AN ANALYSIS OF THEME VOWELS IN MODERN GREEK WITHIN DISTRIBUTED MORPHOLOGY[1]

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1. Introduction

In this paper I propose a unified account of the representation of aspect and voice in Modern Greek (MG) within the framework of Distributed Morphology (DM). In specific, I concentrate on the function and the features represented in theme vowels (TVs). The existing treatments in the literature mainly see TVs as empty morphemes, markers of the conjugational classes to which verbs belong mainly in Romance languages but also in Greek and Russian. As becomes clear in what follows, this treatment cannot account for the syntactico-semantic features represented in TVs in MG. In addition, the existing morphological analyses of the verbal morphology in MG do not account satisfactorily either for the presence of TVs or their distribution. This paper focusses exactly on these issues.

The rest of the paper is organised as follows: in section 2, I provide a brief summary of the most influential accounts around TVs in the literature. In section 3, I present the data drawn from MG and I highlight the problems the previous analyses of TVs cause. Moreover, I provide an alternative account for the MG data in section 4, where I also summarise the main principles of the framework, I adopt (section 4.1). The discussion is rounded off in section 5 with the concluding remarks.

2. Existing Treatments

The aim of this section is to discuss briefly some of the existing accounts around TVs in the literature. I shall first present the ones drawn from the Greek literature and I will then move on to the accounts based on other languages. One point should be made clear; I do not intend to discuss the problems these accounts cause for the data presented in this section. Their applicability is questioned in the next section (3), where I discuss the data drawn from MG.

In Ancient Greek (AG), TVs are the vowels appearing between the temporal stem and the endings in some verbal forms (M. OIKONOMOU 1995), as exemplified in (1a-b). TVs are treated as empty –non-inflected- morphemes within this account.

(1) (a) *g `raf*   – *(O)* *- men*
      write.ROOT   – (TV) - PRESENT.ACTIVE.1PLURAL
   (b) *gr `af*   – *(E)* *- te*
      write.ROOT   – (TV) - PRESENT.ACTIVE.2PLURAL

Nevertheless, it should be noted that the morphemes *–o-* (1a) and *–e-* (1b) are generally treated as part of the inflectional suffix and not as independent morphemes elsewhere in the literature (E. JAY 1958, H. SMYTH 1956). Consequently in these accounts, the features represented in M. OIKONOMOU's (1995) TVs are the ones of the inflectional suffixes; tense, voice, person and

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number. Due to the fact that the latter accounts do not make reference to TVs, I follow M. OIKONOMOU (1995).

On the other hand, the picture is not so transparent in MG. According to M. TRIANTAFILLIDES (1941: 152), TV is called the vowel (*-o-* in 2a) or the digramma (*-ei-* in 2b) appearing at the syllable before the ending.

(2) (a) *plir(`O)n*   *- o*
       pay.ROOT.(TV)   – PRESENT.ACTIVE.1SINGULAR
    (b) *L(EI- `E)p*   *– o*
       be absent.ROOT(TV)   – PRESENT.ACTIVE.1SINGULAR

Nevertheless, the account developed by M. TRIANTAFILLIDES (1941) is not the only treatment of TVs in MG. I. PHILIPPAKI-WARBURTON (1973:212) suggests that TVs follow the root or the stem; <<past tense is marked by the quality of the thematic vowel in active voice (3a) and perfective passive (3b) and by suffixation in imperfective passive (3c)>>. She then claims that TVs in the non-active forms represent the feature of voice (3c).

(3) (a) *`e*   *– graf*   *– (A)*
       AUGMENT[2] – write.ROOT   – (TV).PAST.ACTIVE.1SINGULAR
    (b) *gr `af*   *– tik*   *– (A)*
       write.ROOT – PERFECTIVE.NON-ACTIVE.PAST – PAST.1SINGULAR
    (c) *graf*   *– (`O)mun*
       write.ROOT   – (TV).PAST.NON-ACTIVE.1SINGULAR

Even at this stage, it is clear that the treatments of TVs in AG and MG are controversial. In simple terms, as far as TVs in AG are concerned, these are the morphemes appearing after the stem and before the inflectional endings. Importantly, these morphemes are empty, they do not represent any syntacticosemantic features. On the other hand, the status of TVs in MG varies in the present literature; they can be considered empty or morphemes representing the features of tense or voice. The position at which TVs appear, also varies. They could follow the root or the stem and be considered independent morphemes or they could be treated as part of the inflectional suffix.

Nonetheless, the results of the comparison between the above AG and MG treatments and the ones drawn from Russian and Catalan in what follows, are even less transparent. A. SPENCER (1991:11) suggests that TVs <<serve no other purpose than to help create a base to which to attach the inflectional desinences, and to define the separate morphological classes>>. It is clear that TVs do not represent any features within this account. The TVs attaching to the root forms in (4a-b) and (4c-d) respectively are markers of the distinct conjugational classes to which these two verbs belong. These TVs appear throughout the verbal forms which belong to the same class and throughout the different forms of the same root.

(4) (a) *del – Aj – u*
       do – TV – PRESENT.ACTIVE.1SG

    (b) *del – Aj – et*
       do – TV – PRESENT.ACTIVE.3SG

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[2] The augment is not discussed here. It is a morpheme inserted in some 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 A . GALANI (2002a).

(c) *govor – I   – t*
 speak – TV – PRESENT.ACTIVE.3SG
(d) *govor – I   – te*
 speak – TV – PRESENT.ACTIVE.2PL

Finally, M.-I. MASSUET-OLTRA (1999) proposes that TVs are the realisations of a morphological well-formedness requirement on all syntactic functional heads, so that every syntactic functional head requires a theme position.

(5) *agud   – idz – A   – r   – I   -∅   - A   - z*
 ROOT.sharpen – V   – TV – FUTURE – TV – PAST – TV - PARTICIPANT.AUTHOR.2SG

Crucial about this treatment is the fact that TVs do not represent any syntacticosemantic features. The essentiality of this treatment lies in the presence of several allomorphic morphemes throughout the verbal forms and the degree of difficulty of conditioning their morphological spell-out. So, the treatment of TVs as empty pieces of morphology fits the picture. This account, consequently, is not essentially different from M. OIKONOMOU (1995), M. TRIANTAFILLIDES (1941) or A. SPENCER's (1991). The difference lies between these accounts and I. PHILIPPAKI-WARBURTON's (1973) who claims that tense or voice is represented in TVs in MG.
 In what follows, I present the data drawn from MG and I then briefly apply these accounts to it and discuss some of the main problems which are raised.

3. Modern Greek Data

This paper mainly draws attention to the non-active forms in MG. Let us first consider the imperfective, non-active forms both in the present and the past tenses. I follow this path in order to test the validity of the previous claims, where evidence was also drawn from the non-active forms (M. OIKONOMOU 1995, I. PHILIPPAKI-WARBURTON 1973). Once this is questioned, I compare the status of TVs in these forms against their active counterparts in the second part of this section.

Table 1

	IMPERF NON-ACT PRESENT			IMPERF NON-ACT PAST		
	a) *graf-*	b) *tim-*	c) *kal-*	d) *graf-*	e) *tim-*	f) *kal-*
1SG	*Ome*	*Ieme*	*Ume*	*Omun*	*Iomun*	*Umun*
2SG	*Ese*	*Iese*	*Ise*	*Osun*	*Iosun*	*Usun*
3SG	*Ete*	*Iete*	*Ite*	*Otan*	*Iotan*	*Utan*
1PL	*Omaste*	*Iomaste*	*Umaste*	*Omastan*	*Iomastan*	*Umastan*
2PL	*Osaste*	*Iosaste*	*Iste*	*Osastan*	*Iosastan*	*Usastan*
3PL	*Onte*	*Iunte*	*Unte*	*Ontan*	*Iontan*	*Untan*

Let us first test the AG account against the data in table 1 by considering example (6) below. I distinguish two main units, the root and the inflectional suffixes. What lies between them is the TV which according to M. OIKONOMOU (1995) should be a non-inflected morpheme.

(6) (a) *gr`af   - Ome*
 write.ROOT   – TV.1SG.PRESENT.NON-ACTIVE
  (b) *graf   - `Omun*
 write.ROOT   – TV.1SG.PAST.IMPERFECTIVE.NON-ACTIVE
  (c) *tim   -I`eme*

        honour.ROOT – TV.1SG.PRESENT.NON-ACTIVE
(d) *tim*   - *I`omun*
    honour.ROOT – TV.1SG.PAST.IMPERFECTIVE.NON-ACTIVE
(e) *kal*   - *`Ume*
    invite.ROOT –TV.1SG.PRESENT.NON-ACTIVE
(f) *kal*   - *`Umun*
    invite.ROOT – TV.1SG.PAST.IMPERFECTIVE.NON-ACTIVE

Following this treatment, I am forced to suggest that what follows the roots (*graf*- (6a-b), *tim*- (6c-d), *kal*- (6e-f)) is the TV (*-o-* (6a), *-i-* (6c), *-u-* (6e) in the present (imperfective), non-active and *–o* (6b) *-, -i-* (6d)*, -u-* (6f) in the imperfective, non-active, past forms). There is also the question of whether the TV in the *tim*- cases is *–i-* or *–ie-* which is even more obvious in the first and second person plural. The TV of *graf-(`Omaste)* also appears in forms which are traditionally seen as belonging to a different conjugational class (*tim-I`Omaste*) (D. HOLTON, P. MACKRIDGE, I. PHILIPPAKI-WARBURTON 1997). If one assumes that the TV is identified as the vowel between the root or the stem and the inflectional endings, then the TV for verbs such as *tim*- should be *–i-*. So, here the question relates to the distribution and the role of the TV in verbs such as *graf-.* Does the TV of such forms function like a default marker?

In addition, what about the significant degree of allomorphy TVs exhibit throught the forms in table 1? The allomorphy can be interpreted in two ways; firstly, allomorphy as far as the morphological spell-out of TVs in verbs belonging to different conjugational classes is concerned (table (1a and d) versus (1b and e), and all versus (1c and f)). This type of allomorphy derives from the treatment of TVs as independent morphemes. It could be interpreted along the lines of A. SPENCER's (1991) point of view of TVs in Russian which necessarily needs to be formulated formally within the principles of a theoretical framework. Secondly, if TVs are treated as part of the inflectional suffixes, the allomorphic pattern initially seems to depend upon agreement. Although both cases of allomorphy are indirectly explained in this paper, the interested reader is referred to A. GALANI (2003b) regarding the interpretation allomorphy receives within DM.

Nonetheless, it seems that these questions, related to the morphological spell-out of TVs throughout the different forms in the verbal system in MG and regarding the difficulty of identifying the TVs in the various forms/conjugations, are raised due to the fact that the features represented in these morphemes have been overlooked in the literature. This is the focus of the discussion in what follows. Let us assume first that TVs appear after the roots.

If M. OIKONOMOU (1995) and A. SPENCER (1991) are correct about the status of TVs –empty morphemes-, I believe that there is no reason for the absence of these morphemes in the active counterparts of the above forms, where the information about the conjugational classes would be marked by the presence of the TV, as it is the case in Russian. Consider the following example, (7). One expects *–o-* to appear in (7a-b), *-i-* in (7c-d) and *–u-* in (7e-f) following the roots.

(7) (a) *gr`af*   *– o*
    write.ROOT   – 1SG.PRESENT.ACTIVE
  (b) *`e*   *–graf*   *– a*
    AUGMENT - write.ROOT   – 1SG.PAST.IMPERFECTIVE.ACTIVE
  (c) *tim*   - *`o*
    honour.ROOT - 1SG.PRESENT.ACTIVE
  (d) *tim*   - *`u*   - *s*   *– a*
    honour.ROOT – IMPERFECTIVE – ACTIVE – 1SG.PAST
  (e) *kal*   - *`o*
    invite.ROOT   – 1SG.PRESENT.ACTIVE
  (f) *kal*   *– `u*   *–s*   *– a*
    invite.ROOT – IMPERFECTIVE – ACTIVE – 1SG.PAST

Contrary to our predictions, the TVs are not present in all forms except (7f). On the other hand, this morpheme also appears in (7d), although these two verbs belong to different conjugational classes according to what has been claimed so far in the literature (D. HOLTON, P. MACKRIDGE, I. PHILIPPAKI-WARBURTON 1997). Consequently, the morphological realisations of the TVs should be distinct, as is the case in the non-active forms (6c, d versus 6e, f).

Moreover, what is puzzling is that these morphemes are not empty, as argued in the previous accounts, but they represent the features of aspect instead. They appear in the imperfective forms regardless of the voice or the tense features (6a-f, 7f). The question which is now raised, relates to the representation of voice. As can be seen from examples (6-7), voice is marked overtly in the active forms (7d, f), whereas the picture is not yet clear as far as the ways non-active voice is marked, are concerned. This leads us back to the account developed by I. PHILIPPAKI-WARBURTON (1973). As has already been mentioned, this is the only treatment according to which syntacticosemantic features are attributed to TVs.

Recall that she claims that TVs represent the temporal features of [+past] in the active (8a) and perfective, non-active forms (8b), whereas the voice features in the non-active (imperfective) forms (8c), example (3) is repeated here as (8).

(8) (a) `e   – graf   – (A)
        AUGMENT – write.ROOT   – (TV).PAST.ACTIVE.1SINGULAR
    (b) gr`af   – tik   – (A)
        write.ROOT – PERFECTIVE.NON-ACTIVE.PAST – (TV).PAST.1SINGULAR
    (c) graf   – (`O)   – mun
        write.ROOT – (TV.NON-ACTIVE)   - PAST.NON-ACTIVE.1SINGULAR

This results from the position, she claims, TVs appear at; they follow the root or the stem. In (8a, b), TVs should necessarily mean that they are inflected for tense regardless of the fact that the features represented in this morphological unit are fused. Tense is not the only feature represented in it; voice, person and number agreement are also marked. Consequently, if one assumes that this morpheme is a TV, this should necessarily mean that it is inflected for tense, voice and agreement, contra I. PHILIPPAKI-WARBURTON (1973). On the other hand, this is not the case with (8b), where what is treated as the TV represents only tense and agreement features. This clearly shows that one needs to focus on the definition of TVs. If one assumes that TVs always follow the roots, it is falsily predicted that TVs represent tense only. In addition, the basis on which the position of TVs is determined, is not clear. Why should they follow the root or the stem? How are these two positions restricted? It seems that in most cases TVs follow the root and this is the position I adopt. What is important to establish now is the features represented in TVs.

This matching of features to the morphological pieces of inflection turns out to be even more complicated in the non-active, perfective forms (8c). According to what we have seen so far, TVs seem to represent the features of aspect (6-7), something which contradicts I. PHILIPPAKI-WARBURTON's (1973) claims (8c). If −o- (8c) is the marker of the non-active voice, one expects it to be present both in the imperfective as well as the perfective, non-active forms contra (8b). This shows that this morpheme does not only represent the features of voice but also the features of aspect. What I am claiming is that the features represented in TVs in MG are subject to the way the features of voice are marked on the form. The absence of a distinct morphological unit representing the features of voice in the form (6), contrary to the presence of this morpheme (7), results to an analsysis which suggests that TVs represent the features of aspect and in the non-active forms, specifically, the features of aspect as well as voice. Nonetheless, it should be noted that this treatment results from the way voice is represented in the non-active forms and it could be possible to be related to diachronic changes the verbal inflectional system in Greek undergone. This discussion, though, is omitted from the present paper (A. GALANI in progress).

Finally let us now consider the last piece of evidence mainly drawn from the active, past tenses regarding the features of aspect represented in TVs in MG.

(9) (a) *tim*   -`U`   - *s*   − *a*
        honour.ROOT − IMPERFECTIVE(active) − ACTIVE − 1SG.PAST
    (b) *t`im*   *−I*   − *s*   − *a*
       honour.ROOT − PERFECTIVE − ACTIVE − 1SG.PAST
    (c) *tim*   -`I`   − *thik*   − *a*
       honour.ROOT − PERFECTIVE − NON-ACTIVE − 1SG.PAST
    (d) *kal*   − `U`   *−s*   − *a*
       invite.ROOT   − IMPERFECTIVE − ACTIVE − 1SG.PAST
    (e) *k`al*   − *E*   − *s*   − *a*
       invite.ROOT − PERFECTIVE − ACTIVE   − 1SG.PAST
    (f) *kal*   -`E`   − *stik*   − *a*
       invite.ROOT   − PERFECTIVE   − NON-ACTIVE − 1SG.PAST

According to the forms in (9), what follows the root is the TV representing the features of aspect. The TV representing the perfective aspect appears in both forms marked for [+perfective] (9b, c and 9e, f).

Additionally, the issue which has not been touched upon in the literature, relates to the matching of the roots to the correct set of inflectional suffixes. The mechanisms according to which the root *graf-* is only matched to *−ome* but not *−*i`eme* or -* `ume*, are not provided. In the next section, I also shed light on this subject matter.

I believe that there is no need to refer to M. TRIANTAFILLIDES (1941) and M.-I. MASSUET-OLTRA's (1999) accounts. As far as the first one is concerned, this account does not allow us to look at the status and the distribution of TVs in depth. On the other hand, the account based on the Catalan data does not contribute towards a different treatment of these morphemes. It is an extended version of A. SPENCER's (1991) view of TVs as empty morphological units carrying the information regarding the conjugational classes, a position which only explains part of the status of TVs in MG.

To summarise, the main points which have been raised in this section suggest that TVs in MG are not only markers of the conjugational classes (morphological elements) but also morphemes representing the features of aspect. Depending on the way voice is marked on the forms, TVs can be also seen as markers of aspect and voice. TVs do not attach to the root, though, as A. SPENCER (1991) suggests. In this paper, I mainly deal with the way one can theoretically account for the double function of TVs, both as morphological as well as inflectional units. Although a short reference is made on the cases, where TVs seem to represent both the features of aspect and voice, the interested reader is referred to A. GALANI (2003a) for a detailed analysis.

4. An Alternative Analysis

I first start off by highlighting the main principles of the framework under which the alternative account of TVs in MG is formulated. I then move onto some general claims regarding the verbal morphosyntax in MG and I, finally, present the alternative account of TVs in section 4.3.

4.1. Theoretical Background: Distributed Morphology

DM is a post-syntactic framework developed by M. HALLE and A. 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 M. Halle and A. 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 M.-I. Massuet-Oltra (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 (M. 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 (D. 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>>.

4.2. The Verbal Morphosyntax in Modern Greek

Let me now draw attention to some general claims made in earlier work (A. Galani 2002a, b, c) regarding the verbal morphosyntax in MG. I see word formation as a complex process involving the obligatory interaction of syntax, morphology as well as phonology. If any violations occur in any of these stages of the word formation process, ungrammaticality results. This position contradicts both the purely syntactic (M. Baker 1985, J.-Y. Pollock 1989, M.-L. Rivero 1990) as well as the purely morphological (S. G. Lapointe 1980, A.-M. Di Sciullo and E. Williams 1987) approaches to word formation. An important aspect of the framework's expansion is that I further focus on the interaction not only of syntax-morphology –as in DM- but also on the morphology-phonology interface and the processes which take place at PF for the purposes of word formation. Important to these phonological operations is stress assignment in MG (A. Galani 2002a) and not only phonological changes on the possible phonological clusters.

Moreover, I propose that roots are generated in the syntax contra A. Marantz (1997) and A. Galani (2002c) who claim that the syntactic category V is a morphological category created by syntax. The formation of a verbal or nominal form is determined by the local environment of the root (See A. Galani 2003c for details).

An important issue regarding the MG verbal morphology relates to whether it is morpheme or stem-based. B. Joseph and J. Smirniotopoulos (1993) follow S. Anderson (1992) and claim that the MG verbal system is stem-based. In this work, I suggest that it is morpheme-based and verbal forms consist of roots and affixes. Due to the purposes of this paper, I do not expand further on this matter but the interested reader is referred to A. Galani (2002b, c) for the relevant discussion. One point is important; MG show a significant degree of cumulative exponence. When one claims that a verbal system is morpheme-based, the status of morphemes is highly questioned. Here, I do not support the claim that, when one argues that a verbal system is morpheme-based, this necessarily means that a single feature should be represented in a single morpheme. I rather expand on L. Bloomfield's (1933) notion of morphemes –morphemes are seen as the smallest, meaningful morphological units- and I incorporate this view within DM and the status of VIs in the lexicon (A. Galani in progress).

At the syntactic level, the terminal nodes are arranged in the way exemplified in structure 1. Head-movement applies to this structure. This would be the syntactic output serving as the morphological input.

Structure 1
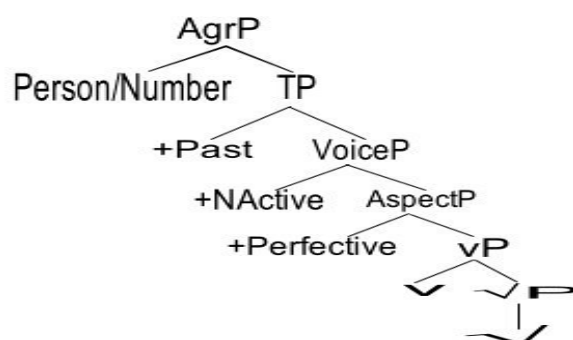
      I now turn onto the analysis of the morphological and syntacticosemantic features represented in TVs within DM.

4.3. Theme Vowels

      Two are the main points an alternative 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 (morphological features), whereas the second set in the syntax. The Feature Disjointness principle ensures that the wrong features are not inserted in the wrong component. 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 is what was missing from A. SPENCER's (1991) account; although he suggests that TVs attach to the roots, the mechanism by which this attachment process is achieved, is not provided. This causes problems as to why a specific root is matched to X TV but not Y, as discussed in section 3.

      Nonetheless, the matching puzzle has not been yet solved. What one needs is to define these morphological features and apply them to the TVs. I follow M.-I. MASSUET-OLTRA (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. A. KOUTSOUDAS (1962) suggests that *gr`afo*-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 (*tim`o* (honour) and *kal`o* (invite)). I further propose that *gr`afo*-like verbs should be distinguished from *pl`eno* (wash)-like ones on the basis of the TVs' realisations. As can be seen in the forms in (10), the way the TVs are spelled-out, especially in the perfective forms, enables us to suggest that the second class of verbs behave in a different way and they should be, consequently, treated as a separate class.
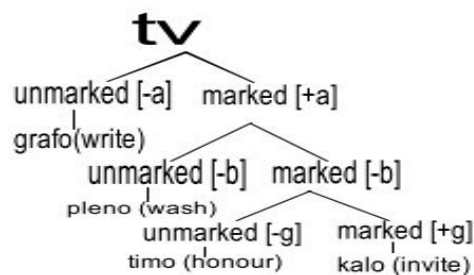
(10) (a) *gr`af* *– o*
     write.ROOT – 1SG.PRESENT.ACTIVE
  (b) *`e* *– graf* *– s* *– a*
     AUGMENT – write.ROOT – PERFECTIVE.ACTIVE – 1SG.PAST
  (c) *gr`af* *– tik* *– a*
     write.ROOT – PERFECTIVE.NON-ACTIVE – 1SG.PAST
  (d) *pl* *- `en* *– o*
     wash.ROOT – IMPERFECTIVE – 1SG.PRESENT.ACTIVE
  (e) *`e* *– pl* *– in* *– a*
     AUGMENT - wash.ROOT – PERFECTIVE.ACTIVE – 1SG.PAST
  (f) *pl* *- `i* *– thik* *– a*
     wash.ROOT – PERFECTIVE - NON-ACTIVE – 1SG.PAST

Following a similar line of argumentation, I suggest that *tim`o*-like verbs should be treated as a separate conjugational class from *kal`o*-verbs based on the selection of TV. Recall example (9), repeated here as (11).

(11) (a) *tim* *- `u* *- s* *– a*
      honour.ROOT – IMPERFECTIVE(active) – ACTIVE – 1SG.PAST
  (b) *t`im* *–i* *– s* *– a*
     honour.ROOT – PERFECTIVE – ACTIVE – 1SG.PAST
  (c) *tim* *- `i* *– thik* *– a*
     honour.ROOT – PERFECTIVE – NON-ACTIVE – 1SG.PAST
  (d) *kal* *– `u* *–s* *– a*
     invite.ROOT – IMPERFECTIVE – ACTIVE – 1SG.PAST
  (e) *k`al* *– e* *– s* *– a*
     invite.ROOT – PERFECTIVE – ACTIVE – 1SG.PAST
  (f) *kal* *- `e* *– stik* *– a*
     invite.ROOT – PERFECTIVE – NON-ACTIVE – 1SG.PAST

Based on what has been said so far, the evidence for the TVs is mainly drawn from the non-active, perfective forms. These forms clearly show the distribution and the morphological realisations of these morphemes. The way TVs are arranged in the markedness hierarchy of TVs is shown in the following structure (2).

Structure 2

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 [+α, -β], this means that some of the inflectional suffixes (the non-active, imperfective) will be identical between the two classes ([-α] and [+α, -β]). The same goes to [-γ]; these forms share a similar pattern to [+γ] ones (as for example in the active, imperfective, past) but they also share a similar pattern to the [+α] cases, as they are embedded under this node (recall what was mentioned in section 3; forms like *tim`o* and *kal`o* are diachronically related). This hierarchy also shows that the most embedded the TV is, the most irregular pattern the inflectional suffixes follow. Structure 2 is a representation of aspect.

Moreover, VIs are also arranged in the grammar according to the markedness hierarchy, as exemplified in structure 3. This has important consequences for the organisation of the grammar. Nonetheless, this is not important for the claims made in this paper and the discussion is omitted (A. GALANI in progress).

Structure 3


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                    Inflectional Suffixes
                 unmarked [-a]   marked [+a]
                       |
          /-tik-/ - [+PER, NA, PST]
                          unmarked [-b]  marked [-b]
                     /-thik-/ - [+f]
                             unmarked [-g]   marked [+g]
                             /-thik-/ - [+f]    /-stik-/ - [+f]
```

At the syntactic component (recall structure 1), the terminal nodes AgrP and TP are fused in a single node, TAgrP, as shown in structure 4. There is syntactic reasons (based on evidence drawn from J. BOBALJIK and H. THRAINSSON's (1988) work on these maximal projections and characteristics regarding the use of expletives, among other structures, in languages which have a fused TAgr node contrary to these where Tense and Agreement are two separate maximal projections[3]) for which AgrP and TP should be fused into a single node in MG.

Moreover, there is also morphological evidence –based on the degree of cumulative exponence this morphological unit presents (recall example (6))- which also indicates that this is the right path. Finally, head movements applies to this structure before it enters into the morphological component.

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[3] The relevant discussion is omitted from the present paper due to space limitations (A. GALANI (2002in progress).
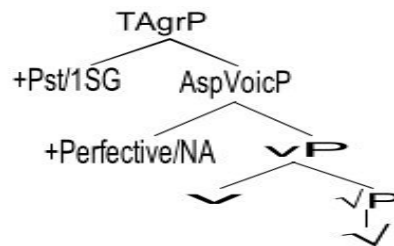
Structure 4

At the morphological component, morphological operations occur before Vocabulary Insertion. AspP and VoiceP are fused into a single node, AspVoiceP, based on the evidence drawn mainly from the non-active imperfective forms. During this part of the derivation, roots are further specified for the morphological features. This information is further coded 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 morphological features of the root. By these means, the correct roots are matched to the correct set of inflectional suffixes. If the morphological features of the inflectional suffixes do not match these of the root, ungrammaticality results.

Structure 5

At the final stage of the word formation process, the already fused nodes, TAgrP and AspVoiceP, are further fused into INFLP (structure 6). Again, evidence for this is derived from the way the features of aspect, voice, tense and agreement are represented in the non-active (example (6)), imperfective forms regardless of the conjugational class.

Structure 6
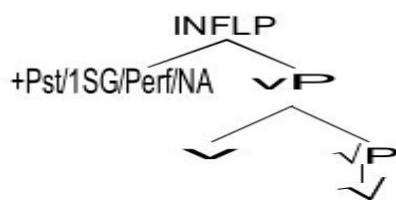
Once these operations are complete, Vocabulary Insertion applies and the VIs are inserted into the terminal nodes. Unless the VI matches the syntacticosemantic features as well as the morphological features of the root, the operation of Vocabulary Insertion cannot be completed and ungrammaticality results. Let us illustrate the operation of Vocabulary Insertion for the formation of the perfective, non-active, past, first person, singular form of the root *graf-*. The following VIs are stored in the lexicon. This, of course, is not an exhaustive list of the VIs in the MG lexicon.

(12) (a) /*-tika*/ ↔ [PERFECTIVE, NON-ACTIVE, PAST, 1SINGUILAR], [-α]
    (b) /*-ithika*/ ↔ [PERFECTIVE, NON-ACTIVE, PAST, 1SINGUILAR], [+α, -β, -γ]
    (c) /*-estika*/ ↔ [PERFECTIVE, NON-ACTIVE, PAST, 1SINGUILAR], [+α, -β, +γ]
    (d) /*graf-*/ ↔ [$\sqrt{}$,-α]
    (e) /*tim-*/ ↔ [$\sqrt{}$,+α, -β, -γ]
    (f) /*kal-*/ ↔ [$\sqrt{}$,+α, -β, +γ]

INFLP will be inflected for [+PERFECTIVE, +NON-ACTIVE, +PAST, +1SINGULAR] features. So, from the available VIs in the lexicon the ones which match the morphosyntactic specification of this node compete for insertion. Items (12a-c) could be all compete. The next features that need to be matched are the lexical features set by the root. This root (12d) is specified for the features [-α]. Consequently, the VI, the specification of which matches both the morphosyntactic as well as the morphological features of the INFL node, wins the competition and is inserted in the node. The derived form is *graftika*.

The structure, finally, enters the phonological component, where phonological operations and stress assignment further applies. This part of the derivation is omitted, though, from the present discussion. The reader is referred to A. GALANI (2002a) for a detailed discussion.

5. Conclusion

In conclusion, it has been argued that the verbal system in MG is organised in terms of markedness based on the degree of markedness of TVs. The markedness hierarchy can be seen as the representation of aspect. TVs, specifically, are not seen as markers of the conjugational markers, as has been previously suggested in the literature, but also as morphemes representing syntactico-semantic features, these of aspect and voice depending on the way voice is marked on the verb. Roots and inflectional suffixes are necessarily specified for syntacticosemantic and morphological features which should be matched during the operation of Vocabulary Insertion. Any violations result to ungrammaticality.

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