SO, WORD FORMATION: SYNTAX OR MORPHOLOGY? FORMATION OF NON-SUPPLETIVE STEMS IN MODERN GREEK*

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Abstract

Ο σχηματισμός μη αλλόμορφων θεμάτων στα Νέα Ελληνικά εξετάζεται μέσα στα πλαίσια της Κατανομημένης Μορφολογίας (Halle and Marantz 1993). Υποστηρίζεται ότι ο σχηματισμός αυτού του είδους θεμάτων είναι αποτέλεσμα της εφαρμογής του *Lowering Merger* (Embick and Noyer 1999) στο μορφολογικό τομέα (MS). Η εισαγωγή και οι ιδιότητες των ριζών παίζουν καθοριστικό ρόλο τόσο στο σχηματισμό των θεμάτων όσο και στην κατανόηση των κινήτρων που υποκινούν τις διεργασίες οι οποίες επέρχονται στο μορφολογικό επίπεδο. Η αρχή της *Πρώιμης Εισαγωγής* των ριζών (Embick 2000) υιοθετείται σε συνδυασμό με την πρόταση ότι οι ρίζες εισάγονται στο συντακτικό τομέα προσδιορισμένες. Η ακριβής προσδιόρισή τους καθώς επίσης και ο τρόπος με τον οποίο αυτές οι ιδιότητές τους κατανέμονται στους διαφορετικούς κλάδους (σύνταξη, μορφολογία), εξετάζονται με λεπτομέρεια.

Keywords

word formation, syntax, morphology, non-suppletive stems, Modern Greek

1. Introduction

The purpose of this paper is to discuss the formation of non-suppletive stems in Modern Greek (MG). The present account is formulated within Distributed Morphology (DM) (Halle and Marantz 1993). I propose that the formation of non-suppletive stems occurs at the morphological component and is subject to the application of *Lowering Merger* (Embick and Noyer 1999). The ultimate aim of the paper is to shed light on the insertion and status of roots, explaining what motivates the application of operations at the morphological component in DM. I follow Embick (2000) on roots complying with the principle of *Early Insertion* –contra Marantz (1994, 1995)- and I claim that they are specified. Nonetheless, the ways the specification of the roots is interpreted, depend on the level of representation. From a language-specific point of view, I show that forms which have been previously treated as suppletive, are not in the light of their re-analysis within DM.

The paper is organised, as follows: in section 2, I present the data drawn from MG. In section 3, I provide a sketch of the background assumptions as far as DM is concerned before accounting for the facts. This section is rounded off by a short discussion of the most recent treatments of the verbal morphology in MG (Rivero 1990, Joseph and Smirniotopoulos 1993) to support the merits of the alternative account proposed. The paper concludes in section 4 with a summary of the main points.

2. Data

The aim of this section is to identify the morphological units which participate in the formation

of non-suppletive stems. Crucial for the analysis proposed in section 3, are the features each unit of the stem cluster represents. Attention is mainly paid to verbal forms, although reference to non-verbal environments is also made to support the status of stems.

What is shown is that the mechanisms for combining the pieces of inflection with the root are set within the root domain. Based on the specification of the root, different processes are triggered and applied for the formation of stems in the non-suppletive versus the suppletive environments. I leave, though, the second issue open but the interested reader is referred to Galani (to appear, b).

Here, it should be noted that I first take into account the information available in the data and I then formulate a descriptive definition of the stem in MG.[1]

2.1 Non-suppletive stems: root and its domain

Let us first start the examination of the data with reference to a form which has been previously treated as suppletive in the literature (Joseph and Smirniotopoulos 1993).

Throughout the verbal forms in (1), one notices a fairly stable pattern of representation of the syntactico-semantic features; the root (*gd-*) followed by the pieces of inflection; morphemes representing the aspectual features (*-ern-* (1a-b, d-e), *-ar-* (1c, f)), the features of voice (-∅- (1a-c,), *-o-* (1d-e) and *-thik-* (1f)) and finally agreement and tense (*-o* (1a)), *-a* (1b-c, f), *-me* (1d) and *–mun* (1f)).[2]

a. gd - `ern – ∅ - o
√.skin – IMP – AC - 1SG.PR

b. `e – gd – ern – ∅ - a
AUG[3] – √.skin – IMP - AC – 1SG.PS

c. `e – gd – ar – ∅ - a
AUG – √.skin – PER – AC – 1SG.PS

d. gd - `ern – o - me
√.skin – IMP – NA($_{IMP}$) - 1SG.PR($_{NA}$)

e. gd – ern - `o - mun
√.skin – IMP – NA($_{IMP}$) – 1SG.PS($_{NA}$)

f. gd - `a r –thik – a
√.skin – PER – NA($_{PS.PER}$) – 1SG.PS

The same sequence of the root and the unit representing the aspectual features is further retained in the nominal environment, as exemplified in (2). The root (*gd-*) is followed by the morpheme representing the perfective aspect (*-ar-*) proceeded by the nominal suffix (*-simo*).

(2) gd - `ar – simo
√.skin – PER – 1SG.NEUT.NOM.

It appears, then, that the [root + perfective aspect marker] cluster can be present both in the verbal as well as the nominal environment. So, it could be suggested that a root and the perfective marker form a stem.

Nonetheless, the formation of a stem is not conditioned by the presence of the perfective aspect only (also (3a)), as exemplified in (3b).

(3) a. gd – ar – m`enos

√.skin – PER – SG.NOM.MAS

b. gd - `ern – ontas

√.skin – IMP – ……

The stem of the form in (3b) is formed by the root of the same verb – (*gd*-) as in (3a)- followed this time by the marker denoting the imperfective aspect (-*ern*-). The two stems are followed by the suffix of the relevant environments.

Consequently, a stem consists of the root followed by the perfective or the imperfective marker. The choice of the aspectual marker seems to be related to the morphological unit that follows. So, there is a constraint; -*menos* (3a) can be only suffixed, if the perfective aspect is represented in the structure. Similarly, -*ontas* (3b) is suffixed if and only if the imperfective aspect is represented. In this way, ungrammatical forms –such as **gdern-menos*, ** gdarontas*- are ruled out. Nevertheless, this does not mean that all perfective forms can be combined with the suffix –*menos*. As this is out of the paper's scope, I do not discuss the issue any further.

What is important about the forms throughout (1-3) is that they follow a stable pattern of formation. There is no reason to assume that such forms are suppletive based on the argument that the root of this verb, *gdern*- (skin) which can also be the imperfective stem according to traditional accounts in the literature (cf. Joseph and Smirniotopoulos 1993), undergoes suppletion resulting at the stem used in the perfective forms, *gdar*-. Such a treatment shows an inconsistent approach which does not pay attention to detail.

Let us now turn to another set of verbal forms and try to examine whether the sequence of [root + aspectual marker] can be maintained. This will also further support that the above verb (1-3) is not suppletive in nature.

The imperfective stem in (4a-b, d-e) is consistent; the root (*agap*-) is followed by the aspectual marker which is not spelled out overtly, though. As for the perfective stem, the perfective aspectual marker is preceeded by the root (4d, f). The morphemes realising the features of voice (-∅- (4a), -*io*- (4d-e), -*s*- (4c), -*thik*- (4f)) and agreement/ tense (-*ame* (4a), -*ame* (4b-c, f), -*maste* (4d), -*mastan* (4e)) are further adjoined to the [root + aspect] cluster.

(4) a. agap –∅ –∅ - `ame

√.love – IMP – AC – 1PL.PR

b. agap –∅ – `ag - ame

√. love – IMP - AC – 1PL.PS

c. agap – `i – s - ame

√. love – PER – AC – 1PL.PS

d. agap –∅ – `io – maste

√. love – IMP – NA($_{IMP}$) – 1PL.PR($_{NA}$)

e. agap –∅ - I`o - mastan

√. love – IMP – NA($_{IMP}$) – 1PL.PS($_{NA}$)

f. agap - i –th`ik – ame

√. love – PER – NA($_{PS.PER}$) – 1PL.PS

As for the nominal environment (5), the root is followed by the imperfective marker –which has no overt morphophonological realisation- and the nominal endings representing the features of gender, case and number.

(5) g`ap –∅ - i

√.love – IMP – SG.NOM.FEM

If one compares the form in (5) *–ag`api-* with the one in (2) *–gd`arsimo-*, it is clear that the nominal environment can be based either on the stems representing the imperfective or the perfective aspect. The conditions under which the choice of stems applies, are not at stake here.

The last point to be compared between the forms of the root *gd-* (1-3) and *agap-* (4-5), is the formation of the participle and the gerund. In (6), the root (*agap-*) in combination with the marker of the perfective aspect (*-I-*) are used for the formation of the participial form. On the other hand, the imperfective marker (-∅-) follows the root (*agap-*) for the formation of the gerund in (6b) (*agap`ontas*).

(6) a. agap – I – m`enos
√.love – PER – SG.NOM.MAS
b. agap – ∅ - `ontas
√.love – IMP – ……

Consequently, one can talk about the formation of stems based on the combination of a root followed by the imperfective or the perfective marker. The comparison of a form which have been previously treated as suppletive, and a "regular" one shows that a stable pattern is retained as far as the formation of stems in MG is concerned. These stems appear both in nominal as well as verbal environments. The conditions under which this choice of stems is met, are not discussed in the present paper, though. Such a treatment requires a close examination of the inflectional suffixes which follow the stem.

The issue that remains, relates to the aspectual markers. The question here is why the verbal form in (1) versus (4) select different morphological units (*-ar-* (1c) versus *–i-* (3c)) and also how the correct selection is achieved. Consequently, roots should be specified for some features which condition the suffixation of certain morphemes. Empirically, this says: "root X, specified for features Z, can be only matched with morphemes also carrying features Z". So, ungrammatical forms –such as **agapara* or **gdernisa*, are ruled out. This part of the analysis is presented in section 3.2.

3. An alternative account

In this section I aim to introduce the main principles of DM before moving on to the account I propose as far as the formation of non-suppletive stems is concerned. Here, it should be noted that some aspects of the framework presented in 3.1, are revised in the section that follows. The discussion concludes with a short reference to the most recent accounts of the verbal morphosyntax in MG in order to highlight the significance of the present treatment.

3.1 DM 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.

In addition, Embick and Noyer (1999) develop Marantz's (1988) *Morphological Merger* and claim that the relation between two heads, X and Y, can be replaced by suffixation of the head X to the head Y through *Lowering Merger*. *Lowering Merger* can only occur once all syntactic operations have been completed –and especially after raising- but crucially before Vocabulary Insertion. Up to this point, this operation has been mainly treated as part of well-formedness conditions between levels of representation.

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. VIs are stored in the vocabulary.[4]

Finally, in line with the principle of *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". Nonetheless, this position will be revisited in the following section.

3.2 Accounting for the facts

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.

Crucial for the treatment of stems in MG I am proposing, is the level at which roots are generated. Following Embick (2000) –and contra Marantz (1994, 1995)[5], I assume that roots are generated in the syntax. This has important consequences for determining what category roots are realised. This is determined by the local external environment of the root. As far as MG roots are concerned, what follows them is the marker of the aspectual features which, as has been seen in section 2, appears as part of the stem both in verbal as well as nominal environments. Consequently, the category roots realise, depends on the functional projections above AspectP.

Moreover, roots should be specified for non-syntacticosemantic features which link them to the pieces of inflection. These features disallow any mismatches between the distinct

morphological pieces. What this tells us, empirically, is that if a root is specified for the feature [X], the unit which will adjoin to it, should also bear the same feature [X]. Otherwise, there is a violation of the matching criterion.

If *Early Insertion* applies to the roots, this inevitably means that the morphological specification of the root is also present in the syntax. Although this would cause a problem as far as the principle of *Feature Disjointess* is concerned, a way out is to propose that syntax does not have the necessary machinery to interpret features which are not syntactic or semantic. Consequently, the morphological features of the roots are invisible in syntax.

Their presence in the syntactic component, though, is compulsory. First of all and from a technical perspective, if these features were not present in the syntactic component, they would only become available to the structure after Vocabulary Insertion. This would necessarily mean that the features are stored in the vocabulary and their interpretation would come too late. Any item could be inserted in any given node, as long as it matches the syntacticosemantic features of the node. According to this view, the matching of the appropriate suffixes is subject to features stored in the vocabulary. Crucially, this means that the morphological component is only the part of grammar where syntacticosemantic features are matched to their phonological realisations but no productive and morphological processes that would affect word formation, actually apply. This certainly affects the nature of word formation.

What is needed for the structure to know once it enters the morphological component is which operations to apply. The invisible features of roots in syntax can be now seen at the morphology. The application of any morphological operation is triggered/ restricted by the specification of the root. This plays a vital role for the formation of non-suppletive versus suppletive stems. In this paper, we have only seen cases where the root forces the application of *Lowering Merger* of Aspect to the head of vP. In suppletive environments, on the other hand, the information roots carry will force the application of *Fusion* of AspectP and √P in the morphology.

Important for this treatment is the presence of TVs.[6] According to Galani (2002 and subsequent work), TVs follow the root and in the non-suppletive environment are identified as the markers of the aspectual features. Contrary to what has been previously suggested in the literature (cf. Spencer 1990), TVs are not distinguished as markers of the conjugational or declensional class. As was previously suggested, this is determined by the external environment of the stem. If voice is adjacent to [Asp-root]P, the derived form belongs to the verbal domain.

The full specification of the root before entering the morphological component is also necessary, as the morphological features which carries, will be copied to the remaining available projections. Consequently when Vocabulary Insertion applies, the VI that wins the competition should not only match the syntacticosemantic specification of the node but also the morphological one.

Let us know try to sketch the formation of the perfective, non-active, past form of *gd`erno* (1a) *–gd`arthika* (1f)- repeated here as (7).

(7) gd - `a r –thik – a
√.skin – PER – NA($_{PS.PER}$) – 1SG.PS

At the syntactic level, the terminal nodes are arranged in the way exemplified in (8).

(8) [AgrP [Agr] [TP [T] [VoiceP [Voice] [AspectP [Aspect] [vP [√P [√]]]]]]]

Based on syntactic properties (Bobaljik and Thrainson 1998), AgrP and TP are fused in the syntactic level. Note that according to the principles of DM, *Fusion* occurs in the morphology.[7] Due to the purposes of this paper, I do not expand any further (see Galani (in preparation) for details). Finally, head-movement applies to this structure, (9). This would be the syntactic output serving as the morphological input. The root will carry the morphological features which are invisible in the syntactic component.

(9) [AgrTP [AgrT] [VoiceP [Voice] [AspectP [Aspect] [vP [√P [√]]]]]]

Once the structure enters the morphological component, the morphological features of the root, are interpreted. Let us assume that the features for the given root are [X] (10).

(10) [AgrTP [AgrT] [VoiceP [Voice] [AspectP [Aspect] [vP [√P [√X]]]]]]

According to its specification, these features are further mapped to all projections. The resulting structure is the one presented in (11) below.

(11) [AgrTP [AgrTX] [VoiceP [VoiceX] [AspectP [AspectX] [vP [√P [√]]]]]]

Once the requirement of mapping the morphological features of the root to the remaining nodes is met, *Lowering Merger* of Aspect to the head of vP is ordered, (12).

(12) [AgrTP [AgrTX] [VoiceP [VoiceX] [AspectP [*t*] [vP vo v Asp [√P [√]]]]]]

Here it should be made clear that this only applies to what has been treated as non-suppletive stems. The [vP-√P] cluster forms a local environment which can be used for the formation of both nominal and verbal forms, as has been previously seen in section 2. *Lowering Merger* applies to the structure to create the structural environment for the formation of stem. Its application is not part of any well-formedness requirement (Halle and Marantz 1993). There is no need to apply this operation to the structure in order to derive the appropriate structure corresponding to the order of morphemes. This is already available in (11). This operation applies in order to satisfy the morphological requirement of specific roots regarding stem formation.

Once the morphological processes have all been completed, Vocabulary Insertion applies and the VI which matches both the syntactico-semantic as well as the morphological specification of the node it competes for insertion at, wins the competition. Finally, the structure enters PF for the application of the stress rule and any other phonological operations.

In the case of suppletive ones, the operation of *Lowering Merger* is blocked in the presence of another feature which orders the application of morphological *Fusion*.

3.3 Existing accounts in the literature

This section aims to refer briefly to the most significant problems a syntactic approach (Rivero 1990) as well as a purely morphological (Joseph and Smirniotopoulos 1993) treatment would have to face.

Assuming that verb formation in MG is a strictly syntactic process would not allow us to account for the interpretation of the morphological features of the roots which trigger the matching of the distinct pieces of inflection. On the other hand, the formation of stems is not a syntactic phenomenon and consequently one is forced to assume that stem formation does not apply in MG.

Finally as far as the morphological account Joseph and Smirniotopoulos (1993) propose, the downfall lies on the argument that stems are formed in the lexicon in MG. Consequently, they see stem formation as a fairly non-productive process and they do not allow for the distinction between non-suppletive versus suppletive stem formation. For them, roots do not carry any specification, whereas the notion of TVs is not incorporated into their account.

4. Conclusion

The formation of non-suppletive stems has been the central focus of this paper. The account sketched has been formulated within DM. I proposed that non-suppletive stems in MG consist of a root and the TV, the morpheme representing the aspectual features. This systematic pattern is followed for the formation of verbal as well as non-verbal environments. In order to account for the facts, it was assumed that roots are specified for morphological features which not only link them to the pieces of inflection (nominal or verbal) but they also trigger the operations which apply at the morphological component; apply *Lowering Merger* (Embick and Noyer 1999) to AspP. This function of roots can be only retained if one assumes the principle of *Early Insertion* (Embick 2000); roots enter in the syntactic component. Inevitably, this means that when roots enter the syntax, they are fully specified. Although this might cause problems in relation to the *Feature Disjointess Principle* (Marantz 1994), it is assumed that roots′ specification remains invisible in the syntactic component. It is suggested that syntax does not have the appropriate mechanisms to interpret features which are not syntactic or semantic. Nevertheless, this should not preclude the existence of features which affect the operations which apply in the morphological component. A short reference was made to suppletive stems –which are formed once the operation of fusion applies- in order to support the importance of the root′s specification as to what triggers the application of operations at the morphological component.

Notes

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[1] There has been a great number of significant works around the verbal morphology in Modern Greek in the literature (cf. Philippaki-Warburton 1970, 1973 and subsequent work). Due to space limitations, though, I only refer briefly to the latest and most controversial ones (Rivero 1990, Joseph and Smirniotopoulos 1993) in section 3.3.

[2] The following abbreviations are used in paper: IMP(erfective), PER(erfective), AC(tive), N(on)-A(ctive), PR(sent), P(a)S(t), AUG(ment), S(in)G(ular), PL(ural), NOM(inative), NEUT(ral), MAS(culine), FEM(inine).

[3] The interested reader is referred to Galani (to appear, a) for an analysis of the augment's insertion within DM

[4] The interested reader is referred to Galani (to appear b, c) for a discussion around the nature of the vocabulary and its organisation, respectively

[5] Late Insertion of the roots has been previously suggested in Galani (in press).

[6] For a detailed discussion of TVs and the differences between the alternative account I am proposing and the existing treatments as well as the way VIs are arranged in the vocabulary, see Galani (2002 and subsequent work).

[7] Fusion of Agreement and Tense is further supported by Philippaki-Warburton (1990).

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