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Distributed Morphology and Suppletive vs.
Non-Suppletive Stem Formation in Modern
Greek*

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Abstract

This paper discusses the formation of suppletive versus non-suppletive verbal stems in Modern Greek within Distributed Morphology (Halle and Marantz 1993). I argue that the formation of non-suppletive stems occurs at the morphological component, whereas the formation of suppletive ones in the vocabulary via morpholexical rules. From a theoretical point of view, I propose that the phonological forms of the vocabulary items — corresponding to suppletive stems — stored in the vocabulary are altered by rules which involve reference to morphological and syntactic features. The application of such rules in the vocabulary also proves that its nature is not restricted to a repository of the mapping between morphophonological and morphosyntactic features but it is now extended to an active subcomponent participating in word formation. Consequently word formation is seen as a process requiring the obligatory interaction of syntax-morphology-phonology and the rules applied in the vocabulary.

1 Introduction

The purpose of this paper is to discuss the formation of suppletive as well as non-suppletive verbal stems in Modern Greek (MG) within Distributed Morphology (DM)

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(Halle and Marantz 1993). I propose that the formation of non-suppletive forms occurs at the morphological component, whereas the formation of suppletive ones in the vocabulary.

The ultimate aim of the paper is to shed light on the nature of the vocabulary in the present framework. I propose that the phonological forms of the vocabulary items stored in the vocabulary may be altered by rules which involve reference to morphosyntactic features. It will be shown that the morphophonological spell-out of vocabulary items in suppletive environments is dependent upon morphosyntactic features. The application of such rules also proves that the nature of the vocabulary is not restricted to a repository of the mapping between morphosyntactic features on to phonological ones of underspecified entries.

Moreover, these proposals have significant consequences for the nature of word formation; it is now seen as a process requiring the obligatory interaction of syntax-morphology-phonology and the rules applied in the vocabulary.

The paper is organised as follows: in Section 2, I present the data drawn from MG.¹ In Section 3, I make a short reference to the existing treatment around verbal stems in MG in the literature, whereas in Section 4 an alternative account is formulated. The discussion is rounded off in Section 5 with the concluding remarks.

2 Data

In this section I pay attention to the facts any treatment of stem formation in MG should account for. I will first start off by making a short reference to non-suppletive stems and I will then move on to the suppletive ones.

Crucial is the presence and the function of theme vowels (TVs) in MG. TV is the morphological cluster which follows the root. It only appears in the perfective forms and it represents the feature of perfective aspect. In addition, it is the marker of the conjugational class to which verbs belong in MG.²

The TV in the following example is present in (1c) and (1f), *-ar-*, immediately following the root, *gd-* ‘skin’. It represents the perfective aspect. It is not present, though, in the imperfective forms (1a, b, d, e).

- (1) a. gd - ‘ern - $[\emptyset - o]$
 $\sqrt{\text{skin}}$ - IMP - AC - 1SG.PRES.

¹The following abbreviations are used in paper: IMP(erfective), AC(tive), S(in)G(ular), PRES(ent), P(a)S(t), N(on)-AC(tive), PER(erfective), AUG(ment), NEUT(ral), NOM(inative), FEM(inine).

²The interested reader is referred to Galani (2002b, 2003a,b,d,e) for extensive discussions of the features, the function of TVs in MG, a review of the existing treatments in the literature and an alternative account within DM.

- b. ‘e - gd - ern - $[\emptyset - a]$ ³
AUG - $\sqrt{\text{skin}}$ - IMP - AC - 1SG.PS.
- c. ‘e - gd - ar - $[\emptyset - a]$
AUG - $\sqrt{\text{skin}}$ - TV.PER - AC - 1SG.PS.
- d. gd - ‘ern - $[\emptyset - ome]$
 $\sqrt{\text{skin}}$ - IMP - NAC - 1SG.PRES.
- e. gd - ern - $[\emptyset - ‘omun]$
 $\sqrt{\text{skin}}$ - IMP - AC - 1SG.PS.
- f. gd - ‘ar - $[thik - a]$ ⁴
 $\sqrt{\text{skin}}$ - TV.PER - NAC - 1SG.PS.

Moreover, the morpheme which has been identified as the TV is also present in the nominal environment, *gd’ARsimo* (2).

- (2) gd - ‘ar - $[simo]$
 $\sqrt{\text{skin}}$ - TV.PER - $[SG.NOM.NEUT]$

It appears at the same position, following the root (*gd-*), and it is expected to represent the features of perfective aspect and be a marker of the declensional class to which the noun belongs. This consequently means that the nature of the TV is not strictly conjugational or declensional. It is rather a marker of class. The conjugational or declensional classification is determined by the external environment of the $[root+Aspect]$ cluster, as shown in Section 4.2.

The same observations can be made for (3–4). This is also a non-suppletive verb and one expects similar points to apply with respect to the discussion in (1–2).

- (3) a. $apolim$ - ‘en - $[\emptyset - o]$
 $\sqrt{\text{disinfect}}$ - IMP - AC - 1SG.PRES.
- b. $apol‘im$ - en - $[\emptyset - a]$
 $\sqrt{\text{disinfect}}$ - IMP - AC - 1SG.PS.
- c. $apol‘im$ - an - $[\emptyset - a]$
 $\sqrt{\text{disinfect}}$ - TV.PER - AC - 1SG.PS.
- d. $apolim$ - ‘en - $[\emptyset - ome]$
 $\sqrt{\text{disinfect}}$ - IMP - NAC - 1SG.PRES.
- e. $apolim$ - ‘an - $[\emptyset - ‘omun]$
 $\sqrt{\text{disinfect}}$ - IMP - AC - 1SG.PS.

³The augment is not discussed in this paper. It is a morpheme inserted in some verbal forms in the active, past tenses in order to occupy the stress. It is treated as a phonological well-formedness requirement on the stress rule in MG. See Galani (2002a).

⁴The attention is drawn away from the fact that the morpheme *-thik-* can only occur in forms representing the non-active, perfective and past features, as have been previously noticed in the literature (cf. Tsangalidis 1993). This is not crucial, though, for the discussion around TVs and the formation of stems.

- f. apolim - 'an - [thik - a]
 $\sqrt{\text{disinfect}}$ - TV.PER - NAC - 1SG.PS.

The morphological cluster which follows the root in the perfective forms — both in the active as well as the non-active voice — is the TV. In comparison to the TV in (1), one predicts that the two verbs — *gd'erno-* 'skin' versus *apolim'eno-* 'disinfect' — belong to different conjugational classes.

As for the nominal in (4), it is noticed that the TV is also present which means that the form is inflected for the perfective aspect⁵ and belongs to a certain class, different from the one the form in (2) belongs to.

- (4) apol'im - an - si
 $\sqrt{\text{disinfect}}$ - TV.PER - [SG.NOM.FEM]

The distribution of the TV in the forms suggests that the combination of [root+Aspect] forms a stem. In the case of [root+Aspect (Perfective)] the combination allows the formation of a stem which appears both in the verbal as well as the nominal environment. As the morphemes representing the aspectual features attach to the roots, the formed stem also represents these features. Additionally, when [root+Aspect (Perfective)] occurs, one assumes that the verbal or the nominal class of the formed word is determined by the external elements following the stem, namely voice/tense, or gender/case respectively.

I shall now move on to a verb which makes use of suppletive stems. The discussion aims to illustrate that the formation of such suppletive stems cannot be predicted or occur under the same conditions as the formation of the stems discussed above. The formation of this type of stems should necessarily be the outcome of the application of rules stored in the system. The absence of the TV in these cases is of extreme importance for the predictions one is allowed to make.

In (5), the stem in (5b, d, e), *leg-*, is completely distinct from the one in (5c, f), *ip-*. As for (5a), the form *l'eg-o* is no longer in use in MG and deletion of *-g-* has occurred resulting in *le-*. As Philippaki-Warbuton (1973) explains, although the phonological conditions under which the deletion of *-g-* occurs in (5a) are similar to the phonological status of the forms in (5b, d, f), deletion does not take place in the latter ones. Consequently, the deletion can be attributed to the absence of the feature [+past, +non-active]. The formal way by which the deletion is accounted for within DM is explored in Section 4.2.

- (5) a. l'e - o
 $\sqrt{\text{say}}$ - (IMP.AC).1SG.PRES.
 b. 'e - leg - a
 AUG - $\sqrt{\text{say}}$ - (IMP.AC).1SG.PS.

⁵It is worth noticing that similar claims have been made in Pesetsky and Torrego (2001) as well Nordlinger and Sadler (2002) who propose that tense may be represented in nominal forms.

- c. 'ip - a
 (AUG) $\sqrt{\text{say}}$ - (PER.AC).1SG.PS.
 d. l'eg - ome
 $\sqrt{\text{say}}$ - (IMP.NAC).1SG.PRES.
 e. leg - 'omun
 $\sqrt{\text{say}}$ - (IMP.AC).1SG.PS.
 f. ip - 'othike
 $\sqrt{\text{say}}$ - (PER.NAC).3SG.PS.

On the other hand, the perfective forms (5c, f) bear a historic relation to ones appearing in Ancient Greek. Due to the high frequency of use of this verb, it retained its form. The way by which these forms are formed, is explored in Section 4.2 in detail. On a descriptive basis, the argumentation is similar to the above cases. The presence of the features [+perfective, (+past)] alters the morphophonological realisation of the root (*leg-*).

It is further noticed that the TV does not appear in these forms. A possible interpretation of its absence signals the difficulty in classifying it into a specific class. As is indeed the case, this verb does not belong to a specific conjugation.

Once the TV is not present in the perfective forms, the formation of the nominals is an interesting case. In line with what has been previously suggested, the combination of the [root+Aspect (Perfective)] forms a stem which is used in the nominal environment. So the question now is how the nominal form of (5a) is formed.

- (6) l'eksi (l'eg - si)
 word.NOM.SG.FEM ($\sqrt{\text{say}}$ - NOM.SG.FEM)
 'word'

What (6) shows is that the nominal is formed by the root (*leg-*) of the verb immediately followed by the nominal inflection. This necessarily means that such forms do not represent the features of aspect, as the ones in (2, 4). So, when the TVs are present in the perfective forms, the derived words make use of the [(root+Aspect (Perfective))] morphological cluster, namely the stem representing the aspectual features. In cases where the TVs are not present, the derived nominal forms make use of the most fundamental unit of the word, the root, in addition to the nominal inflection.

In the cases of (5–6) and contra (1–4), the stems do not represent any syntacticosemantic features. This information is mapped on to the inflectional morphemes which follow them. Nonetheless, the verbal or the nominal environment in all cases is determined by the external structure of the stem.

In what follows, I refer briefly to the existing treatment of stems in MG in order to highlight its problems for accounting for the points raised in this section and the need

for an alternative account I am putting forward in Section 4.2. The discussion in Section 4 also aims to propose some changes regarding the DM framework.

3 Stem formation and the existing treatment

The majority of the accounts around the verbal morphology in MG (cf. Rivero 1990, Joseph and Smirniotopoulos 1993)⁶ does not take into account the presence of the TVs in the verbal forms. In this section, I present a short discussion of the main claims put forth in Joseph and Smirniotopoulos (1993). It has to be made clear that this account matches the general proposals around the formation and the status of stems in the Greek literature. This further complies to the descriptive accounts.

Joseph and Smirniotopoulos (1993) argue against Rivero's (1990) syntactic approach to the verbal morphology in MG. They see it, instead, from a purely morphological perspective and claim that *at least* three different stems participate in the formation of the distinct verbal forms. *Stem 1* appears in the imperfective forms (*gdern-* (7a)), *stem 2* appears in the active perfective (*gdar-* (7b)), whereas *stem 3* appears in the non-active perfective (*gdar-* (7c)).⁷

- (7) a. 'e - gdern - a
AUG - √scratch.IMP - 1SG.PS
- b. 'e - gdar - a
AUG - √scratch.PER - 1SG.PS
- c. gd'ar - thik - a
√scratch.PER.NAC - NAC.PER.PS - 1SG.PS
- d. gd'ar - simo
√scratch - NOM.SG.NEUT.

The drawback lies on the the descriptive nature of this treatment; the 'definitions' of the three types of stems. What one needs to know is the features represented in each one of the stems. As it stands at present, one could easily suggest that *stem 2* represents the perfective aspect and active voice, whereas the identical *stem 3* the perfective aspect and non-active voice.

As far as (8) is concerned, one also predicts that *stem 2* and *stem 3* are identical in the morphophonological spell-out, although distinct on the voice features they represent.

⁶Rivero's (1990) account is a syntactic approach to the verbal morphology in MG, whereas Joseph and Smirniotopoulos's (1993) is a morphological one. Philippaki-Warbuton (1973) makes a short reference to the presence of TVs in MG. According to the author, TVs appear in the non-active, imperfective forms and they represent the features of voice. Due to space limitations, though, the relevant discussions are omitted; see Galani (2002b, and subsequent work).

⁷I do not use the same examples as Joseph and Smirniotopoulos (1993) in order to present the inadequacies of their account.

- (8) a. apol'imēn - a
√disinfect.IMP - 1SG.PS
- b. apol'imān - a
√disinfect.PER - 1SG.PS
- c. apolim'an - thik - a
√disinfect.PER - NAC - 1SG.PS
- d. apol'imān - si
√disinfect - NOM.SG.FEM.

Moreover, they try to enforce the significance of the stems by suggesting that they also appear in derived environments (7d, 8d). In such cases, nonetheless, stems do not have the same status. They do not represent any inflectional features, but they are derivational in nature.

What is crucial, though, is their claim that it is impossible to determine the selection of the appropriate stem in the derived environments in MG. I believe that this is due to the fact that they do not incorporate into their account the presence of TVs as well as that they do not acknowledge the presence of zero morphology. Instead, they prefer to assume that both aspect and voice are represented in the stems, regardless of the fact that in the perfective, non-active voice, voice is also overtly marked (*-thik-* (7c, 8c)). Consequently, this account is not consistent.

Furthermore, they claim that stems are already stored in the lexicon and inflectional rules apply to them. For example, the formation of *apol'imana* (8a) is the result of the following rules:

- (9) a. [+perfective, +active] ↔ Stem 2 (*apoliman-*, from the lexicon)
- b. [+perfective, +past] ↔ Select ending set 2
- c. [1st person, singular] ↔ *-a* (from ending set 2)

Finally, the formation of stems appearing in (5) would occur under the same conditions. The different stems (*le-*, *leg-* *ip-*) are already stored in the lexicon and the dependence of these stems upon the morphosyntactic features (tense, aspect, voice) is not captured. This necessarily means that the status of these three different verbs is the same as far as stem formation is concerned. Such an account in an attempt to explain the irregular morphological pattern of verbs such as *l'eo-* 'say' and offer a generalised treatment, fails to account for the individuality of verbs exhibiting non-suppletive stems. It also fails to capture the exact conditions under which stem formation occurs and it does not make use of the available information based on the forms. Importantly, TVs are completely overlooked.

In light of such a treatment, stem formation — and consequently word formation — cannot be seen as a fully productive operation. The application of the rules is of a purely

stipulative nature and there is no mechanism explaining the formation of these stems. It also complicates the grammar and it is not economical.

Nonetheless, what one needs to know is how these stems are formed. Bearing in mind the data presented in Section 2 and especially the features represented in each inflectional unit, it seems unreasonable to suggest that in all cases stems are seen as a minimal unit due to the fact that MG verbal forms exhibit a high degree of cumulative exponence. The internal constituent structure of the non-suppletive stems — [root+Aspect (Perfective)] — can be easily determined, once one looks at the way they behave throughout the verbal paradigm. As for the suppletive ones, the lack of this internal structure signals a different formatting system.

4 An alternative account

4.1 The framework

DM is a post-syntactic framework developed by Halle and Marantz (1993). A significant aspect of this framework is the way syntactic terminal nodes are seen. Syntactic terminal nodes are complexes of syntactic and semantic features which are called morphemes. These morphemes lack any phonological specification. Head-movement applies at the syntactic component. Once the syntactic operations are complete, the structure enters the morphological component. Morphological processes may further modify the structure mainly before Vocabulary Insertion. Fusion, for instance, is the morphological operation by which two terminal nodes are fused into a single one. Only one Vocabulary Item (VI), the specification of which matches the specification of the fused node, can compete for insertion in this node. This contradicts Halle and Marantz (1993) who suggest that the item inserted in the fused node should have a subset of the features of the fused node, including features of both input nodes. It is also contrary to what Oltra-Massuet (1999) claims; the item that may be inserted should match all or a subset of the features of the fused node.

Moreover, Vocabulary Insertion is the operation which supplies the terminal nodes with phonological features. It should be noted that Vocabulary Insertion is subject to the Subset Principle (Halle 1997); the competition between the VIs is won by the most highly specified item for the features of the given terminal node. In addition, a principle relevant to the discussion that follows is Feature Disjointness (Embick 2000: 188); ‘features that are phonological, or purely morphological, or arbitrary properties of VIs, are not present in the syntax; syntacticosemantic features are not inserted in the morphology.’

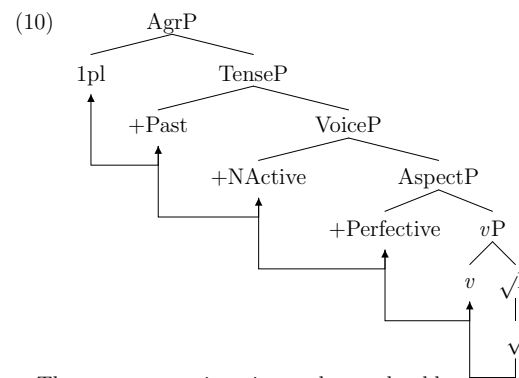
Finally, there is no lexicon in DM. The mapping of the morphosyntactic features to their phonological realisation is stored in the vocabulary. The vocabulary is seen as the repository of this mapping in the literature. Any readjustment rules apply at the morpho-

logical component. So, the vocabulary does not participate actively in the process of word formation. There is not also any particular organisation of the VIs in the vocabulary. In the best case, they are also organised in terms of the Subset Principle. This paper aims to contribute towards the nature of the vocabulary — whether it plays an active role in word formation — and make some proposals around its organisation, although this is discussed in detail in Galani (2003c).

4.2 The proposal

I see word formation as a complex process involving the obligatory interaction of syntax, morphology as well as phonology. If any of these stages are omitted or any violations occur at any point of the word formation process, ungrammaticality results. Consequently, this position contradicts both the purely syntactic (Baker 1985; Pollock 1989) as well as the purely morphological (Di Sciullo and Williams 1987) approaches to word formation. Moreover, I propose that roots are generated in the syntax, contra Marantz (1997) and Galani (2002b) who claim that the syntactic category V is a morphological category created by syntax.

At the syntactic level, the terminal nodes are arranged in the way exemplified in (10). Head-movement applies to this structure. This would be the syntactic output serving as the morphological input.

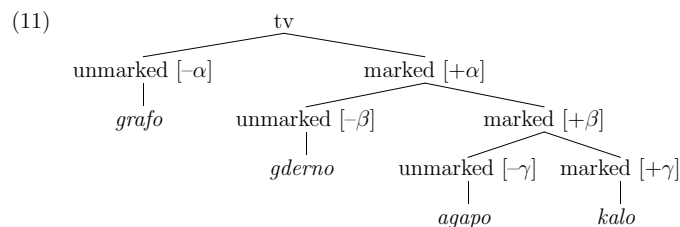


There are two main points a theory should account for regarding TVs in MG; they are seen as markers of the conjugational classes and they are also morphemes carrying syntacticosemantic information. This means that the first set of features should be interpreted at the morphological component (lexical features)⁸, whereas the second set in the syntax. The Feature Disjointness principle ensures that the wrong features are not inserted in the wrong component. Since there is no lexicon in DM, the term ‘lexical features’ refers to the features of TVs regarding the conjugational information.

⁸Let us call these features lexical since there is no lexicon in DM.

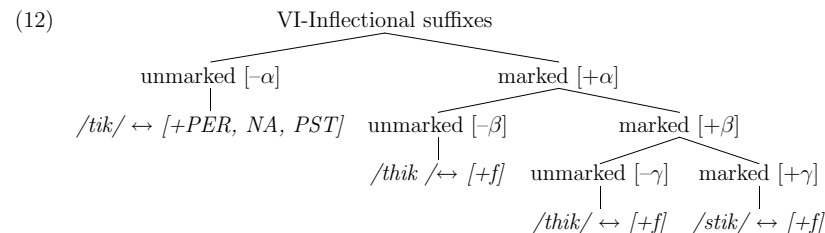
There is also the question of how the correct roots are matched to the correct set of inflectional suffixes. Let me first start by looking at the first set of features and the matching puzzle of the morphological units. So, I suggest that TVs provide the roots and the inflectional suffixes the information about the conjugational classes. What this means is that TVs carry lexical features for which roots and inflectional suffixes are also specified in the grammar. This ensures the correct matching between the roots and the inflectional suffixes.

Nonetheless, the matching puzzle has not been yet solved. What one needs is to define these lexical features and apply them to the TVs. I follow Oltra-Massuet (1999) and I propose that the MG verbal system is organised in terms of markedness based on the degree of markedness of the TV. The hierarchy derives from the degree of frequency and regularity of the TVs. Koutsoudas (1962) suggests that *gr'af'o-* 'write' like verbs are the most frequent forms in MG as far as their morphological pattern is concerned. This class is followed by verbs stressed on the last syllable *agap*-*'o-* 'love' and *kal*-*'o-* 'invite'. Based on the way TVs are realised in each case, one predicts that the second class of verbs behave in a different way and they should be, consequently, treated as a separate class — contra traditional claims in the literature which treat verbs as belonging to two main classes based on the stress pattern (cf. Holton, Mackridge, and Philippaki-Warbuton 1997). I assume that TVs are arranged in the markedness hierarchy of TVs as shown in (11).

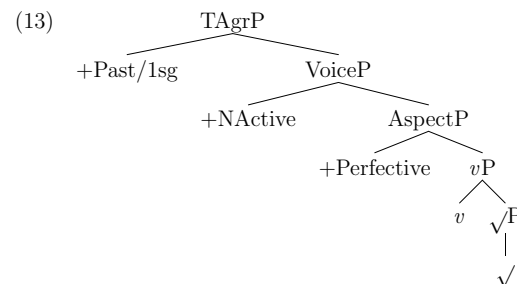


What is evident from this hierarchy is that it also provides information about the way inflectional suffixes are related to one another. For verbs specified for $[+\alpha, -\beta]$, this means that some of the inflectional suffixes will be identical between the two classes ($[-\alpha]$ and $[+\alpha, -\beta]$). The same goes for $[-\gamma]$; these forms share a similar pattern to $[+\gamma]$ ones but they also share a similar pattern to the $[+\beta]$ cases, as they are embedded under this node. This hierarchy also shows that the most embedded the TV is, the most irregular pattern the inflectional suffixes follow. (11) is a representation of aspect.

Moreover, VIs are also arranged in the grammar according to the markedness hierarchy, as exemplified in (12). This has important consequences for the organisation of the vocabulary. There is no need for the several subcategorisation frames but VIs are stored in the vocabulary in bundles depending on the lexical features they carry.



At the syntactic component (recall (10)), the terminal nodes AgrP and TP are fused in a single node, TAgRP, as shown in (13). Morphological evidence — based on the degree of cumulative exponence this morphological unit presents (recall examples (1, 3)) — indicates that this is the right path. Finally, head movement applies to this structure before it enters into the morphological component.



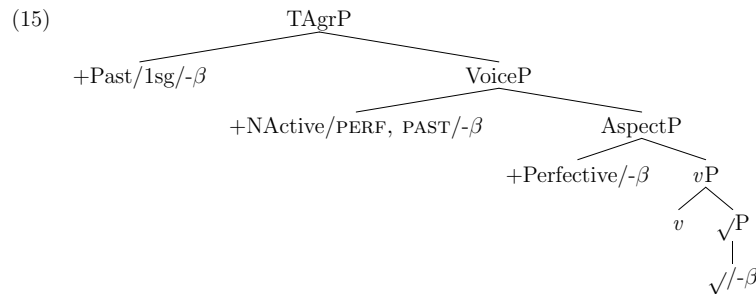
At the morphological component, roots are further specified for the lexical features. This information is further encoded to the remaining projections. So, the VI which will be inserted in the terminal nodes should not only match the syntacticosemantic features of the given terminal node but also the lexical features of the root. By these means, the correct roots are matched to the correct set of inflectional suffixes. If the lexical features of the inflectional suffixes do not match these of the root, ungrammaticality results.

What (13) shows is that AspP is deeply embedded in the structure and occurs in an internal position to *vP*. On the other hand, VoiceP and TAgRP are less embedded to *vP* and occur in an external position. So, it could be suggested that *vP* and AspP could be seen as having an internal structure to which the remaining projections are adjoined. Once these operations are complete, Vocabulary Insertion applies and the VIs are inserted into the terminal nodes. Unless the VI matches the syntacticosemantic features as well as the lexical features of the root, the operation of Vocabulary Insertion cannot be completed and ungrammaticality results.

Let me try to exemplify vocabulary insertion and consequently the formation of (1c) *gd'arthika-* 'skinPER.NAC.1SG.PS', for instance. The VIs which are stored in the vocabulary — in relation to this verb — are the following ones. Let us assume that the lexical feature for this class is $-\beta$.

- (14) a. $/-ern-/ \leftrightarrow [\text{IMP}, -\beta]$
 b. $/-ar-/ \leftrightarrow [\text{PER}, -\beta]$
 c. $/-thik-/ \leftrightarrow [\text{NAC}, \text{PER}, \text{PS}, -\beta]$
 d. $/-\text{O}-/ \leftrightarrow [\text{AC}, -\beta]$
 e. $/-a/ \leftrightarrow [\text{PS}, \text{1SG}, -\beta]$
 f. $/gd-/ \leftrightarrow [\checkmark, -\beta]$
 g. $/-simo/ \leftrightarrow [\text{NOM}, \text{SG}, \text{NEUT}, -\beta]$

So, structure (13) — repeated here as (15) — will be inflected for the following features.



The secondary features of the item inserted in VoiceP should be checked prior insertion. Since the features of tense and aspect are matched, these are deleted leaving the VI which is inserted into VoiceP with the relevant to this node specification. The items which win the vocabulary insertion for competition are the following ones:

- (16) a. TAgP: $/-a/$
 b. VoiceP: $/-thik-/$
 c. AspP: $/-ar-/$
 d. vP: $/gd-/$

This matching and deletion of features prior to vocabulary insertion plays a crucial role for the formation of nominal forms. The features of the external structure of the AspP/vP cluster should not match the features of this cluster. Otherwise ungrammaticality results. This shows that the external structure of the complex AspP/vP cluster determines the verbal or the nominal environment, supporting the position I follow on the nature of word formation; a complex process which involves the obligatory interaction of syntax as well as phonology.

The structure, finally, enters the phonological component, where phonological operations and stress assignment further apply. This part of the derivation is omitted, though,

from the present discussion. The reader is referred to Galani (2002a) for a detailed discussion.

Up to this point, the formation of non-suppletive stems has been discussed. In the remaining of this section, I will look at the formation of suppletive stems bearing in mind the data in (5), repeated here as (17).

- (17) a. l'e - o
 $\sqrt{\text{say}} - (\text{IMP.AC}).\text{1SG.PRES.}$
 b. 'e - leg - a
 $\text{AUG} - \sqrt{\text{say}} - (\text{IMP.AC}).\text{1SG.PS.}$
 c. 'ip - a
 $(\text{AUG})\sqrt{\text{say}} - (\text{PER.AC}).\text{1SG.PS.}$
 d. l'eg - ome
 $\sqrt{\text{say}} - (\text{IMP.NAC}).\text{1SG.PRES.}$
 e. leg - 'omun
 $\sqrt{\text{say}} - (\text{IMP.AC}).\text{1SG.PS.}$
 f. ip - 'othike
 $\sqrt{\text{say}} - (\text{PER.NAC}).\text{3SG.PS.}$

In Section 2, I suggested that the formation of such stems occurs in the vocabulary. It is the result of the application of a lexical rule which is based on the distribution of the morphosyntactic features. Although this idea is drawn from Philippaki-Warbuton (1973), there are certain differences about the motivation and greater differences related to the morphemes she treats as TVs as well as the features represented in them. As I do not intend to get into any great depth, the interested reader is referred to the paper for details.

The conclusion drawn in Section 2 was that the stem *leg-* is used when the features of [+past and/or +non-active] are represented in the form. In the markedness hierarchy, the entry for such verbs is placed under the last node. Recall that the most embedded the node is, the most irregular the formation of the verb is too. Let us assume that this node is specified for the $[\epsilon]$ lexical feature, the feature for the non-specified items for TVs. Two lexical rules apply to this entry. Both of them result at the formation of stems under different conditions. The first one will give the forms used in (17b, d, e) and explain the pattern in (17a), whereas the application of the second one will result at the formation of the stem used in (17c, f).⁹

- (18) 1. (a) $\gamma \rightarrow \text{O} / [+V] - V \#$
 where $+V = [+verb]$ and $V = \text{vowels}$

⁹(18.1) is adapted from Philippaki-Warbuton (1973: 208). The way (18.2) is altered in the subjunctive forms is not discussed in the present paper, as it is related to the presence of the augment.

- (b) $\gamma + V \rightarrow \emptyset / [+V] - V$
 but $[V +\text{PAST}, +\text{NON-ACTIVE}] \rightarrow [-\text{Rule 18}]$
2. $\sqrt{\text{leg-}} + [+perfective, (+past)] \rightarrow V[ip-]$

So, these stems have been formed and are not stored in the vocabulary. When vocabulary insertion occurs — once all the syntactic and morphological processes have been completed — the stem which matches the specification of the node is inserted in the structure. Finally, the structure enters PF, where phonological rules may further apply.

5 Conclusion

The formation of non-suppletive as well as suppletive stems has been the central focus of this paper. I proposed that non-suppletive stems are formed at the morphological component, whereas suppletive forms are formed in the vocabulary via readjustment rules. The application of these rules in the vocabulary provided evidence for its nature which is seen not only as the repository of the mapping between morphophonological and morphosyntactic features but as an active subcomponent obligatorily participating in word formation.

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