

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

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'íθhéde:s-dé:l* '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.

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, *stafiðon*. 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 *stafiðini* ‘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

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)
- | | |
|-----------------------------------|--|
| <i>two marked morphemes</i> | <i>one marked morpheme</i> |
| <u>Acc Root + Pre-Acc InflS</u> | <u>Acc Root + UnMark InflS</u> |
| a. klívanu /(klivan -u)/ | klívanos /(klivan -os/ ‘kiln’ |
| b. fantáru /fan(tar -u)/ | fantáros /fan(tar -os/ ‘soldier’ |
|
 | |
| <u>UnAcc root + Pre-Acc InflS</u> | <u>UnAcc root + UnMark InflS</u> |
| 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)
- | | |
|---|--|
| <i>two marked morphemes</i> | <i>one marked morpheme</i> |
| <u>Acc root + Acc InflS</u> | <u>Acc root + UnMark InflS</u> |
| a. γόνδolon /(γονδ ol-(on/ | γόνδola /(γονδ ol-a/ ‘gondola’ |
| b. stafíðon /sta(fið -(on) ⁴ | stafíða /sta(fið -a/ ‘raisin’ |

⁴ The nouns *γινέκα* ‘woman’, *fanéla* ‘flannel’ have final stress in genitive plural, *γινεκόν*, *fanelón*. I treat both as exceptions to the generalization presented in this chapter.

<u>UnAcc root + Acc Infs</u>		<u>UnAcc root + UnMark Infs</u>			
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 *edgemo*st 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_{InfS}

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 *metacconstraint on ranking* (McCarthy and Prince 1995:364). However, this metacconstraint, 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 metacconstraint 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

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).

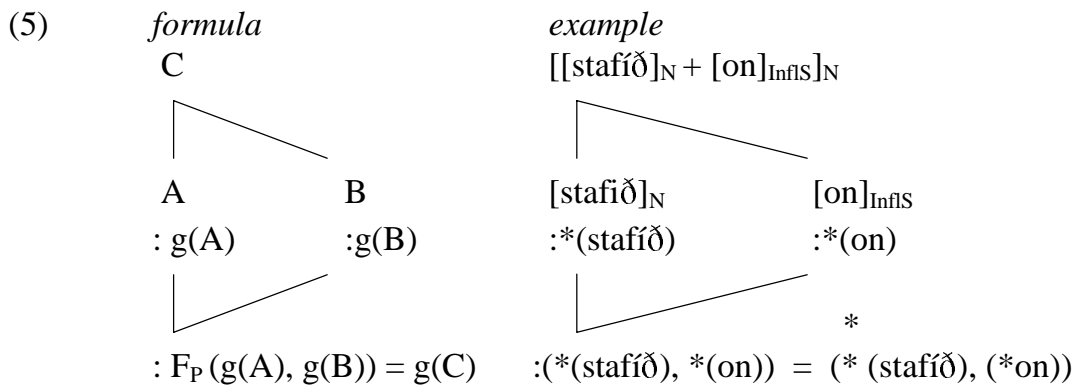
That Greek assigns prominence to the head is an expected, and somewhat desired situation, given recent theories on headedness. Dresher and Van der Hulst (1997) argue that the notion ‘head’ is a central linguistic concept. In case there is an asymmetry in grammar, the head is the element that always shows 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 edgemoat 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.



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

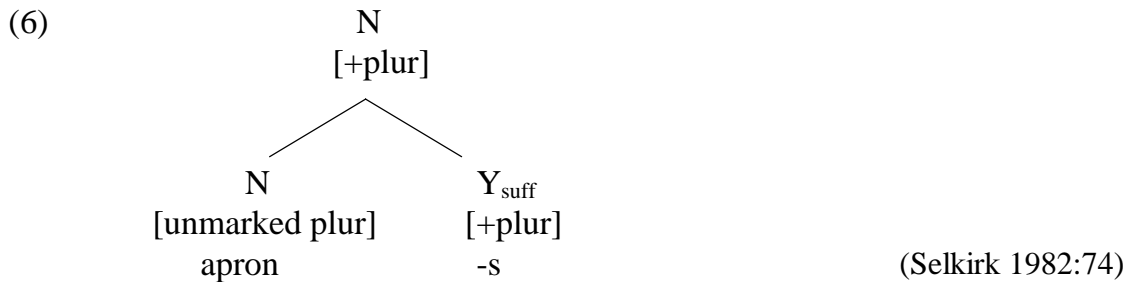
I adopt a central aspect of a number of current theories that assign internal structure to affixed words: the notion of *head*, which is intended to account for the relation between the properties of a word as a whole and the properties of its parts. The basic idea is that the head of a word should be 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).



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.

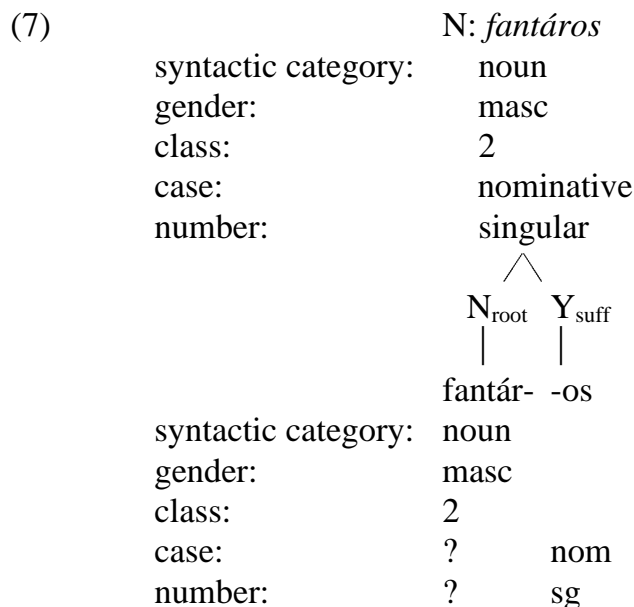
Williams's ideas about headedness have been criticized by a number of scholars (Zwicky 1985, Scalise 1988a,b, Anderson 1992, among others). The appearance of morphological determination is simply the result of the fact that rightmost elements in words are inflectional loci. Morphological principles locating 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.

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_{F_1} and a head_{F_2} , where *F*₁ and *F*₂ 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.



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

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 (*giellino* ‘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 $FAITH_R \gg FAITH_{InflS}$. 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):

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

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)

<i>input:</i> sta(fið-, -(on)	HEADFAITH(HEAD)	FAITH(HEAD)
☞ a. sta(fiðon)		*
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)

<i>input:</i> * uran-, -u)	HEADFAITH (HEAD)	*FLOP	*DOMAIN	FAITH(HEAD/ TAIL)
☞ * a. (ura)(nu)				**
* b. u(ranu)			*!	

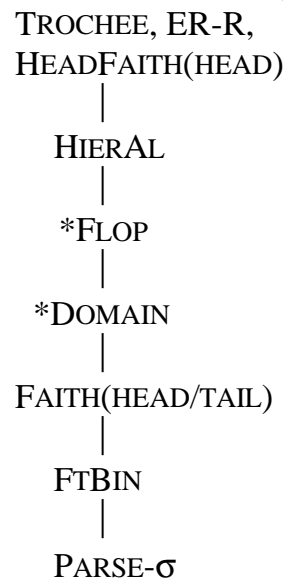
¹¹ Recall from Chapter 3 that this constraint is ranked lower than HIERAL; there are no four-syllable words with final stress originating from unaccentable roots.

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*



- 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	άνθρωπος	κλίβανος	fantáros	uranós
	GEN.sg	ανθρώπου	κλίβανου	fantáru	uranú
	NOM.pl	άνθρωπι	κλίβανι	fantári	uraní
	GEN.pl	ανθρώπων	κλίβανον	fantáron	uranón
	ACC.pl	ανθρώπους	κλίβανους	fantárus	uranús
b.	NOM.sg	θάλασα	γόνδολα	stafíða	ayorá
	GEN.sg	θάλασας	γόνδολας	stafíða	ayorás
	NOM.pl	θάλασες	γόνδοles	stafíðes	ayorés
	GEN.pl	thalasón	γόνδolon	stafíðon	ayorón

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., *ánthropos* (NOM.sg), *anθrópu* (GEN.sg) ‘man’), or even three positions of stress (e.g., *έδαφος* (NOM.sg), *eđáfus* (GEN.sg), *eđafón* (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

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'), *lemonođásos* 'lemon forest' (> *đásos* '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)	<i>variable root + AccDerS + Pre-Acc InflS (GEN.sg)</i>			
	<u>base</u>		<u>derived word</u>	
a.	ágel-os	‘angel’	ageláku	‘little angel’
b.	papa(γal-os	‘parrot’	papaγaláku	‘little parrot’
c.	<u>misθ</u> -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*

<u>base</u>		<u>derived word</u>	
a.	γίψ-ος ‘plaster’	γίψινος	‘of plaster’
b.	sa(nið-a ‘plank’	saníðinos	‘of plank’
c.	pīl-ός ‘clay’	pīlinos	‘of clay’
d.	ánθrop-ος ‘man’	anθrópinos	
		anθropinós	‘human’
e.	a(er-as ‘air’	aéρινος	
		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*

<u>base</u>		<u>derived form</u>	
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)	

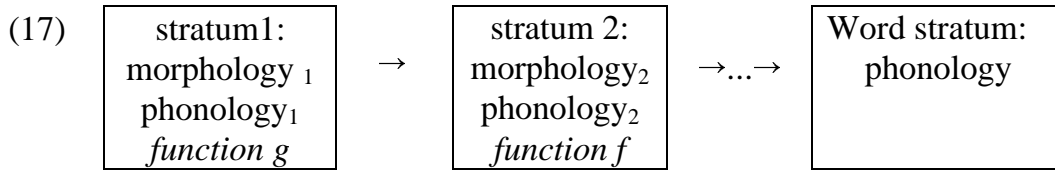
Having presented the general picture of stress in derived words, the question now is how can we account for the stress variability in the above three groups? To begin with, we have to assume that derivational suffixes must have inherent accentual properties. Otherwise, it is hard to explain why stress 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:



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 Infs
 a. rathíne /ráth-**ín**-é/ ‘charioteer (DAT.sg)’
Acc root + Acc DerS + UnMark DerS + UnMark Infs
 b. cíkarayisati /ci-ka:r-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 rule¹⁷, 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. papayálákos /papayál-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)’

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: $\sigma\sigma + \underline{\sigma} + \acute{\sigma} > \sigma\sigma\acute{\sigma}\sigma$. 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)
- | | <u>combined morphemes</u> | <u>derived word</u> | |
|----|---------------------------|---------------------|-----------------|
| a. | agel-(ak-u) | ageláku | ‘little angel’ |
| b. | papa(γal-(ak-u) | papaγaláku | ‘little parrot’ |
| c. | <u>misθ</u> -(ak-u) | misθáku | ‘small salary’ |
-
- variable root + Acc DerS + Acc InflS* (GEN.pl)
- | | <u>combined morphemes</u> ¹⁸ | <u>derived word</u> | |
|----|---|---------------------|-------------|
| d. | vark-(að-(on | varkáðon | ‘boating’ |
| e. | ro(mándz-(að-(on | romandzáðon | ‘romance’ |
| f. | <u>zoir</u> -(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:

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 *koningin* ‘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)

<i>input</i> : 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)	<i>variable root + UnAcc DerS + UnMark InflS</i>			
	<u>base</u>		<u>derived word</u>	
a.	γίψ-os	‘plaster’	γίψinos	‘of plaster’
b.	sa(nið-a	‘plank’	saniðinos	‘of plank’
c.	<u>pil</u> -ós	‘clay’	pílinos	‘of clay’
d.	γάλ-os	‘Frenchman’	γαλικός	‘French’
e.	porto(γ-al-os	‘Portuguese’	portoγαλικός	‘Portuguese’
f.	<u>elvet</u> -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. * $\acute{\sigma}_{\text{Pref}}-\sigma_{\text{R}}-\sigma_{\text{Suff}}$. 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-head²² 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)	<i>accentual variation</i>			
a.	άνθρωπ-os	‘man’	ανθρώπινος	‘human’
			ανθρωπινός	
b.	κρέα-s	‘meat’	κρεάτινος	‘of meat’
			κρεατινός	
c.	a(er-as		aέρινος	‘aerial’
			aερινός	
d.	τύρκ-os	‘Turk’	τύρκικος	‘Turkish’
			τυρκικός	
e.	βύλγ-ar-os	‘Bulgarian’	βυλγάρικος	‘Bulgarian’
			βυλγαρικός	

I propose that the suffixes /-ik(-os)/ and /-in(-os)/ sponsor a floating accent whose landing position is determined by an alignment constraint.²³

²¹ However, the prefixes that are included in the prosodic word show accentual allomorphs when they are combined with unaccentable bases, *anástrofi* and *anastrofi* ‘reversion’, *epimiktos* 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, *fthinoporinos* ‘of autumn’ and the suffix /-ik(-os)/ has a counterpart with antepenultimate stress, e.g. *gftikos* ‘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 *γψinos* ‘of plaster’ and *γαλίκός* ‘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 *romanzáða* ‘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)

<i>input:</i> *	HEADFAITH(HEAD)	ALIGN-L
γψs-,in-,os		
* /		
a. (γψsi)nos		
* \		*!*
b. γψsi(nos)		
* 		*!
c. γί(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)

<i>input:</i> * 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.

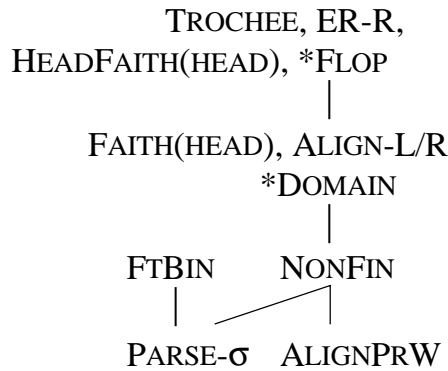
Variation arises when an unaccentable head exploits both edges of the word as landing positions for its floating accent. Often the byproducts of variation are exploited by grammar. Different grammatical functions are allotted to each accentual allomorph (Anttila 1995). This situation is also witnessed 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.

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 γίψinos (27)
- FTBIN, NONFIN >> PARSE-σ, ALIGNPRW 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 | /(ryb -(a/ | rýby | /(ryb -y/ | ‘fish’ |
| b. | rabóta | /ra(bot -(a/ | rabóty | /ra(bot -y/ | ‘work’ |

²⁵ The following dictionaries were consulted: *Rückläufiges Wörterbuch der Russischen Sprache der Gegenwart* (1965), *The Concise Oxford Russian Dictionary* (1996).

- c. čečevíca /čeče(vic-(a/ čečevícý /čeče(vic-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 /pravil-(a/ právalo /pravil-o/ 'apple'
 b. bolóta /bo(lot-(a/ bolóto /bo(lot-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 *gospoží* '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_{InfS}) 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.

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)

<i>input:</i> 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 *gospoží* ‘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)

<i>input:</i> * gospož-, -(a	HEADFAITH	*FLOP	*DOMAIN	FAITH
☞ * (*) \ a. (gospo)(ž)a				*
* (*) b. go(spož)a			*!	*
(*)* / c. go(spož)a	*!*	*		**

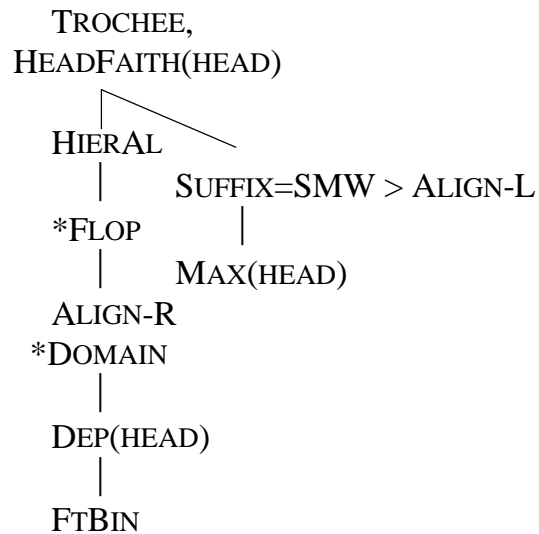
The first two candidates preserve the accent of the head whereas the third candidate preserves the accent of the suffix (unrealized accents are given within parentheses). Given the proposed ranking, candidate (38c) has no chance to survive. It is eliminated by high-ranked HEADFAITH. Notice that this 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. *práviló* (NOM.sg), *právilá* (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 *čěčevícá* 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 >> gospožá (38)
- *DOMAIN >> FAITH(HEAD)

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*
- | | <u>base</u> | | <u>derived word</u> |
|----|--------------------------|----------|-----------------------------------|
| a. | borod-(a | ‘beard’ | borodásta (fem) ‘heavily bearded’ |
| b. | (gorl-o | ‘throat’ | gorlásta (fem) ‘loud-mouthed’ |
| c. | <u>jazyk</u> -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)*
- | | <u>base</u> | | <u>derived word</u> |
|----|-----------------|------------|----------------------------|
| a. | borod-(a | ‘beard’ | borodačí ‘bearded man’ |
| b. | (puz-o | ‘belly’ | puzačí ‘man with a paunch’ |
| c. | <u>zurn</u> -(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*

	<u>base</u>	<u>derived word</u>		
a.	xolod 'cold'	xóloden (m)	xolodná (f)	xólodny (pl) 'cold'
b.	(zlost' 'malice'	zlósten	zlóstna	zlóstny 'hateful'
c.	<u>xmel'</u> 'tipsiness'	xmel'ón	xmel'ná	xmel'ný '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*

	<u>base</u>		<u>derived form</u>	
a.	golov-(a 'head'		golovíšča	pejorative/diminutive
b.	(jam-(a 'pit'		jámišča	meaning
c.	<u>temnot-</u> (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*

	<u>base</u>		<u>derived word</u>	
a.	pojezd	'train'	pójezdnik or pojézdnik	'commuter'
b.	(j)abed-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 J_{PrW}* (Melvold 1990:30)

a.	kukol (GEN.pl)	kukl-a (NOM.sg)	'doll'
b.	sosen (GEN.pl)	sosn-a (NOM.sg)	'pine tree'
c.	veter (NOM.sg)	vetr-a (NOM.pl)	'wind'

²⁸ The vowel /e/ in *otéčestvo* 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: *otec* ‘father’ > *otéčestvo* ‘fatherland’, *kupec* ‘merchant’ > *kupéčestvo* ‘the merchants (collective meaning)’, *kukol* ‘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 Infs*
- | <u>combined morphemes</u> | <u>derived word</u> | |
|---------------------------|---------------------|-------------------|
| a. borod-(ast-(a | borodásta (fem) | ‘heavily bearded’ |
| b. (gorl-(ast-(a | gorlásta (fem) | ‘loud-mouthed’ |
| c. <u>jazyk</u> -(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 is 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 edgemoat rules. The ranking ROOTFAITH >> SUFFIXFAITH wrongly predicts stress on the lexical accent of the root in (46). Similarly, an edgemoat 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)

<i>input</i> : (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

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)	<i>variable root + UnAcc DerS + UnMark InflS (NOM.pl)</i>	
	<u>combined morphemes</u>	<u>derived word</u>
	a. borod- <u>ač</u> -i	borodačí ‘bearded man’
	b. (puz- <u>ač</u> -i	puzačí ‘man with a paunch’
	c. <u>zurn</u> - <u>ač</u> -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 constraints. As shown in (50) ALIGN-R dominates *DOMAIN.

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)

<i>input:</i> * (puz-, -ač)	HEADFAITH (HEAD)	*FLOP	ALIGN-R	*DOMAIN	FAITH (HEAD)
(*) * a. pu(záč)				*	*
(*) * / b. (puzáč)			*!		*
* (*) c. (puzáč)	*!		*		*

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 *borodač* ‘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

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)

<i>input:</i> * borod-, -ač, -i	HEADFAITH (HEAD)	*FLOP	ALIGN-R	FAITH (HEAD)
* ↖ a. (boro)da(či)				*
* b. (boro)(dači)			*!	

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)

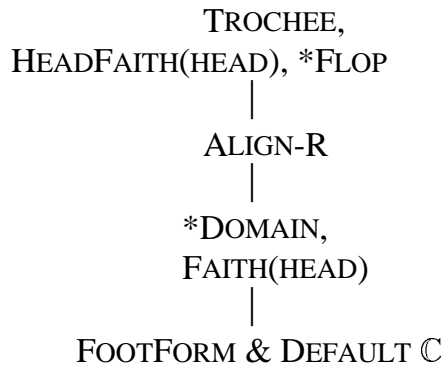
<i>input:</i> (zlost-, -En, -(a	FAITH	EDGEMOST-L
☞ a. zlóstna	*	
b. zlostná	*	*!

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*



- HEADFAITH(HEAD) >> FAITH(HEAD) gorlásta (48)
- *FLOP >> ALIGN-R puzáč (50)
- ALIGN-R >> *DOMAIN borodačí (51)
- ALIGN-R >> FAITH zlóstna (53)
- FAITH(HEAD) >> EDGEMOST-L

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)*

<u>base</u>		<u>derived form</u>
a. golov-(a (fem) 'head'		golovíšča (fem)
b. (jam-(a (fem) 'pit'		jámišča (fem)
c. <u>temnot</u> -(a (fem) 'darkness'		temnotíšča (fem)

(56) *diminutive suffix -ic-a (fem)*

<u>base</u>		<u>derived form</u>
a. část' (fem) 'part'		částíca (fem)
b. (luž-a (fem) 'puddle'		lužica (fem)
c. <u>temnot</u> -(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)

<u>base</u>		<u>derived form</u>
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

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 (ia). With accented bases there is variation; either they attract stress (iib) or lose stress after a root (ia).

- | | | | | | |
|------|----|----------|-----------------|-------------|-----------------|
| (ii) | a. | trús | 'coward' | truslívij | 'cowardly' |
| | | (d'orn | 'turf' | dernístij | 'turfy' |
| | b. | (barxat | 'velvet' | barxatístij | 'velvety' |
| | | (studen' | 'fish-jelly' | studenístij | 'of fish-jelly' |
| | | šal-ít' | 'to be naughty' | šalovlívij | '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)

<i>input:</i> (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)

<i>input:</i> golov-, -išč, -(a	SUFFIX=SMW > ALIGN-L	FAITH(HEAD)
☞ a. (golo)(víščá)		*
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).

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] | + [íšč]] | → | [[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 *pužač* ‘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

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 environments. 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. <i>noun:</i>	<u>singular</u>	<u>plural</u>	
NOM	kolbas-á	kolbás-y	‘sausage’
GEN	kolbas-ý	kolbás	
DAT	kolbas-é	kolbás-am	
b. <i>adjective:</i>	<u>short form</u>	<u>long form</u>	
	xoroš, -á, -ó, -í	xoróš-ij	‘good’
c. <i>verb:</i> ³⁶	<u>present</u>	<u>past</u>	
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.

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. <i>noun:</i> | <u>singular</u> | <u>plural</u> | |
| NOM | ózer-o | oz'ór-a | 'lake' |
| b. <i>adjective:</i> | <u>short form</u> | <u>long form</u> | |
| | 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 morphological 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)

<i>input</i> : * 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)

<i>input:</i> 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.