricted to occurring within constructs of category *Z*, while its co-constituent, of category *Y*, occurs in constructs belonging to a number of categories in addition to *Z*. As a result, *Z* can be predicted on the basis of *X*, but not on the basis of *Y*."

To illustrate with an example, the derivational suffix -*ness* in English is the morphological determinant because it occurs only in noun constructions where it combines with adjectival bases e.g., *sad-ness*. On the contrary, the adjective *sad* occurs in verb constructions, *sadden,* adverbial constructions, *sadly,* and so on.

Note that in derivation the semantic argument is always the base rather than the suffix. The suffix is the functor that applies to the argument represented by the base. Zwicky notes that the relation between semantic functor and morphological determinant is a natural one. Morphological determination is the specification of the morphosyntactic properties of the word, whereas the semantic functor operates on the semantic argument to provide the interpretation of the word.

In Scalise (1986) a stronger claim is made. Derivational suffixes always change the syntactic category of their base. Even when a noun remains a noun such as in *man* < *manhood*, it is reasonable to assume that the suffix has changed the entire list of information attached to the base. The -*hood* in the aforementioned example, for instance, changes the features <-abstract>, <+countable>. According to Scalise there is no derivational rule that leaves unchanged both the lexical category and the features associated to the base.[8]

Based on these assumptions I argue that those derivational suffixes are heads that determine the morphosyntactic category of a word, the particular class or

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[8] Scalise (1988b) has also pointed out that a class of 'evaluative' suffixes in Italian is completely transparent. Suffixes like /-ino/, for example, systematically fail to determine syntactic category. When added to noun bases, it derives nouns (*tavolino* 'little table'), when added to adjectival bases, it derives adjectives (*giallino* 'yellowish'). Evidently, these suffixes do not qualify as heads. Category-neutral diminutive suffixes are attested in a variety of languages, including the Slavic languages (cf. the discussion in §4.14).

gender a word belongs to and, in general, the overall list of information that characterizes a word. Once again, I leave open the debatable issue of whether morphological determination belongs to the morphological constituent and percolates up to the word or it is assigned by the rule that performs the operation of combining a base and a derivational suffix.

4.5. Prosodic Compositionality and Head Dominance in Inflected Words

The Greek data in §4.3 suggested a particular ranking between the faithfulness requirements of roots and inflectional suffixes, namely $\text{F}{\small\text{AITH}}_{\text{R}}$ >> $\text{F}{\small\text{AITH}}_{\text{InflS}}$. It was pointed out, nevertheless, that this ranking is theoretically unjustified. McCarthy and Prince's (1995) metaconstraint on ranking is just a crosslinguistic observation that does not stem from any principled account of grammar. Moreover, it does not seem to hold true for the accentuation of derived words.

Instead, I propose that morphological 'headhood' provides the theoretical basis that sustains the ranking of prosodic faithfulness in Greek. It is the head accent that outweighs all other accents in a word and not just the accent of the root. Inflectional suffixes succumb to a constituent that is much stronger and important in the morphological structure, namely the root. But even roots succumb to the accentual properties of a constituent that is structurally stronger than them. In derived formatives a derivational suffix wins out accents stemming from other elements of the word.[9] Only within a compositional grammar, a grammar that establishes an interaction between the prosodic and morphological component through one and the same structure, is expected morphological headedness to influence stress.

In conclusion, the segregation of root and inflectional suffix faithfulness and in particular high ranking of root faithfulness emanates from the theory of head dominance: stress prominence is assigned to the morphological head of the word. According to what has been claimed in §4.4.1, the root has a head-role in the internal structure of an inflected word.

The theory of head dominance also equips the grammar with a particular type of interface constraints, namely the head constraints: HEADFAITH and HEADSTRESS (repeated from chapters 1 and 2):

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[9] Ralli (1988) first proposed for Greek that roots (and derivational suffixes) determine word stress.

(8) *head constraints*

a. HEADFAITH(LA)
A lexical accent sponsored by a head in S_1 (input) has a correspondent in S_2 (output) (HEADMAX(LA)).

A lexical accent hosted by a head in S_2 (output) has a correspondent in S_1 (input) (HEADDEP(LA)).

b. HEADSTRESS
Morphological heads are stressed.

Formally, head dominance is stated as a type of 'positional faithfulness ranking' in which faithfulness pertaining to morphological headedness outranks simple faithfulness. Under the proposed theory of prosody-morphology interface, the constraint ranking in (3) is annotated as (9).

(9) *head dominance in inflected words*
HEADFAITH >> FAITH

The ranking in (9) constitutes the heart of head-dependent systems.[10] It is evident that the two faithfulness constraints are not necessarily ranked with each other. In Greek their conflict is established by intervening constraints.

The tableaux in (10) and (11) illustrate some applications of head dominance. The tableau in (10) demonstrates the accentuation of the word *stafíðon* 'raisin-GEN.pl' which is composed of two accented morphemes. The tableau in (11) shows the accentuation of the word *uranú* 'sky-GEN.sg' which contains an unaccentable root and a pre-accenting inflectional ending.

To avoid unnecessary complexity, I do not include word-form and other structural constraints in the tableaux. The reader should keep in mind that in inflected constructions word-form constraints (HIERAL) dominate faithfulness to the position of the lexical accent (*FLOP) as well as the constraint that urges

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[10] Recall from Chapter 1 that there are more systems that show dependence on morphological headedness. Not all of them, however, have lexical accents (e.g., Yupik, Kobon, Chukchee) and neither do all allow the inherent accents of other constituents to emerge (e.g., Tahltan and Thompson Salish). For example, in Kobon, heads are obligatorily stressed and in Tahltan heads from all constituents exhibit lexical contrasts. In all these systems the head is the dominant constituent in a given formation and this is reflected in prosody either by having head faithfulness superseding other faithfulness constraints (HEADFAITH >> other constraints) or by ensuring that heads will always be stressed (HEADSTRESS >> other constraints).

floating accents to neighboring morphemes (*DOMAIN). ER-R, the constraint responsible for the trisyllabic window in Greek is top-ranked.

(10)

input: sta(fið-, -(on	HEADFAITH(HEAD)	FAITH(HEAD)
☞ a. sta(fíðon)		*
b. (stafi)(ðón)	*!	*

Both (10a) and (10b) preserve a lexical accent. The former output preserves the accent of the root/head, whereas the latter preserves the accent of the inflection. Candidate (10b) has no other choice but to fail; it fatally violates HEADFAITH. The inherent properties of the suffix are respected, but this is useless given the proposed ranking. Notice that the losing form scores one violation of simple faithfulness. This is because faithfulness evaluates input accents that are lost in the output irrespective of whether they belong to a head or not. Candidate (10a) respects head-faithfulness and obviously wins. The single violation of faithfulness caused by the deletion of the suffixal accent is minor. The form satisfies the most important constraint.

The tableau in (11) manifests the dominance of the root/head. The floating accent of the root is realized on the suffix in compliance with *DOMAIN.[11] The insertion of the floating root-accent to the suffix triggers a double violation of faithfulness. First, the inflectional suffix loses its weak accent and, second, the strong accent of the root is added to it.[12]

(11)

input: * uran-, -u)	HEADFAITH (HEAD)	*FLOP	*DOMAIN	FAITH(HEAD/ TAIL)
* ☞ | a. (ura)(nu)				**
* . | | b. u(ranu)			*!	

---

[11] Recall from Chapter 3 that this constraint is ranked lower than HIERAL; there are no four-syllable words with final stress originating from unaccentable roots.

[12] Violation of suffix-tailness for the sake of *DOMAIN clearly shows that both DEP(HEAD) and MAX(TAIL) are under the spell of this constraint.

Note that the winning candidate (10a) does not violate *FLOP because the vocalic peak /u/ is not in correspondence with the weak accent it lexically introduces. Faithfulness to association lines must be respected only when the vocalic peak and the lexical accent stand in correspondence.

Under the light of the new facts, the Greek grammar for inflected words ranks faithfulness to the lexical accent of the root/head above other prosodic faithfulness constraints. The ranking introduced in Chapter 3 takes its final shape in (12). The accompanying examples refer to crucial rankings.

(12) *ranking for the accentuation of inflected words with lexical accents*

TROCHEE, ER-R,
HEADFAITH(HEAD)
|
HIERAL
|
*FLOP
|
*DOMAIN
|
FAITH(HEAD/TAIL)
|
FTBIN
|
PARSE-σ

- HEADFAITH(HEAD) >> FAITH(HEAD/TAIL) stafíðon (10)
- HEADFAITH(HEAD) >> *DOMAIN >> FAITH(HEAD/TAIL) uranú (11)

Prosodic faithfulness and structural constraints take charge of accentuation only when the head of the word is unmarked. Heads are not obligatorily stressed. This is the reason for calling languages like Greek head-dependent systems with lexical accents.

A welcome result of head dominance is the accentual stability within the paradigm. If marked heads prevail, inflected words with marked roots have immobile stress as opposed to words of unmarked heads which display accentual alternations. Compare the following paradigms:

(13) *paradigm of masculine and feminine nouns*

a.	NOM.sg	ánθropos	klívanos	fantáros	uranós
	GEN.sg	anθrópu	klívanu	fantáru	uranú
	NOM.pl	ánθropi	klívani	fantári	uraní
	GEN.pl	anθrópon	klívanon	fantáron	uranón
	ACC.pl	anθrópus	klívanus	fantárus	uranús
b.	NOM.sg	θálasa	γónðola	stafiða	aγorá
	GEN.sg	θálasas	γónðolas	stafíða	aγorás
	NOM.pl	θálases	γónðoles	stafíðes	aγorés
	GEN.pl	θalasón	γónðolon	stafíðon	aγorón

It is evident that the paradigms of the leftmost column in (13a) and (13b) are mobile. Every time the unmarked root /anθrop-/ or /θalas-/ combines with a pre-accenting or an accented suffix, stress shifts from the default antepenultimate position to the position determined by the suffix; that is, the penultimate and ultimate, respectively. On the other hand, words with a marked root display accentual stability. We conclude that the learner has to memorize one position of stress for the latter type of words but two (e.g., *ánθropos* (NOM.sg), *anθrópu* (GEN.sg) 'man'), or even three positions of stress (e.g., *éðafos* (NOM.sg), *eðáfus* (GEN.sg), *eðafón* (GEN.pl) 'ground') for the former type of words.

Another important aspect of head dominance is that prosodic structure provides cues for the morphological organization of the word and not for word boundaries, as is the case in fixed-stress systems. There is a one-to-one correspondence between prominence and headedness, the only condition being that the dominant constituent bears an accent. Marking is not an impediment to learnability. Morphemes are equipped with pieces of metrical information learned as part of their subcategorization matrix. Moreover, we have seen that languages find ways to control the freedom of marking.

Given that only by means of marking morphological heads can reflect to prosody, one would expect elements that are (or can be) heads to have inherent marking properties. Marking cannot really be functional for non-heads when conflicts arise. The statistics presented in Chapter 3 show that indeed most roots have inherent accentual properties and moreover, inflectional suffixes tend to be unmarked or marked with weak accents (i.e. tails). The theory of head dominance cannot provide a formal account of these facts but at least intuitively elevates a correlation between heads and marking. This intuition is also strongly supported by the accentuation of derived words, as I will show later. Unmarked words stressed by the default constraints lack this interlevel transparency. Perhaps this is one of the reasons that make them less favored and marginal in the system. Undoubtedly, the head-oriented aspect of the system is more forceful than the fixed-stress subsystem. It remains to be seen whether the language can provide extra evidence for this hypothesis.

To conclude, there are many reasons that render compositionality and head dominance invaluable in interface systems in general and in Greek in particular. Among other things, it enhances the predictable aspects of lexical accent systems and verifies the presence of systematicity in the organization of their prosodic structure. The prediction borne out by the analysis here is that prosodic structure exhibits similar behavior with derived words because the derivational suffix is the head constituent in complex morphological constructions. Moreover, our theory predicts that prosody can be sensitive to any kind of morphological mode of combination.[13] The Salish languages in Chapter 5 meet this prediction. These languages show that prosodic structure is indeed sensitive to several morphological modes of combination that characterize polysynthetic languages (e.g., head-specifier relation, incorporation, compounding, etc.).

4.6. Derived Words: The Facts

The central theme of this section is the accentual behavior of derived words. As already mentioned, derived words in Greek have the shape: [Root + DerS + InflS]. Derivation is recursive; often a number of derivational suffixes are concatenated to the root. Consequently, elaborate structures emerge when all morphemes in the string bear inherent accentual properties.

In §4.6, I introduce the basic facts of Greek derivational morphology. In §4.7, I account for these facts using first, Kiparsky's (1982) model of Lexical Phonology which views dominance as a property of ordered strata and, second, Halle and Vergnaud's (1987) approach which accounts for dominance effects by means of cyclic and non-cyclic strata. The conclusion of the discussion in §4.7

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[13] Head dominance holds for compounds and prefixed formations in Greek (Revithiadou 1995). According to Ralli (p.c.) the negation prefix /a(n)-/ has two structural roles. First, there is a prefix *a(n)-* that changes the syntactic category, class, gender of the base, e.g. *átixos* 'unlucky (adjective)' > *tix-i* 'luck (noun, fem)'. Second, there is a prefix /a(n)-/ that does not change the syntactic category or class of the base, e.g. *analiθís* 'untrue (adjective)' > *aliθís* 'true (adjective)'. We assert that when the prefix /a-/ is a head, it attracts stress but when it is not a head, it is stress neutral. Similarly, in (non-synthetic) compounds the head constituent of the construction is always stressed, e.g. *paljopórta* 'lousy door' (> *pórta* 'door'), *lemonoðásos* 'lemon forest' (> *ðásos* 'forest') (Revithiadou 1997d).

is that neither of these analyses can capture the essential qualities of Greek stress in a satisfactory way. An alternative account based on the theory of head dominance is proposed in §4.8.

The data is organized into three groups depending on whether word stress is stable on the derivational suffix (14), the root or the inflectional suffix (15), or whether stress is mobile, alternating between the root and the inflectional suffix (16). In each case all possible accentual combinations are given. The derivational suffix is combined with bases and inflectional suffixes of various accentual patterns. For the moment, I leave the accentual properties of derivational suffixes, if any, unspecified. The examples listed here cover the most important aspects of stress in derivational morphology.[14]

The examples in (14) illustrate words derived with the diminutive/ pejorative suffix /-ak(-os)/.[15] The markedness properties of the base-root vary; the root is either unmarked (14a), or accented on the last syllable (14b), or unaccentable (14c). Moreover, the forms are given in the genitive singular which, as we know by now, has a weak accent. This results in highly elaborate structures such as the one in (14b) in which two constituents both equipped with foot-heads are competing for primary stress. The foot-tail accent of the inflection is at odds with the foot-head specification of the root. In all three cases, stress is on the derivational suffix.

(14) *variable root + AccDerS + Pre-Acc InflS* (GEN.sg)

	base		*derived word*	
a.	ágel-os	‘angel’	ageláku	‘little angel’
b.	papa(γal-os	‘parrot’	papaγaláku	‘little parrot’
c.	misθ-ós	‘salary’	misθáku	‘small salary’

The derivational suffix /-in(-os)/ in (15) forms qualitative adjectives from nouns. The examples in (15) are interesting for two reasons; first, in (15a-c) stress is located on the antepenultimate syllable irrespective of the accentual properties of the base-root. For example, in (15c) stress is on the root despite

---

[14] There is a handful of suffixes whose stress is dependent on the prosodic shape of the base. Such suffixes are stressed after a disyllabic root but are unstressed after a monosyllabic root. For example, *kléf-tis* ‘thief’ but *ðikas-tís* ‘judge’. I assume that the accentual behavior of such suffixes is dependent on morphological factors of a different nature than the ones we focus on in the present study. I refer the interested reader to Drachman, Kager and Malikouti−Drachman (1997) for prosodic morphology phenomena in Greek.

[15] This suffix is a head because either it changes the noun class of the base it belongs to, e.g. *fitit-ís* ‘student’ > *fititákos* ‘poor student’, or the syntactic category of the base, e.g. *tebél-is* (adjective) ‘lazy’, *tebelákos* (noun) ‘little lazy (boy)’.

the fact that the morpheme is unaccentable. Second, the examples in (15d-e) show that stress alternates between the antepenultimate and ultimate syllable.

(15) *variable root + DerS + UnMark InflS*

	base		derived word	
a.	γíps-os	‘plaster’	γípsinos	‘of plaster’
b.	sa(niδ-a	‘plank’	saníδinos	‘of plank’
c.	pil-ós	‘clay’	pílinos	‘of clay’
d.	ánθrop-os	‘man’	anθrópinos	
			anθropinós	‘human’
e.	a(er-as	‘air’	aérinos	
			aerinós	‘of air’

The third group of examples is given in (16). The derivational suffixes /-tor(-as)/ and /-si/ derive nouns from verbs. As mentioned in earlier parts of the thesis, verbal roots lack inherent accentual properties. Stress is on the antepenultimate syllable when the inflectional suffix is unmarked and on the penultimate when the inflectional suffix is pre-accenting. Unfortunately, most suffixes of this sort combine either with verbal bases which in Greek are unmarked, or they are less productive and lack the crucial examples.

(16) *UnMark root + DerS + UnMark/Pre-Acc InflS*

	base			derived form		
a.	prat-o)	> práto	‘do’	práktor-as	(NOM.sg)	‘agent’
				praktór-on	(GEN.pl)	
b.	kin-(o	> kinó	‘move’	kínis-i	(NOM.sg)	‘movement’
				kinís-is	(NOM.pl)	

Having presented the general picture of stress in derived words, the question now is how can we account for the stress variability in the above three groups? To begin with, we have to assume that derivational suffixes must have inherent accentual properties. Otherwise, it is hard to explain why stress lands on the penultimate in (14) but on the antepenultimate or ultimate syllable in (15). In addition, we need to account for the antepenultimate stress in examples like (15c), where the unaccentable root is eventually stressed. The examples in (15) are interesting for another reason. The forms (15d) and (15e) display accentual allomorphy. This is a phenomenon that the theory needs to account for in some way. Finally, an accentual analysis of derived formatives has to account for the stress-shifts in (16).

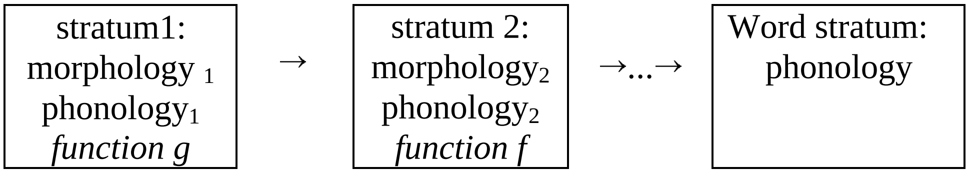
These questions are addressed in the following sections. In §4.7, I present two accounts of the described facts. The first account is based on Kiparsky's (1982) analysis of Vedic accent proposed within the framework of Lexical Phonology. The second analysis is based on Halle and Vergnaud's (1987) approach to capturing dominance effects in lexical accent systems by means of a cyclic/non-cyclic distinction of suffixes. Both approaches will prove to be problematic in some respects and, moreover, be of less explanatory power compared to the alternative analysis introduced in §4.8.

4.7. Dominance as Ordered Stratum and Cyclicity

4.7.1. Dominance as ordered stratum

In the standard model of stratum ordering in Lexical Phonology, developed primarily by Kiparsky (1982) and Mohanan (1982, 1986), the lexical component is divided into a number of ordered strata, each the domain of certain morphological and phonological processes:

(17)



This model is proposed by Kiparsky (1982) in his analysis of dominant and non-dominant suffixes in Sanskrit. According to the author, dominance in Sanskrit is a property of stratum 1, the stratum of derivation, and not of stratum 2 where inflection takes place.

All derivational suffixes are 'dominant'. This means that the function *g* that performs the mapping of the morphological domain in stratum 1 into a prosodic one, deletes the accent of the base and assigns prominence to the suffix itself, if it is accented (18a) or, to the initial syllable by the language particular default algorithm (18b), if the suffix lacks an inherent accent.

The function *f* that performs the mapping of a morphological domain into a prosodic domain in stratum 2 assigns prominence either to the leftmost accent of the word (18c) or the leftmost vocalic peak (18d). Function *f* cannot change the prosodic shape of the word when stratum 1 suffixes are present in (18b). Suffixes that belong to stratum 2 are non-dominant and Kiparsky calls them 'recessive'. In (18) dominant suffixes are in boldface and inherently accented morphemes are represented with an accent in the underlying forms.

(18) *stratum 1: dominant suffixes*

Acc root + Acc DerS + Acc InflS

a. rathíne /ráth-**ín**-é/ 'charioteer (DAT.sg)'

Acc root + Acc DerS + UnMark DerS + UnMark InflS

b. cíkaːrayisati /ci-kaːr-áy-**isa**-ti/ 'wants to cause to make'

stratum 2: non-dominant ('recessive') suffixes

c. marúte /marút-é/ 'wind-DAT'

d. tákṣat /takṣ-at/ 'fashioning'

The appealing generalization invoked by the ordered strata approach is that non-dominant suffixes must always follow dominant ones but not vice versa. Inkelas (1996) mentions a number of theoretical problems that such an approach invokes. The most important objection is that the stratum approach does not hold for all languages. As we will see later, dominance in Russian does not correlate with order. Suffixes with similar phonological function and ordering properties differ with regard to whether they are dominant or not. The Greek derivational data also support this criticism. The following explains why:

Assume for the moment that Greek grammar is organized in a similar fashion. That is, dominant suffixes occupy stratum 1 and non-dominant ones stratum 2. Suffixes such as /-ak(-os)/ are then categorized as dominantly accented because they wipe out the accent of the base and impose their own stress. Similarly, suffixes like /-in(-os)/ are also classified as dominant unmarked suffixes. Such suffixes delete any other accent present but, being unmarked themselves, they trigger the default algorithm.

However, problems arise when we start thinking about the classification of suffixes like /-tor(-as)/ in (16) that belong to the third group. This suffix cannot be categorized as stratum 1 because it is not dominant. The non-dominant status of the suffix is established by the fact that the inflectional suffix, if marked, takes over accentuation, e.g. *prák-tor-as* (NOM.sg), *prak-tór-on* (GEN.pl) 'agent'. In this example, stress shifts from the antepenultimate syllable to the penultimate one due to the pre-accenting genitive suffix /-on/. Since the derivational suffix cannot influence stress, we conclude that it must be unmarked but non-dominant. It is classified as stratum 2 together with the inflectional suffixes. A word with a stratum 2 suffix is stressed either on the accent of the inflectional suffix, or by default on the antepenultimate syllable.

Unfortunately, this solution creates more problems than it solves. Often words derived with this recessive suffix are further expanded with a dominant (stratum 1) derivational suffix such as the suffix /-í(-o)/, e.g. *prak-tor-í-o* 'agency'. This suffix is dominant and accented because it deletes the stress of the base and imposes penultimate stress. Examples like the aforementioned one destroy the generalization that recessive suffixes (stratum 2) are never followed by dominant ones (stratum 1). We conclude, therefore, that an ordered stratum approach is not the best way to account for the accentual phenomena in Greek.

4.7.2. Dominance as cyclicity

Similar problems in Russian and Sanskrit led Halle and Vergnaud (1987) and Halle and Kenstowicz (1991) to propose that dominance is the direct consequence of cyclicity. Words are fully constructed by morphology and then interpreted by phonology which is itself modular, consisting of a cyclic and a non-cyclic stratum. Rules in the cyclic stratum apply to stress domains created by those suffixes identified in the morphology as being cyclic. In addition, cyclic rules apply to these domains according to the order morphology inserted in the corresponding suffixes. Rules of the non-cyclic stratum apply once to the entire word.

Cyclic suffixes differ from non-cyclic ones in that they do not belong to the same plane of representation as the base to which they are attached. In order for cyclic suffixes to interact with their bases, material from the base must be copied onto the plane of the suffix, but stress is not copied because of the *Stress Erasure Convention*:

(19) *Stress Erasure Convention*

> In the input to the rules of cyclic strata information about stress generated on previous passes through the cyclic rules is carried over only if the affixed constituent is itself a domain for the cyclic stress rules. If the affixed constituent is not a domain for the cyclic stress rules, information about stresses assigned on previous passes is erased.
>
> (Halle and Vergnaud 1987:83)

As a result, cyclic suffixes are dominant because they are not by themselves domains for the cyclic stress rules, whereas non-dominant suffixes are non-cyclic. The cyclic/non-cyclic distinction seems to solve the ordering paradox witnessed in examples like *práktoras* ‘agent’, *praktorío* ‘agency’. However, it does encounter other problems.

Inkelas (1996) points out that the cyclic theory lacks explanatory force. In most cases analyzed using this method, the cyclic stratum exists for the sole purpose of achieving dominance effects. She agrees that there is plenty of evidence for cyclicity in other phonological phenomena beyond stress; however, this particular innovation of cyclicity to achieve dominance appears to be unmotivated (Inkelas 1996:143). It does not follow from general principles that only accentual prominence should fail to be copied onto the plane of the cyclic suffix. Moreover, Russian provides a strong empirical objection to the theory since in this language dominance, that is, the property of some suffixes to delete the accent of the base and impose their own accent or the default stress,[16] seems to be shared by cyclic as well as non-cyclic suffixes. Thus, dominance is not the result of cyclicity but a diacritic that some suffixes (cyclic or not) are lexically specified with. I postpone a detailed discussion on this issue till later in this chapter.

With respect to Greek, the theory is equally problematic. Before reviewing the weak parts of the theory, I will first give a brief picture of how the theory applies to the data described in (14-16). Suffixes like /-ák(-os)/ and /-in(-os)/ are cyclic accented and unmarked, respectively. This means that both erase the stress of the base because they are not themselves domains to cyclic stress rules. However, the former, being accented, is stressed (20a) but the latter invokes the default stress rule[17], which is antepenultimate stress for Greek (20b). Function *g* is associated with the cyclic component of grammar.

Suffixes of the type /-tor(-as)/ are unmarked but non-cyclic. Thus, the default accentuation applies to stress the string when all morphemes are unmarked (20c). In the presence of a marked inflectional suffix, the marking property of the inflection prevails. Finally, all inflectional suffixes (marked and unmarked) belong to the non-cyclic level. Function *f* is associated with the non-cyclic level of grammar.

(20)	*cyclic accented derivational suffix*			
	a.	papaɣalákos	/papaɣál-ák-os/	‘small parrot’
	cyclic unmarked derivational suffix			
	b.	pílinos	/pil-in-os/	‘of clay’
	non-cyclic unmarked derivational suffix			
	c.	práktoras	/prak-tor-as/	‘agent (NOM.sg)’
	(cf.	praktóron	/prak-tor-on)/	‘agent (GEN.pl)’)
	non-cyclic marked inflectional suffix			
	d.	stafíðon	/stafíð-ón/	‘raisin (GEN.pl)’

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[16] Neither the ordered stratum approach nor the cyclic theory spell out the formal details of deaccenting suffixes, that is, suffixes that are dominant because they delete the accent of the base but unmarked because they impose the default stress.

[17] It is irrelevant whether the default is assigned by rules or emerges from constraint interaction.

A natural question brought up by this analysis is why are only unmarked derivational suffixes non-cyclic in Greek? In this model, inflectional suffixes are also non-cyclic but there are accented inflectional suffixes (20d) in the language. One can assume that there can be a derivational suffix that does not erase the stress of the root but, nevertheless, is stressed when the root is unmarked. This suffix would not win over the accent of the root but it would win over the accent of the inflectional suffix: σσ + σ̲́ +σ́ > σσσ́σ. The absence of these suffixes remains a question under this model.

To summarize, the models just reviewed distinguish two levels in grammar. Different functions, not necessarily related to each other (Orgun 1996), are associated with morphological domains that belong to different strata (levels) of grammar. However, both the ordered strata and the cyclic approach cannot satisfactorily account for the Greek stress facts. Treating dominance as a property of ordered strata is problematic for Greek. The facts clearly show that dominant suffixes can be preceded by non-dominant ones, in this way stamping out the fundamental generalization of the theory that stratum 1 suffixes are always followed by stratum 2 suffixes. A cyclic approach to dominance proves to be equally unsuccessful since it leaves the absence of non-cyclic suffixes unexplained.

An alternative analysis provided within the framework of a compositional organization of grammatical components is given in the following section. In the model advanced here a different route is taken. I argue that it is not necessary to motivate cyclic and non-cyclic strata with independent functions in order to derive the correct stress result. There is one function 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. Compositionality allows the prosodic component to scan the morphological tree, detect the established hierarchical relations and translate them into prosody. In this procedure lexical accents guide the mapping. 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. It derives dominance effects by means of a simple ranking, namely HEADFAITH >> FAITH, without assuming different levels or cyclic/non-cyclic groupings of suffixes. More importantly, it has more explanatory power. It accounts for stress variation and the absence of marked derivational suffixes which lack dominance effects. Marked derivational suffixes which comply to the definition of headedness are always dominant.

4.8. Prosodic Compositionality and Head Dominance in Derived Words

4.8.1. Accented derivational suffixes

Let us start with the examples in (14) repeated here as (21). I enrich the list with some additional examples in (22) involving the suffix /-áð(-a)/ which derives nouns from nominal and adjectival bases. The leftmost column presents all combined morphemes with their inherent properties and the rightmost column the surface form. The derivational suffix in (21) is accented. Moreover, the suffix is dominant; all three examples lead to this conclusion. Regardless of the marking specification of the root or the inflectional ending, stress is on the derivational suffix. The suffix in (22) is also accented for exactly the same reasons. There is no doubt that this suffix is dominant; its accent prevails over the accent of the root and the accent of the inflection.

(21) *variable root + Acc DerS + Pre-Acc InflS* (GEN.sg)

	combined morphemes	derived word	
a.	agel-(ak-u)	ageláku	'little angel'
b.	papa(γal-(ak-u)	papaγaláku	'little parrot'
c.	misθ-(ak-u)	misθáku	'small salary'

variable root + Acc DerS + Acc InflS (GEN.pl)

	combined morphemes[18]	derived word	
d.	vark-(að-(on	varkáðon	'boating'
e.	ro(mándz-(að-(on	romandzáðon	'romance'
f.	zoir-(að-(on	zoiráðon	'vividness'

The derivational data in (21) shows that morphological heads are assigned stress prominence, supporting the claim once again that morphological headedness determines prosodic headedness.[19] Head dominance is expressed as top-ranking of a head-constraint, namely HEADFAITH:

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[18] *várka* 'boat (fem)', *romádzo* 'romance (neut)', *zoirós, -í, -ó* 'vivid'.

[19] Van der Hulst (1981), following Hoekstra, Van der Hulst and Moortgat (1980), proposes a similar analysis for some aspects of derivational morphology in Dutch. According to his proposal, the prosodic shape of the word *koningín* 'queen' is determined by the prosodic shape of the accented derivational suffix /-ín/ which is the head in the morphological tree of the word.

(22) *head dominance in derived words*
HEADFAITH >> FAITH

Unfortunately, derivational morphology does not provide direct evidence for the ranking of these two constraints. The effects of (22) are straightforwardly illustrated in tableau (23) which presents the accentuation of the word *romandzáðon* 'romance (GEN.pl)'. The derivational suffix is marked with a strong lexical accent which is realized in a trochaic language like Greek as a foot-head (HEADFAITH(HEAD)). Similarly, the root as well as the inflectional suffix are marked with a foot-head on some syllable. The accent of the derivational suffix conflicts with the accent of the root and the accent of the inflection. For the sake of simplicity I omit structural constraints (ER-R, FTBIN, PARSE-σ, etc.)[20] from the tableau. Keep in mind that faithfulness to the position of a lexical accent, namely *FLOP, dominates *DOMAIN: linked accents are realized locally.

If our assumptions that morphological headedness determines stress prominence are correct, then we expect the accent of the derivational suffix to prevail. The tableau in (23) confirms our expectations.

(23)

input: ro(mandz-, -(að-, -(on	HEADFAITH(HEAD)	FAITH(HEAD)
☞ a. (roman)(dzáðon)		**
b. ro(mándza)ðon	*!	**
c. ro(mandza)(ðón)	*!	**

The candidate that verifies high ranking of HEADFAITH is (23a). This candidate wins the competition because it satisfies faithfulness to the lexical accent of the derivational suffix/head. The fact that it incurs two violations of faithfulness is insignificant for its evaluation. On the contrary, the remaining candidates violate the most important constraint and are doomed to fail.

---

[20] It must be noted that the same structural constraints apply in derived words as well as in inflected words (cf. Chapter 3) in an unaltered domination order. This means that TROCHEE and ER-R are high ranked whereas foot-form constraints such as FTBIN and PARSE-σ are ranked below faithfulness constraints. Word-form constraints, however, like HIERAL seem to be out of play in derivation because derived words are often longer than four syllables. Consequently, it is impossible to build templatic prosodic structures on material that is not morphologically templatic. Moreover, even in small sized structures it is hard to detect the effects of HIERAL since priority is given to head faithfulness.

An important outcome of the proposed analysis is that it induces dominant effects from marking. Only marked heads have the power to impose their own accentual pattern to the word. Stress-neutral heads are always unmarked (cf. §4.8.3.). More importantly, the theory of head dominance explains the absence of marked derivational suffixes that belong to stratum 2. Greek is deprived of stress-neutral derivational suffixes (with an accent) because all derivational suffixes are heads and, therefore, dominant.

4.8.2. Unaccentable derivational suffixes

The second group of examples is more interesting because it includes forms that have accentual allomorphs. For convenience of exposition, I repeat the data in (15) as (24). The reason that I group together examples with antepenultimate stress ending in /-in(-os)/, and examples with ultimate stress ending in /-ik(-os)/, will become clear later.

In (24a-c) stress is on the antepenultimate syllable irrespective of the accentual properties of the root. For instance, in (24c) the root bears an accent even though it is unaccentable. Similarly, in (24d-f) stress is on the final syllable suggesting once again that the marking preference of the root is not important. In short, stress seems to be controlled by the derivational suffix.

(24) *variable root + UnAcc DerS + UnMark InflS*

	base		derived word	
a.	γíps-os	‘plaster’	γípsinos	‘of plaster’
b.	sa(nið-a	‘plank’	saníðinos	‘of plank’
c.	pil-ós	‘clay’	pílinos	‘of clay’
d.	γál-os	‘Frenchman’	γalikós	‘French’
e.	porto(γal-os	‘Portuguese’	portoγalikós	‘Portuguese’
f.	elvet-ós	‘Swiss’	elvetikós	‘Swiss’

In Chapter 3, I argued that next to accented morphemes there is another marked variety, namely unaccentable morphemes. Such morphemes introduce a floating accent which is realized in another morphological domain. Theoretically, the floating accent of unaccentable roots can be located at either of the two edges of the word. The left edge option, however, is excluded mainly because of the window limitation. A prefix that hosts stress usually violates the trisyllabic window, e.g. $*\acute{\sigma}_{Pref}\text{-}\sigma\sigma_{R}\text{-}\sigma_{Suff}$. Moreover, most prefixes in Greek usually fall outside the scope of the prosodic word.[21] Consequently, in inflected words an unaccentable root forces its inherent accent to the inflectional ending, the only stressable element in the word.

In the same spirit, one can argue that there are unaccentable derivational suffixes as well. Such suffixes assign their accent to segmental material outside their domain just like their root counterparts. Unlike roots, however, unaccentable derivational suffixes are surrounded by morphemes that are included in the prosodic word and can bear stress without disrespecting trisyllabic boundedness. Their floating foot-head[22] can land onto the root or the inflectional suffix. This implies that two positions can be eligible for stress: the antepenultimate and the ultimate one. it is precisely this prediction which is borne out by the data in (24). There is a group of suffixes whose accent resides at their left and another group of suffixes whose accent resides at their right. It is obvious that Greek exploits both positions. Moreover, there are a few examples of accentual variation. Often both eligible positions harbor a floating accent resulting in forms like the ones in (25).

(25) *accentual variation*

a.	ánθrop-os	‘man’	anθrópinos anθropinós	‘human’
b.	kréa-s	‘meat’	kreátinos kreatinós	‘of meat’
c.	a(er-as		aérinos aerinós	‘aerial’
d.	túrk-os	‘Turk’	túrkikos turkikós	‘Turkish’
e.	vúlγar-os	‘Bulgarian’	vulγárikos vulγarikós	‘Bulgarian’

I propose that the suffixes /-ik(-os)/ and /-in(-os)/ sponsor a floating accent whose landing position is determined by an alignment constraint.[23]

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[21] However, the prefixes that are included in the prosodic word show accentual allomorphs when they are combined with unaccentable bases, *anástrofi* and *anastrofí* ‘reversion’, *epímiktos* and *epimiktós* ‘intermingled’.

[22] The question of whether Greek has floating foot-tails or not is addressed in Chapter 2.

[23] The suffix /-in(-os)/ has a counterpart with final stress, *fθinoporinós* ‘of autumn’ and the suffix /-ik(-os)/ has a counterpart with antepenultimate stress, e.g. *γíftikos* ‘of gypsy’. Both suffixes have different semantic denotations than the suffixes discussed here.

(26) *unaccentable DerS with a preference for a specific edge*
- a. -inos: ALIGN-L (Align LA, PrW, L)[24]
- b. -ikos: ALIGN-R (Align LA, PrW, R)

The tableaux (27) and (28) illustrate the derivation of the words *γípsinos* ‘of plaster’ and *γalikós* ‘French’, respectively. In the first tableau, the floating accent of the derivational suffix/head is realized on the root in violation of the inherent accentedness or unaccentedness of the respective constituent. There is no evidence for the ranking between HEADFAITH and ALIGN-L. We know, however, from forms like *romandzáða* ‘romance’ that *FLOP is ranked above ALIGN-L (or ALIGN-R), otherwise associated accents would have moved to the left (or right) edge of the word.

(27)

input: * γips-,-in-,-os	HEADFAITH(HEAD)	ALIGN-L
* ☞ / a. (γipsi)nos		
* \\ b. γipsi(nos)		*!*
* │ c. γi(psinos)		*!

The decision primarily relies on ALIGN-L. Notice that even the optimal output incurs one violation of alignment but this is forced by the three-syllable window limitation of the language.

Let us now examine the tableau in (28) which gives priority to right alignment.

---

[24] Imagine there is a language like Greek without the window limitation and default leftmost prominence. In such a language, suffixes like /-in(-os)/ would have the power to deaccent marked morphemes by sweeping all accents of the string off and impose initial accent. This is shown by the following hypothetical example: /sa(nið-in-os/ < *sániðinos*. In other words, deaccentuation is triggered by a dominant morpheme with an unlinked accent and a structural constraint that defines the landing position of the accent in question.

(28)

input: * γal-,-ik-, -os	HEADFAITH(HEAD)	ALIGN-R
* ☞ \ a. γali(kos)		
* / b. (γali)kos		**!
* | c. γa(likos)		*!

This tableau is the mirror image of (27). The candidate that best satisfies ALIGN-R prevails over the others because it best satisfies ALIGN-R.

Variation arises when an unaccentable head exploits both edges of the word as landing positions for its floating accent. Often the byproducts of variation are exploited by grammar. Different grammatical functions are allotted to each accentual allomorph (Anttila 1995). This situation is also witnessed in Greek. Words in /-ik(-os)/ with antepenultimate stress sound less conformistic than words with final stress, thus they occur in different environments. For example, if someone wants to refer to Turkish objects in every-day life like coffee the form used will be with antepenultimate stress, *túrkikos kafés*. In formal speech, however, the allomorph with final stress will be used instead, e.g *turkikí politikí* 'Turkish politics'. Similarly, words with antepenultimate stress in /-in(-os)/ acquire metaphoric extensions as opposed to the ones with final stress (Anastasiadi 1997).

Before bringing this discussion to a close, I would like to address another issue. One might think that unaccentable derivational suffixes raise a problem for the theory of head dominance. The constituent to the left or right side of the suffix is assigned prominence and not the head itself. In consequence, the head of the prosodic word does not exactly coincide with the head of the morphological word. This is not correct, however, because prominence originates from the derivational suffix. It is always the inherent preference of the derivational suffix that prevails outranking accentual properties that other constituents of the word might have. And under this interpretation head dominance does hold. In addition, recall from Chapter 2 that unaccentability is a less transparent marking pattern because it signifies the borders of the sponsoring morpheme by demarcating the borders of neighboring domains.

I close this section with some examples of recursive derivation. In recursive constructions, the rightmost derivational suffix/head determines prosodic headedness. This is illustrated in (29):

(29) *words with two derivational suffixes*

a.	prak-tor-**í**-o	‘agency’	<	prát-o, prák-tor-as
b.	man-ul-**íts**-a	‘my dear mother’	<	mán-a, man-úl-a
c.	poð-ar-**úkl**-a	‘very big foot’	<	póð-i, poð-ár-a

4.8.3. Unmarked derivational suffixes

The final group of examples involves accentless derivational suffixes. These are the suffixes that in previous analyses have been labeled non-cyclic. In our model these suffixes are just devoid of marking properties. When unmarked, the dominant element is not armed with any prosodic structure, and therefore it cannot participate in the conflict for primary stress. Consequently, other principles must be responsible for accentuation.

Unmarked derivational suffixes mostly derive nouns from verbal roots which are devoid of inherent accentual properties. Therefore, usually the default accentuation takes over assigning primary stress to the antepenultimate syllable (30a). The inflectional suffix wins over default, if it is marked (30b).

(30) *UnMark root + UnMark DerS + UnMark/Pre-Acc InflS*

base				derived form	
prat-o)	>	práto	‘do’	a. práktor-as (NOM.sg)	‘agent’
				b. praktór-on (GEN.pl)	

As we have seen in Chapter 3, antepenultimate stress imposed by default in the absence of marks is expressed in constraint terms as NONFIN >> ALIGNPRW-R. The tableau makes clear that the candidate with a binary non-final trochaic foot wins over all others.

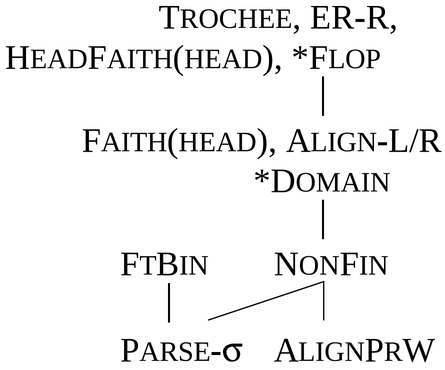
(31)

input: prak-, -tor-, -as	TROCHEE	ER-R	FT BIN	NON FIN	PARSE-σ	ALIGN PRW-R
☞ a. (prákto)ras					*	*
b. pra(któras)				*!	*	
c. (prakto)(rás)			*!	*		
d. (prákto)(ras)		*!	*			

At this point the analysis of Greek stress is concluded. In the following section I present an assessment of the analysis and I summarize the positive effects that a compositional theory of stress has for the grammar of lexical accent systems.

In (32) I give the ranking of the constraints that determine stress in Greek derived words. Unlike inflectional morphology, the ranking between HeadFaith and Faith is not established by intervening constraints.

(32) *ranking for the accentuation of derived words with lexical accents*



• HeadFaith(head), Faith(head) *Flop >> *Domain	romadzáðon	(23)
• HeadFaith(head), Align-L/R	γípsinos	(27)
	γalikós	(28)
• FtBin, NonFin >> Parse-σ, AlignPrW	práktoras	(31)

4.9. Assessment and Conclusions of Greek Accentuation

In the first part of this chapter I proposed that conflicts between lexical accents for stress are resolved by morphology: morphological headedness determines prosodic headedness. The interaction between the two components of grammar centers around the principle of compositionality, which enables prosody to peek into morphological structure and, more importantly, to establish a close correspondence between prosodic and morphological structure.

The function that executes the mapping between prosody and morphology is articulated in terms of a theory of head dominance, which states that accents that belong to morphological heads prevail over other accents in the word. In Optimality Theory, head dominance takes the form of the ranking:

(33) *head dominance in Greek*
HeadFaith >> Faith

This ranking has different implementations depending on the morphological structure. In inflected constructions, root faithfulness is given priority, whereas in derived constructions derivational suffix-faithfulness is dominant.

One of the most important advantages of this approach is that it offers a uniform account for the accentuation of inflected and derived words. There is one function (ranking) that performs the mapping. This function is sensitive to the structural roles of morphemes and not to the scope in which phonological operations take place. Because of compositionality, the prosodic component can scan the morphological tree, detect the established hierarchical relations and translate them into prosody. In this respect, the theory presented is more economical than cyclic-derivationalist models which invoke levels in grammar and associate them to different functions.

A second merit of the theory of head dominance is that it justifies to some extent the existence of marking. Marking is the tool by which the prosody-morphology mapping is performed and not an accidental property of these languages. Only accented morphological heads are visible to prosody. Unmarked words and words with unmarked heads lack this interlevel transparency. In other words, marking has a specific purpose in lexical accent systems: it gives parsing cues for the morphological organization of the word.

The theory finds empirical support as well. First, it analyzes patterns like *uranú* (UnAcc root + Pre-Acc suffix) without employing further stipulations and unjustified rules. Second, it accounts for the absence of marked derivational suffixes which do not display dominance effects. Derivational suffixes that have lexical accents and adhere to the definition of headedness are always dominant. Third, it attributes the accentual variation of suffixes like /-ik(-os), -in(-os)/ to unaccentability and not to accentual allomorphy.

In the second part of the chapter, I apply the model advanced here to Russian, which is also a lexical accent system with fusional morphology. The similarity between the two languages is striking and the way in which the theory of head dominance wades through the facts is also of interest.

Russian

In the second part of this chapter, I extend the theory of head dominance to Russian which is also a head-dependent system with lexical marking. As in Greek, we see that prosodic structure here is also determined by morphological structure. The prosody-morphology interface is established by the principle of prosodic compositionality which, in simple words, states that prosody can have access to morphological structure because the two components of grammar are built in a parallel fashion.

The function *g* that performs the mapping between the morphological and prosodic component of the grammar is also expressed as head dominance. Morphological heads, however, are not stressed unconditionally. An important prerequisite is marking; only marked heads can be prominent. This means that a marked inflectional suffix can attract stress from an unmarked root and, similarly, an unmarked derivational suffix can lose its stress to a marked root or a marked inflectional suffix.

Interestingly, Russian gives us the chance to test the theory proposed here. What happens when a derivational suffix does not exhibit the characteristics of a head? Can a derivational suffix be accentually dominant, although it never changes the syntactic or other properties of the base? Evaluative suffixes that denote diminutive, augmentative, pejorative and similar meanings never alter the morphosyntactic specifications of the base, and neither do they determine word stress. Thus, it is correctly predicted by the theory that such suffixes, albeit marked, can never be prosodically dominant.

In Russian we also see the HEADSTRESS constraint in action. There is a phenomenon of 'stress retraction' (Melvold 1990) in Russian. Roots that are unaccentable or unmarked in the singular paradigm of nouns or in the short form of adjectives become accented in the plural paradigm and the long forms of adjectives, respectively. For example, stress in the singular paradigm of the word *koles-ó* 'wheel' is on the inflectional ending, *koles-ó* (NOM.sg), *koles-ú* (DAT.sg), because the root is unaccentable. In the plural, however, the root becomes accented, *kol'ós-a* (NOM.pl), *kol'ós-am* (DAT.pl). I claim that we are confronted here with a phenomenon of 'head-attraction'. Russian reveals a stronger version of head-dependence in specific morphological contexts. In our example the relevant environment is the plural paradigm. In other words, Russian has a subgrammar which promotes a closer relationship between 'head' and 'stress'. It is not accidental that unmarked and unaccentable roots are reformed into accented ones. Unmarked roots fail to express the mapping between morphological and prosodic headedness, whereas unaccentable roots express this mapping in a less transparent way. Interface transparency is accomplished when the HEADSTRESS constraint comes onto the scene to take charge of accentuation.

This subgrammar also hints at possible directions for future development of the stress system. It moderately verifies our intuitions that head-dependent systems are perhaps a transitional stage to stronger forms of prosody-morphology interface in which 'head' and 'stress' are in a one-to-one correspondence.

An advantage of the approach taken here is that it succeeds in providing a more explanatory account of Russian stress as compared to theories that invoke cyclic/non-cyclic groupings of suffixes (Melvold 1990).

The ideas just presented are organized in the following way: §4.10 presents words with conflicting accents from inflectional morphology and §4.11 examines how prosodic compositionality and head dominance applies in these cases. The basic facts of derivational morphology are given in §4.12 and their analysis follows in §4.13. Some ‘exceptional’ stress patterns are accounted for in §4.14. §4.15 reviews another approach to Russian stress, whereas §4.16 examines cases in which a lexical accent retracts from its original position in specific morphological environments. A summary of Russian stress is given in §4.17.

4.10. Inflected Words: The Facts

The central subject of this section is the accentuation of words composed of a marked root and a marked inflectional suffix. The examples are mainly drawn from the feminine nouns in -*a* and the neuter nouns in -*o*. The analysis proposed here holds for the remaining noun classes as well as the other syntactic categories. The primary sources for Russian are Halle (1973), Melvold (1990) and the corpus I compiled with the assistance of informants and dictionaries.[25]

Most of the examples listed in (34) and (35) were already examined in Chapter 3. There, emphasis was on the interrelation of marking with prosodic wellformedness constraints and especially, the restrictive force these constraints exercise in shaping marked outputs. Here, however, emphasis is primarily on the conflict between lexical accents and the dramatic role morphology plays in forming marked outputs.

Let me remind the reader that in the notation I use throughout the thesis a left bracket ‘(’ stands for a lexical accent that is a foot-head. Underlined morphemes have floating accents. Accents in boldface belong to the root and accents in italics belong to the suffix.

(34) *feminine nouns in -a* (NOM.sg), -*y* (NOM.pl)

	two marked morphemes		*one marked morpheme*		
a.	rýba	/**(ry**b-*(a*/	rýby	/**(ry**b-y/	‘fish’
b.	rabóta	/ra**(bo**t-*(a*/	rabóty	/ra**(bo**t-y/	‘work’

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[25] The following dictionaries were consulted: *Rückläufiges Wörterbuch der Russischen Sprache der Gegenwart* (1965), *The Concise Oxford Russian Dictionary* (1996).

c.	čečevíca	/čeče**(vi**c-*(a*/	čečevícy	/čeče**(vi**c-y/	‘lentil’
d.	lad’já	/**lad’**-*(ja*/	lad’jí	/**lad’**-i/	‘mountain’
e.	gospožá	/**gospož**-*(a*/	gospoží	/**gospož**-i/	‘lady’

(35) *neuter nouns in -o* (NOM.sg), *-a* (NOM.pl)

	two marked morphemes		*one marked morpheme*		
a.	právila	/**(pra**vil-*(a*/	právilo	/**(pra**vil-o/	‘apple’
b.	bolóta	/bo**(lo**t-*(a*/	bolóto	/bo**(lo**t-o/	‘swamp’

In some examples the accentual preference of the root is in conformity with the accentual pattern introduced by the inflectional ending. Unaccentable roots combined with accented suffixes are an example of lexical accents in harmony. The root pushes the floating accent outside its domain and, eventually, to the suffix which, in turn, introduces an accent itself. Because Russian lacks pre-accenting suffixes (cf. §3.13), the only instance of competition arises when an accented root meets an accented suffix. Recall from Chapter 3 that bimoraic suffixes lose stress after a marked root. Consequently, the accent of the root prevails over marked and bimoraic suffixes.

Melvold (1990), following Kiparsky (1982), argues that the patterns in (34) and (35) are derived by an edgemost rule that assigns prominence to the leftmost lexical accent. Stress on the leftmost peak is the default stress choice in Russian. She treats ‘unaccentable morphemes’ as post-accenting. Postaccentuation results from a rule that transfers the asterisk that a marked vowel projects on the grid one syllable to the right. Evidently, extra rules are put in force in order to derive the correct accentual pattern for post-accenting morphemes. More crucially, we have seen in Chapter 3 that a split in faithfulness is necessitated in Russian. Unaccentable roots place their accent on the suffix showing that faithfulness to the lexical accent of the root is deemed more important than faithfulness to (the unmarkedness of) the suffix. For example, in words like *gospož-í* ‘lady (pl)’ the suffix sacrifices its unmarked status for the sake of the root-accent.

4.11. Prosodic Compositionality and Head Dominance in Inflected Words

The Russian facts call for an interpretation similar to the one offered for the Greek facts. More specifically, I argue that accentual properties of inflectional suffixes give way to the markedness of roots. This is not surprising in the model promoted here. Examples like the ones just reviewed show that one structure is shared by morphology and prosody and, more importantly, the accent of a constituent in head position is assigned prominence.

In terms of constraint ranking, head dominance in inflected words is formalized as follows:

(36) *head dominance in inflected words*
HEADFAITH >> FAITH

The split into root and suffix faithfulness was already hinted at in Chapter 3. The accentuation of unaccentable roots and accented suffixes as well as the accentual behavior of bimoraic suffixes suggest that faithfulness to the root is considered more important than faithfulness to the inflectional suffix. Here the ranking between root and suffix faithfulness receives a principled substantiation. It is not just faithfulness to the root that outranks inflectional suffix faithfulness (FAITH$_R$ >> FAITH$_{InflS}$) but faithfulness to the head that outranks simple prosodic faithfulness. Derivation supports the same claim. In derived words the accent of the derivational suffix/head wins over the accent of the root and, in general, any other lexical accent in the word.

As I showed in Chapter 3, there are more constraints involved in Russian accentuation. Faithfulness to the lexical accent of the root/head (HEADFAITH(HEAD)) occupies the highest rank in the hierarchy but faithfulness to the position of the lexical accent (*FLOP) is dominated by word-form constraints such as HIERAL which, in turn, dominates the constraint banning local realization of floating accents, namely *DOMAIN. Recall that HIERAL is dominated by HEADFAITH. Accented suffixes never insert their accent to the root/head even if this means that the resultant structure will not be well-formed.[26] The ranking between HEADFAITH and FAITH is established by intervening constraints such as HIERAL, *FLOP and *DOMAIN. Full argumentation for the described domination order is provided in Chapter 3. Here I omit constraints that pertain to other issues and focus on head dominance.

The tableau in (37) illustrates how the system of constraints is organized based on the accentuation of the word *rabóta* ‘word (NOM.sg)’. The candidate which complies with the highest constraints of the hierarchy is appointed as the most optimal one.

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[26] In Chapter 3 it is shown that inflectional suffixes exhibit fewer accentual contrasts compared to roots(/heads) because FAITH is dominated by a structural constraint (SUFFIX=SMW > ALIGN-L).

(37)

input: ra(bot-, -(a	HEADFAITH	FAITH
☞ a. ra(bóta)		*
b. (rabo)(tá)	*!	*

Candidate (37b) is eliminated because it triggers fatal violation of HEADFAITH. Faithfulness is violated by both candidates but the score has already been determined by head-faithfulness.

Tableau (38) presents the accentuation of the word *gospožá* ‘lady (NOM.pl)’ which is composed of an unaccentable root and an accented suffix. Once again, the optimal output is the one that best satisfies HEADFAITH.

(38)

input: * gospož-, -(a	HEADFAITH	*FLOP	*DOMAIN	FAITH
* (*) ☞ \ a. (gospo)(ža)				*
* (*) │ b. go(spoža)			*!	*
(*)* / c. go(spoža)	*!*	*		**

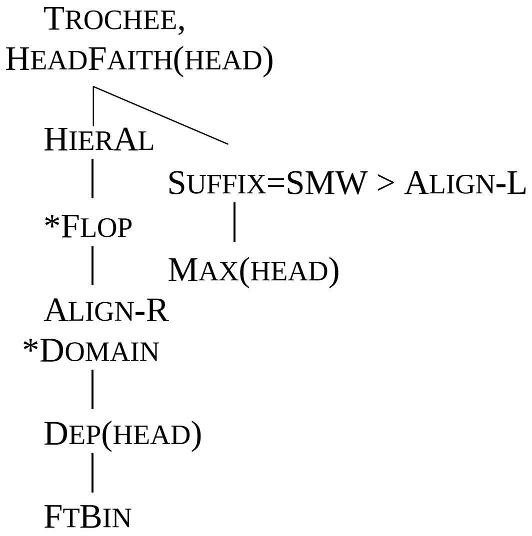
The first two candidates preserve the accent of the head whereas the third candidate preserves the accent of the suffix (unrealized accents are given within parentheses). Given the proposed ranking, candidate (38c) has no chance to survive. It is eliminated by high-ranked HEADFAITH. Notice that this candidate incurs a double violation of HEADFAITH. First, it deletes the accent of the root and second, it inserts the accent of the suffix to the root. Candidate (38b) does not manage to surface either because it violates *DOMAIN. The first candidate, (38a), is the winner despite the single violation of FAITH. The analysis of the remaining examples does not add anything new from an accentual point of view.

To summarize, in inflectional morphology we observe that first, priority is given to the faithfulness of the morphological head (i.e. root) and second, prosodic wellformedness constraints apply in a restrictive fashion yielding prosodic binarity (templatic shape) within the word. The interrelation of marking with morphological headedness and wellformedness constraints alleviates the unpredictable aspects of marked words.

Another positive result of head dominance in particular is that it derives immobile paradigms. Words with marked roots have stable stress on the same syllable, e.g. *právilo* (NOM.sg), *právila* (NOM.pl), *právilami* (INSTR.pl) ‘apple’, etc. Unmarked heads allow either accented inflectional markers or the default to take charge of accentuation creating paradigms with variable stress, e.g. *skovorodá* (NOM.sg), *skóvorody* (NOM.pl) ‘frying pan’. The learner has to memorize one position of stress for the former paradigm but two for the latter and, moreover, associate the different stress positions to different morphological cases. In combination with the fact that words like *čečevíca* display correspondence between morphological and prosodic headedness, we conclude that forms with marked heads are more preferred than others.

The complete ranking schema for inflected words is given in (39). This ranking was partly introduced in Chapter 3.

(39) *ranking for the accentuation of inflected words with lexical accents*



• HEADFAITH(HEAD) >> FAITH(HEAD)	rabóta	(37)
• HEADFAITH(HEAD) >> HIERAL >> *FLOP >> *DOMAIN >> FAITH(HEAD)	gospožá	(38)

4.12. Derived Words: The Facts

Derived words in Russian are composed of a root, a derivational and an inflectional suffix: [Root+DerS+InflS]. Derivation is recursive; often more than one derivational suffix is added to a root. Recursivity gives rise to elaborate structures when all or almost all morphemes in the string are marked.

Unfortunately, because of space limitations the focus will only be on non-recursive derivational morphology. It suffices to mention that formatives with many derivational suffixes can be analyzed in a similar fashion. They do not impose any extra problems for the analysis advanced here.

The data examined in this section are classified into two basic groups. The first group includes words with accented, unaccentable and unmarked derivational suffixes. In all three cases the derivational suffix at issue is combined with roots of a different accentual status and wins. The second group of data includes words composed of evaluative suffixes. The suffixes are marked but the accentual patterns they produce are different to the ones documented with the suffixes of the first group.

The first group of derived words is organized into three subgroups depending on whether word stress is stable on the derivational suffix (40) or the inflectional suffix (41), or whether stress is mobile, alternating between the root and the inflectional suffix (42).

The suffix /-ast/ forms adjectives which emphasize the size of body parts. All outputs in (40) have stress on the derivational suffix regardless of the accentual specification of the root which is unmarked in (40a), accented in (40b) and unaccentable in (40c). To increase accentual complexity, the derived forms are given in the nominative singular, which is an accented ending. Needless to say, the accent of the inflectional suffix has no bearing in determining the prosodic shape of the word.

(40) *variable root + Acc DerS + Acc InflS*

	base		derived word	
a.	borod-(a	‘beard’	borodásta (fem)	‘heavily bearded’
b.	(gorl-o	‘throat’	gorlásta (fem)	‘loud-mouthed’
c.	jazyk-ú (DAT.sg)	‘tongue’	jazykásta (fem)	‘sharp-tongued’

The suffix /-ač/ attaches to nominal, adjectival and verbal roots deriving masculine nouns referring to a type of person. In each case the derived noun has fixed accent on the inflection. The accentual status of the root or the inflectional suffix is nonessential; it is the derivational suffix that determines the prosodic shape of the word by imposing its lexically prespecified accentual pattern.

(41) *variable root + UnAcc DerS + UnMark InflS* (NOM.pl)

	base		derived word	
a.	borod-(a	‘beard’	borodačí	‘bearded man’
b.	(puz-o	‘belly’	puzačí	‘man with a paunch’
c.	zurn-(a	‘clarinet’	zurnačí	‘zurna player’

The suffix /-En/ with a yer derives adjectives from nominal bases. As mentioned in previous parts of this thesis, a yer vocalizes only when it is followed by another yer or when it is in word final position. In (42) this condition of yer vocalization is met in the nominative singular of the masculine gender but not in the rest of the paradigm. The derivational suffix /-En/ is unmarked, otherwise it would have appeared with stress in the environments in which it vocalizes such as *xoloden* (NOM.sg.masc).[27]

(42) *variable root + UnMark DerS + Acc/UnMark InflS*

	base	derived word		
a.	xolod	xóloden (m)	xolodná (f)	xólodny (pl)
	‘cold’			‘cold’
b.	(zlost’	zlósten	zlóstna	zlóstny
	‘malice’			‘hateful’
c.	xmel’	xmel’ón	xmel’ná	xmel’ný
	‘tipsiness’			‘drunk’

Default accentuation assigns prominence to the leftmost vowel correctly producing *xóloden*; otherwise the accented ending attracts stress, e.g. *xolodná*. The forms in which both the root and the inflection carry an accent are interesting. Here the accent of the root prevails over the accent of the inflection, *zlóstna* < *(zlost-n-(a*.

The accentual facts displayed by the first group of derivational suffixes can be straightforwardly accounted for within the framework of prosodic compositionality and head dominance. The actual analysis of these words takes place in the following subsections, after the presentation of the remaining groups.

A second group consisting primarily of evaluative suffixes gives priority to the accent of the root rather than their own accent. More specifically, in (43a) primary stress is on the root and not on the augmentative suffix. Notice that the derivational suffix is stressed when it joins with unmarked roots as in (43a).

(43) *variable root + Acc DerS + Acc InflS*

	base		derived form	
a.	golov-(a	‘head’	golovíšča	pejorative/diminutive
b.	(jam-(a	‘pit’	jámišča	meaning
c.	temnot-(a	‘darkness’	temnotíšča	

---

[27] Yers can be accented. This is shown by suffixes like /-Ec/, e.g. *xrabr* ‘brave’ > *xrabréc* ‘brave person’.

At first sight the prosodic outcome in (43) is at odds with the accentual behavior of the derivational suffixes in (41-42). In §4.14 I show that this outcome is not a threat for the theoretical model advocated in this thesis; on the contrary, it supports the proposed account.

For the sake of completeness I would like to present a third group of suffixes which will be not analyzed here for reasons explained below. This group includes the suffixes /-ost’/, /-nik/ and /-stv(-o)/. A word derived with these suffixes is always stressed on the base. An unmarked root is variably stressed on the initial or final syllable (44a) and an accented root is stressed on its accented syllable (44b). Interestingly, in unaccentable roots floating accents are preserved but they are realized locally. Examples (44a-b) are derived with the suffix /-nik/ and examples (44c-d) are derived with the suffix /-stv(-o)/. Formatives with /-ost’/ behave in a similar way.

(44) *variable root + DerS + InflS*

	base		derived word	
a.	pojezd	‘train’	pójezdnik or pojézdnik	‘commuter’
b.	(jabed-a	‘slander’	jábednik	‘mocker’
c.	serebr-ó	‘silver’	serébrjanik	‘silversmith’
d.	svja(ščennyj	‘holy’	svjaščénstvo	‘priesthood’
e.	žréc, -á	‘priest’	žréčestvo[28]	‘priesthood’

The facts in (44) make clear that suffixes like /-nik/ are not as weak accentually as inflectional suffixes. Unlike inflectional endings, they banish floating accents from their domain. In (44c) and (44e), for instance, the floating accent is realized in the sponsoring morpheme.

There is evidence beyond accentuation that these suffixes fall outside the domain of the prosodic word and behave like clitics. The most convincing argument comes from the vocalization of yers. A very common environment for the vocalization of yers is the end of the prosodic word. This is shown by the examples in (45).

(45) *yer vocalization at]$_{PrW}$* (Melvold 1990:30)

a.	kuko̲l (GEN.pl)	kukl-a (NOM.sg)	‘doll’
b.	sose̲n (GEN.pl)	sosn-a (NOM.sg)	‘pine tree’
c.	vete̲r (NOM.sg)	vetr-a (NOM.pl)	‘wind’

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[28] The vowel /e/ in *otéče̲stvo* is epenthetic. It is inserted in order to satisfy an OCP- restriction against adjacent sibilants. There is also a rule of velar palatalization that shifts /c/ to /č/ before front vowels (Melvold 1990).

Interestingly, yers preceding the suffixes at issue vocalize, despite the fact that they are followed by a full vowel (and not a yer). Some examples are: *ote̲c* ‘father’ > *otéčestvo* ‘fatherland’, *kupe̲c* ‘merchant’ > *kupéčestvo* ‘the merchants (collective meaning)’, *kuko̲l* ‘doll, puppet’ > *kúkol’nik* ‘puppeteer’. It is worth mentioning that the same set of suffixes is extraprosodic in other Slavic languages. For instance, in Polish the suffix /-stv(-o)/ displays a clitic-like behavior in terms of phonotactics (Rowicka 1999). Future research must explore the reasons that force these suffixes to behave like clitics.

To summarize, in this section I presented the basic facts of Russian derivation. I introduced a set of suffixes which are prosodically dominant when they are marked and a group of evaluative suffixes which never impose their inherent accent on the word. I suggested that the inability of the latter group to determine stress does not pose any problem for the theory advanced in this thesis.

4.13. Prosodic Compositionality and Head Dominance in Derived Words

In this section, I show that the empirical facts just reviewed can be best accounted for within the framework of prosodic compositionality and head dominance. According to this theory, compositionality enforces a one-to-one correspondence between morphological and prosodic structure. Data from Greek and the inflectional morphology of Russian showed that the interface between the two components of grammar is expressed as head dominance: the lexical accent of the morphological head is prominent. At the beginning of this chapter, I established that the constituent that determines syntactic category, class and gender is defined as a head. Derivational suffixes that meet the aforementioned requirements qualify as heads. It remains to be seen whether prosodic headedness follows morphological headedness.

4.13.1. Accented derivational suffixes

The first set of data contains words with fixed stress on the derivational suffix. I repeat the examples in (40) as (46). The leftmost column presents the morphemes participating in word formation with their inherent accentual properties. In (46a), the suffixes are accented but the root is not. In (46b) all participating morphemes are accented whereas in (46c) the root is unaccentable and the suffixes are accented. Despite the diversity and richness of the underlying forms there is always one outcome: stress on the (accented) vowel of the derivational suffix.

(46) *variable root + Acc DerS + Acc InflS*

	combined morphemes	derived word	
a.	borod-(ast-(a	borodásta (fem)	‘heavily bearded’
b.	(gorl-(ast-(a	gorlásta (fem)	‘loud-mouthed’
c.	jazyk-(ast-(a	jazykásta (fem)	‘sharp-tongued’

Our first encounter with the derivational morphology of Russian firmly supports the primary claim of this study, namely that prosody depicts morphological structure. Head dominance is codified for derived formations as follows:

(47) *head dominance in derived words*
HEADFAITH >> FAITH

The ranking between the two constraints in initiated by intervening constraints that are presented in the course of the discussion. It becomes clear now that accentuation in Russian is not root-controlled, and neither is decided by edgemost rules. The ranking ROOTFAITH >> SUFFIXFAITH wrongly predicts stress on the lexical accent of the root in (46). Similarly, an edgemost rule wrongly assigns primary prominence to the accent of the root. Consequently, a ranking that separates prosodic faithfulness into head faithfulness and simple faithfulness and gives priority to the former, can best account for the facts in (46). The tableau in (48) illustrates how the word *gorlásta* is stressed.

As evident from (48), only the first candidate passes the highest constraint and is, rightfully, appointed the winner.

(48)

input: (gorl-, -(ast, -(a	HEADFAITH(HEAD)	FAITH(HEAD)
☞a. gor(lásta)		**
b. (górla)sta	*!	**
c. (gorla)(stá)	*!	**

Derivational suffixes with similar accentual behavior are: -(*ist* (e.g. *svjazíst* ‘signaler’), -(*at* (e.g *puzát* ‘having a belly’), -(*jaga* (e.g. *rabotjága* ‘hard worker’), and so on.[29]

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[29] The example *kolektivíst* invites the following remark. In inflected words, the word-form

4.13.2. Unaccentable derivational suffixes

There is another set of words which includes marked derivational suffixes with a floating accent. Since the derivational suffix is flanked by a root at the left and an inflectional suffix at the right, there are two positions the accent can dock onto. We have seen earlier that Greek exploits both positions. It is interesting to see now whether Russian is similar in this respect.

The examples in (41) repeated here as (49) have fixed stress on the inflectional suffix although the inflection /-i/ (NOM.pl) is itself unmarked. The leftmost column reveals the accentual status of the morphemes participating in word formation.

(49) *variable root + UnAcc DerS + UnMark InflS* (NOM.pl)

	combined morphemes	derived word	
a.	borod-ač-i	borodačí	‘bearded man’
b.	(puz-ač-i	puzačí	‘man with a paunch’
c.	zurn-ač-i	zurnačí	‘zurna player’

Interestingly, forms with null inflection have stress on the derivational suffix itself. Thus, the examples in (49) form nominative singular as follows: *borodáč*, *puzáč* and *zurnáč* .

Unlike Greek, all unaccentable suffixes in Russian surface as post-accenting under the influence of ALIGN-R. This constraint positions floating accents at the right edge of the word. It takes no effect, however, on linked vowels because it is dominated by *FLOP.[30] The ranking between ALIGN-R and *DOMAIN was undetermined in inflected words but examples like *puzáč* are illuminating for the domination order between these two constrains. As shown in (50) ALIGN-R dominates *DOMAIN.

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constraint HIERAL occupies a rank from which it can exercise control over the prosodic shape of the word. In derived words, however, HIERAL is inactive. This is not surprising if one takes into consideration that derived formations, composed of many morphemes, are usually very long and therefore, harder to fit into templates.

[30] This ranking is justified in §3.12.2.2. Derived words support this ranking as well. Examples like *gorlásta* ‘loud-mouthed (fem)’ show that the accent of the head /-(ast/ does not move to the right edge of the word but it remains associated to its sponsor.

(50)

input: * (puz-, -ač	HEADFAITH (HEAD)	*FLOP	ALIGN-R	*DOMAIN	FAITH (HEAD)
(*) * ☞ | a. pu(zač)				*	*
(*) * / b. (puzač)			*!		*
* (*) | c. (puzač)	*!		*		*

The competition is mainly decided by the ranking between ALIGN-R and *DOMAIN. Both (50a) and (50b) preserve the accent of the head and score two violations in the tableau but the former candidate passes because it incurs a violation of a lower-ranked constraint. The last candidate realizes the accent of the derivational suffix/head and, as expected, is ruled out by head-faithfulness. Unrealized accents are given within parentheses.

To conclude, ranked below HEADFAITH(HEAD) and *FLOP, but above *DOMAIN and simple FAITH, ALIGN-R leaves only a single survivor in tableau (50), form (a). This ranking explains why unaccentable derivational suffixes never impose initial stress in Russian.[31]

The accentuation of the word *borodačí* 'bearded man' is pursued in a similar way. The presence of the inflectional ending offers to the lexical accent a suitable position to satisfy ALIGN-R (and *DOMAIN). This is of course at the expense of simple faithfulness because the accent of the head is forced upon the

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[31] Melvold (1990:claims that there is one derivational suffix which imposes fixed initial stress. This suffix is /-En'/ and derives nouns from nominal and verbal bases. Some examples are given in (i):

(i)	skovorod-(a	'frying pan'	skóvoroden'	'dovetail joint'
	obo(rot	'turn'	óboroten'	'werewolf'
	opolz-(at	'to slip'	ópolzen'	'landslip'

The problem with all the above examples is that there is little, if any, semantic association between the base and the derived form. Moreover, this suffix is highly unproductive. These characteristics lead to the conclusion that the forms in (i) are most probably fossilized. It is well-known that often loss of morphological boundaries causes a chain of changes which can have an effect on the prosodic structure of the word as well.

inflectional ending. We conclude, therefore, that ALIGN-R must dominate FAITH.

(51)

<table>
<tr><th><i>input</i>: *
borod-, -ač, -i</th><th>HEADFAITH
(HEAD)</th><th>*FLOP</th><th>ALIGN-R</th><th>FAITH
(HEAD)</th></tr>
<tr><td>*
☞ \
a. (boro)da(či)</td><td></td><td></td><td></td><td>*</td></tr>
<tr><td>*
|
b. (boro)(dači)</td><td></td><td></td><td>*!</td><td></td></tr>
</table>

4.13.3. Unmarked derivational suffixes

The last set of suffixes to be examined in this section lacks lexical accents and, consequently, the means to map morphological heads onto prosodic heads. Since unmarked suffixes cannot determine prosodic structure, the question is whether this role is taken over by the other constituents of the word.

The adjectives in (52), repeated from (42), are formed from noun bases with the derivational suffix /-En/. Another unmarked suffix is /-Ok/. Note that the unmarkedness of these suffixes is not related to the fact that they both have yers because yers can bear an accent as documented by examples like *xrabr* ‘brave’ > *xrabréc* ‘brave person’ formed with the suffix /-(Ec/.

The examples in (52) show that the accentuation of words with unmarked derivational suffixes is pursued in the same way as the accentuation of inflected words. A marked root always attracts stress. An inflectional suffix can bear stress only when it is the only morpheme with an accent, otherwise prominence is given to the leftmost syllable by default.

(52)	a.	xólod-en (m)	xolod-n-á (f)	xólod-n-y (pl)	‘cold’
	b.	(zlost-en	zlóst-n-a	zlóst-n-y	‘hateful’
	c.	xmel’-ón	xmel’-n-á	xmel’-n-ý	‘drunk’

Forms like *zlóstna* hint at the fact that the accent of the root overrides the accent of the inflectional suffix even though the root is not the head. This is due to EDGEMOST-L which now has the chance to determine which one of two ‘equal’ accents should survive:

(53)

input: (zlost-, -En, -(a	FAITH	EDGEMOST-L
☞ a. zlóstna	*	
b. zlostná	*	*!

I will not spell out the specifics of accentuation for the examples in (52) because their analysis is straightforward.

At this point, the analysis of stress for the largest part of derivational morphology is brought to an end. The logic of the system is simple: there is a systematic pattern of correspondence between morphological and prosodic structure. Accents belonging to morphologically dominant elements are assigned prominence. Morphological structure is projected onto the prosody with the help of marking. This pattern of correspondence is disrupted when the word lacks marked heads. In the next section, I discuss some cases which at first sight appear to be counterexamples to head dominance. A more careful look, however, shows that the suffixes at issue are not exceptional. On the contrary, their behavior can be efficiently accounted for within the framework proposed.

The accentuation of derived words in Russian is summarized in (54). The numbers refer to tableaux that determine the domination order between the relevant constraints. The accompanying examples illustrate crucial rankings.

(54) *ranking for the accentuation of derived words with lexical accents*

TROCHEE,
HEADFAITH(HEAD), *FLOP
|
ALIGN-R
|
*DOMAIN,
FAITH(HEAD)
|
FOOTFORM & DEFAULT ℂ

• HEADFAITH(HEAD) >> FAITH(HEAD) *FLOP >> ALIGN-R	gorlásta	(48)
• ALIGN-R >> *DOMAIN	puzáč	(50)
• ALIGN-R >> FAITH	borodačí	(51)
• FAITH(HEAD) >> EDGEMOST-L	zlóstna	(53)

4.14. Some ‘Exceptions’ to Head Dominance?

Russian has a number of evaluative suffixes commonly found in other Slavic languages as well. These suffixes are usually divided into groups: diminutives, augmentatives, pejoratives, and others. Evaluative suffixes in Russian are different from other derivational suffixes with respect to stress. Consider the following examples:

(55) *augmentative/pejorative suffix -išč-a* (fem)

	base			derived form	
a.	golov-(a	(fem)	‘head’	golovíšča	(fem)
b.	(jam-(a	(fem)	‘pit’	jámišča	(fem)
c.	temnot-(a	(fem)	‘darkness’	temnotíšča	(fem)

(56) *diminutive suffix -ic-a* (fem)

	base			derived form	
a.	část’	(fem)	‘part’	častíca	(fem)
b.	(luž-a	(fem)	‘puddle’	lúžica	(fem)
c.	temnot-(a	(fem)	‘darkness’	temnotíca	(fem)

The interesting property of the suffixes /-išč(-a), -ic(-a)/ is that they lose stress when they are combined with other marked morphemes. The accentedness of the suffix, documented in examples (55a) and (56a), cannot determine accentual outputs. In a way, suffixes such as /-išč(-a)/ and /-ic(-a)/ behave as if they were inflectional with respect to stress. The question that arises now is whether the evaluative suffixes presented above contradict head dominance. In order to address this question, the first step will be to examine whether evaluative suffixes qualify as heads or not. Have a look at the examples in (57):

(57)

	base			derived form	
a.	nós	(masc)	‘nose’	nosíšče	(masc)
b.	nogá	(fem)	‘foot, leg’	nožíšča	(fem)
c.	oknó	(neut)	‘window’	okníšče	(neut)
d.	dén’gi	(fem.pl)	‘money’	den’žíšči	(fem.pl)

The examples in (57) show that evaluative suffixes are transparent. They can be attached to masculine, feminine and neuter bases without changing gender: masculine nouns are derived from masculine bases, feminine nouns from feminine bases, and so on. The example in (59d) is even more telling. The augmentative form of the noun *den’gi*, which is attested only with plural inflection, is formed with plural inflection as well.

In general, an evaluative suffix preserves the syntactic category of the item to which is attached and, moreover, fails to change the sub-categorization features of gender or class. The examples in (57) indicate without any doubt that evaluative suffixes are not heads.

Coming back to stress, in the light of the above observation the failure of the evaluative suffixes in (55) and (56) to determine prosodic structure is understandable. Evaluative suffixes are not dominant because they do not qualify as heads; the weak status they occupy in morphological structure translates into weakness to determine the prosodic make-up of the word.[32]

The main point here is that evaluative suffixes do not challenge the theory of head dominance. On the contrary, they strengthen it by providing solid proof that prosodic structure faithfully follows morphological structure. The root is

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[32] According to Melvold (1990:200) the suffixes /-ist/ and /-liv/, which derive qualitative adjectives with the meaning ‘X has Y’s characteristic property’ from nominal and verbal bases, lose stress after a marked root:

(i)	a.	Acc base	talánt-liv-yj	‘talented’	bolót-ist-yj	‘marshy’
	b.	UnAcc base	dožd-lív-yj	‘rainy’	kust-íst-yj	‘bushy’
	c.	UnMark base	xlopot-lív-yj	‘exacting’	gor-íst-yj	‘mountainous’

If these suffixes are heads, then it is clear that they fail to project their morphological status to prosody. They attract stress only with unaccentable (ib) and unmarked roots (ic). There is more to be said, however, about these two suffixes. McFadden (1975) states that /-ist/ and /-liv/ always attract stress when the base is monosyllabic (iia). With accented bases there is variation; either they attract stress (iib) or lose stress after a root (ia).

(ii)	a.	trús	‘coward’	truslívyj	‘cowardly’
		(d’orn	‘turf’	dernístyj	‘turfy
	b.	(barxat	‘velvet’	barxatístyj	‘velvety’
		(studen’	‘fish-jelly’	studenístyj	‘of fish-jelly’
		šal -ít’	‘to be naughty’	šalovlívyj	‘naughty’

There are two possible explanations for the accentual behavior of these suffixes. One may assume that they have two accentual allomorphs, an accented and unmarked one, or that the ability these suffixes have to attract or lose stress depends on the phonological size of the base. The latter type of suffixes is very common in languages (cf. fn 14 for prosodic phonology phenomena in Greek). To conclude, the accentual behavior of the suffixes /-liv/ and /-ist/ needs to be looked at more closely in the future but it seems that the explanation hinges on phonological properties that these suffixes exhibit.

the syntactic determinant of the word and hence responsible for reflecting structural complexity in prosody.

With respect to accentual properties, we notice that evaluative suffixes have predictable initial stress. The explanation is simple: the evaluative suffix together with the inflectional ending constitute a bimoraic unit and, as all bimoraic suffixes in Russian, are subject to the coordinated constraint Suffix=SMW > Align-L. The basic argument for treating these suffixes as a cluster is that they are never separated by other morphological elements.

Given that the root is the head in formatives with evaluative suffixes, faithfulness to the lexical accent of the root/head must dominate the coordinated constraint and simple faithfulness: HeadFaith >> Suffix= SMW > Align-L >> Faith. As a result of this ranking, evaluative suffixes (non-heads) exhibit a much more restricted set of accentual contrasts exactly like inflectional suffixes. The proposed constraint hierarchy appoints candidate (58a) as the winner. The accent of the inflectional suffix can never supersede the accent of the root/head nor can it compete with the constraint that imposes a peak at the left edge of bimoraic suffixes.

(58)

input: (jam-, -išč, -(a	HeadFaith (head)	Suffix=SMW > Align-L	Faith (head)
☞ a. (jámi)šča		(*) *!	*
b. ja(míšča)	*!		*

The root is the morphological head in the evaluative constructions in (57) and (58) but even heads can be idle in controlling stress, if they lack lexical accents. Recall that the prosody-morphology interface in systems like Russian is expressed by means of marking. When the root/head is deprived of lexical accents, the accentuation is decided by the other constraints of the system. This is shown in tableau (59).

(59)

input: golov-, -išč, -(a	Suffix=SMW > Align-L	Faith(head)
☞ a. (golo)(víšča)		*
b. (golo)(viščá)	*! (*)	
c. golo(ví)šča	(*) *!	*

Candidates (59a) and (59b) violate the coordinated constraint. The former violates the coordinated constraint because it has a peak that is not aligned to the left edge of the suffix, whereas the latter does because the suffix is not properly included in the foot. The first candidate is by all means the most optimal output of this tableau.

4.15. Another View on Russian Stress: Melvold (1990)

Following Halle and Kiparky's (1977) and Kiparsky's (1982) works on Indo-European, Melvold adopts the "Basic Accentuation Principle (BAP)" in (60) to describe the location of stress in Russian.

(60) *Basic Accentuation Principle*
If a word has more than one accented vowel, assign stress to the leftmost one; otherwise assign stress to the leftmost vowel.

Given the BAP, fixed root stress is predicted whenever the root is accented; the accentual specification of the desinence is irrelevant, e.g. *rabóta* (NOM.sg.) < *ra(bot-(a*, *rabóty* (NOM.pl) < *ra(bót-y* 'work'. Post-stressing roots as in *gospožá* (NOM.sg), *gospoží* (NOM.pl) 'lady' result from a rule that transfers inherent accent one syllable to the right. When the root is unmarked, the BAP predicts a mobile paradigm as in *golová* (NOM.sg) < *golov-(a*, *gólovy* (NOM.pl) < *golov-y* 'head'. This latter observation is crucial for Melvold's analysis and is expressed with the following generalization:

(61) *non-derived noun generalization*[33]
Mobile stress occurs only in non-derived nouns, [root + InflS].

Melvold's generalization in (61) implies that stress in derived words is always 'fixed'. To account for this, she advances the following proposal: (a) derivational suffixes can be unmarked or marked and are all cyclic and (b) the BAP is a cyclic rule. Let us see how this system works.

If the BAP applied on the first cycle, the cycle created by the root, then stress would have always been on some vowel of the root, either by marking or default. Since stress is shifted in inflected formations, we conclude that the BAP does not enter the first cycle. The addition of the inflectional ending creates a second cycle in which the BAP applies to assign stress to the leftmost accent or, else, the leftmost vowel. The derivation in cycle 2 is exemplified in (62).

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[33] The same generalization holds for adjectives and verbs.

(62) *derivation in cycle 2*

	* *	BAP	
a.	[[rabot] [a]]	→	rabóta
b.	[[golov] [y]]	→	gólovy

Derived words introduce a third cycle. The outcome of cycle 2 cannot enter cycle 3 without already having stress on some syllable even when both the root and the derivational suffix are unmarked. The default clause of the BAP blindly assigns leftmost prominence in cycle 2. Since there is already some stress on the left and leftmost stress wins, a third cycle suffix can never win. Hence, stress can never shift in words with three or more cycles. In this way Melvold explains the generalization in (61).

In (63), it is shown that accented and unmarked derivational suffixes cannot control stress, although they are cyclic. For Melvold the suffix /-íšč(-a)/ is an accented cyclic suffix and the suffix /-ost'/ is an unmarked cyclic suffix.

(63) *derivation in cycle 3*

	* *	BAP	* *	BAP	
a.	[[jam] + [išč]]	→	[[jamišč] + [a]]	→	jámišča
	cycle 2		cycle 3		
		BAP	* *	BAP	
b.	[[molod] + [ost']]	→	[[molodost'] + [am]]	→	mólodost'am
	cycle 2		cycle 3		

The word *jámišča* contains an accented root and an accented derivational suffix. It is clear from the derivation in (63a) that the BAP assigns stress to the first accented syllable. Another instance of a cyclic accented suffix is /-ic(-a)/. When the cyclic derivational morpheme lacks an inherent accent, the derivation proceeds as in (63b). The [root+DerS] constituent enters the third cycle having leftmost stress by the default clause of the BAP in cycle 2. The output of cycle 3 has fixed initial stress; the accent of the inflection is insignificant. The suffixes /-stv(-o)/ and /-nik/ behave in a similar way.

Not all derivational suffixes behave alike. There are also cyclic suffixes that do impose their inherent accent as /-ast/ in *gorlásta* 'loud-mouthed (fem)' and /-ač/ in *pužačí* 'man with a paunch'. To account for these cases Melvold employs another diacritic, namely dominance. Some suffixes have the ability to override stem stress. The ability to override stem stress, however, is not predictable but it has to be assigned in the lexicon. In short, Russian suffixes can be marked for lexical accents and dominance.

A sample of derivation with dominant suffixes is presented in (64). The suffix /-ast/ is an example of a dominant accented suffix. Melvold mentions /-En’/ as the only example of an unmarked dominant suffix. Notice the heterogeneous mode in which dominance is expressed. With accented suffixes it is represented with a level 2 asterisk in (64a), revealing that primary stress is already marked in the lexicon. With unmarked suffixes, on the other hand, dominance is expressed as deletion of preceding asterisks.

(64) *derivations with dominant suffixes*

	*				
	* *	BAP	* *	BAP	
a.	[[gorl + [ast]]	→	[[gorlast] + [a]]	→	gorlásta
	cycle 2		cycle 3		
	*	BAP	*	BAP	
b.	[[oborot] + [En’]]	→	[[oborot] + [En’]]	→	óboroten’
	cycle 2		cycle 3		

To summarize, Melvold argues that all derivational suffixes in Russian are cyclic; some of them are accented (e.g. /-íšč(-a)/), whereas some others are unmarked (e.g. /-ost’/). Those that impose their markedness (e.g. /-ást/) or unmarkedness (e.g. /-En’/) on the word are equipped with the additional diacritic of dominance.

Notice that the non-derived noun generalization is violated in forms derived with the suffixes /-En/ and /-Ok/ as, for example, in *xóloden* (NOM.sg.masc), *xolodná* (NOM.sg.fem) ‘cold’. Melvold’s explanation centers on differences between yers. One type of yer, called Φ-yer, is represented on the segmental plane but not on the stress plane, therefore it can never be accented. The suffixes in question include Φ-yers. The second type of yer, called X-yer, is linked to a syllable nucleus and thus, is represented both on the syllable and stress plane. Consequently, X-yers can host an accent. The suffix /-(Ec/ which derives *xrabr* > *xrabréc* ‘brave person’ has an X-yer.

The problem with this proposal is that stress and in particular the ability of a yer to carry a lexical accent or not, is the only visible criterion to draw the distinction between the two types of yers. However, one can simply claim that yers behave like full vowels in this respect. Some of them are marked, whereas some others are not. In other words, the criterion of stress is circular and insufficient to support the twofold distinction between yers.[34] The derivations with the suffixes /-En, -Ok/ are still problematic for Melvold.

An important disadvantage of the analysis just reviewed is that dominance cannot be equated with cyclicity nor with markedness. Not all cyclic suffixes are dominant neither are all dominant suffixes marked. Moreover, dominance is an additional diacritic some morphemes are provided with. Even more problematic is the unclear status of dominance. The diacritic of dominance in marked morphemes is tantamount to primary stress. In unmarked morphemes dominance is a diacritic that sweeps off previously assigned structure but states nothing about the position of stress. Finally, the analysis does not explain why yers vocalize before suffixes like /-nik/, e.g. *kúkol'nik* 'puppeteer' but not before inflectional suffixes, e.g. *kúkla* 'doll (NOM.sg)'. They are both cyclic suffixes and one would expect them to behave alike.

The analysis could be substantially improved if we discard one of the two diacritics and more specifically, dominance which is, in my opinion, the most problematic one. One possible step towards this direction would be to derive dominance from cyclicity. A second solution would be to derive it from markedness. The first hypothesis is examined in the following paragraphs.

The main motivation for Melvold to claim that suffixes like /-išč(-a), -ic(-a)/ are cyclic is the parallel existence of the suffixes /-ost', -nik, -stv(-o)/. If we assume that the latter suffixes follow a prosodic word and behave like clitics, then there is no real reason for treating the former suffixes as cyclic. The welcome result of this move is that dominance effects are now derivable from cyclicity.

Suffixes like /-ast/ and /-En'/ are cyclic; this means that they can destroy previously assigned metrical structure by imposing their own accentual pattern. On the other hand, suffixes like /-išč(-a), -ic(-a)/ and /-En, -Ok/, as well as inflectional suffixes, are non-cyclic; this is why they respect stress assigned in previous cycles.

The modified version of Melvold's model accounts for the empirical facts but falls short of explanatory power. Even if we adopt a stratum organization of the grammar and classify cyclic suffixes to level I and non-cyclic suffixes to level II, some generalizations are still missed. First, why is there only one instance of a cyclic unmarked suffix, namely /-En'/? Second, why does level II embody

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[34] Melvold (1990:156) wrongly assumes that the vowel /e/ which appears between the root and the derivational suffix /-stv(-o)/ in examples like *múž-e-stv-o* 'courage', *sv'jatóš-e-stv-o* 'sanctimonious behavior' is a third type of yer which, as opposed to the others, can trigger velar palatalization. This is, however, an epenthetic vowel due to an OCP-restriction against adjacent sibilants (cf. fn 28).

such a diverse group of suffixes, ranging from inflectional (e.g. -a, -i, -o) and evaluative (e.g. -išc(-a), -ic(-a)) to derivational (e.g. -En, -Ok)?

To start with the first question, one would expect unmarked cyclic suffixes to be the majority, as is the case in other languages (e.g. Dutch, English). But in Russian this type of suffixation is uncommon and, moreover, the only example that Melvold cites is highly unproductive.

The second question is more relevant to the point I am trying to make. The non-cyclicity and consequently, non-dominance of the suffixes /-En, -Ok/ is related to the absence of a lexical accent. On the other hand, the non-cyclicity of inflectional and evaluative suffixes is attributed to morphology. As explained in previous sections, both types of suffixation are unable to determine fundamental properties of the word such as syntactic category. In conclusion, for the modified version of Melvold's analysis it is completely accidental that level II morphology contains suffixes with the prosodic and morphological characteristics described above.

In the route I take in the analysis of Russian stress, dominance results from two factors: morphological headedness and marking. Constituents that are both armed with a lexical accent and stand in head position in the structure are dominant. One of the many advantages of this model is that it closely connects morphological role with prosodic status. Evaluative and inflectional suffixes are not accidentally 'non-cyclic'. They simply do not fulfill some requirements that other suffixes do, and this has repercussions for their phonological behavior. Neither can one claim that the suffixes /-En/ and /-Ok/ are accidentally weak. They simply lack a lexical accent, the only means to reflect their morphological status in prosody.

At this point the analysis of Russian stress is complete. Before concluding this chapter, I would like to draw our attention to a phenomenon that highlights significant aspects of Russian accentuation and is indicative of the internal dynamics of the system, namely stress retraction.

4.16. Head-Attraction: Evidence for HEADSTRESS

A substantial part of the Russian vocabulary exhibits a phenomenon that is known in the literature as 'stress retraction'. Instead I propose the term 'head-attraction' because, as it will become clear later on, retraction is just an epiphenomenon generated by the morphology-prosody interface.

Two types of stress alternations are evidenced in a large number of nouns, adjectives and verbs.[35] First, unaccentable roots convert to accented, e.g. *kolbas-á* (NOM.sg) but *kolbás-y* (NOM.pl) ‘sausage’. Second, unmarked roots become accented, e.g. *ózero* (NOM.sg), *oz’óra* (NOM.pl) ‘lake’.

These accentual changes take place in specific morphological environ-ments. For example, a root is unaccentable throughout the singular paradigm but accented in the plural paradigm. Other contexts in which these changes take place are the short and long form of adjectives and the present and past form of verbs. More examples of stress retraction are given in (65) and (66).

In (65), stress retracts from the ending to the root. Thus, instead of the expected form *kolbasý* with final stress, the form *kolbásy* with pre-final stress occurs. It is important to stress that *kolbásy* is not in free variation with *kolbasý* but the only attested form for nominative plural.

(65) *unaccentable root → accented root*

a.	*noun*:	singular	plural		
	NOM	kolbas-á	kolbás-y		‘sausage’
	GEN	kolbas-ý	kolbás		
	DAT	kolbas-é	kolbás-am		
b.	*adjective*:	short form	long form		
		xoroš, -á, -ó, -í	xoróš-ij		‘good’
c.	*verb*:[36]	present	past		
	1sg	strig-ú	stríg	(masc)	‘to shear’
	2sg	striž’-óš	stríg-la	(fem)	
	3sg	striž’-ót	stríg-lo	(neut)	

The root in (65) shifts from unmarked to accented in the plural form of nouns and the long form of adjectives. Thus, *oz’óram* and not *ozerám* is the stress pattern of the dative plural for the noun *ózero*. Similarly, the adjective *vesel* has fixed stress in the long form but shifting stress in the short form.

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[35] According to Levin (1978), there are approximately 200 nouns, 250 adjectives and 90 verbs that retract their stress.

[36] The opposition between unmarked and unaccentable roots is neutralized in the present form of the verb because all present tense endings are accented. The process here can be also interpreted as conversion of an unmarked root into an accented one.

(66)	*unmarked root* → *accented root*			
	a. *noun*:	singular	plural	
	NOM	ózer-o	oz’ór-a	‘lake’
	b. *adjective*:	short form	long form	
		vésel, -á, -o	ves’ól-yj	‘merry’

Melvold (1990) accounts for the forms in (65) by means of a rule that moves stress one syllable to the left in the designated morphological environment. The forms in (66) are treated in a different way. According to Melvold they are derived by a rule that moves stress to the right edge of the root. One of the less satisfactory aspects of this proposal is that it treats both processes as unrelated to each other. It is a mere coincidence that the targeting pattern is one: a word with stress on the root. In my opinion, it is not accidental that fixed stress on the root is a target of both conversions. The root is the dominant element in the morphological structure and, when marked, it is prosodically dominant as well. With this in mind, let us try to explain the stress shifts in (65) and (66).

We have seen that the floating accent of unaccentable roots lands on the inflectional morpheme. Patterns created by unaccentable morphemes are somewhat peculiar because they express the mapping between morphological and prosodic structure in a less transparent way. Stress demarcates the head-constituent by designating the beginning of the non-head. There is not really a one-to-one correspondence between ‘stress’ and ‘head’. We conclude, therefore, that retraction in (65) aims at a more straightforward mapping between ‘stress’ and ‘head’. This is achieved only by obligatorily stressing the root which in inflected words takes up the role of the head.

The conversion process in (66) aims at exactly the same pattern. An unmarked root reforms to accented to eliminate accentual mobility but, more importantly, to achieve a one-to-one mapping between morphology and prosody. Unmarked roots are less preferred because they totally fail to project their morphological dominance to prosody. By having obligatory stress on the root there is, once more, a direct correspondence between ‘stress’ and ‘head’. To conclude, what we are dealing with here is a process of stress attraction by morphological heads; therefore I call it ‘head-attraction’.

One may wonder why the phenomenon of head-attraction takes place in specific morphological environments. It is hard to give a definite answer to this question. One can postulate, nevertheless, that head attraction takes place in ‘derived paradigms’. I use the term ‘derived’ here loosely to refer to a paradigm that at an intuitive level is based on another paradigm. The basis for the formation of long form adjectives are short form adjectives; similarly, the singular paradigm is the basis for the formation of plural and the present tense form is the basis for the formation of past tense. It is to some degree justified and even desirable that reparatory mechanisms such as head- attraction apply to derived contexts in order to improve interlevel transparency.

To recapitulate, there is a subgrammar in Russian which promotes morphological wellformedness in patterns that fail to express in a transparent way the prosody-morphology interface. For the outcomes of this subgrammar, morphological heads are always stressed. Interestingly, this subgrammar is also head-oriented and, consequently, not so distant from the core grammar.

I propose that head-attraction is triggered by the constraint HEADSTRESS, which demands morphological heads to be obligatorily stressed. This constraint is generally low ranking but climbs up the hierarchy in derived paradigms. HEADSTRESS is more forceful than the other head constraints we have seen because it demands stricter correspondence between mor-phological heads and stress prominence. The description of the constraint is given in (67).

(67) HEADSTRESS
Morphological heads are stressed.

Top-ranking of this constraint ensures that all outcomes will have stress prominence on the morphological head. The exact position of stress is determined by the other constraints of the system and especially, the prosodic ones. Notice that retracted forms are stressed on the root final syllable. This pattern arises under the influence of ALIGN-R which urges lexical accents towards the right edge. With HEADSTRESS high ranking, the best way to satisfy the constraint is to have the lexical accent at the last syllable of the root. This is as close as it can get to the right edge of the word.

The tableau in (68) illustrates the effects of HEADSTRESS in the plural form of the word *kolbasá*. Two candidates pass HEAD-STRESS but ALIGN-R gives priority to the first one, (68a). The winning candidate shows that a prosodic constraint determines the exact position of the accent when unaccentable heads are obligatorily stressed.

(68)

input: * kolbas-, -y	HEADFAITH	HEADSTRESS	ALIGN-R
☞ a. kol(básy)			*
b. (kólba)sy			**!
c. (kolba)(sý)		*!	

The driving force behind the second type of retraction is also HEADSTRESS. High ranking grants the constraint complete control of accentuation. Indeed, this constraint impels the lexical accent of the inflectional ending to be realized on the root. This is shown in (69).

(69)

input: ozer-,-(a	HEADSTRESS	FAITH(HEAD)
☞ a. o(z’óra)		*
b. oze(rá)	*!	

HEADSTRESS is crucially ranked above FAITH(HEAD). This ranking gives priority to outputs that are stressed on the root/head. The first candidate in (69) is selected as the winner, despite the fact that it triggers violations of all constraints that are lower than HEADSTRESS.

The account proposed here has several positive aspects. First, it establishes a connection between the two patterns of retraction. Both target and, eventually, improve structures in which the prosody-morphology interface is either less transparent or missing. Second, the analysis accounts for both cases by means of one and the same constraint, namely HEADSTRESS which is within the spirit of the theory advanced in the thesis. What the retracted forms try to accomplish is a stricter and more direct correspondence between morphological heads and prominence.

One could speculate that head-attraction is indicative of the internal dynamics of the Russian stress system and points to a potential future development. To some extent, it verifies the hypothesis that lexical accent systems are in the transitional stage towards a more ideal form of head-dependence in which the correlation between ‘head’ and ‘stress’ is expressed in a straightforward way. With this speculative remark the analysis of Russian stress is brought to an end. The following section summarizes the basic aspects of Russian accentuation.

4.17. Assessment and Conclusions of Russian Accentuation

Lexical items in Russian enter a rich system of morphological operations in which they already have a heavily specified metrical structure. The formation of complex word structures gives rise to internal conflicts for primary stress between morphemes and their inherent accentual patterns. In this chapter, and the rest of the thesis, I show that the conflict is resolved with the help of morphology. There is a systematic pattern of correspondence between morphological heads and prominence. The intrinsic accentual properties of heads define the prosodic make-up of the word. For example, accented derivational suffixes form words with stress on the derivational morpheme even when the other participating morphemes are marked as well. On the other hand, prosody does not remain idle either. We have seen in Chapter 3 that prosodic form constraints restrict accentual contrasts and ensure prosodic wellformedness.

Marking is the tool to express morphological structure to prosody. The mapping between morphological and prosodic structure is performed with the assistance of marking. Only marked heads can be prosodically dominant. Head dominance in Russian is implemented as follows:

(70) *head dominance in Russian*
HEADFAITH >> FAITH

Prosodic constraints on the other hand, intervene to establish the conflict between head faithfulness and faithfulness but, more importantly, to restrict accentual contrasts. Weak morphemes such as inflectional and evaluative suffixes exhibit fewer marking distinctions compared to heads because of a structural constraint that dominates FAITH. Similarly, by having prosodic wellformedness constraints like HIERAL above faithfulness to the position of the lexical accent, templatic shape is guaranteed for all inflected words.

In the introductory part of this thesis we speculated that ideally head-dependent systems would progress towards stricter forms of head-to-stress correspondence. This hypothesis is verified in Russian which shows stronger variants of head-dependence. There is a subgrammar within the core grammar in these languages which improves patterns that express indirectly the prosody-morphology interface. To achieve one-to-one correspondence, the interface constraint HEADSTRESS takes over accentuation, rendering faithfulness constraints powerless.

It remains to be seen how prosody interacts with morphological structure in lexical accent systems of polysynthetic morphology and whether it is still possible for prosodic constraints to influence the choices made by morphological structure. This is the subject of Chapter 5.

4.18. Summary and Conclusions of Chapter 4

This chapter focuses on the competition of lexical accents for prominence. The main proposal is that prosody is built hand-in-hand with morphology: prosodic headedness is determined by morphological headedness. The principle that launches the prosody-morphology interface is prosodic compositionality. This principle allows the prosodic component of grammar to scan morphological structure, detect the hierarchical relations between morphemes and become sensitive to them.

The mapping between the two components of grammar is articulated in terms of the theory of head dominance. In Optimality Theoretic terms, head dominance is expressed with a ranking in which head-faithfulness dominates faithfulness: HEADFAITH >> FAITH. This ranking resolves the conflict between lexical accents for prominence. Accents that are sponsored by morphological heads prevail over other accents in the word. The significance of heads is not accidental. Recent theories on phonological asymmetries argue that the 'head' is a central linguistic concept. In many languages heads display the maximum degree of complexity. Extending this idea, I claim that languages like Greek and Russian allow more accentual contrasts on (morphological) heads than non-heads and, more importantly, give priority to the prosodic properties of heads. Many interface systems, even the ones that lack marking, segregate heads from other morphological constituents and give head constraints top-ranking in the grammar.

We have seen implementations of head dominance in inflected and derived constructions in two fusional languages, Greek and Russian. There are many similarities in the accentuation of these languages. In fact, if one puts aside prosodic constraints, the resolution of conflicting accents is identical. In inflected words the accent of the inflectional suffix gives in to the accent of the root, whereas in derived words the derivational suffix is always the winner.

The accentual evidence discussed in this chapter shows that the theory of head dominance voids the need for the complex derivational machinery of cyclic and non-cyclic levels. Moreover, it offers a compelling counter-proposal 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.

Lexical marking is an important prerequisite for the prosodic dominance of the heads. Only heads with an accent are visible to prosody. This implies that when the head of a word lacks inherent accentual properties the prosody-morphology mapping is disturbed. Then, different factors determine accentuation as, for instance, the lexical accents of constituents other than the head or the default. The very essence of lexical accent systems hinges on head-dependence. These systems promote lexical accents belonging to heads but they do not necessitate obligatory stress on the head, if it is not armed with a lexical accent.

There is, nevertheless, the phenomenon of head-attraction that is attested in part of the Russian vocabulary. This process converts unmarked or unaccentable heads to accented heads. This way the one-to-one mapping between ‘head’ and ‘stress’ is actualized in forms where the interface is lacking, or it is improved where the interface is less transparent.

In the next chapter, I extend the framework of head dominance developed here to some lexical accent systems of polysynthetic morphology.

5 Lexical Accents and Head Dominance in Polysynthetic Languages

The Salish Languages

5.1. Introduction

This chapter extends the theory of head dominance to languages of polysynthetic morphology. In such languages, words consist of multiple morphemes that encode several semantic and syntactic notions. The term 'incorporating languages' is also used to describe such systems. Polysynthetic languages raise interesting questions about the relationship between morphology and syntax. The essential property of morphology is that it is concerned with the structure of words; the essential property of syntax is that it is concerned with the structure of sentences. However, the two components of grammar in polysynthetic languages are intimately related and the demarcation between them is sometimes fuzzy. Some processes in languages like Greek and Russian occur at the level of the sentence while in polysynthetic languages these processes take place within the word. For example, a verb may combine with its object and subject to form a word. What is striking in such languages is that morphological changes are in line with the syntactic operations with which they are associated. This generalization follows from the principle of Universal Grammar known as the *Mirror Principle* (Baker 1985, 1988), which states that morphological derivations must directly reflect syntactic derivations (and vice versa).

Given the characteristics of polysynthetic languages, it will be interesting for us to test whether morphological constituents that have an important status in the morphosyntactic structure behave differently than others with respect to stress.

As mentioned earlier in this thesis, the material for this chapter is drawn from a North American family of languages, namely the Salish or Salishan family. Like many native American languages, the Salishan languages are polysynthetic. The family is comprised of languages located in Washington and southern

British Columbia. It is divided into two large groups: Coast Salishan and Interior Salishan. Within the Interior division two groups are recognized, a northern and a southern one. The focus of this chapter will mainly be on two languages of the Northern Interior branch of the family, namely Thompson (Nɬeʔképmx) and Lillooet Salish (St’at’imcets). Both languages are spoken in British Columbia. I also use examples from two Salish languages of the Southern Interior branch, namely Moses-Columbia (Nxa’amxcín) and Spokane. The following section provides a rough guide to the main ideas of this chapter.

5.1.1. Theoretical explorations in Chapter 5

In order to present the central proposal of this chapter it is necessary to familiarize the reader with the complex morphological structure of the Salish word. Thus, some background information needs to be provided first.

Morphemes in Salish are of two types: roots and affixes. Most roots are *free*, i.e. they can, on occasion, constitute words by themselves. But many words are complex, containing in addition to a root, one or more affixes. Affixes are *bound*, meaning they never occur except as parts of such complex words. Some affixes are ‘prefixes’, which appear before roots. Most affixes are ‘suffixes’, which follow the root. A few affixes are ‘infixes’, that is, they occur between the root and another suffix. Finally, there are also some ‘reduplicating affixes’.

In this study only suffixes are examined. Prefixes fall outside the scope of the stress rule that applies within the word. This is another instantiation of the well-known phenomenon of prefix-suffix asymmetry. Infixation and reduplication, on the other hand, have their own value for prosodic morphology but fall outside the goals of the present study.

The morphological constituents found in the words of the Salish languages examined here are, besides the root, the *morphological stem* and the *morphological word* (Czaykowska−Higgins 1996). The former constituent encodes the lexical content of the word, whereas the latter constituent encodes the morphosyntactic content of the word.

The morphological stem is composed of the root, the locative and reduplicative prefixes as well as primary affixes (PA) (mainly the ‘inchoative’ infix /-p/) and lexical suffixes. Lexical suffixes (LexS) are bound morphemes with lexical referents. In some cases these resemble incorporated nouns but usually have no corresponding free-standing morphemes in the synchronic grammar. In general only one lexical suffix occurs in a word, but there are cases where two or three co-occur. Lexical suffixes play an important role in this chapter as will shortly become apparent. In sum, the Salish morphological stem has the following structure.

(1) *Salish morphological stem*[1]
LOC-RED/√ROOT+RED-PA=LEXS

n/q’^{w}y=úym’x^{w}-m ‘bake in earth oven’
LOC- √cook=earth(oven) (Thompson)

na/ħúy+ħuy=cin ‘loud person’
LOC- √irritate+RED(CVC)=mouth (Moses-Columbia)

The *morphological word* includes transitive markers such as the ‘directive’ (DR), ‘transitive’ (TR) and ‘causative’ (CAUS) suffixes. It also includes object (O) and subject (S) marking, or intransitive markers (ITR). Directive morphemes function similarly to what are often called applicative morphemes in other languages. Their function is to raise non-direct arguments such as benefectives, indirect objects or possessors to direct object position. Transitive inflection adds sequences of object and subject suffixes to roots (or stems) formed with the transitive former /-t/. Causative inflection is marked by a suffix (usually /-s/) before the transitivizer. The intransitive category are includes a ‘middle’ marker (usually /-əm/) as well as aspectual suffixes, modals (definitive, perseverative), and reflective and reciprocal markers. The aspectual markers can be either prefixes, which distinguish non-perfective and stative aspects, or suffixes which express habitual, translocational, iterative meanings. The focus will be mainly on aspectual suffixes.

(2) *Salish morphological word*
ASP-LOC-RED/√ROOT+RED-PA=LEXS-DR-CS-TR-O-S
-ASP/MOD/RFL/REC

cuw-e-t-∅-es ‘he makes s.t.’
√do-DIR-TR-3sgO-3sgS (Thompson)

k/ƛ’əm’-n-t-sa-s ‘he went past me’
LOC- √pass-CTR-TR-1sgO-3sgS (Moses-Columbia)

s-k/ɬux^{w}-p=akst ‘handbag’
ASP-LOC- √hang-INCH=hand (Moses-Columbia)

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[1] I use ‘√’ to designate a root, ‘+’ to indicate a reduplicative affix, and ‘=’ to indicate a suffix that belongs to the lexical suffix category. A prefix has a hyphen, except when it is immediately followed by a root, then a slash (/) is used.

In general, we distinguish a morphological and syntactic component within the word, which roughly coincide with the domains of morphological stem and morphological word, respectively. As I show later, stem-formation is mainly the result of syntactic processes which have a lexical flavor in the sense that they change or extend the lexical meaning of the root. On the other hand, the formation of the (in)transitive word is the byproduct of purely syntactic rules that reflect the syntactic frame or argument structure of a stem, or determine its inflectional (i.e. configurational, agreement) properties.

One of the main proposals in this chapter is that the difference between the morphologically based and syntactically based derivation influences accentuation. More specifically, I argue that at the level of the stem, the Salish languages analyzed in this study exhibit the characteristics of a head-dependent system with lexical accents, whereas at the level of the morphological word (i.e. grammatical suffixation) they behave as head-stress systems. The notion of 'head of the word' proves to be crucial here although it is defined in a different way than headedness in fusional languages like Greek and Russian.

Since reduplication, prefixation and infixation are not closely related to the main theme of this study, the two components which will be recognized as central for the accentuation of the stem are the root[2] and the lexical suffix. It has been argued by Saunders and Davis (1977), Gerdts and Hinkson (1996), Czaykowska−Higgins (1996), Czaykowska−Higgins, Willett and Bart (henceforth CWB) (1996), Gerdts (1998), among others, that most lexical suffixes exhibit properties that one would expect them to have if they were incorporated nouns.[3] This is surprising if one takes into consideration that, in contrast to common patterns of incorporation, the lexical suffixes are bound elements with little, if any, resemblance to free-standing nouns with the same or similar meaning. This gives a more lexical flavor in lexical suffixation than true

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[2] There are two positions in the Salish literature with respect to lexical categories. According to the first one Salish languages are category neutral. Such languages do not show contrast between noun, adjective and verb as lexical categories. This view has been taken by Kuipers (1968), Hukari (1976), Kinkade (1983), Jelinek and Demers (1982, 1994), and many others. On the other hand, some scholars (among others, Van Eijk and Hess 1986, Demirdache and Matthewson 1995, Davis and Matthewson 1997, Davis, Demirdache and Matthewson in prep.) argue in favor of a three-way distinction *in the syntax* between NPs, APs and VPs. In this thesis, I take no position on the question whether Salish languages distinguish lexically between nouns and verbs. The terms 'noun', 'adjective' and 'verb' are used loosely.

[3] There are also lexical suffixes that function as classifiers. Often these suffixes are translated into English with noun-like meanings. Constructions with such suffixes are named Root=LexS compounds as opposed to the Root=LexS predicates discussed here (CWB 1996). The two constructions exhibit not only morphological but also accentual differences, as I will show later in this chapter.

noun incorporation. There is historical evidence which suggests that lexical suffixes used to be free morphological constituents. Studies such as Egesdal (1981), Mattina (1987) and Carlson (1990) suggest that lexical suffixes in all likelihood originated as nominals that commonly occur as the second element in incorporated constructions. They were phonologically reduced, and eventually became bound forms.[4]

If lexical suffixes are elements which are incorporated to the root, they must have a thematic role. Indeed, lexical suffixes can express an object undergoing motion or change, or the object towards which the activity of an event is directed. They can also express location towards which an event is directed or the object by means of which an activity is effected. In other words, lexical suffixes appear to serve as independent arguments within the context of the entire sentence in which the Root=LexS constituent takes a predicate-like role. Some examples with Root=LexS predicates from Thompson and Moses-Columbia Salish (henceforth MC in the examples) are given in (3). The sources for these examples are Thompson and Thompson (1996) (henceforth Th in the examples) and CWB (1996).

(3) *root-lexical suffix relations*

a.	k^{w}én=kn’	‘grab (s.o.) by the back (of clothes)’	
	√grasp=back	*(/k^{w}én/, /=íkn’/)*	(Th 115)
b.	n/paw’=íkn’	‘get a layer of ice on top’	
	LOC/ *√freeze=top*	*(/paw’/, /=íkn’/)*	(Th 228)
c.	táx̣^{w}=yek’	‘lower (s.t., s.o.) with a rope’	
	√lower=rope	*(/táx̣^{w}/, /=eyek’/)*	(Th 341)
d.	n/páw’=ymx^{w}	‘the ground is frozen’	
	LOC/ *√freeze=ground*	*(/paw’/, /=uym’x^{w}/)*	(Th 228)
e.	cək=xə́n	‘get foot chopped or cut’	
	√hew=foot	*(/cək/, /=xən/)*	(Th 23)
f.	mək^{w}ʔ=ús-m	‘cover one’s face’	
	√wrap=face-MIDDLE	*(/mək^{w}ʔ/, /=us/)*	(Th 197)
g.	yəʕ’^{w}=ákst kn	‘I used a lot of force with my hand’	
	√force=hand 1sgS	*(/yəʕ’^{w}/, /=akst/)*	(CWB 32)

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[4] Lexical suffixes are not an idiosyncrasy of the Salishan languages. Wakashan and other northwestern Native American languages are well-known for their lexical suffixes (Gerdts 1998).

The claim I put forward is that stress in these examples is compositional in exactly the same way as in fusional languages like Greek and Russian. Moreover, the function that maps morphological structure into prosodic structure assigns prominence to the root, which is the constituent into which the lexical suffix incorporates and consequently, is the head of the con-struction.

Indeed, focusing on the first four examples, one observes that the root /k^{w}en/ accentually prevails over the suffix /=ikn'/ unlike the root /paw'/. Assume at present that both constituents in (3a) are marked as opposed to (3b) in which only the suffix is marked. The generalization is that a marked root prevails over a marked lexical suffix. This is expected under the theory of prosodic compositionality and head dominance: lexical suffixes are complements that satisfy an internal argument of the root/head, therefore they can never attract stress away from a root.

The default assigns prominence to the leftmost full vowel (3d) or the rightmost schwa (3e).[5] If there is only one full vowel in the word, this vowel is stressed, even when it is not the leftmost one in the word (3f-g).

The picture is somewhat different in the domain of morphological word in which grammatical suffixation takes place. Here stress is on the root unless a plural or an intransitive marker (e.g., aspectual marker, modal marker, reflexive or reciprocal suffix) are present. Then, stress is on the plural or the intransitive suffix.

The examples in (4) illustrate some transitive formations. The transitivizer is the vowelless morpheme /-t/. The root is stressed, even when it is unmarked. The example (4b) from Moses-Columbia is revealing. Here we expect the rightmost vowel to bear stress by default because the root is unmarked. This expectation is, however, not fulfilled. Stress outside the root is tolerated only when the root lacks a (full) vowel (4c-d). The picture is somewhat different when the suffix /-íyxs/, which marks number, follows the root. In this case, stress is on the number marker (4e-f). The examples are drawn from Thompson and Thompson (1992) (henceforth Th&Th in the examples) and Czaykowska-Higgins 1993a (henceforth CH in the examples).

(4) *transitive paradigm*

a. kíc-n-t-im-n 'visit-DR-TR-2plO-1sgS' (Th&Th 65)
b. k^{w}úɬn-n-t-sa-x^{w}-taʔ 'lend-CTR-TR-1sgO-2sgS-IMP' (CH 208)

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[5] The default algorithm in Thompson stresses the leftmost full vowel; otherwise, the rightmost schwa. The mirror image of this rule is the default case for Moses-Columbia: stress the rightmost full vowel, otherwise the leftmost schwa. Lillooet Salish is a foot-based system with a three-syllable limitation. The details of the phonological principles of each system are given in the following sections.

c.	səlk-n-t-úym-n	‘turn-DR-TR-2plO-1sgS’	(Th&Th 65)
d.	sac/səl-p-míx	‘STAT/round-INCH-IMPERF’	(CH 241)
e.	wik-t-íyxs	‘they see him’	(Th&Th 80)
f.	k’ʷenme-t-íyxs	‘they judge him’	(Th&Th 80)

In intransitive formations, aspectual and modal suffixes (5a-d) as well as reflexives (5e) and reciprocals (5f) attract stress from other constituents of the word. The examples are from the Thompson language (Thompson and Thompson 1996).

(5) *intransitive paradigm*

a.	paqʷ-úluɬ *√watch-TRANSLOC(ASP)*	‘travel to see (s.t.)’	(Th 226)
b.	p’en’t-ím’ *√return-IT*	‘take (s.t.) somewhere and back’	(Th 254)
c.	piyeʔ-ɬ-núxʷ *√one-PERSEV*	‘(we) made it through the year’	(Th 242)
d.	piyeʔ-wíʔx *√one-DVL*	‘unite’	(Th 242)
e.	kən-c-cút *√help-CAUS-TR-RFL*	‘help oneself’	(Th 90)
f.	cun-t-wáxʷ *√say-TR-REC*	‘say to each other’	(Th 41)

The question that arises now is whether the prosodic patterns in the above morphological constructions can be accounted for in terms of the theory of head dominance. The answer is that indeed the theory of head dominance is the right approach to analyze the Salish facts of word morphology.

The proposal is that in the above constructions, aspectual and modal morphemes are functional heads in the morphosyntactic structure. Similarly, in transitive formations the transitivizer /-t/ is the head but since this morpheme lacks a vowel, stress is on the immediately lower head, namely the root. Interestingly, when the transitivizer is followed by the number marker /-iyxs/, which heads its own projection, stress moves to this morpheme. The object and subject suffixes are just complements of the predicate and hence powerless with respect to stress.

In short, prosodic dominance emanates from the status which a constituent holds in the syntactic tree. Once again the syntactic organization of the word is projected onto the prosody: the constituent that occupies the most important position in the structure is prosodically highlighted. It is evident that morphosyntactic structure interacts with prosodic structure in polysynthetic languages in a way that is analogous to the prosody-morphology interface in fusional languages.

An advantage of the approach offered here is that it dispenses with unmotivated distinctions of suffixes into cyclic and non-cyclic groups and, moreover, predicts ‘cyclic effects’ from morphological headedness. Only head-constituents display cyclic behavior in these languages. Roots are stressed in transitive constructions, contra to the demands of the default prominence, simply because they are heads structurally. Similarly, lexical and personal suffixes (e.g. objects, subjects) are ineffective for stress not because of an arbitrary label that dubs them as ‘non-cyclic’ constituents, but because they can never be heads.

This chapter is interesting for another reason. It examines three closely affiliated systems that share common ground with respect to the morphological dependencies of stress but which are radically divergent in some phonological properties. More specifically, all four languages examined here have compositional stress with the head element of the word being prosodically dominant but their default algorithm is entirely different. Lillooet, as opposed to its sister languages, is a foot-based system with a three-syllable-window. This divergence gives us the chance to explore whether phonological factors can influence or restrict the patterns imposed by morphological structure, and perhaps contemplate the possible direction the system takes when phonological conditions start outranking mor-phological ones.

This chapter makes three significant claims. First, Salish languages are mixed-stress systems. They are ‘head-dependent systems with lexical accents’ at the stem level, in which derivation is mostly lexically based. They are, however, ‘head-stress systems with lexical accents’ at the level of the word, in which derivation results from pure syntactic operations. Second, prosodic compositionality and head dominance are the basic principles controlling accentuation. Rhythmic factors intervene to highlight or obscure marked patterns. Third, because of the compositional nature of stress in this systems, cyclic effects can be predicted from the morphosyntactic structure.

The ideas sketched here are presented in the following order: stem morphology is the subject of the first part of this chapter. In §5.2, I present the data of lexical suffixation from Thompson Salish and the analysis. The subject of §5.3 and §5.4 is stress-assignment in Spokane and Moses-Columbia Salish, and Lillooet Salish, respectively. A summary of the accentuation in lexical suffixation is presented in §5.5.

Stress in the morphological word and more specifically, in transitive and intransitive formations, is the focus of §5.6 and §5.7, respectively. An alternative analysis to Salish stress is presented in §5.8. A general discussion and an assessment of the framework proposed here are provided in §5.9.

The Morphological Stem

The first part of this chapter is concerned with accentual phenomena that take place within the domain of the stem. As mentioned in the introduction, this is the domain in which morphological rules apply. Many derivational processes take place within the domain of the morphological stem but only two will be examined here, namely lexical suffixation and compounding. Within the stem one can also find locative and reduplicative prefixes and infixes that express inchoative secondary aspect. Although these phenomena have their own value, they fall more within the scope of prosodic morphology, and are therefore not examined in this study.

Lexical suffixation is the process in which a root is combined with a lexical suffix. Lexical suffixes are bound morphemes with primarily lexical rather than grammatical meaning. Most lexical suffixes refer to nominal concepts, with the largest class consisting of body part suffixes. Two types of words are formed by the combination of a root with a lexical suffix: Root=LexS compounds and Root=LexS predicates. The former words express modifier-head relations, whereas the latter express head-complement relations. The structural difference between the two types of lexical suffixation is also reflected in stress. In predicate formations, roots are heads and are accentually dominant. In compound formations, on the other hand, roots function as modifiers of the meaning expressed by the lexical suffix and are accentually weak.

Root-Root compounding is less frequent in Salish languages. In this type of compounding, two roots (and not a root and a lexical suffix) are joined together to form a complex unit. In most cases the second element is an independent word (rather than just a root). There is often a compounding connective which joins the two constituents. Stress in compounds is pursued in the same way as stress in Root=LexS compounds.

In order to preserve the transparency of the morphologically complex forms of Salish, I adopt the following practice: I give the underlying representation of the forms, often abstracting from the phonological processes of consonant merging and vowel deletion. To illustrate with an example, the form /qy-xit-wa-s/ is given for what in the surface is pronounced as [q’iyxítus] ‘he writes to him’ in Moses-Columbia. This form results after (unstressed) vowel deletion and vocalization of the glide /w/ have been applied. Vowel reduction is not indicated in all examples. I adopt the practice of the *Thompson River Salish Dictionary* and indicate vowel reduction in *k^{w}én=kn’* < /k^{w}én=íkn’/ but not in *k^{w}én=cin*. The phonetic form of the latter example, namely [k^{w}énc], is not very informative because it does not show the exact prosodic shape of the suffix. The adopted notational practice primarily aims at enhancing the comprehension of the complicated morphological structure of Salish words. A list of the most important phonological processes is presented in the introductory section of each language.

5.2. Thompson Salish (Nɬeʔképmx)

After a brief introduction to the main morphological and phonological characteristics of Thompson (§5.2.1), I present some examples of lexical suffixation (§5.2.2). An examination of the empirical facts leads to the conclusion that there is a split in the accentual behavior of Root=LexS formations. A closer look at the internal constituency of these constructions reveals that stress reflects the structural difference between Root=LexS formations that are predicates and Root=LexS formations that are compounds (§5.2.3). The former is a type of incorporated construction where the lexical suffix is a complement to the root. The latter is a type of compound formation where the lexical suffix expresses a noun meaning that is modified by the root. The rest of the section analyses the accentual patterns of incorporated constructions (§5.2.4) based on the theory of head dominance (§5.2.5). Words that fall outside the scope of head dominance, namely words that lack inherent accents, are accounted for in §5.2.6.

5.2.1. Background information on Thompson

Thompson is one of the 23 Salish languages, a member of the Northern Interior subgroup of the Interior branch family. Its closest relatives are Shuswap and Lillooet. The Thompson Indians of southern British Columbia take their name after the Thompson river gorge. There is no native name that properly covers the speech community as a whole, although Nɬeʔképmx is sometimes used for this purpose. The sources for Thompson are the grammar and the dictionary compiled by Thompson and Thompson (1992, 1996).

As many Salish languages, Thompson has a large consonant inventory and a small vowel inventory.

(6) *inventory of Thompson Salish*

	obstruents			resonants		
consonants	stops		spirants			
	glot/zed	plain		plain	laryngealized	labial
	p’	p		m	m’	
dental	t’	t		n	n’	
lateral	ƛ’		ɬ	l	l’	
post-dental	c’	c̩	s̩	z	z’	
alveo-palatal	c		s	y	y’	
simple pre-velar	k’	k	x	γ	γ’	
round pre-velar	k’^{w}		x^{w}	w	w’	
simple post-velar	q’	q	x̩	ʕ	ʕ’	
round post-velar	q’^{w}	q^{w}	x̩^{w}	ʕ^{w}	ʕ’^{w}	
laryngeal	ʔ		h			

vowels	front		back
high	i		u
mid	e	ə	o
low		a	

The primary vowels are /i, u, e, ə/; the others are retracted counterparts, which are less common and to some extent automatic variants of primary vowels. /a/ is the retracted counterpart of /e/ and /o/ is the retracted counterpart of /u/. Vowels are homorganic to certain consonants: /i/ to /y/, /u/ to /w/, /e/ to /ʔ/ and /h/, /a/ to /ʕ/ and /o/ to /ʕ^{w}/. Before semi-vowels, laryngeals and pharyngeals, /ə/ is converted to the homorganic vowel, e.g. *zəy-t* > *ziy-t* ‘(liquid) flows’, *ʔes/yəʕ* > *ʔes/yaʕ* ‘it is dragged’ (Th&Th 30), and so on.

Thompson and Thompson (1992:21) claim that “stress manifests itself as a complex of loudness, force and pitch differences.” Moreover, Thompson displays all the characteristics of an unbounded system. Stress is not limited to any particular edge of the word, as indicated by examples such as *héy=sk’iʔ-(e)-∅-s* ‘gradually stop the music’ (Th 79), *ƛ’əq’əm-t-és* ‘he preaches to them’ (Th&Th 32), and stress related phenomena are not foot-based.

There is a general tendency in the language to drop vowels from unstressed syllables wherever possible, and to convert to /ə/ those vowels that are not dropped, e.g. *ƛ’əq’əm-t-és* > *ƛ’q’əm-t-és* ‘he preaches to them’, *k’^{w}inex=éɬc’iʔ* > *k’^{w}ənex=éɬc’iʔ* ‘how many carcasses? (Th&Th 32)’. Vowel deletion seems to be conditioned by constraints on syllable shapes, but since an extended study of Thompson is needed to confirm this hypothesis, I simply provide descriptive statements of the processes here. It is worth mentioning that /ə/ does not always represent a reduction of other vowels under weak stress. It has a phonemic status as well. This is shown by the fact that it can bear a lexical accent, e.g. *mə́cək*^{w} ‘blackcap fruit’, *ʔestwə́lle* ‘(brush) is cleared away’ (Th&Th 20).

Vowel loss is the trigger of cluster coalescence or simplification. The sequence /ts/ coalesces to /c/ whereas in the cluster /cs/ develops to /c/ after loss of /s/. Finally, some resonants become syllabic between other consonants and in word final position after a consonant. When this happens, it is common for syllabic /n/ to vocalize before homorganic obstruents to /e/, e.g. *sələk-n-t-és* > *sələk-n̩-t-és* > *səlk-e-t-és* ‘he whirls her around’ (Th&Th 43).

Roots in Thompson are of various shapes, the overwhelming majority conform to a few basic canons or typical shapes given in (7).

(7) *canonical shapes of roots*

CVC(C)	CC	CəC	CəC(C)VC
k^{w}ís ‘fall’	k’c’ ‘crosswise’	cəw ‘do’	pəzén ‘meet’
CVC(C)VC	Cə(h)	CəC(C)əC	CVC(C)əC
méx̩ah[6] ‘girl’	cə(h) ‘lay-long’	sələk ‘whirl’	p’éyəq’ ‘spread out’

There is a large stock of lexical suffixes of the following shape:

(8) *canonical shapes of lexical suffixes*

VC	VCC	VCVC	VCCC
=ap ‘bottom’	=ayk’ ‘rope’	=inek ‘star’	=ax̩^{w}ck ‘chest’
CVC	CCV(C)	CCVCC	
=cin ‘mouth’	=xwey ‘trail’	=szenx^{w} ‘year’	
CəCCəC	CəC	əCVCC	
=ə̩ltən ‘harvest’	=təm ‘inside’	=əw’eck ‘bonus’	

These preliminary remarks will assist our understanding of the Thompson examples to follow. When necessary, additional processes will be discussed.

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[6] Retraction in consonant and vowels is represented as follows: C̩V̩.

5.2.2. The Thompson facts

Like many languages of the Interior branch of the Salish language family, Thompson has a highly complex system of stress assignment. In the data in (9) stress does not fall consistently on any one syllable (e.g. ultimate, penultimate, etc.) or on any one morpheme in a word. All the examples in this section are taken from the *Thompson River Salish Dictionary* compiled by Thompson and Thompson (1996).

(9) a. p’áq’^{w}eɬ ‘scaffold’ (cf. p’aq’^{w}eɬ=qín) (Th 252)
b. q’əlx^{w}-ə́m ‘curl (s.t.)’ (Th 278)
c. piʔúps ‘eight’ (Th 239)
sip’éc’ ‘skin’ (Th 327)
p’ə̣́ṣk’eʔ ‘hummingbird’ (Th 257)
d. qayt=íkn’ ‘go gradually along ridge to the very top’
√reach=ridge (Th 265)
k^{w}én=kn’ ‘grab (s.o.) by the back (of clothes)’
√grasp=back (Th 115)
n/q^{w}ec=íkn’ ‘one’s back is warm’
√warm=back (Th 290)

In previous accounts of Salish accentuation (cf. for Spokane, Carlson 1972, 1990; for Lillooet, Van Eijk 1985; for Shuswap, Kuipers 1974, among others), it has been claimed that the position of primary stress is affected by idiosyncratic stress properties of morphemes. More specifically, it has been proposed that roots and suffixes are divided into three classes: strong, variable and weak. Surface stress is primarily determined by a morphological stress hierarchy which is roughly as follows: strong suffix > strong root > variable suffix > variable root > weak root > weak suffix. In any word, the highest morpheme in the hierarchy is the one to receive primary stress. To illustrate with an example, according to the aforementioned proposal the lexical suffix /=ikn’/ is variable; it attracts stress from a weak root but loses stress after a strong one, as is shown in (9d).

Here I propose an account that makes use of an analogous notion of hierarchically ordered preferences. However, the fundamental difference is that the hierarchy is not an idiosyncratic property of morphemes. It is imposed by the hierarchical relations between morphological constituents as these are established by morphosyntactic rules. More specifically, I argue that some morphemes are marked with a lexical accent whereas others are not. Besides marking, however, the role each constituent has in the structure is decisive for its prosodic dominance. But let us take things from the beginning and have a careful look at some more examples.

In (10) some examples with lexical suffixes are listed. Examples (10a) and (10c) are both stressed on the root whereas (10b) has stress on the suffix. It seems that the difference between the aforementioned pairs relies on the quality of their (underlying) vowels. (10a) has two full vowels underlyingly and stress on the leftmost one. (10b) has to two schwas and stress on the rightmost one. (10c) has a root with a full vowel and a suffix with a schwa; stress here is located on the full vowel of the root. I conclude from the examples in (10) that, other factors aside, the following generalization holds for Thompson: stress is on the leftmost full vowel, otherwise on the rightmost schwa.

(10) a. n/páw’=ymx^{w} ‘the ground is frozen’
LOC/√freeze=ground *(/paw’/, /=uym’x^{w}/)* (Th 228)

b. cək=xə́n ‘get foot chopped or cut’
√hew=foot *(/cək/, /=xən/)* (Th 23)

c. q^{w}úɬ=xn ‘get a blister on one’s foot
√blister=foot *(/q^{w}uɬ/, /=xən/)* (Th 301)

The picture is somewhat different in (11) which presents some more examples of Root=LexS derivations, all with full vowels. These examples will help us test the generalization drawn in the above paragraph. The words in (11a) show once more that the leftmost vowel is stressed. Problematic for this hypothesis, however, are the examples in (11b). Here stress is on the suffix, although the root has a full vowel.

(11) a. píx̣=qn ‘lay (boards) on top (of s.t.)’
√lay-parallel=top *(/pix̣/, /=qin/)* (Th 241)
k^{w}én=kn’ ‘grab s.o. by the back (of clothes)’
√grasp=back *(/k^{w}en/, /=ikn’/)* (Th 115)

b. n/paw’=íkn’ ‘get a layer of ice on top’
LOC/√freeze=top *(/paw’/, /=ikn’/)* (Th 228)
qayt=qín ‘reach the top’
√reach=top *(/qayt/, /=qin/)*

qayt=íkn’ ‘go gradually along ridge to the very top’
√reach=ridge *(/qayt/, /=ikn’/)* (Th 265)

One way to explain the stress patterns in (11b) is to assume that roots such as /qayt/ are extrametrical. This solution, however, fails because in transitive paradigms the root is accented, e.g. *qáyt-s-t-∅-es* ‘take somebody on the top’. Moreover, the proposal implies that the extrametricality of the root would have to be canceled when it is preceded by a prefix. Thus, different stress patterns would arise, depending on whether the root is accompanied by a prefix or not. However, this is not empirically correct in Thompson or any other of the Salish languages examined here.

Another possible explanation is to assume that the lexical suffixes in (11b) are marked; they have an inherent accent that attracts stress. Under this proposal we have to find out in which contexts the accent of the suffix surfaces with primary stress.

A more careful look at (11) reveals that, if the lexical suffixes /=qín/ and /=íkn’/ are accented, their accent surfaces only with roots that lack lexical accents such as the roots in (11b). We conclude, therefore, that the roots /píx̣/ and /k^{w}én/ in (11a) must be accented because they accentually prevail over the suffix.[7] In sum, the stress algorithm for the Thompson words is as follows:

(12) *stress-rule for Thompson lexical suffixation (I)*
a. stress an accented root; if there is no marked root, stress an accented lexical suffix.
b. if there are no marked morphemes at all in a word, stress the leftmost full vowel, otherwise the rightmost schwa.

The only chance an unmarked suffix such as /=uym’x^w/ has to reveal its accent is when it is combined with an accentless or a vowelless root, as in (13).

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[7] Accented morphemes will be represented with an acute accent in their underlying forms, /k^{w}én/, /=íkn’/. It is tedious to provide evidence for the accentual status of each one of the morphemes presented here, therefore sometimes the accentedness of a constituent will be taken for granted. The reference numbers given to the right of the examples can always help the reader to find the corresponding entry in the dictionary and check the validity of the claims. More on the representation of marked morphemes is given in §5.2.4.

(13) a. n/k’ʔ=úym’xʷ-tn[8] ‘anchor’
LOC/ √set-long-object=ground-INSTR (Th 98)

b. ʔes/sǝlk=ús ‘s.t. has been turned to face the other way’
STAT/ √whirl=face (Th 321)

The examination of stress patterns has not yet been completed. In the dictionary, I found the following group of data which contradicts both statements of the stress-rule in (12). The lexical suffix is stressed regardless the shape or the accentual status of the root. For instance, in (14a) the root has a schwa and in (14b) and (14c) the roots are accentless and accented, respectively.[9] More importantly, the lexical suffix is stressed even when it is unmarked as, for example, the suffix /=uym’xʷ/ in (14b), or when it has a schwa, as for example, the suffix /=xǝn/ in (14b-c).

(14) a. piʔkʷ=xǝ́n ‘dust from wheels (of vehicle)’
√dusty=foot, wheel *(/pǝy’ǝkʷ/, /=xǝn/)* (Th 239)

b. s/xen’xʷ=úy’mxʷ ‘Rocky Mountains’
NOM *√rock=ground* *(/xen’xʷ/, /=uy’mxʷ/)* (Th 391)
ƛ’ixʷeɬ=xǝ́n ‘different shoes’
√different=shoe *(/ƛ’ixʷeɬ/, /=xǝn/)* (Th 182)
p’uƛ’=qín ‘misty, foggy on top of the mountain’
√misty=top *(/p’uƛ’/, /=qín/)* (Th 261)

c. sip’ec’=qín ‘scalp (animal or person)’
√skin=head *(/sip’éc’/, /=qín/)* (Th 327)
n/qʷec=íkn’ ‘one’s back is warm’
LOC *√warm=back* *(/qʷéc/, /=íkn’/)* (Th 290)

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[8] Here the Root=LexS predicate has undergone further derivation. The suffix /-tǝn/ as well as the suffix /-min/ create words denoting instruments, implements and related notions (Thompson and Thompson 1992). It is puzzling that such clearly derivational suffixes are not prosodically dominant in any Salish language. Further investigation will shed some light on their prosodic as well as morphological status.

[9] The roots in (14c) are considered to be accented because, when in isolation, they are stressed on the final vowel and not on the leftmost one, as predicted by the default.

		piʔups=xə́n	‘eight (pairs of) shoes	
		√*eight=foot, shoe*	*(/piʔúps/, /=xən/)*	(Th 240)
		s/weʔwit=xə́n	‘lower part of hind foot or leg’	
		NOM/√*behind=foot*	*(/weʔwít/, /=xən/)*	(Th 372)

It seems that for the words in (14) a simpler stress rule is at play, namely stress the rightmost vowel (or the rightmost element). This rule is given in (15).

(15) *stress-rule for Thompson lexical suffixation (II)*
Stress the rightmost vowel (or the rightmost morpheme).

The central task of the analysis is to explain the split in the Thompson lexicon. Are there two ‘stress-rules’ and part of the vocabulary chooses one or the other, or is there something more fundamental in the process of accentuation that escaped our attention?

Let us adopt for the moment the first hypothesis by assuming that there is a split in stress assignment; some roots are marked to follow the algorithm in (12) whereas some others follow the algorithm in (15). Under this proposal, it is predicted that there are no roots that follow both stress rules. However, the examples in (16) falsify this prediction.

(16)	a.	qʷéc=n’i-tn	‘thing to keep the ears warm, ear-muffs’	
		√*warm=ear-*INSTR	*(/qʷéc/, /=en’i/)*	
		qʷec=úym’xʷ	‘warm place’	
		√*warm=area, land*	*(qʷéc/, /=uym’xʷ/)*	(Th 290)
	b.	p’úƛ’=s	‘blow smoke in s.o.’s face’	
		√*smoke=face*	*(/p’uƛ’/, /=us/)*	(Th 261)
		s/p’uƛ’=úym’xʷ	‘ground fog’	
		NOM √*haze=ground*	*(/p’uƛ’/, /=uym’xʷ/)*	

The above examples show that the same (accented/unmarked) root can follow different stress rules. An additional problem raised by the idea of split-lexicon is that it implies a very complex mechanism of marking in which each morpheme has to be specified as belonging to group A (algorithm (12)) or group B (algorithm (15)). Within the framework of Optimality Theory one way to encode this split is by having a grammar with two rankings each one of accounting for the attested stress patterns (cf. Inkelas 1994, Anttila 1995, 1997 and Chapter 2 for a discussion on variation in grammar). Although such parametric approaches have been forward by scholars, this is perhaps not the best way to account for the Thompson facts.

Instead I attribute the stress difference between the two groups of words to their different morphological structure. Czaykowska−Higgins (1996) and CWB (1996) in a study on Moses-Columbia lexical suffixes, argue that there are two forms of lexical suffixation. Firstly, there are lexical suffixes that take on the role of a theme or patient of the root or satisfy an argument of the root. These types of forms are referred as Root=LexS predicates. In these cases the lexical suffix functions as an incorporated noun. Secondly, there are forms in which the lexical suffixes take on 'abstract' meanings and very often function as classifiers. These forms are called Root=LexS compounds.

Some of the diagnostic criteria for the predicative function of the derived component as well as the incorporated nature of the lexical suffix are whether or not the lexical suffix assumes theme, locative, instrument and perhaps agent roles. Transitivity is another criterion; the Root=LexS component may be either transitive or intransitive. Moreover, certain types of noun incorporation have been argued to allow doubling (i.e. the presence of an overt NP coreferential with the incorporated noun) (Baker 1988, 1996). Salish languages in general allow an independent nominal to be coreferential under certain conditions (e.g., if the independent nominal is marked as oblique). Root=LexS components that do not meet any of these criteria are compound forms and not predicates.

In the following section, I establish that there are lexical suffixes which function as incorporated elements and lexical suffixes which function as the second element of a compound. After drawing this distinction, I claim that the different status of lexical suffixes in the morphological structure has an impact on stress.

5.2.3. Incorporation and compounding in lexical suffixation

5.2.3.1. Root=LexS predicates

The first property of Root=LexS predicates that we focus on involves the thematic interpretations assumed by lexical suffixes in such constructions. Lexical suffixes in Salish languages in general, and in Thompson in particular, can be semantically interpreted as themes, locatives or instruments (CWB 1996, Gerdts 1998).[10] Because the papers on Salish incorporation do not directly deal

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[10] CWB (1996) argue that, marginally, lexical suffixes can take on an agent role, as shown in (i). Baker (1996) argues that incorporation of agent roles is not a characteristic of true noun incorporating languages. Obviously, this issue calls for further examination.

with Thompson, I often include examples from Moses-Columbia Salish in order to strengthen the point made here and to clarify the argument.

CWB (1996) define the theme role as the relation representing an object undergoing motion or change. Some examples with the lexical suffix marked as direct argument are given in (17).

(17) *lexical suffix-theme*
a. q^{w}éc=n’i-tn ‘thing to keep the ears warm, ear-muffs’
√warm=ear-INSTR *(/q^{w}éc/, /=en’i/)* (Th 290)
b. cək=xə́n ‘get foot chopped or cut’
√hew=foot *(/cək/, /=xən/)* (Th 23)
c. héy=sk’iʔ ‘stop singing’
√pause=song *(/hey/, /=esk’iʔ/)* (Th 79)
d. nék’=ɬx^{w} ‘change roof’
√change=house, roof *(/nek’/, /=eɬx^{w}/)* (Th 213)
e. k’it’=áɬp ‘cut down tree’
√cut=tree (MC, CWB 1996:34)

The locative thematic role is defined as the thematic relation expressing location towards which an event is directed, or the location in which an event/object is situated.

(18) *lexical suffix-locative*
a. n/páw’=ymx^{w} ‘the ground is frozen’
LOC/√freeze=ground *(/paw’/, /=uym’x^{w}/)* (Th 228)
b. ʔes-n/túz=ym’x^{w} ‘bent down to the ground’
STAT-LOC/√stoop=ground *(/tuz/, /=uym’x^{w}/)* (Th 361)
c. n/xéƛ’=k^{w}u-n-∅-es ‘skim (s.t.) off water’
LOC/√skim off=water *(/xeƛ’/, /=etk^{w}u/)* (Th 391)

In sentences with parallel meanings but with independent nominals instead of lexical suffixes, the nominal is marked as an oblique rather than direct argument. This is illustrated with the example in (19) from Moses-Columbia. The locative preposition precedes the word *ʔacp’áƛ’* ‘tree’:

(i) x^{w}ay’-əm-ált ʔací Línda ‘Linda’s child ran away’
√run away-MIDDLE=child DEM Linda (MC, CWB 1996:32)

(19) a. kn tk’əwəlxálqʷ
t/k’iw-ilx=álqʷ
1sgS LOC/√climb-AUT=pole

b. kn tk’íwlx l ʔacp’áƛ’
1sgS LOC/√climb-AUT PREP tree
‘I climbed the tree’ (CWB 1996:32)

The thematic role of instrument is used to refer to objects which are the means by which an activity is effected. I found only one example in Thompson with the lexical suffix in an instrument role. However, other Salish languages such as Halkomelem (Gerdts 1998) and Moses-Columbia (CWB 1996) offer more examples.

(20) *lexical suffix-instrument*
a. táx̣ʷ=yek’ ‘lower (s.t, s.o.) with a rope’ (Thompson)
√lower=rope (/táx̣ʷ/, /=eyek’/) (Th 341)

b. yəʕ’ʷ=ákst kn ‘I used a lot of force with my hand’ (MC)
√force=hand 1sgS (CWB 1996:32)

There are more factors supporting the incorporated nature of lexical suffixes in Root=LexS predicate constructions. Unfortunately, the Thompson grammar (Thompson and Thompson 1992), which constitutes the main source for the data presented here, offers very little information with respect to this phenomenon. In fact, it provides only one example. For this reason, I strictly follow CWB’s (1996) paper on Moses-Columbia Salish lexical suffixation. In the discussion that follows, most examples are taken from their research. It must be emphasized that there is very little divergence among the Salish languages on this issue. This is also verified by Gerdts’s (1998) study on lexical suffixation in Salish languages. Besides, the main goal of this section is not to provide an exhaustive analysis of incorporation but to offer a description of the facts that will help us understand the difference between the predicative and compounding function of Root=LexS constructions.

The data from Moses-Columbia and Thompson shows that the Root=LexS predicate that takes on a theme role may surface as intransitive or as transitive. Some examples of intransitive predicates are given in (21a). In intransitive predicates, which are also called inactive predicates, an incorporated element can also serve as the notational subject of the clause. An independent nominal, which is semantically linked to the lexical suffix, can occur in the same clause with the intransitive predicate only when it is marked as 'oblique', as shown in (21b).[11] The latter type of incorporation is often referred as 'compound noun incorporation' (Rosen 1989).

(21) *intransitive theme predicates*
a. cək=xə́n kn 'I get foot chopped or cut' (Thompson, 17b)
k'it'=áɬp kn 'I cut down a tree' (MC, CWB 1996:32)
√cut=tree 1sgS

b. pu[p]n'=éwɬ tə s/c'əqʔ=éwɬ
√find[DIM]=conveyance OBL NOM/*boat*
'he found a boat' (Thompson, Th&Th 147)

Mary tumist=áɬxʷ t stəxʷtəxʷúl
Mary √sell=house OBL *houses*
'Mary sells houses' (MC, CWB 1996:34)

The Root=LexS predicate can also be marked as transitive (22a). In this case an independent nominal direct object is allowed which is, however, interpreted as the possessor of the lexical suffix, although it never surfaces with possessor morphology (22b). Transitives can also co-occur with a coreferent independent nominal which is marked as an oblique (22c).

(22) *transitive theme predicates*
a. héy=sk'iʔ-(e)-∅-s 'stop singing'
*√pause=song-*TR*-3O-3sgS* (Thompson, cf. 17c)
nék'=ɬxʷ-e-∅-s 'put a new roof'
*√change=roof-*TR*-3O-3sgS* (Thompson, cf. 17d)

b. k'it'=áɬp-t-∅-n John 'I cut down John's tree'
*√cut=tree-*TR*-3O-1sgS John* (MC, CWB 1996:34)

c. k'it'=áɬp-t-∅-n John t c'əq'=áɬp-s
*√cut=tree-*TR*-3O-1sgS John* OBL *√fir=tree-his*
'I cut down John's fir tree' (MC, CWB 1996:34)

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[11] Gerdts (1998:96) claims that Halkomelem Salish does not allow doubling with a free-standing noun of the same or more specific meaning.

Predicates which contain a locative or instrument lexical suffix can surface as intransitive (23a) or transitive (23b). An independent nominal can co-occur with a corresponding lexical suffix only if it is marked as oblique (23c).

(23) *intransitive locative/instrument predicates*
a. n/páw’=ymx^{w} ‘the ground is frozen’ (Thompson, cf. 18a)
x^{w}ir=xn-m ‘reach out a/the foot’
√reach out=foot-MIDDLE (MC, CWB 1996:35)

b. n/xéƛ’=k^{w}u-e-∅-es ‘skim s.t. off water’
LOC/ √skim off=water-TR-3O-3sgS (Thompson, cf. 18c)
táx̣^{w}=yek’-e-∅-es ‘lower s.t, s.o with a rope’
√lower=rope-TR-3O-3sgS (Thompson, cf. 20a)

c. yəʕ’^{w}=ákst-min-∅-n t ʔinkálx
√force=hand-REL-3O-1sgS OBL 1sgPOSS-hand
‘I used force on it with my hand [...] (MC, CWB 1996:35)

One of the issues often discussed in the literature of noun incorporation concerns the question of whether or not incorporated nouns can be interpreted as referential in meaning. CWB (1996: 15-16) argue that speakers of Moses-Columbia Salish can interpret lexical suffixes in both types of constructions (i.e. theme and locative/instrument) as being coreferential with a corresponding independent nominal or pronominal in the sentence (24a) or with an independent nominal in a preceding clause (24b).

(24) *referentiality*
a. kn q’il=əlq^{w}p k^{w}aʔ ʔac-mín-stu-∅-n
1sgS √hurt=throat and √rub-REL-CAUS-3O-1sgS
‘My throat$_{i}$ hurts and I am rubbing it$_{i}$’

b. q’ilt ʔin-qənúx^{w} k^{w}aʔ kn mín=əlq^{w}p-m
hurt POSS- √throat and 1sgS √rub=throat-MIDDLE
‘My throat$_{i}$ hurts and I am rubbing it$_{i}$.’

To summarize, the constructions cited here serve as the predicate of the clause, and the lexical suffix corresponds to one of the arguments of the verb. More specifically, the lexical suffix corresponds to the object of the transitive predicate or to an oblique nominal such as locative or instrument. Often an independent nominal occurs in the same sentence with the predicate, which further specifies or extends the meaning of the lexical suffix. There are also reasons to believe that lexical suffixes can be coreferential with an independent nominal or pronominal of the same or a previous clause.

We conclude, therefore, that lexical suffixes exhibit the basic properties of noun incorporation. The only difference with real noun incorporation is that the lexical suffix is a bound and not a free-standing element, which always appears to be attached to a root. Carlson (1990) has argued that lexical suffixes originated as nominals that commonly occurred as the second element of compounds but they were phonologically reduced and ended up as bound forms. From this viewpoint, lexical suffixes can be regarded as incorporated nouns that have lost their status as free-standing nominals. However, it is important to keep in mind that lexical suffixation is a lexically predetermined type of syntactic operation. It is needed to establish the appropriate configuration in which complex expressions can be licensed.

In the next section I examine Root=LexS constructions that seem to be closer to compound forms. Moreover, I argue that the structural differences between the two constructions are also reflected in stress.

5.2.3.2. Root=LexS compounds

Lexical suffixes are widely used in complex nominals. In these cases they do not satisfy the argument structure of the root. On the contrary, it seems that the root they combine with operates as a modifier. Often the root functions as a modifier of the object or the event the lexical suffix designates, as in (25). It can also be a numeral or a quantifier, as in the examples in (26). It has already been mentioned that the lexical suffix here always hosts primary stress regardless of whether it is unmarked or accented, or it has a weak vowel (i.e. schwa). The accentual properties of roots are irrelevant for stress.

(25) *modifier-head relation*
a. piʔk^{w}=xə́n ‘dust from wheels (of vehicle)’
√*dusty=foot, wheel* *(/pəy’ək^{w}/, /=xən/)* (Th 239)
ƛ’ix^{w}eɬ=xə́n ‘different shoes’
√*different=shoe* *(/ƛ’ix^{w}eɬ/, /=xən/)* (Th 182)
s/weʔwit=xə́n ‘lower part of hind foot or leg’
NOM √*behind=foot* *(/weʔwít/, /=xən/)* (Th 372)

	b.	p’uƛ’=qín	‘misty, foggy on top of the mountain’	
		√misty=top	*(/p’uƛ’/, /=qín/)*	(Th 261)
		sip’ec’=qín	‘scalp (animal or person)’	
		√skin=head	*(/sip’éc’/, /=qín/)*	(Th 327)
	c.	kawpuyh=ésk’iʔ	‘cowboy song’	
		√cowboy=song	*(/kàwpúy/, /=esk’iʔ/)*	(Th 82)
		ʕəl’pix=ésk’iʔ	‘slahal (game) song’	
		√slahal=song	*(/ʕal’píx/, /=esk’iʔ/)*	(Th 471)
		s/yuweh=ésk’iʔ	‘herbalist’s song’	
		NOM *√herbalist=song*	*(/yúweh/, /=esk’iʔ/)*	(Th 448)
(26)	*numeral/quantifier-noun relation*			
	a.	piyeʔ= xə́n	‘one pair of footwear’	
		√one=shoe	*(/piyeʔ/, /=xən/)*	(Th 242)
		keʔɬ= xə́n	‘three shoes’	
		√three=shoe	*(/keʔɬ/, /=xən/)*	(Th 83)
		xʷiʔ-t= xə́n	‘many footprints’	
		√many=footprint	*(/xʷiʔ/, /=xən/)*	(Th 409)
		k’ʷənex= xə́n	‘how many shoes?’	
		√how many=shoe	*(/k’ʷənex, /=xən/)*	(Th 132)
	b.	piyeʔ-ɬ=zénxʷ	‘one year old’	
		√one=year	*(/piyeʔ/, /=szenxʷ/)*	(Th 242)
		keʔɬ=zénxʷ	‘three years old’	
		√three=year	*(/keʔɬ/, /=szenxʷ/)*	(Th 83)
		k’ʷənex=szénxʷ	‘how many years old?’	
		√how many=years	*(/k’ʷənex/, /=szenxʷ/)*	(Th 132)

The examples are parallel to compound forms of the [root+root] type in which the first constituent often functions as a modifier.[12] Some examples of [root+root] compounding are listed in (27). Notice that stress is always on the second element here as well.

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[12] Carlson (1990) argues that there are also compounds which combine a verbal member and a nominal(ized) member to create a verbal predicate, e.g. *xʷiʔ-e-s/qáx̣aʔ* ‘look for horses’ (/xʷíʔ/ ‘search for’, /s/qáx̣aʔ/ ‘horse’, /e/ connective of stems) (Th&Th 110).

(27)	[*root+root*] *compounds*[13]		
a.	k'is-t-eɬ-tmíx^{w}	'bad world, hell'	(Th 358)
	√bad- √land, world		
b.	n/k'əɬ-tmíx^{w}	'person from same place'	(Th 358)
	√co-- √land, world		
	n/k'əɬ-ʔúq^{w}eʔ	'drinking companion'	
	√co-- √drink		(Th 103)
b.	keʔɬ-ʔúpn=ekst	'thirty'	
	√three- √ten times		(Th 83)

It is evident from the above examples that there is a common stress rule for Root=LexS compounds and [root$_1$+root$_2$] compounds. More importantly, they do not contradict the theory of head dominance advocated here. Stress reflects the internal constituency of these words. In both cases the modified constituent (i.e. lexical suffix or root$_2$), and not the modifier (i.e. root or root$_1$), is accentually prevalent.[14] As CWB (1996) point out, lexical suffixes (and roots) in compound formations have noun-like meanings and the whole construction has a noun-like function in the sentence in which it occurs. Despite its fascinating aspects, compound stress has not been examined in the other languages of this study and I pay no further attention to it here either.

Before concluding this section, it is worth noting that there are structures with two lexical suffixes. In most cases the lexical suffixes form a compound with a specialized meaning. For instance, the complex form /=ep=qn'/ has the meaning 'back of head, nape of neck' and the form *zənk=ép=qn-me* is translated as 'twist and coil hair at back of head' (Th 460). There are a few forms in which both lexical suffixes seem to be incorporated as in *ʔes/púy=(u)s=(i)kn'* 'carrying a smaller basket upside down on a larger basket' (Th 249). In the aforementioned examples stress assignment follows the same steps as stress assignment in predicate formations with one lexical suffix.

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[13] These compounds resemble phrasal compounds in more familiar languages such as English, for example, *motor-car, water-lily, sour-dough,* etc.

[14] Notice that modifiers never reduce their stressed vowels. For example, the root /ʕal'píx/ in *ʕəl'pix=ésk'iʔ* < (/ʕal'píx/, /=esk'iʔ/) 'slahal (game) song' (25c) reduces the unstressed vowel but preserves the stressed one. This suggests that the accented syllable of the root has prominence and the whole root forms a prosodic word. We infer from this that the prosodic structure of Root=LexS compounds must be [[root]$_{\text{PrW}}$[LexS]$_{\text{PrW}}$]$_{\text{PrW}}$, where the head constituent (i.e. LexS) is more prominent than the non-head one (i.e. root) because it bears primary stress.

To summarize, I showed that lexical suffixes are combined with roots into types of constructions: a predicate and a compound one. The same suffix can form a predicate (*qayt=qín* ‘reach the top’) and a compound word (*p’uƛ̓’=qín* ‘misty top’). In the first one, the lexical suffix satisfies the argument structure of the root by being a complement and the whole construction has a predicative function in the clause. Stress in these forms is on the root, if marked, or on the marked lexical suffix, in the absence of a marked root. Otherwise, the default clause applies to assign stress to an edgemost vowel. In the second type, the Root=LexS component behaves more like a compound. The root is a modifier of the object or event expressed by the lexical suffix. Stress in these forms is exactly the same as in real [root+root] compounds.

Table (28) summarizes the stress patterns attested in incorporated and compound formations. The patterns in which the two structures accentually diverge are highlighted.

(28) *accentual patterns of Root=LexS predicates and compounds*

input forms	*Root=LexS predicate*	*Root=LexS compound*
√CV́C=CVC	**CV́C=CVC**	**CVC=CV́C**
√CVC= CV́C	CVC=CV́C	CVC=CV́C
√CVC=CVC	**CV́C=CVC**	**CVC=CV́C**
√CəC=CVC	CəC=CV́C	CəC=CV́C
√CVC=CəC	**CV́C=CəC**	**CVC=Cə́C**
√CəC=CəC	CəC=Cə́C	CəC=Cə́C

In the following sections I focus on Root=LexS predicate formations. The analysis is along the theory of head dominance advanced for lexical accent systems with fusional morphology. The head element in the construction is prosodically dominant, if accented; otherwise, stress is on other accented vowels of the word or edgemost vowels, according to the language’s default option.

5.2.4. Lexical marking

As proposed in Chapter 2, a lexical accent in this study is an abstract entity, an autosegment, which is sponsored by some morpheme and provides no cues as to its phonetic interpretation. We have also seen that lexical accents are usually associated with the morpheme they belong to, but this is not an obligatory condition. There are also floating lexical accents which are linked to a vocalic peak during the process of accentuation. Finally, it has also been claimed that lexical marks can be ‘strong’ or ‘weak’. If the language is foot-based, ‘strong’ lexical accents surface as foot-heads and ‘weak’ lexical accents surface as foot-tails. Here I show that lexical marks in Thompson are also strong and weak. Strong accents surface with primary stress, if included in the prosodic organization of the word, whereas weak accents surface with weak prominence. That is to say, they have duration but no loudness.

Thompson has both marked roots and marked lexical suffixes. In §5.2.2, it has been shown that the accentedness of lexical suffixes is revealed in Root=LexS predicates when the lexical suffix is combined with an unmarked root. I repeat in (29) some of the examples discussed in that section.

(29)	*unmarked root + accented LexS*			
	a.	n/paw’=íkn’	‘get a layer of ice on top’	
	b.	qayt=qín	‘reach top’	(cf. 11b)

On the other hand, there are also marked roots which attract stress from accented lexical suffixes:

(30)	*accented root + accented LexS*			
	a.	k^{w}én=kn’	‘grab s.o. by the back (of clothes)’	
	b.	píx̣̩=qn	‘lay boards on top (of s.t.)’	(cf. 11a)

A phonemic schwa can also bear a lexical accent. Roots and lexical suffixes with an accented schwa are found in Thompson but they are not very common. Some examples are listed in (31).

(31)	*unmarked root + accented schwa LexS*			
	a.	ʔes/k’^{w}up’=eʔyə́ps	‘pinned at neck in front’	
		STAT/ *√pin=neck in front (/k’^{w}up’/, /=eʔyə́ps/)*		(Th 136)
	roots with accented schwa			
	b.	k^{w}ə́zeʔ	‘offspring’	(Th 119)
		mitə̣̩́s-n-t-∅-es	‘put gaiters on s.o.’	(Th 202)
		pcə́kɬ-es	‘be made a leaf’	(Th 228)
		s/xec’ə́n’	‘gooseberry’	(Th 390)
		tukə́ti	‘CPR-station (loan)’	(Th 360)

Morphemes with a floating lexical accent, called unaccentable morphemes in this study, are also found in Thompson. Some examples are given in (32). We have established that unmarked suffixes such as /=cin/, for instance, usually lose stress after an accented root, unless the root has a schwa. However, in the listed examples, unmarked as well as marked suffixes are stressed, despite the fact that the roots they are combined with have full vowels. This is because the root is equipped with a floating lexical accent which eventually, lands on the suffix. Unaccentable morphemes are underlined in order to avoid confusion with other accentual varieties.

(32) *unaccentable roots*

a. q^{w}in=cín ‘talk back (to s.o.)’
√talk=mouth (UnAcc /q^{w}in/, UnM/=cin/)
q^{w}in=íkn’ ‘talks (about s.o.) behind (his) back’
√talk=back (UnAcc /q^{w}in/, Acc/=íkn’/) (Th 296)

b. n/weʔx-tə́n ‘home’
LOC/√be-INSTR
s/weʔx=íl’e ‘adopted child’
NOM/√be=offspring[15] (UnAcc /weʔx/, UnM /=il’eh/) (Th 373)

c. cuwes=úym’x^{w} ‘measure the ground’
√measure=ground (UnAcc /cuwes/, UnM /=uym’x^{w}/)
cuwes=xə́n ‘measure another shoe against my own’
√measure=shoe (UnAcc /cuwes/, UnM /=xən/) (Th 43)

It is not so easy to detect unaccentable lexical suffixes. The unaccentedness of the suffix would emerge only when its floating accent is pushed to the root. Unfortunately, the effects of such a move are concealed by the default leftmost prominence. Consequently, there is no way to tell with confidence where the accent originates from in such cases. There is one instance of unaccentability with the resultative suffix /-e/ which is discussed in §5.7.

I have not found any unaccentable morphemes with a schwa. I assume that this is also a consequence of the default clause. An unaccentable root with schwa will force stress to materialize on another element, most probably the suffix. The default clause, however, ensures that a suffix of the shape CVC or CəC will always bear stress when the root has a schwa. Recall that the default

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[15] /=il’eh/ ‘offspring-pity’ (usually referred to in some unfortunate connection or as a patient).

clause assigns stress to the leftmost full vowel or the rightmost schwa deriving the following patterns: CəC=CV́C, CəC=Cə́C. It is hard to find evidence from other phonological processes (e.g. reduplication) that will shed some light on the exact source of stress in the aforementioned abstract examples.

In sum, Thompson has both accented and unaccentable morphemes. In the former, the lexical accent is associated to a vocalic peak of the sponsoring morpheme, whereas in the latter it is not:

(33) *representation of marked morphemes in Thompson*

accented	unaccentable
*	*
|	
CVC	CVC
CəC	

Weak lexical accents in Thompson have segmental content but lack prominence. In this sense they are very similar to lexical accents that function as tails in systems like Greek. These accents also have a segmental content (represented with a right foot-bracket, ')' or a dot '.') but are never assigned prominence unless, of course, more important forces in the system apply to violate this condition. However, weak accents in Thompson have duration, and are therefore called grave accents. A vocalic peak that is associated to a grave accent never reduces to schwa or zero. Recall that vast vocalic reductions affect unstressed vowels in the word. We conclude that besides primary stress, grave accents prohibit vowel reduction or deletion.

It must be emphasized that first, the distribution of a grave accent is not rhythmically conditioned. For example, in (34c) and (34d) both accents, weak and strong, are in adjacent syllables. Second, a grave accent never surfaces with secondary stress. Such an accent has duration but no loudness.

(34) *morphemes with grave accents*

a.	kàwpúy		'cowboy'	(Th 82)
vs.	c(ə)menús	/cumenús/	'very'	(Th 41)
b.	p'ə̀tex̣íc		'lie in row-pl'	(Th 257)
	kə̀lzém		'indigestion'	(Th 89)
vs.	k^{w}l'íqəq	/k^{w}əl'íqiq/	'robbin'	(Th 495)
	nmím(ə)ɬ	/nəmímeɬ /	'we'	(Th 220)

c.	hèléw’		‘golden eagle’	(Th 78)
vs.	pətə́le(ʔ)	/petə́leʔ/	‘blood’	(Th 232)
d.	címèɬ		‘be first’	(Th 30)
	=úsyèp’		‘firewood’	(Th 543)
vs.	=íx^{w}ənc’k’	/=íx^{w}ec’k’/	‘palate’	(Th 541)

Besides roots and lexical suffixes, some grammatical morphemes are also marked with a grave accent such as the imperative suffixes -*e* (sg) and -*wze* (pl). These endings are never stressed. Stress is either on the root (35a) or on another suffix (35b), according to the stress rules of the language. The grammatical morpheme remains unstressed, even if it is the only full vowel in the string. In this case stress is on a schwa (35c) or sometimes the increment /et/ is inserted to carry stress (35d).

(35) *imperative suffixes with grave accents* (Th&Th 79)

a.	wík-t-ey-wzè	‘see us!’
b.	kən-t-sém-è	‘help me!’
c.	x^{w}ə́s-t-è	‘go home!’
d.	sələk-n-t-ét-è	‘turn her around’

Marked morphemes with floating ‘weak’ accents are hard to detect in Thompson. They are empirically attested, however. In Cupeño (Hill and Hill 1968), the suffix /yə/ introduces a weak floating accent which eventually lands on the root. In (36) the accent of the suffix lands on the final syllable of the root, protecting the final vowel of the root from deletion. Primary stress is on the accent of the root, /ʔísi/ ‘coyote’.

(36) *floating weak accents in Cupeño* (Hill and Hill 1968:236)
ʔísi-l^{y}ə-yə → ʔísì-l^{y}ə-yə [ʔís**i**-l^{y}i] ‘coyote (objective case)’

The examples in (37), which include accentless morphemes, completes the presentation of the inherent accentual properties of morphemes. Thompson has a substantial number of unmarked roots and unmarked lexical suffixes. When both elements in a complex word are unmarked, the default clause applies to assign stress to the leftmost full vowel (37a-b) or the rightmost schwa (37c).

(37) a. n/páw’=ymx^{w} ‘the ground is frozen’
LOC/√freeze=ground (/paw’/, /=uym’x^{w}/) (Th 228)

b. qʷúɬ=xn 'get a blister on one's foot'
√blister=foot *(/qʷuɬ/, /=xən/)* (Th 301)

c. cək=xə́n 'get foot chopped or cut'
√hew=foot *(/cək/, /=xən/)* (Th 23)

The tables in (38) summarize the accentual patterns found in Thompson Salish. Shaded cells denote patterns that have not been found mainly because the default clause of the language neutralizes accentual contrasts.

(38) *marked morphemes*

√Root			=Lexical Suffix	
	V	ə	V	ə
accented	* | CVC	* | CəC	* | =CVC	* | =CəC
unaccentable	* CVC	▨	▨	▨

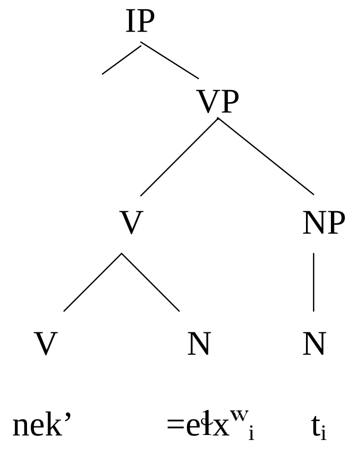
unmarked morphemes

√Root		=Lexical Suffix	
V	ə	V	ə
CVC	CəC	CVC	CəC

5.2.5. Prosodic compositionality and head dominance in Root=LexS predicates

In §5.2.3.1, I gave some reasons for considering 'incorporated' constructions with lexical suffixes to be the reflection of a syntactic process. In such constructions, a verbal root and a lexical suffix combine into a single word at some stage. The lower lexical item in the syntactic tree, namely the (nominal) lexical suffix, moves to adjoin to the higher lexical item, the (verbal) root. To illustrate this, the lexical suffix /=eɬxʷ/ 'roof' in (39) which is the direct object of the verb root /nek'/ 'change' moves to V and adjoins to it.[16] Notice that this movement cannot destroy a thematically relevant structure. The moved element leaves a trace which heads a direct object phrase that receives a theta role from the verb and satisfies the verb's subcategorization requirements (Chomsky 1981). The surface structure of an incorporated lexical suffix must look as follows:

(39)



√change =roof
'put a new roof'

It is evident from the tree in (39) that the root is the head of the VP to which the lexical suffix incorporates. According to the theory of prosodic compositionality developed in this thesis, in lexical accent systems the prosodic and morphosyntactic component share the same structure. This means that for the type of syntactic mode of combination given in (39), there is a particular type of prosodic mode of combination that assigns prosodic structure to that complex constituent. As in languages with fusional morphology, I argue that the function *g* that maps syntactic structure onto prosodic structure is interpreted as head dominance. The inherent accentual properties of the root/head prevail when a conflict between accents arise. The prosodic dominance of the head element is a desired development since it is true that in many languages head elements display the greatest degree of complexity compared to non-heads.

The theory of head dominance equips the grammar with interface constraints. This means that it provides constraints that allow a direct relation between prosodic and morphological constituents as, for example lexical accents and

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[16] Contra Baker (1988, 1996) and much work in contemporary minimalist syntax, the incorporated element seems to adjoin to the right of the verb. I will leave this matter undiscussed here.

morphological heads. Head-constraints is a particular family of interface constraints. In the previous chapters we have seen two head-constraints in action: HEADFAITH and HEADSTRESS. These constraints are crucial for the analysis of the Salish facts as well. Head dominance takes the form of a ranking in which HEADFAITH dominates simple FAITH:

(40) *head dominance in Thompson Root=LexS predicates*
HEADFAITH >> FAITH

The conflict between the constraints in (40) is initiated by intervening constraints. Let us check how this ranking accounts for accentual patterns in which both the root and the lexical suffix are marked. The relevant examples are listed in (41). Here the marked root wins over the marked suffix.[17]

(41) *two marked morphemes*
accented root + accented lexical suffix
a. píx̩=qn ‘lay boards on top (of s.t.)’
√lay-parallel=top (/píx̩/, /=qín/) (Th 241)
b. k^{w}én=kn’ ‘grab s.o. by the back (of clothes)’
√grasp=back (/k^{w}én/, /=íkn’/) (Th 115)

unaccentable root + accented lexical suffix
c. ʕac=qín-m ‘tie s.t. up at top’
√tangle=top-MDL (/ʕac/, /=qín/) (Th 471)
d. q^{w}in=íkn’ ‘talks (about s.o.) behind (his) back’
√talk=back (/q^{w}in/, /=íkn’/) (Th 296)

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[17] The suffixes /=ewiɬ/ ‘vehicle’, /=usim/ ‘equivalent’, /=enis/ ‘tooth’ attract stress both from accented and unmarked roots. There is a tendency the suffix to be stressed on the final syllable, e.g. *nek’=ewíɬ* ‘change vehicles’ (Th 213). When the suffix forms the second part of a compound, however, stress is on the initial syllable of the suffix, e.g. *s/q’^{w}ut=éwɬ* ‘one side of the canoe’ (Th&Th 29). I have no particular account for the accentual behavior of these suffixes. The suffix /-men/, based on the English -*man*, derives words that denote profession and is also stress-attracting, e.g. *q^{w}uʔ-mén* ‘water-boy’, *ti-mén* ‘water-boy’, *naq’^{w}-mén* ‘thief’, *tɬ=uym’x^{w}-m-mén* ‘(surveying) engineer’ (cf. *tɬ=úym’x^{w}-m* ‘lay line on ground to measure’) (Th&Th 128). These words seem to behave like compounds both with respect to meaning and stress.

When only one accent is present in incorporated constructions, this accent bears primary stress even if it is sponsored by the lexical suffix. This is suggested by the following data:

(42) *one marked morpheme*

accented root + unmarked lexical suffix			
a. kʷén=cin	‘take (s.o.’s) food’		
	√grasp=mouth, food	*(/kʷén, /=cin/)*	(Th 115)
b. píx̣ =n’i	‘lay protective covering over s.t.’		
	√lay-parallel=on top	*(/píx̣/, /=en’ih/)*	(Th 241)
unaccentable root + unmarked lexical suffix			
c. qʷin=cín	‘talk back (to s.o.)’		
	√talk=mouth	*(/qʷin/, /=cin/)*	
d. s/weʔx=íl’e	‘adopted child’		
	NOM/ *√be=offspring*	*(/weʔx/, /=il’eh/)*	(Th 373)
unmarked root + accented lexical suffix			
e. qayt=qín	‘reach top’		
	√reach=top	*(/qayt/, /=qín/)*	
f. qayt=íkn’	‘go gradually along ridge to the very top’		
	√reach=ridge	*(/qayt/, /=íkn’/)*	(Th 265)

The tableaux in (43) and (44) present the accentuation of complex forms with two lexical accents. The first candidate in both tableaux is the winner because it satisfies the faithfulness requirements of the root/head.

(43)

input: √píx̣, =qín	HEADFAITH(HEAD)	FAITH(HEAD)
☞ a. píx̣qin		*
b. pix̣qín	*!	*

(44)

input: √kʷén, =íkn’	HEADFAITH(HEAD)	FAITH(HEAD)
☞ a. kʷénikn’		*
b. kʷeníkn’	*!	*

The fact that the lexical accent of the root remains fixed to its underlying position and does not migrate to the suffix suggests that the anti-migration constraint *FLOP is ranked higher than *DOMAIN, the constraint that forces accents beyond their lexically preassigned domain. This is shown in the following tableau:

(45)

input: √kʷén, =cin	*FLOP	*DOMAIN
☞ a. kʷéncin		*
b. kʷencín	*!	

*DOMAIN takes effect only when the accent introduced by a morpheme is not lexically associated to it. A floating accent sponsored by a root is forced by *DOMAIN upon the lexical suffix. This gives rise to patterns like the ones in (42c-d). The tableau in (46) illustrates the derivation of a word composed of an unaccentable root and an unmarked suffix. Note that in this tableau, faithfulness dominates the constraints responsible for default stress. These constraints are combined into a single constraint, labeled here DEFAULT. In Thompson, default imposes stress to the leftmost full vowel. A detailed presentation of default accentuation is offered in the following section.

(46)

input: * √qʷin, =cin	HEADFAITH (HEAD)	*FLOP	*DOMAIN	FAITH (HEAD)	DEFAULT
☞ * | a. qʷincin				*	*
* | b. qʷincin			*!		
c. qʷíncin	*!			*	

The first candidate (46a) survives the competition because it satisfies both HEADFAITH and *DOMAIN. This is at the expense of FAITH because the accent of the root/head lands on the lexical suffix. The second candidate (46b) follows a different route. It realizes the lexical accent locally but this does not guarantee an optimal output either, given the present constraint hierarchy. The last candidate fails to realize the input lexical accent and is stressed by default on the leftmost syllable. This proves to be fatal for its survival.

The last tableau exemplifies the accentuation of the word *qaytqín* ‘reach top’, which is composed of an unmarked root and an accented suffix. With faithfulness dominating default, the result is always in favor of the morpheme that carries a lexical accent.

(47)

input: √qayt, =qín	FAITH(HEAD)	DEFAULT
☞ a. qaytqín		*
b. qáytqin	*!	

The first candidate of the second tableau is stressed by default. This move, however, is fatal for its survival because it is at the expense of being faithful to the accent of the lexical suffix.

Before concluding this section, another issue should be addressed, namely the accentuation of words with grave accents. As mentioned before, grave accents lack prosodic prominence but they block vowel loss or reduction.[18] In (48) I show the derivation of the word *hèléw* ‘golden eagle’. This word has a strong lexical accent on the final syllable and a weak lexical accent on the initial one. The strong accent is phonetically realized with duration and loudness, whereas the weak accent is realized only with duration. Both faithfulness to the prosodic head as well as faithfulness to the weak accent outrank the constraints of default accentuation.

(48)

input: hèléw’	HEADFAITH (HEAD)	HEADFAITH (GRAVE)	DEFAULT
☞ a. hèléw’			*
b. heléw’		*!	*
c. hélew’		*!	

The constraint ranking for the accentuation of Root=LexS predicate words is summarized in (49). The examples refer to tableaux in which the ranking at issue is established.

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[18] I do not give the technical details of vowel reduction. This discussion will take us too far afield.

(49) *ranking for the accentuation of Root=LexS predicates in Thompson*

HEADFAITH, *FLOP
|
*DOMAIN
|
FAITH(HEAD)
|
DEFAULT ℂ

• HEADFAITH(HEAD), FAITH(HEAD)	píx̣=qn	(43)
	k^{w}én=kn’	(44)
• *FLOP >> *DOMAIN	k^{w}én=cin	(45)
• *DOMAIN >> FAITH	q^{w}incín	(46)
• FAITH >> DEFAULT	qaytqin	(47)

5.2.6. The accentuation of words with no lexical accents

When there is no lexical mark in a complex word, Thompson reveals an edge-oriented stress subsystem. As the reader may recall from Chapter 1, edge-oriented systems do not make use of binary rhythmic structure. Prominence is assigned to some edge (left or right) of the prosodic word. Such systems belong to the fixed-stress group of languages and are often called ‘unbounded’ because the distance between the edge and position of the main stress knows no principled limits. Some edge-oriented systems are driven by peripheral prominence, whereas some others make use of an additional dimension besides peripherality such as syllable strength or quantity. Representatives of the quantity sensitive (edge-oriented) systems are Murik, a lower Sepik language of New Guinea (Abbott 1985, Walker 1996) and Komi (Itkonen 1955, Lytkin 1961, Hayes 1995).

The fixed subsystem of Thompson is quantity sensitive and edge-oriented. Prominence here is assigned to the leftmost syllable with a full vowel, or if there is no full vowel in the string, to the rightmost schwa. Conflicting directionality is another term found in the literature that describes the directionality of stress in such systems (Zoll 1995). The examples in (50) exemplify the described stress algorithm.

(50) *edge-oriented stress as default in Thompson*

<u>leftmost full vowel</u>

a.	p’áq’ʷeɬ	(cf. n/p’aq’ʷeɬ=qín)	‘scaffold’	(Th 252)
b.	n/páw’=ymxʷ	/paw’=uym’xʷ/	‘the ground is frozen’	(Th 228)
c.	qʷúɬ=xn	/qʷuɬ=xən/	‘get a blister on foot’	(Th 301)
d.	məƛ’q’ʷ-p=áqs	/məƛ’q’ʷ-əp=aqs/	‘dislocate a joint’	(Th 198)
e.	məkʷʔ=ús-m	/məkʷʔ=us-əm/	‘cover one’s face’	(Th 197)
f.	kəɬ=áqs-xi-t-e	/kəɬ=aqs-xi-t-e/	‘disconnect his end’	(Th 89)

<u>rightmost schwa</u>

g.	q’əlxʷ-ə́m	‘curl (s.t.)’	(Th 278)
h.	cək=xə́n	‘get foot chopped or cut’	(Th 23)
j.	c’əq’=xə́n	‘get hit on leg’	(Th 60)

What is involved in unbounded systems like the one just described, is a kind of prominential enhancement that calls directly on contrasts in the intrinsic prominence of syllables. To begin with, it is necessary to establish in such systems the relation between the intrinsic prominence of syllables and stress. Prince and Smolensky (1993) propose the constraint Peak-Prominence (PK-PROM) in (51). This constraint states that the element *x* is a better peak than *y* if the intrinsic prominence of *x* is greater than that of *y*.

(51) PK-PROM[19]

$$\text{Peak}(x) \succ \text{Peak}(y) \text{ if } |x| > |y|$$

Following Zoll (1995) and Walker (1996), I propose that in order to capture opposite-edge stress effects, two alignment constraints are required. The first alignment constraint aligns stressed light syllables (i.e. syllables with schwas) to the right edge of the word (or the left edge of the word depending on the language).[20] The second alignment constraint aligns a peak to the left edge of the word. The alignment constraints are formulated as follows:

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[19] The relative prominence of a syllable may be determined on the basis of various factors. For some languages like Thompson it is sonority, for others, syllable length or weight, and yet others, pitch or tone (Kenstowicz 1993, 1994, 1995). The peak-prominence constraint is not strictly binary, but can assess scalar evaluations of the relative harmony of elements as peaks.

[20] Zoll (1995) argues that a stressed light syllable counts as marked prosodic structure and proposes to treat stress in such syllable forms as an effect of marked structure licensing. Conflicting directionality arises when the licensing edge is in opposition to the main stress alignment constraint. On the other hand, Crowhurst and Hewitt (1997) suggest that

(52) a. ALIGN-R (ə́, PrW, R)
Align a stressed schwa to the right edge of the prosodic word.

b. ALIGN-L (Pk, PrW, L)
Align a peak to the left edge of the prosodic word.

Let us test now how the proposed constraints account for the accentual facts in (50). The tableau in (53) illustrates the accentuation of the word *n/páw’=ymx*^{w} ‘the ground is frozen’. On its own, ALIGN-L is sufficient to derive the desired stress pattern. Candidate (53b) fails to surface because, by not having the peak aligned to the left edge of the prosodic word, it violates the alignment constraint.

(53)

input: √paw’, =uym’x^{w}	ALIGN-L
☞ a. páw’uymx^{w}	
b. paw’úymx^{w}	*!

In words with schwas, ALIGN-L is outranked by ALIGN-R. This way the rightmost weak syllable is stressed. This is shown by the tableau in (54), which exemplifies the stress pattern of the word *cək=xə́n* ‘get foot chopped’. Candidate (54a) that best satisfies ALIGN-R is the winner in this tableau.

(54)

input: √cək, =xən	ALIGN-R	ALIGN-L
☞ a. cəkxə́n		*
b. cə́kxən	*!	

More interesting from an accentual point of view are the examples in (50c-e). In the words *q*^{w}*úɬ=xn* ‘get a blister on one’s foot’ and *məƛ’q’*^{w}*-p=áqs* ‘dislocate a joint’, stress is on the syllable with the strong peak (i.e. full vowel). Stress is expected on the schwa, given the previous ranking. However, these examples manifest the decisive role of PK-PROM. This constraint, ranked higher than the alignment constraints, guarantees stress on the peak with the greater intrinsic

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dependencies between phonological requirements such as the ones examined here can be formally expressed by complex constraints that are related in the same way as expressions in a logical implication.

prominence. The tableaux in (55) evidence the crucial role of peak-prominence. The candidates that satisfy this constraint are the optimal outputs.

(55)

input: √q^{w}uɬ, =xən	PK-PROM	ALIGN-R	ALIGN-L
☞ a. q^{w}úɬxən			
b. q^{w}uɬxə́n	*!		*

input: √məƛ’q’^{w}, -p, =aqs	PK-PROM	ALIGN-R	ALIGN-L
☞ a. məƛ’q’^{w}páqs			*
b. mə́ƛ’q’^{w}paqs	*!	*	

The last tableau shows that ALIGN-L can also be crucial in producing the right accentual pattern. This tableau examines two particular candidates of the word *kəɬ=áqs-xi-t-e* ‘disconnect his end (IMP)’. The first one, (56a), has stress on the leftmost full vowel, whereas the second one, (56b), has stress on the second syllable from the right edge of the word.

(56)

input: √kəɬ, =aqs-xi-t-e	PK-PROM	ALIGN-R	ALIGN-L
☞ a. kəɬáqsxite			*
b. kəɬaqsxíte			**!

Both candidates satisfy PK-PROM and are irrelevant for ALIGN-R. Thus, the decision for the right outcome relies on ALIGN-L which leans towards the first candidate. (56a) is the candidate that best satisfies the constraints of the given hierarchy. It is deemed as the optimal output because it incurs only one violation of the alignment constraint as opposed to the double violation of alignment by the second candidate.

At this point the presentation of Root=LexS word stress in Thompson is completed. In the following sections I present the analogous facts from Spokane and Moses Columbia Salish and their analysis. Lillooet Salish is examined in a separate section (§5.4) because it is a foot-based system with a window.

5.3. Spokane and Moses-Columbia Salish

5.3.1. Background information on Spokane

Spokane is a Salish language of the southern division. Most Spokane speakers are found in the Spokane Indian Reservation northwest of the city of Spokane, Washington. The main sources for Spokane are Carlson 1972, 1990 and Carlson and Flett (C&F) 1989. These sources are less detailed than the sources I used for Thompson. Therefore, it is not always possible to find the appropriate examples for a specific accentual phenomenon.

The consonant and vowel inventory of Spokane is similar to the one of Thompson. Only the status of schwa is different in this language. According to Carlson (1972:12) schwa is not established as a phoneme because it never occurs stressed and its distribution is predictable. Non-pharyngeal resonants are either syllabic or have a schwa inserted before them, if non-initial, or after them, if initial, e.g. *nə̱-wís-t* ‘it’s up high’ (Carlson 1972:13). A schwa is also inserted in other places, such as between a glottalized consonant and a following consonant, e.g. *c’ə̱sqáqə̱neʔ* ‘chickadee’ or between a consonant and a following glottal stop, e.g. *hecə-ʔ̓tṣi* ‘(I am) sleeping’ (Carlson 1972:13).

Spokane is also an unbounded system which, as we will see, stresses the rightmost (full) vowel in unmarked words. Unfortunately, the sources do not provide examples exclusively consisting of schwas, therefore there is no clue as to the direction of prominence in words consisting totally of schwas.

Like Thompson, unstressed vowels reduce to schwa, e.g. *ta hin-s-mʔém* [ta ysəməʔém] ‘she’s not my woman’, unless they are protected by weak accents, e.g. *ʔèmut* [ʔemút] ‘(he) sits’ (Carlson 1972:22).

5.3.2. The Spokane facts

Stress in Spokane is not rhythmic. As in Thompson, lexical suffixes are the center of stem morphology. They join to the root to form a complex form with either a predicative or a compound function. It is important to emphasize that what has been claimed for incorporated and compound constructions in §5.2.3 applies to the other Salish languages discussed in this chapter and to Spokane as well. This means that two types of lexical suffixation are distinguished: Root=LexS predicates and Root=LexS compounds. Examples of both structures are presented in (57) and (58). Stress in (57) is on the root, if accented; otherwise on the lexical suffix. Stress in (58) is always on the lexical suffix.

(57) *Root=LexS predicates*

stress on the root

a. n/cíq=leʔxʷ-n-t (C&F 1989:11)
LOC= √dig=ground-TR-? ‘dig the ground (sg.)!’

b. ʔép’=us-n-t-∅-en [ʔép’sn] (Carlson 1990:74)
√wipe=face-TR-3O-1sgS ‘I wiped his face’

c. kʷén=lt-n-t-∅-en [kʷénltn] (C&F 31)
√carry=child-TR-3O-1sgS ‘I carried his child’

stress on the lexical suffix

d. n/c’w’aq=úleʔxʷ-m [nc’oʔqúleʔxʷm](C&F 1989:16)
LOC/ √pull=ground, root ‘pull up by the roots’

e. n/xʷist=étkʷ [nxʷstétkʷ] (Carlson 1990:74)
LOC/ √walk=water ‘walk in the water’

f. c̣n ʔemut=áqs [c̣nʔamtáqs] (Carlson 1990:75)
1sgS √sit=road ‘I sat on the road’

g. c̣-m-ɬq=éneʔ ‘it fell on a heap around your ears’
(C&F 42)

(58) *Root=LexS compounds*

a. s/mʔem=éɬc’eʔ [smeʔméɬc’eʔ]
NOM/ √woman=animal ‘female animal’

b. piƛ̓’=qín [pƛ̓’qín]
√bare=head ‘bare-head’

c. s-n/ʔanɬq=éɬxʷ-tn [snʔanɬqéɬxʷn]
NOM-LOC/ √summer=house ‘summer mat house’
(Carlson 1990:76)

The forms in (58) fall into the same group as the corresponding Thompson compound forms. As mentioned earlier, the lexical suffix in such constructions expresses a nominal meaning (i.e. an object or event) that is modified by the root. Stress reflects exactly this modifier-head relation that holds in real compounds as well. I want to emphasize once again that lexical suffixes are not divided into those that form compounds and those that form predicates; the same suffix can form both structures.

In (57) stress is on the lexical suffix unless the root/head is marked; in this case stress is on the root. Notice that the default stress in Spokane is on the rightmost full vowel. This results in the neutralization of some accentual contrasts. More specifically, it is almost impossible to tell the difference between an accented and an unmarked lexical suffix because stress occurs in both circumstances on the suffix. We are certain that a suffix is accented only when it disyllabic with initial stress such as the suffix /=úleʔx^{w}/ in (57d). The inherent accent of this suffix is revealed when it is combined with an unmarked root. If the root is accented itself, then it attracts stress, concealing the accentual properties of the lexical suffix such as in (57a).

Only the difference between accented and unmarked roots can be easily traced. Unaccentable roots do exist in Spokane but they are hard to detect because of the neutralized contrasts caused by the directionality of the default. Their existence is verified by an accentual phenomenon that takes place in grammatical (transitive) suffixation and also by a process of metathesis. In transitive formations the root is stressed, even when it lacks an accent, contra to the directionality of the default. Unaccentable roots are exceptions to this generalization because they force their inherent accent to the suffix, e.g. *caqntén* ‘I place it’ (cf. §5.6). Moreover, when the non-control suffix /-p/ and the middle suffix /-m/ attach to an unaccentable root, the vowel of the root metathesizes to avoid the lexical accent:

(59) *metathesis with unaccentable roots* (Carlson 1972:26)

a.	caq-m	>	cqém[21]	‘he hit’
b.	cuʔ-m	>	cəʔúm	‘he hit’
c.	ƛ’ux^{w}-p	>	ƛ’əx^{w}úp	‘he won back’
d.	ɬuʔ-m	>	ɬəʔúm	‘it is jabbed’

In sum, the chart of marked morphemes in Spokane includes accented and unaccentable roots.

(60) *representation of marked morphemes in Spokane*

accented	unaccentable
*	*
|	
CVC	CVC
k^{w}en	caq

---

[21] According to Carlson (1972) the underlying form is /ceq/ but a backing rule, which applies before a postvelar, derives *cáq*.

5.3.3. Accentuation of Root=LexS predicates in Spokane

Accented roots are dominant. In head-dependent systems like Spokane, the function that maps morphosyntactic structure onto prosodic structure gives priority to the inherent accentual properties of elements that are heads. As mentioned earlier, the root is the head in the complex forms examined here. Technically, head dominance is expressed as follows:

(61) *head dominance in Spokane Root=LexS predicates*
HeadFaith >> Faith

The analysis of the facts in (57) proceeds in the same manner as in Thompson. I also assume that the conflict between head-faithfulness and faithfulness is established by the ranking *Flop >> *Domain >> Faith. Lexical accents do not move to other vocalic positions, unless they are floating. In the latter case they land on the suffix.

The tableau in (62) exemplifies the accentuation of the word *n/cíq=leʔx*^{w} ‘dig the ground’. Faithfulness to the lexical accent of the root dominates the general faithfulness constraint. The winner cannot be any other candidate than the one that best satisfies faithfulness to the lexical accent of the root/head.

(62)

input: √cíq, =úleʔqx^{w}	HeadFaith(head)	Faith(head)
☞ a. cíquleʔqx^{w}		*
b. ciqúleʔqx^{w}	*!	*

Complex words composed of unmarked morphemes are stressed by default on the rightmost full vowel. I have not found any cases of unmarked words consisting exclusively of schwas. Therefore, the directionality of prominence in this case is unclear. The constraint that accounts for the default pattern is Align-R, given in (63).

(63) Align-R (Pk, PrW, R)
Align a peak to the right edge of the prosodic word.

The accentuation of the word *n-x*^{w}*ist=étk*^{w} ‘walk in the water’ is presented in (64). Align-R is sufficient to derive the desired stress pattern. Candidate (64b) fails to surface because it violates the alignment constraint by not having the peak aligned to the right edge of the prosodic word.

(64)

input: √x^{w}ist, =etk^{w}	ALIGN-R
☞ a. x^{w}istétk^{w}	
b. x^{w}ístetk^{w}	*!

PK-PROM proves to be crucial for the accentuation of words that contain schwas and full vowels as, for example, *tqɬúləmən* ‘I hit you people’. Unfortunately, I could not find an example of lexical suffixation, so I borrowed an example from transitive derivation. For the sake of completeness I present the analysis of this case in (65). The tableau in (65) makes clear that the winning candidate is the one with prominence on the rightmost syllable with a full vowel. It is not important that this stress pattern implies multiple violations of ALIGN-R because this constraint is dominated by PK-PROM. Note that the tableau does not include the constraints triggering epenthesis.

(65)

input: √tq, - ɬul, -m, -n	PK-PROM	ALIGN-R
☞ a. tqɬúləmən		**
b. tqɬuləmə́n	*!	

5.3.4. Background information on Moses-Columbia (Nxa’amxcín)

Moses-Columbia Salish, known to the native speakers as Nxa’amxcín, is one of the seven languages of the Interior branch of the Salish family. It is spoken by about 80 speakers on the Colville Reservation in central Washington State. The main source for Moses-Columbia are Czaykowska−Higgins (1993a, 1996) and CWB (1996).

Like the other Salish languages examined here, Moses-Columbia displays a large consonant inventory which is very similar to the consonant inventory of Thompson. There are, however, two points where they differ. Firstly, Moses-Columbia lacks simple pre-velar resonants /γ, γ’/ but has coronal resonants /r, r’/ and pharyngeal resonants /ħ, ħ^{w}/. Secondly, in addition to the three vowels /i, u, a/, Moses-Columbia has a schwa /ə/, whose position and surface forms is completely predictable. There are few roots with a phonemic schwa, e.g. *sac/sə́l’-l’-mix* ‘STAT/crazy-OC-IMPERF’ (CH 234).

Three phonological processes are relevant for the data under consideration in this section: vowel reduction, consonant deletion and vocalization. Most likely, all these processes are triggered by constraints on syllable shapes. Vowel deletion applies to all unstressed vowels, e.g. [kasħúycnmncn] /*kas-√ħuy=cin-min-t-si-n*/ ‘I’ m going to bother you (by mouth)’ (CH 202). This process triggers, in turn, consonant deletion or consonant merging. In the aforementioned example, for instance, /t/ merges with /s/ to form an affricate, /c/. Vocalization usually takes place after a consonant and before a vowel, as in [kasħaw’iyáltəx^{w}] /*kas-√ħaw’y=alt-mix*/ ‘she’s going to give birth’ (CH 201).

Stress in Moses-Columbia is also unbounded and mainly dependent on morphological structure. In the absence of marked morphemes, stress relies on the rightmost syllable with a full vowel, otherwise on the leftmost syllable with a schwa.

As mentioned earlier, Czaykowska−Higgins (1993a) argues that the vowel quality of the schwa is predictable. It is determined by the consonantal environments in which they occur. For instance, it surfaces as [u] before a /w(’)/ or as [a] before /ʔ, h/. Root vowels, whose quality is predictable, appear only in certain types of positions. MC roots may contain between one and five consonants although the number of roots containing one or five consonants is very small. (66) lists the surface types of roots containing two, three and four consonants and the number of roots in each type. There were approximately 1500 roots examined (Czaykowska−Higgins 1993a:219).

(66) *root types found in MC*

2C roots		3C roots				4C roots	
CVC	~550	CVCC	92	CəCVC	37	CCVCC	4
CəC	~650	CəCC	87	CVCəC	4	CəCVCC	4
CCV	2	CCVC	19	CəCəC	7	CVCCVC	4
CVCV	10	CCəC	4	CVCCV	1	CəCCVC	3
CəCV	4	CVCVC	15			CəCCəC	3
						CVCCəC	15
						CVCVCVC	5

5.3.5. The Moses-Columbia facts

We have seen that Moses-Columbia distinguishes between two forms of lexical suffixation. The main arguments for this distinction come from CWB’s (1996) paper on Moses-Columbia lexical suffixation. To avoid unnecessary repetition I will not restate the argumentation here (cf. §5.2.3 about the details of this distinction). I proceed here with the presentation of some illustrative examples from Root=LexS compounds and Root=LexS predicates. However, only the latter cases will be closely examined. The examples are listed in (67) and (68), respectively. Most examples are drawn from Czaykowska−Higgins (1993a).

(67) *Root=LexS compounds*
a. n/naqs=qín ‘one tipi’
LOC/√one=top (CH 206)
b. s/q’y’=míx ‘school children’
NOM/√write=people (CH 216)
c. p’isƛ̓’ʔ=ákst ‘big hands’
√pl.big=hand (CH 229)
d. k’^{w}in’=ásq’t ‘a few days’
√few=day (CH 259)

(68) *Root=LexS predicates*
a. na/máʕ’^{w}=ikn ‘(he) broke his back’
LOC/√break=back (CH 230)
b. yap/k^{w}án=akst-n-t-∅-n ‘I grab s.o. by the hand’
LOC/√grab=hand-CTR-TR-3O-1sgS (CH 229)
c. x^{w}ír=akst-m ‘reach out’
√reach=hand-MIDDLE (CH 230)
d. k’it’=áɬp ‘cut down tree’
√cut=tree (CWB 1996:34)
e. k^{w}uɬn=íc’ʔ-n-t-∅-n ‘I borrow a wig’
√borrow=skin-CTR-TR-3O-1sgS (CH 207)

As mentioned in earlier sections, compound stress is on the element modified by the root. In predicates stress varies which means it can be on the root or on the suffix. There are reasons to believe that, like Spokane, the default assigns prominence to the rightmost full vowel, otherwise to the leftmost schwa. This is shown in (69) which also includes some formations with vowelless roots. In (69d-e) stress is on the vowel of the suffix because this is the only full vowel in the string. The vowel of the prefix is irrelevant because prefixes are not part of the stress domain. These formations come from the transitive inflection because there were no examples of Root=LexS predicates available in the corpus of data.

(69) *edge-oriented stress as default in Moses-Columbia*

stress on the rightmost full vowel

a.	s-tux̣^{w}-tax̣^{w}-x̣^{w}- m’íx	‘getting convulsions’[22]	
b.	ʔarasík^{w}	‘turtle’	(CH 205)
c.	cək-n-t-sá-s	‘he hit me’	
	√hit-CTR-TR-1sgO-3S	(/ck/)	(CH 216)
d.	ʔac/ʔəm-s-t-ál-s	‘he is feeding us’	
	STAT/√feed-CAUS-TR-1plO-3S	(/ʔm/)	(CH 226)

stress on the leftmost schwa[23]

e.	kat/k’ə́t’-p=xən		‘(I) lost my toes’	
	LOC/√lose-INCH=toe			(CH 225)
f.	ʔə́ħ^{w}aʔ	/ʔəħ^{w}əʔ/	‘cough’	(CH 223)
g.	mə́lx̣aʔ	/məlx̣əʔ/	‘tell a lie’	(CH 223)

If the default clause assigns prominence to the rightmost full vowel, then stress on the root indicates that the root is accented (68a-b). Stress on the lexical suffix, on the other hand, indicates either an accented suffix or the default prominence (68d-e). Consequently, accentual contrasts are neutralized by the directionality of the default stress. The only clear distinction is the one between accented and unmarked roots:

(70)

accented roots	*unmarked roots*
máʕ’^{w}	k’it’
x^{w}ír	k^{w}uɬn
k^{w}án	ʔarasik^{w}
	məlx̣aʔ

It is worth mentioning that there are some instances of accented roots containing a schwa, e.g. *sac/sə́l’-l’-mix* ‘STAT/crazy-OC-IMPERF’, *ɬə̣́t’=ul’əx^{w}* ‘the ground is wet’ (CH 234).

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[22] This example is taken from Czaykowska−Higgins (1993b).

[23] We have seen in §5.3.3 that the constraint responsible for stress on the rightmost full vowel is ALIGN-R (cf. (63)). A second alignment constraint is at play here, namely ALIGN-L (ə́, PrW, L): Align a stressed schwa to the left edge of the prosodic word (Zoll 1995, Walker 1996). This constraint ranked above ALIGN-R will assign stress prominence to the leftmost schwa in the word.

The analysis of the facts in (68) and (69) is analogous to the analysis of the marked and unmarked words in Spokane. For this reason I believe that a detailed presentation of the analysis will add nothing new from a theoretical point of view. The table in (71) summarizes the stress patterns attested in predicate and compound lexical suffixation of Spokane and Moses-Columbia Salish. The patterns in which the two structures diverge are highlighted. Notice that default neutralizes some contrasts. Also keep in mind that the same suffix can participate in both formations. The ranking that derives head dominance effects in Root=LexS predicates follows in (72).

(71) *accentual patterns in Root=LexS predicates and compounds*

input forms	*Root=LexS predicate*	*Root=LexS compound*
√CV́C=CVC	**CV́C=CVC**	**CVC=CV́C**
√CVC= CV́C	CVC=CV́C	CVC=CV́C
√CVC=CVC	**CVC=CV́C**	**CVC=CV́C**
√CəC=CVC	CəC=CV́C	CəC=CV́C
√CVC=CəC	**CV́C=CəC**	**CVC=Cə́C**
√CəC=CəC	(?) Cə́C=CəC	CəC=Cə́C

(72) *ranking for the accentuation of Root=LexS predicates in Spokane and Moses-Columbia*

HEADFAITH(HEAD), *FLOP
|
*DOMAIN
|
FAITH(HEAD)
|
DEFAULT ℂ
(PK-PROM >> ALIGN-L >> ALIGN-R)

• HEADFAITH(HEAD) >> FAITH(HEAD)	n/cíq=leʔqx^{w}-n-t	(62)
• PK-PROM >> ALIGN-R	n/x^{w}ist=étk^{w}	(64), (65)
• ALIGN-L >> ALIGN-R	kat/k’ə́t’-p=xən	(69f)

I will come back to Moses-Columbia in §5.6 where I discuss some more interesting facts from the transitive derivation. The last case study of incorporation is Lillooet Salish.

5.4. Lillooet Salish (St’át’imcets)

5.4.1. Background information on Lillooet

Lillooet is a Northern Interior Salish language spoken in southwest mainland of British Columbia with two dialects, Mount Currie and Upper. These dialects are mutually intelligible, the main difference being in the vocabulary. The source used here for Lillooet Salish is Van Eijk (1985) (henceforth E in the examples).

Lillooet and Thompson Salish have the same consonant and vowel inventory. However, /ə/ has an epenthetic rather than a phonemic status in Lillooet. There are traces of quantity sensitivity in the language. Schwas are never stressed unless there is no full vowel in the word, whereas superheavy syllables ((C)VCC) always attract stress. Unstressed vowels reduce to schwa or delete in this Salish language as well, e.g. *slamála* [sləmála] ‘bottle’, *x*^{w}*ik’m=áɬx* [x^{w}ək’máɬx^{w}] ‘shed for butchering fish’, *n/k’ax-ín’was* [n-k’x-ín’was] ‘island, dry in the middle (lit)’ (E 37).

Lillooet is very interesting from an accentual point of view. Besides quantity sensitivity, the system is foot-based. Trochees are built from left to right and an edgemost rule assigns primary prominence to the rightmost foot. Schwas are avoided in foot-head position. It is interesting to see how these rhythmic principles interact with lexical marking.

Many roots occur as free forms, e.g. *cuk*^{w} ‘finished’, but a number of roots occur exclusively with an affix, or reduplicated, or with interior glottalization, e.g. *ʕəl-ilx* ‘to exert oneself’, *lək*^{w}*-lák*^{w} ‘loose’, *laʔk*^{w} ‘to become loose’ (E 43). The main root-types with approximate percentages are:

(73)	*root shapes*					
	CVC	65%	q’aʔ	‘to eat’	x̩^{w}əm	‘fast’
	CVCC	18%	mulx	‘stick’	x̩əlq’	‘to roll down’
	C(ə)CVC	5%	ptak	‘to pass by’	wənáx^{w}	‘true’
	CVCVC	5%	máwal’	‘alive’	cal’áɬ	‘lake’
	residual types	7%	k^{w}tamc	‘husband’	túɬkis	‘hand-maul’

Lillooet makes the distinction between two types of lexical suffixation: predicate and compound. As we have seen in the other languages of this family, Root=LexS compounds are stressed on the rightmost element (74a) like real compounds (74b). The same set of suffixes can participate in Root=LexS compounding as well as predicate formation. Compound forms are not analyzed here.

(74) *compound forms in Lillooet*

a. Root=LexS compounds

n-x^{w}ənaʔm=ásk’aʔ	‘power song’	(E 99)
palʔ=ásq’ət	‘one day’	(E 100)
ʔamh=ín’ak	‘good gun’	(E 101)
cənəmən=íl’ap	‘denim pants’ (cə́nəmən ‘Chinese’)	(E 103)

b. [root+root] compounds

qə̩l̩-aɬ-tmíx^{w}	‘bad land (lit.), storm’	
p’əc-aɬ-lə́qəm	‘first snow’	
ləp’-aɬ-k’^{w}únaʔ	‘cured (by burying) salmon eggs’	(E 66)

5.4.2. The Lillooet facts

In Root=LexS predicate formations, a lexical suffix is the complement of the root/head. With respect to accentual properties, two types of roots and lexical suffixes are distinguished: marked and unmarked ones. In the light of the theory of head dominance, it is expected that marked root/heads are prosodically dominant. This expectation is fulfilled, as indicated by the examples in (75).

(75) *Root=LexS predicates*

a.	súp=us-əm[24]	‘to scratch one’s face’	(E 98)
b.	c’aw’=ús-əm	‘to wash one’s face’	(E 98)

In (75a) the root /sup/ and the lexical suffix /=us/ are accented. The marking properties of these morphemes are established by the following line of argumentation: the example (75b), which is composed of the root /c’aw’/ and the same lexical suffix, is stressed on the suffix. This pattern implies that either the stress pattern at issue originates from the language-specific foot-form or that the root is unmarked and the suffix accented. If the foot-form is an iamb, then the word in (75b) is footed as follows: (*c’aw’=ús*)-*əm*.[25] Other forms with the same root, however, clearly indicate a trochaic pattern: (*c’áw’=i*)*lap* ‘to wash

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[24] Most predicate forms in Lillooet include a grammatical marker (e.g. transitivizer, intransitivizer).

[25] Syllable structure is a very complicated issue in all Salish languages. For the purposes of footing in this study I adopt a somewhat loose form of syllabification. The readers who are interested in Lillooet syllable structure can find more information in Roberts (1993). A valuable source for prosodic morphology phenomena in Lillooet is Urbanczyk (1996).

the floor' (E 103), (*c'aw'=qa*)(*n'ís-əm*) 'to brush one's teeth' (E 113). Moreover, as I show later, secondary stress adduces strong evidence for a trochaic organization of the language. We infer from the above that the footing in Lillooet is not iambic and that the word in (75b) is parsed as follows: *c'aw'=*(*ús-əm*). This parsing indicates that the root /c'aw'/ is unmarked and the suffix /=ús/ is accented. An alternative hypothesis would be to argue that the root is unaccentable and the suffix unmarked. Often there is no way to choose one solution over the other because the crucial examples are missing. But we can tell with confidence that the root /c'aw'-/ is not unaccentable from examples like (*c'áw'=i*)*lap* 'to wash the floor' and (*c'aw'=qa*)(*n'ís-əm*) 'to brush one's teeth'.

Indeed, if a root such as /ciq/ is unmarked, then it is expected to lose stress from any accented suffix. Such roots can bear stress only by default as, for example, in (*c'áw'=i*)*lap*. A more complete picture of the marked and unmarked patterns of Lillooet is presented in (76).

(76) *words with marked and unmarked morphemes in Lillooet*

a. accented root + accented lexical suffix

súp=us-əm	'to scratch one's face'	(E 98)
súp=aɬməx-am[26]	'to scratch oneself on the belly'	(E 102)

b. unmarked root + accented lexical suffix

c'aw'=ús-əm	'to wash one's face'	(E 98)
k'ətx^{w}=ús-ən	'to cut off s.o.'s head'	(E 98)
x̩aλ̑'am'=ús	'to go up a hill'	(E 99)
maλ̑'=ayúʔ	'people mixed together'	(E 116)

c. accented root + unmarked lexical suffix

n-súp=l-əqs-am'	'to scratch one's nose'	(E 111)

d. unmarked root + unmarked lexical suffix

c'áw'=lap	'to wash the floor'	(E 103)
k^{W}əz=ánis-əm	'to varnish boards'	(E 100)

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[26] Schwas in Lillooet are never stressed, unless they are the only vowels in the word. This explains the difference between initial stress in this example and penultimate stress in the following form.

s-təq=əl’wás	‘to have one’s hands on hips’	(E 108)
n-pə́x̣ʷ=l-əqs	‘to get a bleeding nose’	(E 111)

There are no unaccentable suffixes in the corpus of the data I examined. One instance of a pre-accenting suffix has been found. The grammatical suffix /-tam/, which precedes the suffixes /-al’ap/ and /-ɬkal’ap/ has a weak lexical accent. When this suffix is parsed it needs to be in weak foot position, e.g. (*pùn-tam*)(-*ɬkál’ap*)[27] ‘find PASS-2plS’(E 22), (*cùn-tam*)-(*ál’ap*)-*as* ‘tell-2plO-3sgS’ (E 174-175). The example (*x'ʷìtəns*)-*tam*-(*àl’ap*)(-*ás*-*wit*) ‘whistle at-2plO-3plS’ is telling: when canonical (left-to-right) footing demands the weakly-marked suffix to be parsed as the head of the foot, the suffix is skipped and the first syllable of the following morpheme is parsed into the head of the foot. If, according to what has been claimed in this study, inherent accentual properties take precedence over the default in lexical accent systems, then one would expect the suffix to force stress upon the last syllable of the root. Recall, however, that it is illegitimate for schwas to be stressed. This requirement rules the footing *x'ʷi*(*tə̀ns*-*tam*)-(*àl’ap*)(-*ás*-*wit*) out as ungrammatical.[28]

The present example also suggests that preaccentuation is a form of weak marking. Similar suffixes in Greek give the impression of preaccentuation because of the particular prosodic principles that are active in the language. Lillooet shows that it is not necessary to interpret weakly-accented suffixes as pre-accenting because they do not always imply stress on the preceding syllable. These morphemes simply avoid prosodic prominence. In this sense pre-accenting suffixes found in Greek and Lillooet are very close to the weakly accented suffixes encountered in unbounded systems such as Thompson and Spokane.

5.4.3. Prosodic compositionality and head dominance in Lillooet Root=LexS predicates

According to the theoretical framework proposed here, root-dominance follows from head dominance. In compositional systems like the ones examined in this study, the mapping between morphology and phonology is interpreted as prosodic dominance of the head element. As a result, marked heads prevail over

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[27] According to Van Eijk (1985:24) vowels which serve as the counting bases in stress assignment, i.e. vowels in foot-head positions, receive secondary stress.

[28] The form (*x'ʷìtəns*)-(*tám*-*a*)(*l’áp*-*as*)-*wit* is excluded because it incurs a double violation of faithfulness. The vocalic peak of the suffix /-tam/ not only loses its accent but it is also added secondary stress.

other marked morphemes in the string. Head dominance is spelled out with the ranking HEADFAITH >> FAITH. Unfortunately, no intermediate constraints establish the conflict of these two constraints in Lillooet. Therefore these constraints are unranked in this Salish language.

The tableaux (77) and (78) illustrate the accentuation of the forms *súp=us-əm* ‘to scratch one’s face’ and *c’aw’=ús-əm* ‘to wash one’s face’. The winner of tableau (77) cannot be any other candidate but the first one. This candidate is faithful to the lexical accent of the root as opposed to the second candidate, which fatally sacrifices faithfulness to the accent of the root/head. Keep in mind that trochaic feet are enforced by high-ranking TROCHEE.

(77)

input: √súp, =ús, -əm	HEADFAITH(HEAD)	FAITH(HEAD)
☞ a. (súpus)am		*
b. su(púsam)	*!	*

In the second tableau, the first candidate complies to both faithfulness constraints and wins. In (78b), the root/head has been added the lexical accent of the suffix. This is a fatal move because it triggers violation of head-faithfulness. Notice that stress on the root is also at the expense of *FLOP because the accent is not linked to the vocalic peak of the suffix any more.

(78)

input:√c’aw’, =ús,-əm	HEADFAITH (HEAD)	FAITH(HEAD)
☞ a. c’aw’(ús-əm)		
b. (c’áw’us)-əm	*!	

One of the most interesting aspects of Lillooet stress is the accentuation of polysyllabic forms which bring to light the rhythmic aspects of the system. The examples discussed in the following section suggest that rhythmic principles can co-exist with marking in a language. They also show that Lillooet is a border-case between a lexical accent and a rhythmic system. This coexistence opens a new perspective for our analysis because it gives us the chance to examine whether or not rhythmic properties can conceal the effects of head dominance and possibly influence the evolution of a stress-system.

5.4.4. Rhythmic patterns in Lillooet

Unmarked words display various accentual patterns depending on vowel quantity and also on syllable structure.[29] The examples in (79) manifest that first, trochaic feet are built from left to right and, second, primary stress is assigned to the rightmost foot: (*c'áw'=i*)*lap*, (*c'àw'=qa*)(*n'ís-əm*).

(79) *words with no lexical accents*

a.	c'áw'=lap (/=ilap/)	'to wash the floor'	(E 103)
b.	c'àw'=qan'ís-əm	'to brush one's teeth'	(E 113)

We infer from the facts in (79) that two additional constraints must be at play here, ALIGN-PRW and ENDRULE-R.[30] Moreover, the fact that stress is not final in (79b) suggests that parsing syllables to feet is not at the expense of foot-binarity hence FTBIN >> PARSE-σ.

(80)

input: √ c'aw', =ilap	ER-R	ALIGN-PRW	FTBIN	PARSE-σ
☞ a. (c'áw'i)lap				*
b. (c'àw'i)(láp)			*!	
c. c'a(w'ílap)		*!		*

Obviously, the first candidate is the winner because it complies to all the given constraints. The losing candidate (80b) is ruled out by FTBIN, whereas the losing candidate (80c) incurs two violations of PARSE-σ and a crucial violation of ALIGN-PRW (the foot starts on the second syllable from the left edge of the prosodic word).

The rhythmic pattern is disturbed when the word contains schwas. Some examples are listed in (81). Keep in mind that schwas cannot host (primary or secondary) stress. This is because PK-PROM will choose full vowels as better peaks than schwas. If schwas cannot be parsed in weak foot positions, they are left unparsed: *k*^{w}*əz=*(*ánis*)*-əm, s-təq=əl'*(*wás*). More specifically, the example in (81a) suggests that PK-PROM outranks the requirement of having the left edge of the prosodic word aligned to the left edge of the foot. Consequently, the

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[29] For an alternative account on the rhythmic aspects of Lillooet stress and syllable structure see Roberts (1993).

[30] ALIGN-PRW (PrW, L, Ft, L) (McCarthy and Prince 1993b): Any [$_{PrW}$ is aligned with a ($_{Ft}$.
ENDRULE-R (Prince 1983, cf. EDGEMOST in Prince and Smolensky 1993): The rightmost foot of the word is the head of the prosodic word.

ranking is PK-PROM >> ALIGN-PRW. In (81b), the syllable with the only full vowel in the word forms a monosyllabic foot. We infer from that that PK-PROM outweighs FTBIN. Finally, a schwa hosts stress only when there are no full vowels in the string, as in (81c).

(81)	a.	k^{w}əz=ánis-əm	‘to varnish boards’	(E 100)
	b.	s/təq=əl’wás	‘to have one’s hands on hips’	(E 108)
	c.	n/pə́x̣^{w}=l-əqs	‘to get a bleeding nose’	(E 111)

(82)

input: √təq, =əl’wás	PK-PROM	ALIGN-PRW	FTBIN
☞ a. təqəl’(wás)		**	*
b. (tə́qəl’)was	*!		

Candidate (82b) conforms better to all constraints but the most important one. This proves to be fatal for its survival, as shown by the victory of the first candidate (82a).

PK-PROM is decisive for the accentuation of words that have syllables of the shape (C)VCC. Such syllables count as heavy and attract stress. This is evidenced by the examples in (83).

(83)	a.	n/ʔucz=úɬq’^{w}əlt-am	‘to clear one’s throat’	(E 103)
	b.	k^{w}uɬn=áwɬ	‘to borrow a car, canoe’	(E 115)
	c.	naq’^{w}=áwɬ	‘to steal a ride (e.g. on a train)’	(E 115)

There are reasons to believe that the lexical suffix in (83a) is unmarked as evidenced by examples like *k’áx=aɬq’^{w}əlt* ‘to have a dry throat’ (E 103). (Cf. *n/k’ax=ín’was* ‘island’ (E 37,101)). Under this assumption, the only possible parsing for (83a) is *n*-(*ʔùcz*)(=*úɬq’^{w}əl*)*t-am*. Similarly, (83b) and (83c) are parsed as (*k^{w}uɬn*)(=*áwɬ*) and *naq’^{w}*(=*áwɬ*), respectively. It is important to note that the absence of secondary stress in the latter example is indicative of the parsing *naq’^{w}*(=*áwɬ*) and not (*naq’^{w}*)(=*áwɬ*). In short, such examples imply that CVCC syllables count as heavy for stress. The tableau in (84) illustrates how the correct prosodic pattern of *naq’^{w}*(=*áwɬ*) arises. The competition is controlled by PK-PROM which rules out candidates (84b) and (84c) because their peaks are not on the heavy (CVCC) syllable.

(84)

input: √naq’^{w}, =awɬ	Pk-Prom	Align-PrW	Parse-σ
☞ a. naq’^{w}(áwɬ)		*	*
b. (naq’^{w})(áwɬ)	*!		
c. (náq’^{w}awɬ)	*!		

To summarize, the ranking for rhythmic constraints in Lillooet is:

(85) *ranking for rhythmic stress in Lillooet Salish*
ER-R, Trochee, Pk-Prom
| təqəl’wás (82), naq’^{w}áwɬ (84)
FtBin, Align-PrW
| c’áw’ilap (80)
Parse-σ

One may wonder what effect these rhythmic constraints may have on marked patterns. The examples in (86) evidence that in long forms the marked/unmarked root opposition is neutralized.

(86) *rhythmic stress in marked words*
sùp=alús-əm /súp=alus-əm/ ‘to scratch one’s eye’ (E 98)
(cf. súp=alməx-am (75a))

vs. c’àw’=qan’ís-əm ‘to brush one’s teeth’ (E 113)
(cf.c’áw’=ilap (75b))

Notice that faithfulness to the foot-head of the root is not violated in *sùp=alús-əm* because the input head is present in the output and it bears secondary stress.

Marked words of the shape CVCV́C as, for example, *ca*(*l’áɬ*) ‘lake’, *qa*(*n’ím*) ‘to hear’, *q^{w}a*(*l’íɬ*) ‘pitch’ (E 46), manifest that faithfulness constraints outrank FtBin and Align-PrW; the left edge of the prosodic word and the left edge of a foot are misaligned and the foot built by the lexical accent is monosyllabic. A similar conclusion is drawn by examples such as *c’aw’*(*=ús-əm*) (76b) ‘to wash one’s face’ and (*x̣aƛ’am’*)(*=ús*) ‘to go up a hill’ (76b). The former violates Align-PrW and the latter FtBin.

It is unfortunate that Van Eijk (1985) does not list an example of predicate construction in which a marked root is combined with a heavy suffix.[31] Thus, the ranking between HEADFAITH and PK-PROM remains undecided.

The ranking of all constraints participating in the accentuation of Root=LexS predicates is summarized in (87). Rhythmic constraints build trochaic feet on the basis of lexical information of the root/head or the lexical suffix, if the root is unmarked. Simple faithfulness is dominated by peak-prominence. This is suggested by examples like (*x*ʷ*ìtəns*)-*tam*-(*àl'ap*)(-*ás*-*wit*) where the suffix /-tam/ sacrifices tailness in order to avoid stress on the schwa. The remaining structural constraints are low in the hierarchy. FTBIN is dominated by faithfulness implying that marked feet need not comply to binarity but rhythmic ones must be obligatorily binary.

(87) *ranking for the accentuation of Root=LexS predicates in Lillooet*

ER-R, TROCHEE, PK-PROM, HEADFAITH
\\
FAITH
|
FTBIN, ALIGN-PRW
|
PARSE-σ

The table in (88) summarizes the accentual patterns found in Lillooet Salish. Marked roots attract stress from marked suffixes. In unmarked forms the default would promote penultimate or final stress depending on whether the last syllable is superheavy or not. The interaction of lexical accents with weight is unclear because the crucial data is missing.

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[31] I found two examples of the type CV́C=VCC-əC, e.g. *n/p'íx=alk'-ən* 'to unravel a rope' (E 106), *páx̣=alq*ʷ*-əm* 'to scrape a stick' (E 107). Since both examples are escorted by grammatical suffixes the heaviness of the lexical suffix is obliterated; the last consonant of the lexical suffix syllabifies with the following vowel.

(88) *accentual patterns of Root=LexS predicates*

input		*Lillooet*	
a.	√CV́C=CV́C(C)	CV́C=CVC	CVC=CVCC
b.	√CV́C=CVC(C)	CV́C=CVC	CVC=CVCC
c.	√CVC=CV́C(C)	CVC=CV́C	CVC=CV́CC
d.	√CVC=CVC(C)	CV́C=CVC	CVC=CV́CC

5.5. Summary of Salish Accentuation in the Morphological Stem

In this section I discussed the accentuation of lexical suffixation, a grammatical construction that is documented in all Salish languages. I showed that two types of lexical suffixation exist in these languages. The distinction between these two types is not based on prosodic criteria since often the same suffix participates in both constructions.

In the first type of lexical suffixation, the Root=LexS construction exhibits the semantic and prosodic properties of compounds. The root is the modifier of the meaning expressed by the lexical suffix. Stress follows this modifier-head relation by being on the element that is modified, namely the lexical suffix.

In the second type of lexical suffixation, the Root=LexS construction has the syntactic and semantic properties of incorporated constructions. The lexical suffix satisfies the argument structure of the root and the whole Root=LexS construction takes on a predicate role in the sentence. The lexical suffix corresponds to the same range of relations typical for noun incorporation: object and oblique as locative and instrument.

Stress in predicative formations shows sensitivity to morphological structure and in particular to head-dependent relations. The element that is a head in the morphosyntactic structure is prosodically prevalent. Although there is a debate regarding the existence of lexical categories in Salish, it is unquestionable that in the syntax there is a three-way distinction between NPs, APs and VPs. In the 'incorporated' constructions the root is syntactically the head of the VP into which the lexical suffix incorporates.

As in fusional languages, the morphological headedness of the root is interpreted as prosodic headedness by the function *g* that performs the mapping between the morphosyntactic and prosodic component of the grammar. Head dominance takes the form of the ranking HEADFAITH >> FAITH. This ranking is the backbone of the accentual system in all four languages examined here.

Despite the fact that the Salish languages share head dominance, there are still many differences with respect to stress. These differences appeal to prosodic principles and, more specifically, to the structural constraints that take charge of accentuation in the absence of lexical accents. In Thompson, Spokane and Moses-Columbia default prominence is edge-oriented and has conflicting directionality. In Lillooet, on the other hand, default is dependent on footing, quantity sensitivity and an edgemost rule that assigns prominence to the rightmost foot. The table in (89) summarizes the structural constraints that participate in the accentuation of Salish and indicates their domination order with respect to each other and (head) faithfulness.

(89)

language	*ranking*	*default*
Thompson	HF >> F >> PK-PROM>> ALIGN-R >> ALIGN-L	stress the leftmost V; else, the rightmost ə
Spokane/MC	HF >> F >> PK-PROM>> ALIGN-L >> ALIGN-R	stress the rightmost V; else, the leftmost ə (?)
Lillooet	ER-R, TROCHEE, PK-PROM, HF >> F >> FTBIN, ALIGN-PRW >> PARSE-σ	stress the rightmost foot

In Spokane and Moses-Columbia, default prominence to the rightmost (full) vowel obscures the marked/unmarked opposition in lexical suffixes. In Lillooet, default and other prosodic constraints interact with faithfulness. The high ranking of rhythmic constraints has a dramatic impact on the neutralization of the marked/unmarked opposition in roots and lexical suffixes. Marked patterns are revealed only in short words, whereas in long words head dominance is concealed by principles which enforce exhaustive binary footing, stress on the rightmost foot, weight sensitivity and so on. The table in (90) presents how the four languages examined here realize the same set of inputs.

(90)

input	*Thompson*	*Spokane/MC*	*Lillooet*	
a. CV́C=CV́C(C)	CV́C=CVC(C)	CV́C=CVC(C)	CV́C=CVC	CVC=CVCC
b. CVC=CV́C(C)	CVC=CV́C(C)	CVC=CV́C(C)	CVC=CV́C	CVC=CV́CC
c. CV́C=CVC(C)	CV́C=CVC(C)	CV́C=CVC(C)	CV́C=CVC	CVC=CVCC
d. CVC=CVC(C)	CV́C=CVC(C)	CVC=CV́C(C)	CV́C=CVC	CVC=CV́CC

Thompson displays sharper distinctions between marked and unmarked patterns. First, a comparison between (a) with (b), and (b) with (d) informs us about the accentual properties of roots and lexical suffixes. For example, by comparing the word *kʷén=kn’* ‘grab s.o. by the back (of clothes)’ with the word *n/paw’=íkn’* ‘get a layer of ice on top’, we are able to tell whether one of the two elements is accented or not. Whether it is the root or the suffix depends on another comparison between *n/paw’=íkn’* ‘get a layer of ice on top’ and *n/páw’=ymxʷ* ‘the ground is frozen’. Although it is a cumbersome procedure, in the end we know which morphemes have inherent accentual properties and which ones do not.

This is not the case in Spokane and Moses-Columbia. In these languages the default clause neutralizes the opposition between marked and unmarked suffixes. Stress on the root as in *n-cíq=leʔxʷ-n-t* ‘dig the ground (sg.)!’ suggests that the element is accented. On the other hand, stress on the lexical suffix as in *n-xʷìst=étkʷ* ‘walk in the water’ is ambiguous. It might be triggered by the lexical accent of the suffix or the default (stress the rightmost vowel). We can never, therefore, tell what is the exact accentual status of a lexical suffix, unless it is disyllabic with initial stress.

In Lillooet, marked patterns are detectable only in short forms, e.g. *súp=us-əm* ‘to scratch one’s face’ vs. *c’aw’=ús-əm* ‘to wash one’s face’. In polysyllabic words, boundedness, triggered by high-ranking ER-R, and rhythmic factors such as quantity sensitivity and footing, blur the effects of lexical marking, *naq’ʷ=áwɬ* ‘to steal a ride (e.g. on a train)’, *sùp=alús-əm* ‘to scratch one’s eye’. This language shows us that a change towards the direction of a fixed stress system is enhanced when more prosodic factors cooperate with (head) faithfulness constraints.

In the next section I move on to the accentuation of the morphological word and I claim that the Salish languages exhibit a stricter dependence on headedness than Greek and Russian.

The Morphological Word

As mentioned in the introduction of this chapter, the morphological word is the scope of purely syntactic processes. It includes, besides the root (and the lexical suffix), transitive and intransitive markers. All predicative words are either transitive, incorporating specific reference to the object or goal of an act, or intransitive. Unsuffixed roots are intransitive. There are also many suffixes which create complex intransitive structures.

All transitives are marked by the suffix /-t/ and are further inflected for person. There are also several complex transitive increments expressing directive, relational and other meanings. Transitives incorporate pronominal subject and object.

Aspect is marked partly by affixes and partly by particles and auxiliaries. Only aspectual suffixes are discussed here. Aspectual stems are also intransitive and express a range of meanings: habitual, translocational, iterative, developmental, resultative, and so on. The subject in intransitives is a clitic. Most intransitive words can be extended by suffixes which add special notions about the status or opinion of the referents in relation to the real world. These suffixes add a modal flavor to the predicate.

The second part of Chapter 5 consists of two major sections: §5.6 discusses stress in transitive formations, and §5.7 stress in intransitive formations. The main claim is that Salish languages are head-stress systems at the level of the morphological word. This means that stress is totally dependent on morphosyntactic headedness.

5.6. Accentuation in Transitive Formations

Transitive inflection adds sequences of object and subject suffixes to stems formed with the transitive marker /-t/. Several special suffixes may precede this marker, yielding specialized notions such as directive, indirective, relational[32] or causative. The morphological structure of a transitive formation is as follows:

(91) ROOT=LEXS-DIR/INDIR/REL/CAUS-TR-O-S
ɬək’ʷ-min-t-sem-es ‘remember-REL-TR-3O-1sgS’
(Thompson)

Transitive formations exhibit a stronger type of head-dependence than Root=LexS predicates. Let us have a look at the following examples from Thompson. The inherent accentual properties of roots are given between slashes.

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[32] Indirective transitives focus on the person affected by the action, but also simply imply another object −corresponding to ‘ditransitive’ verbs in more familiar languages. However, the focus of these forms is exactly the opposite of the focus of English ditransitive verbs: whereas in English one gives something to someone, in Salish one benefits someone (direct object) with something (indirect object). Relational markers refer to objects toward which the subject is moving in relation to whom/which the action is accomplished.

(92) *Thompson transitive paradigm*
a. páw’-n-t-∅-es ‘freeze s.t. (liquid)’ (Th 228)
√freeze-DIR-TR-3O-3S (UnM /paw’/)
b. kʷén-xi-t-∅-es ‘catch (s.t.) for s.o.’ (Th 115)
√grasp-INDIR-TR-3O-3S (Acc /kʷén/)
c. ʔes/qʷin-s-t-sém-es ‘s.o. spoke to me’ (Th 295)
STAT/√talk-CAUS-TR-1sgO-3S (UnAcc /qʷin/)
d. qʷin-ə́m ‘serve as spokesman’ (Th 295)
√talk-MIDDLE (UnAcc /qʷin/)

The root in (92a) is unmarked whereas the root in (92b) is accented. In both cases stress is on the root. Only with unaccentable roots does stress land on another morpheme. For example, in (92c), stress is on the leftmost stressable vowel after the root. Notice that in this example the root is preceded by the stative prefix, and can therefore not be extrametrical. The ultimate con-firmation for the unaccentability of the root comes from (92d). Here, the schwa is stressed despite the fact that there is a full vowel in the word.

Now let us see how similar constructions are stressed in Spokane. Some transitive examples are listed in (93). In these examples, not only accented but also unmarked roots are stressed. This is surprising because, according to the default clause, prominence in unmarked words like (93a) is expected to be on the rightmost full vowel. Stress is on a suffix only with unaccentable roots as in (93c).

(93) *Spokane transitive paradigm*
a. ʔemút-st-∅-en ‘I left him at home’
√sit-TR-3O-1S (UnM /ʔemut/) (Bates & Carlson 1989)
b. kʷén-n-t-∅-es ‘he took it’
√take-DIR-TR-3O-3S (Acc /kʷén/) (Carlson 1972:32)
c. caq-n-t-∅-én ‘I place it’
√place-INDIR-TR-3O-3S (UnAcc /caq/) (Carlson 1972:25)

The Spokane data is not unique. Exactly the same phenomenon appears in Moses-Columbia. Default prominence in this language is also on the rightmost full vowel. However, the word in (94a) is stressed on the root even when other (full) vowels occur further to the right.

(94) *Moses-Columbia transitive paradigm*
a. kʷúɬn-min-t-∅-n ‘I’m borrowing it’ (CH 251)
√borrow-REL-TR-3O-1sgS (UnM /kʷuɬn/)
b. máʕ’ʷ-ɬ-t-sa-xʷ ‘you broke my X’
√break-INDIR-TR-1sgO-2sgS (Acc /máʕ’ʷ/) (CH 230)

The default clause in all three languages is revealed when the root lacks a full vowel.[33] In such cases, stress is on the leftmost full vowel in Thompson (95a) and the rightmost full vowel in Spokane (95b) and Moses-Columbia (95c).

(95) a. ɬək’ʷ-mín-t-sem-exʷ ‘you remember me’ (Th&Th 73)
b. tq-n-t-es-ín ‘I hit you (sg)’ (Carlson 1972:40)
c. kas/ħaw’w’-y-míx ‘he’s going to be born’ (CH 201)

Interestingly, the root is not the only constituent that bears stress in transitive formations. When the number marker /-iyxs/ occurs in the string, it bears stress.

(96) *plural formations*
a. wik-t-íyxs ‘they see him/her/them/’ (Th&Th 80)
b. k’ʷenme-t-íyxs ‘they judge him/her/them’
c. c’əq’ʷ-xi-t-íyxs ‘they write to him/her/them/’

The question that naturally arises at this point is why specific morphemes are stressed although prominence is expected elsewhere. It is clear that marking properties are respected. This is demonstrated by unaccentable roots particularly, which force their accent outside their territory. The default accentuation is not discarded because it emerges when there are no full vowels in the string.

The facts above can be easily accounted for under a stricter form of head-dependence. Let us consider the internal structure of transitive formations.

Roots in Salish combine with various suffixes to derive predicates, and predicates combine with various other suffixes to derive clauses. The tree in (97) depicts the internal structure of a Thompson transitive clause. Following Jelinek and Demers (1994), I assume that Trans is a functional head that assigns case to O. The root raises to Trans and the pronominal arguments to their associated functional head (FP). I refrain from labeling the functional head as

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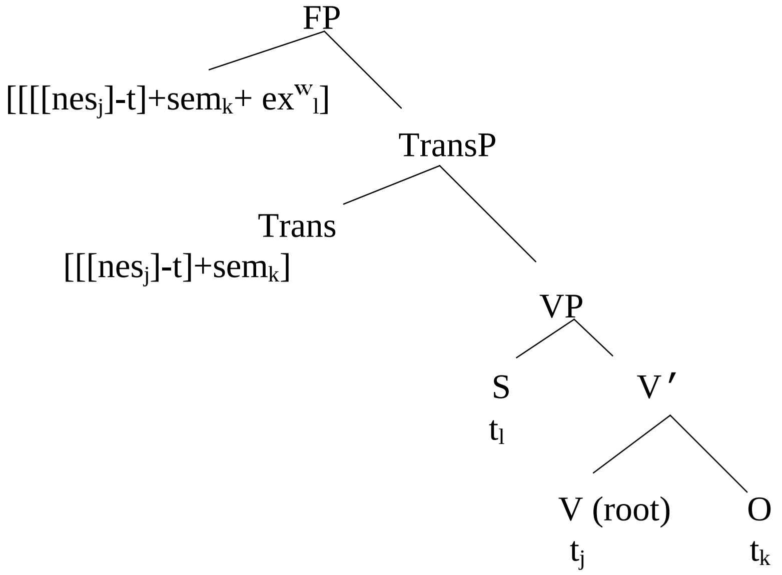
[33] Roots with a phonetic schwa behave the same as roots with a full vowel, e.g. *pcə́kɬ-es* ‘be made a leaf’ (Th 228), *ʔə̣́sxe-s-t-∅-es* ‘make s.o. sneeze’ (Th 8).

Tense because it has been claimed by Davis and Matthewson (1997), amongst others, that Salish languages lack a unitary Tense category. There is no separate functional head which locates events in time. Instead, Tense is decomposed into its component functions. For example, Davis and Matthewson propose that the functional head Fin(ite), performs a subset of the functions performed by English Tense.

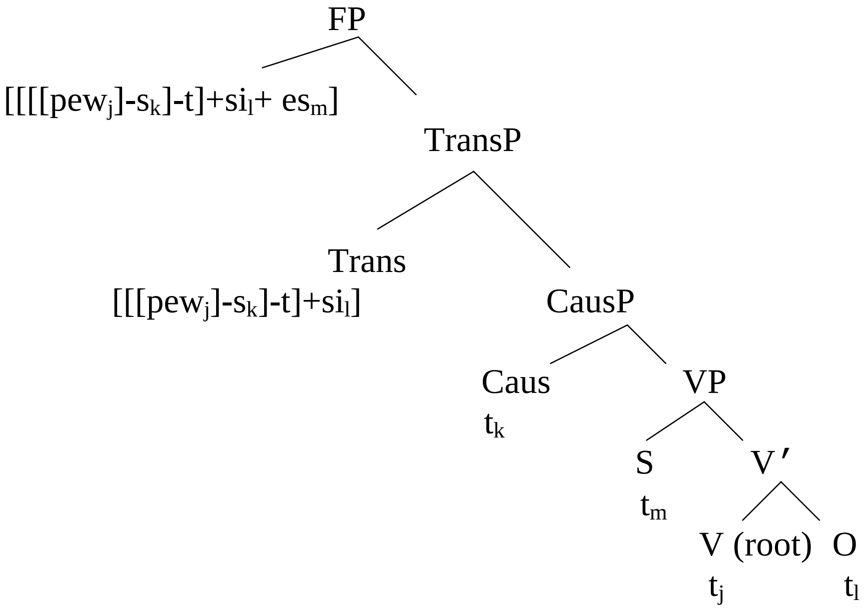
(97)



nés-t-sem-ex^{w} /√convey-TR-1sgO-2sgS/ ‘you convey me’ (Th&Th 63)

There are also transitive elements that have benefactive/indirective (*for the benefit of*), relational (*with respect to*) or directive (*for, to*) meaning. I assume that such constructions are derived by preposition incorporation to the predicate. On the other hand, causative constructions are derived by incorporation of the predicate to the causative head (Baker 1988). In this case, the root incorporates to the causative head and then raises to Trans.

(98)



péw-s-t-si-es /√swell-CAUS-TR-2sgO-3S/ ‘he makes you swell’ (Th&Th 70)

My proposal is that the syntactic structures above can account for the stress facts in (92-94). In these structures the highest (functional) head is Trans. However, the suffix /-t/ is vowelless and consequently, cannot bear stress. The next step would be to examine whether the lower head qualifies to bear stress. This is the root in (97) and the causative in (98). The root in (97) has a vowel and a lexical accent. Therefore it hosts stress. The causative marker, on the other hand, is vowelless and, as expected, stress must rely on the phonological properties of the immediately lower head, namely the root. In sum, stress is determined by the highest head, or more precisely, the highest head with a (full) vowel, in the syntactic tree.

The ultimate verification that the morphosyntactic head controls accentuation comes from plural formations. According to recent proposals (Johnson 1990, Hoekstra and Hyams 1995), Number heads its own projection. In our examples, Number stands higher than Trans and, consequently, is the highest head in the structure and bears stress. Extra evidence from intransitive formations in §5.7 verifies that accentuation in the morphological word is indeed head-controlled. Aspectual and modal heads attract stress from roots and other constituents of the word.

To summarize, stress assignment in the morphological word is head-controlled. Stress is either on the accent of the head element or the head itself. This algorithm describes a head-stress language with lexical accents. In Chapter

1 (Appendix, Bc) I claimed that this algorithm is derived by the following ranking:

(99) *ranking for head-stress systems with lexical accents*
HEADFAITH >> HEADSTRESS >> STRUCTURAL, FAITH

Heads are not obligatorily stressed because HEADFAITH dominates HEADSTRESS. This domination hierarchy allows unaccentable morphemes to realize their floating accent outside the morpheme that sponsors them. No other constituent than the head, however, can impose its inherent accent to the word because the ranking HEADSTRESS >> STRUCTURAL guarantees that unmarked heads will be stressed.

To conclude, in the morphological word we find a situation in which morphosyntactic structure is mapped into prosodic structure and the function that performs the mapping assigns stress to the syntactic head of the word. This is a type of obligatory head dominance: the head has to be stressed even if it is not marked with a lexical accent. Such systems are predicted to exist according to the stress typology discussed in Chapter 1 due to high ranking of another type of head constraint, namely HEADSTRESS. This constraint demands that any morphosyntactic head is stressed regardless of whether it is equipped with pre-assigned metrical structure or not. HEADSTRESS does not invalidate HEADFAITH because accented and unaccentable roots can reveal their markedness. This implies that HEADFAITH >> HEADSTRESS. Because HEADSTRESS is in a relatively high ranking, simple faithfulness cannot exercise any power in forming outputs. The ranking hampers accents that belong to constituents other than the head.

Unaccentable roots substantiate the proposed ranking in a straightforward way. As mentioned earlier, such roots realize their inherent accent outside their morphological domain because of *DOMAIN. Ranked below *FLOP[34] and above HEADSTRESS, this constraint forces a floating accent outside the domain of the morpheme that introduces it. The fact that the floating accent lands on the subject suffix in *caq-n-t-én* ‘I place it’ (93c) shows that FAITH(HEAD) is also ranked low. The tableau in (100) exemplifies the accentuation of this word.

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[34] *DOMAIN has no effect on accents that are linked to their sponsor because it is dominated by *FLOP. Examples like (92b), *kʷén-xi-t-es* ‘catch (s.t.) for s.o.’, support this ranking.

(100)

input: * √caq-,-n, -t, -en	HEADFAITH (HEAD)	*DOMAIN	HEADSTRESS	FAITH (HEAD)
☞ * \\ a. caqnten			*	*
b. caqntén	*!		*	*
* | c. caqnten		*!		

The second candidate, (100b), is rejected because an input lexical accent has been deleted in the output. This form is stressed by default on the rightmost (full) vowel. The third candidate, (100c), realizes the inherent accent but on the root triggering violation of *DOMAIN. The most optimal candidate is the first one (100a). This candidate complies to head faithfulness constraints. The violations of HEADSTRESS and FAITH are negligible given the ranking these constraints occupy in the hierarchy.

We should emphasize the crucial role of the default constraints in determining the landing position of the floating accent. For instance, in the Thompson word *ʔes/qʷ'in-s-t-sém-es* ‘s.o. already spoke to me’ stress is on the leftmost vowel and not the rightmost one under the influence of ALIGN-L. The lexical accent is still located very close to the left edge of the word.

Alignment constraints are also in force when HEADSTRESS is in charge of accentuation. The word *ʔemút-st-∅-en* ‘I left him at home’ from Spokane shows that first, the unmarked root/head is obligatorily stressed and second, the exact position of stress is determined by ALIGN-R. The root/head is stressed on the rightmost vocalic peak because this position best satisfies HEADSTRESS and ALIGN-R.

(101)

input: √ʔemut-st-∅-en	HEADSTRESS	ALIGN-R
☞ a. ʔemútsten		*
b. ʔémutsten		**!
b. ʔemutstén	*!	

Vowelless heads or heads with an epenthetic schwa fail to be stressed.[35] In such cases stress is on the rightmost full vowel for Spokane and Moses-Columbia or the leftmost full vowel for Thompson. I present the accentuation of the Spokane word *tq-n-t-es-ín* ‘I hit you (sg.)’ in (102). Evidently, the candidate with final stress (102a) prevails over the one with pre-final stress (102b).

(102)

input: √ tq-, -n, -t, -es, -in	ALIGN-R
☞ a. tq-n-t-es-ín	
b. tq-n-t-és-in	*!

In Lillooet Salish the effects of HEADSTRESS are concealed by the edgemost rule that assigns prominence to the rightmost foot. Thus, the root does not always bear primary stress but it definitely hosts secondary stress in long forms. Some examples are listed in (103). HEADSTRESS exercises influence in forming outputs in intransitive formations.

(103) *Lillooet transitive formations*

a.	cún-∅-ɬk-an	‘tell-3sgO-1sgS.INDIC’	(E 174)
b.	cùn-tumúɬ-k-ax^{w}	‘tell-1plO-2sgS.INDIC’	(E 174)
c.	x^{w}ítəns-k-an	‘whistle-3sgO-1sgS.INDIC’	(E 175)
d.	x^{w}ìtəns-túmuɬ-k-an	‘whistle-2plO-1sgS.INDIC’	(E 175)

To summarize, in this section I have shown that stress in transitive formations is predictable. However, predictability does not hinge on phonological principles but on morphosyntactic ones: the (highest) head in the syntactic tree controls accentuation in two ways; either by promoting its inherent accent as the primary stress of the word or, in the absence of a lexical accent, by attracting stress from non-heads (i.e. incorporated prepositions, subject and object suffixes). Only in Lillooet rhythmic principles, mainly pertaining to boundedness, conceal the effects of head-dominance. In conclusion, the Salish languages display a stronger form of head-dominance at the level of the word than at the level of the stem. Systems with this behavior are called ‘head-stress systems with lexical accents’ in this study.

One may wonder, however, what the explanation is for the accentual split between stem and word morphological structure. This question is addressed in the next section which completes the presentation and analysis of the Salish stress facts.

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[35] This suggest that PK-PROM is ranked above HEADSTRESS.

The ranking that accounts for stress on transitive formations in Thompson, Moses-Columbia and Spokane is summarized in (104).

(104) *ranking for the accentuation of transitive words*
Thompson, Spokane and Moses-Columbia

HEADFAITH(HEAD),*FLOP
|
*DOMAIN
|
HEADSTRESS
|
FAITH(HEAD), DEFAULT ℂ

• *FLOP >> *DOMAIN	kʷén-xi-t-∅-es	(92b)
• HEADFAITH(HEAD) >> *DOMAIN >> HEADSTRESS >> FAITH, DEFAULT	caq-n-t-én	(100)
• HEADSTRESS >> DEFAULT	ʔemút-st-∅-en	(101)

5.7. Accentuation in Intransitive Formations

Verbal phrases can be assigned an aspectual, modal marker or a reflexive suffix. In both cases the whole form is intransitive and the subject is a clitic. Here, I leave aside reciprocal and reflexive formations[36] and focus on aspectual and modal phrases.

Aspectual and modal morphemes appear as suffixes placed after the root. There are also some aspectual prefixes but these will not concern us here. In such formations stress is always on the aspectual and modal morpheme regardless of the accentual properties of the root (predicate). Some representative examples from Thompson are listed in (105). Moses-Columbia and Spokane are similar in this respect.

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[36] Due to space limitations the accentuation of reciprocal and reflexive forms can not be discussed here. The reflexive and reciprocal suffixes attract stress, *pəzen-t-wáxʷ* ‘meet each other’, *k’ʷen’-n-cút* ‘look at oneself’ (Thompson). The assumption here is that these constructions are derived by head movement. Both suffixes relate to independent roots (*waxʷ* ‘interweave’, *sut* ‘possession, my own’) suggesting that the reflexive/reciprocal element in fact has the status of a ‘light verb’ (Hale and Keyser 1993) to which the VP (root) incorporates (Revithiadou 1997e).

(105) *aspectual and modal formations*

a. ʔuqʷeʔ-úluɬ ‘go out somewhere to drink’ (Th 14)
*√drink-*TRANSLOC

b. ʔuqʷeʔ-úɬ ‘s.o. who likes to drink all the time’ (Th 14)
*√drink-*HBT

c. ɬaʔx̣=ans-úɬ ‘(s.o. who is) perpetually eating’ (Th 144)
*√eat=tooth-*HBT

d. kʷen-wíʔx ‘take and keep s.t.’ (Th 115)
*√grasp-*DVL

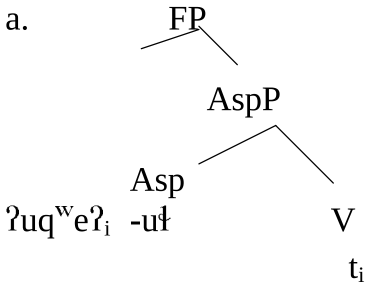
e. nes-ím’ ‘take s.t. to another place repeatedly’(Th 214)
*√go, convey-*IT

f. nes-mémn ‘want to go’ (Th 214)
*√go-*DESID

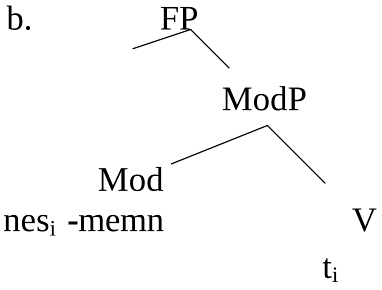
g. piyeʔ-ɬ-núxʷ kt ‘we’ve made it through the year’ (Th 242)
*√one-?-*PERSEV

Based on the theoretical framework of head dominance, I propose that stress in (105) is dependent on the syntactic organization of aspectual and modal phrases. Aspectual and modal suffixes are the functional heads of AspP and ModP to which the root incorporates. This is shown in the syntactic trees in (106):

(106) a.



b.



It is evident that the highest head node, that is the aspectual/modal suffix and not the V (root), determines the position of primary stress in the phrase. As in the transitive paradigm, heads are obligatorily stressed.[37]

An immediate consequence of the stress system described here is that it neutralizes the accented/unmarked opposition in the aspectual and modal suffixes. Disyllabic suffixes could possibly shed some light on potential

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[37] Vowelless heads do not attract stress. The autonomous suffix /əyx/ is never dominant, e.g. *n/ɬém’-əyx* ‘he gets in’, *wáz-əyx* ‘we show up’, *qʷc-ə́yx* ‘[person] moves around’ (Th&Th 101).

aspectual or modal markers with inherent accentual properties but unfortunately, these are not found in the corpus. The only disyllabic suffix, the translocational /-uluɬ/ from Thompson, has initial stress. As I show later, the accentual shape of the suffix most probably results from the influence of the default constraints (i.e. prominence to the leftmost full vowel).

There is one unaccentable aspectual marker, the resultative suffix /-e/ which emphasizes the recent, often sudden, completion of an activity or change of state. The unaccentedness of the suffix is revealed in examples such as *ʔes-t/xə́ɬ-e kn* ‘I feel refreshed’. In this example, stress is on the root although it has a schwa. The transitive form *xəɬ-t-és* ‘refresh s.o.’ shows that the schwa of the root is not phonemic.

We infer, from the above, that functional heads are obligatorily stressed, unless they are unaccentable. The constraints that play primary role in stress assignment are HEADFAITH and HEADSTRESS. As shown in §5.6, these constraints are ranked as follows: HEADFAITH >> HEADSTRESS. Intransitive formations empirically support this ranking.

The example *ʔes-t/xə́ɬ-e* ‘I feel refreshed’ from Thompson clearly establishes the ranking between head constraints. When the aspectual marker/head is unaccentable, the floating accent is forced upon a neighboring morpheme. More specifically, this example suggests that first, the accent of the aspectual morpheme does not get lost because HEADFAITH(HEAD) is high ranked. Second, the accent is realized outside the domain of the aspectual suffix in compliance with *DOMAIN which must also be prominent in the hierarchy. These two conditions are satisfied at the expense of HEADSTRESS and FAITH. However, the violation of these constraints is negligible given their low ranking in the system.

(107)

input: * √xəɬ-, -e	HEADFAITH (HEAD)	*DOMAIN	HEADSTRESS	FAITH (HEAD)
* ☞ | a. xəɬ-e			*	*
* | b. xəɬ-e		*!		

The effects of default prominence are clearly demonstrated by examples with disyllabic suffixes such as *ʔuqʷeʔ-úluɬ* ‘go out somewhere to drink’. Here, stress is on the initial syllable and not the final syllable of the suffix. Keep in mind that this example comes from Thompson which has default prominence on the leftmost (full) vowel. Let us see how initial stress on the suffix arises.

In (108) the first two candidates are better than the third one because they comply the head constraint. However, (108a) is chosen over (108b) because it best satisfies ALIGN-L (default to the leftmost vowel).

(108)

input: ʔuq^{w}eʔ-, -uluɬ	HEADSTRESS	ALIGN-L
☞ a. ʔuq^{w}eʔ-úluɬ		**
b. ʔuq^{w}eʔ-ulúɬ		***!
c. ʔúq^{w}eʔ-uluɬ	*!	

We conclude that the same constraint system that derives head dominance effects in transitive words is active here as well. Without doubt, Salish languages convert to head-stress systems at the level of the morphological word. Only heads reveal their accentual properties; other accents are outlawed.

In §5.4, we have seen that in Lillooet Salish, prosodic constraints, and especially ENDRULE-R, conceal the effects of head dominance. This is mostly due to the fact that the (highest) head in transitive constructions, namely the root, is more distant to the right edge than the aspectual and modal morphemes reviewed here therefore, they are more prone to violate the three-syllable-window (imposed by the high ranked ENDRULE-R).

Interestingly, head-dominance is revealed in aspectual/modal phrases, as shown in (109). Notice that the suffix /-uɬ/ in (109b), is monosyllabic but still manages to attract stress from the root. Similarly, the suffix /-nux^{w}/ in (109c) forms a monosyllabic foot which also bears primary stress. These two examples show that HEADSTRESS dominates FTBIN. The tableau in (110) illustrates the effects of this ranking.

(109) *aspectual and modal formations in Lillooet*

a.	ʕuy’t-m’íx	‘sleep (ʕ^{w}uy’t) all the time’	(E 124)
b.	kiʔkl’-úɬ	‘always lazy (kiʔkl’)’	(E 124)
c.	nʔuc’qaʔ-núx^{w}	‘to make it through the winter, till spring (nʔuc’qaʔ)’	(E 124)
d.	q’ix̩-wíl’x	‘to get hard (q’ix̩)’	(E 125)

(110)

input: √kiʔkl’-, -úɬ	HEADSTRESS	FTBIN
☞ a. (kiʔk)(l’úɬ)		*
b. (kíʔk)l’uɬ	*!	

In this section I showed that morphosyntactic structure influences prosody. The function that performs the mapping assigns prominence to the head constituent in the syntactic tree. Head dominance is expressed as follows: prominence on the lexical accent of the head or just prominence on the head. This latter characteristic distinguishes stress in the morphological word from stress in the morphological stem in Salish. Systems with obligatory stress on the head are called head-stress systems as opposed to head-dependent systems, which simply give priority to the head constituent.

The question that arises at this point is what triggers the dichotomy between stem-stress and word-stress. Why do non-head elements have a chance to influence stress in incorporated constructions but not in (in)transitive ones?

A possible explanation would be to attribute the accentual dichotomy to morphosyntactic reasons. More specifically, one could argue that lexical suffixation is a lexically flavored syntactic operation as opposed to word formation, which is clearly the byproduct of syntactic rules. This hypothesis receives extra support by the fact that in Salish, the incorporated element is a suffix and not an independent noun. In other words, lexical suffixation is lexically predetermined. It is needed to establish the appropriate configuration in which complex expressions can be licensed. On the other hand, grammatical markers and subject and object suffixes have a certain degree of autonomy. Whether they incorporate to the root or not is decided by syntactic rules during word formation and not in the lexicon.

In conclusion, the special bond between a root and a lexical suffix can offer the basis to explain head-dependence. Lexical suffixes not only satisfy the argument structure of the root, but they also extend their lexical meaning. Perhaps this relation allows them to take charge of accentuation by promoting their own lexical accent when the root is unmarked. This relation cannot hold between a root and an object or a subject suffix, for example, because the latter morphemes are not lexical extensions of the root but simply its arguments.

Undeniably, this issue requires future research because it suggests that head-dependent systems are more likely to be found in languages in which word formation results from morphological rules, whereas head-stress systems seem to be more common in languages in which word formation is the byproduct of syntactic operations.

To conclude, there seem to be structural differences between stem and word formation that could possibly account for stress differences between the corresponding constructions. Until future research provides more definite answers to this question, I assume that there is a head-dependent phonology in the stem level and a head-stress one in the word level.

5.8. Another View on Salish Stress: Czaykowska−Higgins (1993a)

The accentuation of Salishan languages has been the focus of interest for many researchers. Here I review Czaykowska−Higgins's (1993a) analysis of the Moses-Columbia stress system.

Czaykowska−Higgins argues that the basic stress rule in Moses-Columbia, called 'Columbian Foot Rule' (henceforth CFR) creates a right-headed unbounded foot. CFR is a cyclic rule. The evidence for this assumption comes from examples like *kʷúɬn-min-t-∅-n* 'I'm borrowing it' (94a), *máʕ'ʷ-ɬ-t-sa-xʷ* 'you broke my X' (94b), which are stressed on the root and not on the rightmost suffix (i.e. the subject). These examples also imply that subject, object suffixes and directive markers are non-cyclic morphemes.

The algorithm is completed with the 'Word Stress Rule' (henceforth WSR) which assigns prominence to the leftmost grid position on line 1. This rule is responsible for leftmost prominence in a sequence of epenthetic vowels. An illustrative example of how this stress algorithm works is given in (111). Notice that CFR applies vacuously in the non-cyclic suffixes.

(111) *accentuation in Moses-Columbia*

cycle 1

```
            input       kʷuɬn

          CFR
          line 1           *
          line 0          (*)
                        kʷuɬn
```

non-cyclic

```
                           *
            input         (*)    *
                        kʷuɬn-min-t-∅-n
```

CFR, WSR	*	
line 1	*	*
line 0	(*)	(*)
	k^{w}uɬn-min-t-∅-n	

The picture is somewhat different in lexical suffixation. The root *k^{w}uɬn* appears without stress as opposed to the root *maʕ'^{w}*, which is stressed. The accentual divergence between the two types of roots is illustrated by examples (68a) and (68e), repeated here as (112a) and (112b), respectively. The situation is further complicated by the fact that often the same suffix can be stressed or not stressed depending on the root, as shown in (112c) and (112d).

(112) a. na/máʕ'^{w}=ikn ‘(he) broke his back’
LOC/√break=back (CH 230)

b. k^{w}uɬn=íc'ʔ-n-t-∅-n ‘I borrow a wig’
√borrow=skin-CTR-TR-3O-1sgS (CH 207)

c. yap/k^{w}án=akst-n-t-∅-n ‘I grab s.o. by the hand’
LOC-√grab=hand-CTR-TR-3O-1sgS (CH 229)

d. x̣əl'/x̣al'=ákst-mn ‘turn with hand, stir s.t.’
DS/√turn=hand-REL (CWB 32)

Czaykowska−Higgins accounts for the above patterns by claiming that roots such as the ones in (112a) and (112c) are marked to impose extrametricality on a following suffix. Extrametricality prevent the CFR to apply and assign stress to that suffix. On the other hand, roots such as those in (112b) and (112d) do not assign extrametricality. As a result of this, the lexical suffix is included in the prosodic structure and is canonically stressed by the CFR.

It is important to mention that extrametricality is inactive in transitive formations, *k^{w}úɬn-min-t-∅-n* and *máʕ'^{w}-ɬ-t-sa-x^{w}* because the subject and object suffixes are non-cyclic. Thus, the CFR applies to the root cycle and assigns stress to it.

According to Czaykowska−Higgins, the most important evidence for marking some roots as extrametrical comes from constructions in which a root that is marked as [+Ex] is followed by two lexical suffixes. As the example in (113) indicates, in this case the last lexical suffix surfaces with primary stress.

(113)

Root=LexS=LexS			
xʷir=akst=átkʷ	vs.	xʷír=akst-m	
√reach=hand=water		*√reach=hand-MIDDLE*	
‘reach into water’		‘reach out’	(CH 230-31)

Here, the extrametricality imposed by the root to the following constituent cannot influence the second lexical suffix, which then naturally attracts stress. Later in this section I argue that such forms are ‘regenerated’.

Extrametricality is canceled only when the cyclic lexical suffix is accented. Czaykowska−Higgins claims that accentedness is a property of a small set of cyclic as well as non-cyclic suffixes in Moses-Columbia. The suffix /=lwás/ in (114a) is accented as opposed to the suffix /=ank/ which is unmarked.

(114)

kɬ/xar=lwás-tn	vs.	na-xár=ank-tn[38]	
LOC/√cover=chest			
‘bib’		‘wallpaper’	(CH 256)

Accented suffixes are immune to the extrametricality imposed by the root. This is because extrametricality affects a line 0 asterisk whereas accented suffixes come with a line 1 asterisk. Therefore, their asterisk can always serve as a head for constituent construction. (115) shows how the derivation works.

(115) *derivations with accented lexical suffixes*

	*
input	*
	xar$_{[+ex]}$=lwas

cycle 1			*cycle 2*		
	CFR			CFR, Extr	
	line 1	*			*
	line 0	*			* <*>
		xar			xar=lwás

---

[38] My account of these facts is that the form *xar=lwás* is either lexicalized or behaves like Root=LexS compound.

non-cyclic (CFR applies vacuously)

WSR		
line 2		*
line 1		*
line 0	*	<*>
	xar=lwás	

Czaykowska−Higgins presents a meticulous analysis of Moses-Columbia stress that goes beyond the traditional analysis of Salish stress and succeeds in accounting for many different accentual phenomena by means of a unified algorithm. There are, however, some problematic aspects in her proposal.

First, the analysis she presents makes use of a rather peculiar notion of extrametricality. Extrametricality usually refers to a smaller domain lying at some edge of a larger domain which is invisible to metrical rules. Consequently, extrametricality has been used as a diacritic only for elements that stand at edges and under certain circumstances become invisible to stress rules. Suffixes are the most common example of elements that can be diacritically marked as extrametrical. Czaykowska−Higgins, however, introduces extrametricality as a diacritic that is imposed from a root on a constituent that lies at the edge of the word.

Second, Czaykowska−Higgins employs two forms of marking: [±Ex] and [±Accented] for root and suffixes, respectively. However, a third type of marking is implied, namely [±cyclic]. Lexical suffixes, aspectual and modal markers are diacritically marked as cyclic, whereas subject and object suffixes are not. It is important, at the same time, to keep in mind that cyclicity is not tantamount to accentedness because there is a difference between cyclic accented and cyclic unmarked suffixes (cf. (112) and (114)).

All in all, a complicated marking apparatus is invoked to account for the data. Since extrametricality seems to be the least preferred part of the proposal, let us see whether the analysis can dispense with it.

Extrametricality is mainly employed to derive the difference in patterns such as *yap/kʷán=akst-n-t-∅-n* (112c) and *x̩əl'/x̩al'=ákst-mn* (112d). An alternative approach would be to claim that there are two types of /=akst/ suffixes. The first one is cyclic and hence stress-attracting, *x̩əl'/x̩al'=ákst-mn*. The second is non-cyclic and hence stress neutral, *yap/kʷán=akst-n-t-∅-n*. The problem with this approach is that we have to accept as a mere coincidence that the cyclic/non-cyclic behavior of the suffix is associated with a specific set of roots. More importantly, it does not explain the existence of cyclic suffixes which lack non-cyclic counterparts and which are stress-attracting with all roots. These are of course intransitivizers such as aspectual/modal suffixes as well as reflexives and reciprocals. Czaykowska−Higgins lists a couple of examples with reciprocal and reflexive suffixes: *k*^{w}*an=akst-n-t-wáx*^{w} ‘get married’ (CH 246), *k’*^{w}*ʔ=akst-n-cút* ‘bite one’s own hand’ (CH 245).

In conclusion, it seems that dispensing with extrametricality creates more problems than it solves. Intuitively, the accentual discrepancy in forms with lexical suffixes seems to be a property of the root rather than a property of the suffix.

The alternative proposal this thesis offers for Salish stress provides a confined and economical account of the facts. It employs a much simpler form of marking both for roots and suffixes. Roots and suffixes are accented/unaccentable or unmarked. Moreover, the proposal advanced here suggests that the key-factor for stress is morphosyntactic structure. By knowing the syntactic role of grammatical suffixes, we can automatically infer their prosodic status. This is due to the compositional organization of prosodic and morphological structure in such systems.

Another important aspect of the analysis is that it *predicts* cyclic effects. Only elements that are heads exhibit a cyclic behaviors. The CFR is claimed to be cyclic in Czaykowska−Higgins’s analysis because roots in transitive constructions are obligatorily stressed. In the account presented here, this is derived from head dominance.

What still remains to be addressed is stress in formations like (113). Such patterns constitute the main argument for invoking root-based extra-metricality. Stress on the second lexical suffix is a clear manifestation of cyclicity. This is correct; such formations are instantiations of a second cycle of derivation. This second cycle, however, should be understood in a somewhat different way than the one suggested by cyclic theories.

Thompson and Thompson (1992) argue that Salish languages display the phenomenon of regenerative or secondary formation. There are many words which are based by and large on fully-formed words or at least stems at an advanced stage of derivation. Regenerative words are more specialized in meaning than corresponding primary forms. They are mainly recognizable in terms of their treatment of underlying interconsonantal /n/, their way of dealing with vowels in unstressed syllables, and their stress patterns. The underlying /n/ in primary formations becomes syllabic before homorganic obstruents. In regenerative formations, however, /n/ is not affected, and remains /n/ in the surface form.

In regenerative formations, primary stress is on the newly added morpheme. The base retains the vowel with its distinctive coloring and the stress of the previous ‘cycle’ but with secondary prominence, as shown in (116). Notice that the base loses stress from any type of suffix, grammatical or lexical. An extra hyphen is added to show the point at which the regenerative suffixation begins.

(116) *regenerative formations*

a. n/zàƛ’=k^{w}u--s-t-∅-és ‘cause several people to
LOC/√drop=water--CAUS-TR-3O-3S fall into the water
accidentally’ (Th 456)

b. zùx^{w}ux^{w}--s-t-∅-és ‘help s.o. to be strong’
√strong--CAUS-TR-3O-3S (Th 466)

c. n/ƛ’q^{w}-e-t-wàx^{w}=ús-e-s ‘he fights with that in view’
(ƛ’q^{w}-e-t-wáx^{w} ‘they slap each other’, nə-...=us ‘eyes’)
(Th 184)

It is evident from the above examples that regeneration is a second derivation that targets all types of constructions; transitive, intransitive and lexical suffixation. The driving force of this phenomenon is subject to future research. What is important to emphasize here is that the forms cited by Czaykowska−Higgins are indeed cyclic but in the sense just described. It is not accidental that the root vowel in *x^{w}ìr=akst=átk^{w}* remains intact and is listed with a secondary stress (Czaykowska−Higgins 1993a:249).

To conclude, it seems that a cyclic approach to Salish stress loses explanatory power and empirical precision compared to the model proposed here.

5.9. Summary and Conclusions of Chapter 5

In this chapter, I have extended the theory of head dominance to Salish languages that have polysynthetic morphology and I have shown that it can successfully account for their complicated accentual phenomena.

The intriguing aspect of these languages is that morphological changes are in step with the syntactic operations with which they are associated. The challenge for the theory developed in this thesis was to test whether prosody can read and interpret morphosyntactic information. To show that indeed prosody is sensitive to morphosyntactic information, I examined two word-constructions in four Salish languages. The constructions at issues were lexical suffixation, a variant of incorporation, and formation of transitive and intransitive clauses.

In lexical suffixation, which to a large extent corresponds to the level of the stem, the Salish languages are head-dependent systems. In this type of formation the lexical suffix is a complement of the verb to which it incorporates. This subordination to the root/head is reflected in stress. The lexical accent of the root/head unconditionally prevails, but the accent of the lexical suffix surfaces only when the root is accentless. In case both elements lack lexical accents, a language-specific default system applies to accent the string. There is variation in the default pattern Salish languages employ, but head dominance is shared by all of them. In short, the ranking HEADFAITH >> FAITH is the central component of Salish accentuation.

The situation is somewhat different in word formation. Heads in transitive and intransitive paradigms show a stronger determination to control word stress. More specifically, they do not allow any other constituent to take charge of accentuation. At this level Salish is a head-stress system. Functional heads such as aspect and modal markers as well as lexical heads such as VPs (roots) are always projected onto the prosody either by means of their inherent lexical accent or simply by having stress. This stronger form of head dominance is derived by the ranking HEADFAITH >> HEADSTRESS. This ranking banishes marking contrasts in other constituents of the word and it often restricts the scope of default constraints to the morphological domain of the head.

The results of this investigation are summarized in table (117). The numbers refer to examples of a given construction and constraint-rankings in the text.

(117) *summary of Salish accentuation*

Type of system	head-dependent	head-stress
Type of formation	Lexical Suffixation (incorporation): Root=LexS	Trans: ROOT-TR-O-S ROOT-TR-PL Intrans: ROOT-ASP/MOD
Examples	Th: (41), (42) Sp: (57) MC: (68) Lill: (75), (76)	(92), (95), (105) (93), (95) (94), (95) (103), (109)
rankings	HEADFAITH, *FLOP >> *DOMAIN >> FAITH >> DEFAULT	HEADFAITH, *FLOP >> *DOMAIN >> HEADSTRESS >> FAITH, DEFAULT

Undoubtedly, the split in Salish accentuation raises questions. Although there is no definite answer at this point, the hypothesis put forward suggests that head-dependence seems to be related to morphologically flavored structures.

This means that lexical suffixation is a lexically predetermined type of incorporation. Lexical suffixes lack an autonomous status. The subordination to the root is part of their subcategorization information. What is left for syntax is the specific way of combination. On the other hand, word formation is purely the result of syntactic operations that exclusively determine the constellation of morphemes in the string. Perhaps syntax is more forceful in promoting its heads than morphology. The validity of the proposed direction is left open for future research.

An important advantage of the account offered here is that it predicts cyclicity from morphosyntactic structure. Only elements in syntactically pre-eminent positions derive cyclic effects. Consequently, we do not need unmotivated diacritics that group suffixes into the cyclic or non-cyclic component of the grammar. In general, I have shown that the analysis proposed here employs less marking and diacritics than other approaches. This, combined with the fact that in compositional systems one structure is shared by two components of grammar, namely prosody and morphology, undeniably makes our proposal more attractive from a learnability point of view. Prosodic structure is a parsing cue for morphosyntactic structure.

This chapter also emphasizes the fundamental role of default accentuation in head-oriented systems; the directionality of default prominence can highlight or obscure marked/unmarked oppositions. Moreover, prosodic constraints (i.e. TROCHEE, ENDRULE-R, PK-PROM, etc.) that occupy high ranks in the hierarchy can effectively conceal the effects of head dominance. Finally, a comparison of the four accentual systems examined here has made clear that default can have a dramatic influence on the evolution and transition of compositional systems. Lillooet Salish, for example, seems to develop in the direction of a fixed stress system in the future.

A significant conclusion can be drawn with the completion of the case studies in this thesis: radically different and unaffiliated systems such as Greek, Russian and the Salish languages examined here, use the internal organization of the word as the basic guide in the pursuit of prosodic structure.

Summary and Conclusions

This thesis focuses on the accentuation of systems with lexically determined stress. Two claims are central in this study. First, prosodic structure serves a as parsing cue for morphological structure in lexical accent systems and second, words have unpredictable stress but predictable prosodic shape. Both proposals are developed based on the examination of Greek, Russian, and four languages of the Salish family, namely Thompson, Spokane, Moses-Columbia and Lillooet Salish.

In lexical accent systems, morphemes are equipped in the lexicon with an autosegment called ‘lexical accent’ or simply ‘mark’. Conflicts between lexical accents arise when morphemes are combined to form complex expressions and the language requires one prosodically prominent element within the word. Such conflicts are resolved through morphology. This statement implies that first, prosody has access to morphological information and second, prosodic structure is formed in parallel with morphological structure.

The principle that enables the prosody-morphology interface is *prosodic compositionality*. This principle allows prosody to peek into morphology and become sensitive to relations that hold between morphemes. The function that maps morphological structure into prosodic structure is expressed as *head dominance*: accents sponsored by morphological heads dominate other accents in the word.

Head dominance takes the form of the constraint ranking HEADFAITH >> FAITH. The constraint FAITH states that an input accent must have a correspondent in the output, whereas the constraint HEADFAITH confines this statement to accents sponsored by morphological heads. In general, HEADFAITH >> FAITH is a form of ‘positional faithfulness ranking’ in which the more specific constraint HEADFAITH must be ranked above the more general constraint FAITH. Other accents have a chance to surface only when the head is accentless, whereas words that do not display any inherent accentual properties are stressed by the lower ranked DEFAULT constraints. Under the term ‘default’ are grouped structural constraints that determine the way input forms are footed, the directionality of prominence, and so on.

To summarize, accentuation in lexical accent systems is dependent on morphological headedness but it is not totally controlled by it. Accents sponsored by other constituents or rhythmic principles also play a role in accentuation. This is the reason that lexical accent systems in this study are also called ‘head-dependent systems with lexical accents’. The ranking schema in (1) summarizes the accentuation in head-dependent systems.

(1) *ranking schema for head-dependent systems with lexical accents*
HEADFAITH >> FAITH >> DEFAULT

The distribution of lexical accents is not only morphologically based but also prosodically controlled. Only a few positions in the word are targeted by lexical accents. In Greek and Russian, lexical accents occur in positions that ensure that a given structure will have a strictly binary prosodic shape. More specifically, accented words in these languages draw their accentual shapes from the following pool: {(σ́σ)(σσ),(σσ)(σ́σ),(σ́σ)σ,σ(σ́σ)}. In simple words, lexical accents limit their arbitrariness by restricting themselves to a confined set of syllabic positions that guarantee well-formed prosodic patterns.

I propose that restricted lexical contrasts arise when constraints on word-form exercise influence on the exact position of a lexical accent. That is to say, next to a constraint that demands faithfulness to the autosegment accent there is another constraint that demands faithfulness to the association of a lexical accent with its underlying vocalic peak. The former constraint is undominated but the latter constraint is under the spell of constraints that determine the prosodic shape of a word and guarantee prosodic wellformedness. A positive outcome of this approach is that unattested accentual patterns are eliminated by constraint-evaluation and not by stipulating restrictions on underlying representations. The ranking in (2) formalizes the claim just presented.

(2) *restricted accentual contrasts*
FAITH TO LA >> WORDFORM >> FAITH TO POSITION OF LA

In conclusion, words with lexical accents reflect morphological headedness in their prosody and have predictable (maximally binary) prosodic patterns. This characteristic brings marked words in a better position than unmarked ones. The latter have predictable stress on some syllable but variable prosodic shape and mobile stress within the paradigm. In Greek, marked four-syllable words are binary, (*servi*)(*tóros*) ‘waiter’, but unmarked words are not, *a*(*stráγa*)*los* ‘ankle’. Moreover, marked words have columnar paradigmatic stress, *klívanos*, *klívanu* ‘kiln’, whereas unmarked words have mobile stress, *ánθropos*, *anθrópu* ‘man’. The accentual alternations of the latter example are closely related to the presence of an accentless head. When the root/head lacks inherent accentual properties, accentuation is determined by simple faithfulness or the default constraints depending on whether the inflectional suffix is accented or not.

Optimality Theory offers an explicit framework to account for conflicting demands. Constraint ranking successfully expresses the idea that there are hierarchically ordered preferences in accentual systems. More specifically, it makes explicit why priority is given to head constraints over other constraints of the system and how restricted accentual contrasts arise.

Besides these two central issues, there are some other questions related to lexical accent systems. These questions are:

i. Where exactly on the ‘stress map’ do lexical accent systems stand?
ii. What is the phonological identity of a lexical accent?
iii. How do constraints that refer to lexical accents interact with other constraints of the grammar?
iv. Is prosody sensitive to different types of morphology and, if yes, how is head dominance expressed in different morphological constructions?

The first question is addressed in Chapter 1 where I present a typology of accentual systems. I argue that next to systems with fixed stress there is a group of languages whose stress behavior can be best understood if seen from the perspective of the prosody-morphology interface. Such systems are called *interface systems* and are grouped into different categories depending on how they rank structural constraints (STRUCTURAL), constraints referring to lexical accents (FAITH) and constraints referring to morphological headedness (HEADFAITH and HEADSTRESS). Lexical accent systems constitute a specific class of interface systems where, as mentioned above, priority is given to marked morphological heads but where constituents other than heads can also reveal their marking properties. There are, however, related languages that are more forceful in promoting one-to-one correspondence between morphological and prosodic heads, and languages that do not exploit morphological headedness for accentual phenomena. All varieties arise from a reranking of the aforementioned archetypical constraints. A factorial typology of stress systems is given in the Appendix of Chapter 1.

The second question is addressed in Chapter 2. On the basis of empirical evidence, I argue that a lexical accent is an autosegmental feature, an abstract entity which provides no cues about its phonetic manifestation. If included in the prosodic word, it is assigned phonetic make-up which varies from pitch to stress depending on the language. In addition, lexical accents are divided into strong and 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. This chapter is completed with a presentation of other theories of marking.

The third question is addressed in Chapter 3, which focuses on the prosodic aspects of two lexical accent systems, namely Greek and Russian. Two main points are made in this chapter. First, lexical marking is not tantamount to exceptional stress. Second, the distribution of lexical accents is not free. Faithfulness constraints urge an inherent accent to be realized in the output form. Structural constraints on foot-form, on the other hand, enforce more rhythmic patterns. The effects of marking become apparent when FAITH outranks FOOTFORM constraints (i.e. DEFAULT constraints). As already mentioned above, lexically assigned metrical information in Greek and Russian is restricted by constraints that define the prosodic shape of the word, namely word-form constraints. These constraints dominate faithfulness to the underlying position of a lexical accent. Consequently, well-formed prosodic structures in marked words emerge from the ranking: FAITH TO LA >> WORDFORM >> FAITH TO POSITION OF LA >> FOOTFORM.

The fourth question is central in this thesis and is addressed in the last two chapters. Chapter 4 accounts for competing accents in two languages with fusional morphology: Greek and Russian, and Chapter 5 accounts for competing accents in four Salish languages with polysynthetic morphology.

In Chapter 4, the theory of head dominance is tested in inflected and derived constructions of Greek and Russian. In both languages, a marked root attracts stress from a marked inflectional suffix but it loses stress from a marked derivational suffix. The explanation is simple: inflectional suffixes cannot change the syntactic category of the base they attach to. Roots and derivational suffixes can do this; they are the ‘morphological determinants’ (i.e. heads) of the word.

In this chapter it is further shown that the theory of head dominance voids the need for the complex derivational machinery of cyclic and non-cyclic levels. Dominance is not an attribute of cyclicity but the result of being a morphological head and being accented. It is not necessary to motivate cyclic and non-cyclic strata with independent function in order to derive the correct stress results. There is one function (one ranking) that is sensitive to the structural roles of morphemes and not to the scope in which phonological operations take place.

In addition, the theory of head dominance offers a convincing counterproposal to the metaconstraint ROOTFAITH >> SUFFIXFAITH (McCarthy and Prince 1995). It restates this metaconstraint as a type of positional faithfulness ranking. When the root is the head of the word both head dominance and the metaconstraint make the same predictions, but when derivational suffixes are heads, then only the former ranking makes the right empirical predictions.

The theory of head dominance developed in Chapter 4 is extended to polysynthetic languages in Chapter 5. 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. Interestingly, stem-level and word-level stress is pursued in a somewhat different fashion in Salish. The major construction of stem-level morphology is lexical suffixation, a form of incorporation. In such formations, the root is the head of the VP into which the lexical suffix incorporates. The root/head is prosodically dominant, if accented; otherwise, the (incorporated) lexical suffix is given a chance to reveal its inherent accent and determine stress. In other words, the ranking HEADFAITH >> FAITH is also central for the accentuation of stem-level morphology in Salish languages.

At the word-level, however, the picture is somewhat different. Aspectual and modal markers, which head aspectual and modal phrases, respectively, are accentually dominant, regardless of whether they bear an accent or not. In other words, word-level morphology reveals a stricter form of head-dependence, expressed with the ranking HEADFAITH >> HEADSTRESS. This domination order guarantees a one-to-one correspondence between ‘heads’ and ‘stress’.

The split in Salish accentuation can be attributed to morphosyntactic differences between lexical and grammatical suffixation. Lexical suffixation is a lexically flavored syntactic operation. The incorporated element is a suffix and not an independent noun. Lexical suffixation is needed to establish the appropriate configuration in which complex expressions can be licensed. On the other hand, grammatical markers have a certain degree of autonomy. Whether they incorporate to the root or not is decided by syntactic rules during word formation and not in the lexicon.

This thesis makes clear that specific aspects in the morphological component of the grammar are important for phonology. There is a group of accentual systems, the interface systems, in which prosodic structure is a parsing cue for morphological structure. There are many ways in which this prosody-morphology interface is expressed. Some languages choose to assign a special prosodic status to specific morphemes or grammatical markers (morphology-dependent systems), whereas some other languages choose to promote elements that are structurally important to prosodically important positions (head-dependent and head-stress systems).

It is interesting that the prosody-morphology interface in the systems examined here is always interpreted as head prominence. It has been argued by Dresher and Van der Hulst (1997) that heads allow richer contrasts and a greater degree of complexity than non-heads. This claim is reinforced by recent studies (Elordieta 1997, 1998) which show that other phonological phenomena as, for instance, vowel assimilation (in Basque), are sensitive to morphosyntactic relations holding among syntactic heads.

We assert from the above that the existence of head constraints in the grammar cannot be refuted. One may wonder, however, whether there are systems in which non-heads take up a prominent prosodic role. It is well-known that constituents above the level of the word are not strictly head-oriented. For example, stress in phrases and in (phrasal) compounds is often hosted by the non-head constituent. The asymmetry between word and phrase level accentual phenomena must be explored in the future.

Another asymmetry that needs to be closely looked at is the one between accent systems and harmony systems. Vowel harmony does not express asymmetrical dominance the way accent does. In Turkish, for instance, derivational suffixes are as sensitive to harmony as inflectional suffixes are. For these cases McCarthy and Prince’s metaconstraint seems to gain ground, even though it still falls short in explaining why roots, and not other morphemes, behave in a special way. Perhaps a way to account for these facts is to investigate what types of head constraints exist in Universal Grammar besides the head constraints proposed here, which mainly refer to morphological headedness.

This study focuses on head-dependent systems with lexical accents, but, as mentioned earlier, there are many varieties of head-based systems and many different ways in which prominence is phonetically realized. Further research should shed more light on the accentual behavior and other phonological properties of these systems.

A final issue that should be investigated more in the future is whether the degree of head-dependence is related to the type of rules that participate in word formation. We have seen in Greek, Russian and part of Salish that morphologically oriented structures promote heads but not all the way;

accentuation is partially controlled by other constituents (i.e. non-heads). On the other hand, structures which are derived by purely syntactic operations such as the Salish transitive and intransitive formations, are more eager to accomplish head-to-stress correspondence.

This study shows that all lexical accent systems share one property: dependence on morphological headedness. Head dominance, expressed with the ranking HEADFAITH >> FAITH, is the central component of accentuation in the grammar of these languages. It can interact with prosodic constraints but it can never be dominated by them. So, even though Greek, Russian and Salish differ in their morphological and rhythmic make-up, they are in principle head-based.

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Errata

Russian

Ch.3, 4	Replace: “jábloko” with právilo, právila (NOM.sg-pl) ‘rule’; “gorá” with lad’já, lad’jí (NOM.sg-pl) ‘rook’; “gospožý” with gospoží
p.121	kúkla; mólodo (neut)
p.122	borodý ‘beard-GEN.sg’; mólodo; eksperimént; gorý is GEN.sg.
p.123	napisát’ ‘to write’; rèvol’juciónnyj
p.124	jábloki (NOM.pl)
p.125	gorý (GEN.sg)
p.126	eksperimént; akvarél’
p.127	eksperimént; fn: sekretár’
p.129	(jašče)(rica)
p.137	rèvol’juciónnyj
p.139	Replace “análog” with prológ ‘prologue’; xaráktery
p.140	patróntaš-i, patrontáš-i
p.143	svéž-ij; ves’jól-yj; pečjóš, -jót
p.144	živ-ú, -jóš, -jót; strig-ú, strìž-jóš, -jót
p.148	stol
p.149	v[ə]dovóz; s[ə]konómit’; l’[ju]dojéd; zàpatentovát’; vodovóz
p.150	górod
p.151	r[ì]vol’juciónnyj
p.152	(3a) & (4a) s advokátom s[ʌ]dvok[á]tom; (3b) v afganistáne v[ʌ]fg[ə]nist[á]ne; (3c) & (4b) podzyvát’ p[ʌ]dzyv[á]t’; (3d) pr[i]dlag[á]t’; (4a) s[ʌ]dvokátami sadvokát[ə]mi ‘solicitor-INSTR.pl’; (4c) výš[ə]dšij; (sadvo)(kátom)
p.157-8	r[ì]vol’juciónnyj; Delete (18b);
p.198	gorý (GEN.sg)
p.200	jábloki (NOM.pl)
p.203	xólodny, zlóstny, xmel’ný
p.204	(44d) svja(ščennyj; veter (NOM.sg), vetra (GEN.sg); kúkol’nik
p.208	(52c) xmel’-jón

p.210	(56b) lúž-a, lúžica
p.211	fn: (ib) dožd-lív-yj; (iia) dernístyj; (iib) šalít’
p.214	pužačí
p.215	kúkol’nik
p.217	kolbasé (DAT.sg); strig-ú, striž-jóš, -jót
p.218	ves’jól-yj
p.219	kolbasá

Salish

p.21	ʔuqʷeʔ-úluɬ /ʔuqʷeʔ-uluɬ/; ʔes-t/xə́ɬ-e kn
p.44	qʷin-ə́m; (5d) is from Th 43
p.227	n/q’ʷy=úym’xʷ-m ‘bake in earth oven’; gloss ‘he went past me’
p.230	/ikn’/; (4a) and (4c): 2plO-1sgS
p.231	p’en’t-ím’
p.235	mə́cəkʷ ‘blackcap fruit’; ʔestwə́lle
p.236	=ə̣ltən; sip’éc’ ‘skin’
p.239	s/xen’xʷ=úy’mxʷ NOM √*rock=ground*; ƛ’ixʷeɬ=xə́n (/ƛ’ixʷeɬ/)
p.240	n/qʷec=íkn’ LOC√warm =back; s/p’uƛ’=úym’xʷ NOM√haze=ground
p.242	k’it’=áɬp; fn: xʷay’-əm-ált ʔací Línda ‘Linda’s child ran away’
p.243	t/k’iw-ilx=álqʷ
p.244	pu[p]n’=éwɬ tə s/c’əqʔ =éwɬ; k’it’=áɬp-t-∅-n John; (22a) Subj is 3sg
p.245	(23b) Subj is 3sg
p.246	ƛ’ixʷeɬ=xə́n (/ƛ’ixʷeɬ/)
p.247	s/yuweh=ésk’iʔ NOM√herbalist=song ‘herbalist’s song’; n/k’əɬ-tmíxʷ
p.248	ʔes/púy=(u)s=(i)kn’
p.251	fn: /=il’eh/
p.252	p’ə̀tex̣íc; hèléw’; =úsyèp’; =íxʷənc’k’ /=íxʷec’k’/; wík-t-ey-wzè
p.254	/=eɬxʷ/
p.255	fn: /ewiɬ/
p.258	hèléw’
p.262	hecə-ʔítṣi
p.263	n/cíq=leʔxʷ-n-t; ʔép’=us-n-t-∅-en; [nc’oʔqúleʔxʷm]; (57a), (57d) and (57g) are from Carlson, B. & P. Flett (1989). “Spokane Dictionary.” *University of Montana Occasional Papers in Linguistics* **6**. Univer-sity of Montana, Mis-soula, Montana.
p.264	[smeʔméɬc’eʔ]
p.268	k’it’=áɬp
p.269	ɬə̣t’=ul’əxʷ
p.271	xʷik’m-áɬxʷ [xʷək’máɬxʷ]; x̣əlq’
p.272	Examples (74b) are from E 66; The correct stress pattern for (75b) is cíq= aɬməx-an. Replace: (75) a. súp=us-əm, b. c’aw’=ús-əm; (c’áw’=i)lap ‘to wash the floor’ (E 103); (c’aw’=qa)(n’ís-əm) ‘to brush one’s teeth’ (E 113)
p.273	(76d) n/pə́x̣ʷ=l-əqs

p.275	(79b) c’àw’=qan’ís-əm
p.276	n/pə́x̣^{w}=l-əqs
p.281	n/cíq=leʔx^{w}-n-t
p.283	fn: pcə́kɬ-es
p.284	ɬək’^{w}-mín-t-sem-ex^{w}
p.285	nés-t-sem-ex^{w}
p.288	(103b) ‘tell-1plO-2sgS. INDIC’
p.290	nes-mémn; piyeʔ-ɬ-núx^{w} kt √one-?-PERSEV
p.291-2	xəɬ-t-és; xə́ɬ-e; fn: n/ɬém’-əyx
p.295	Example (112d) is from CWB 32.
p.296	na/xár=ank-tn