Current Issues in Linguistic Theory

Themes in Greek Linguistics II

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Offprint

This is an offprint from:

Brian D. Joseph, Geoffrey C. Horrocks
and Irene Philippaki-Warburton (eds)
Themes in Greek Linguistics II.
John Benjamins Publishing Company
Amsterdam/Philadelphia
1998
(Published as Vol. 159 of the series
CURRENT ISSUES IN LINGUISTIC THEORY,
ISSN 0304-0763)

ISBN 90 272 3664 X (Hb; Eur.) / 1 55619 875 2 (Hb; US)

ON THE MORPHOLOGICAL STATUS OF INFLECTIONAL FEATURES: EVIDENCE FROM MODERN GREEK*

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1. *Introduction*

The main purpose of this paper is to show that features participating in inflectional processes are primarily morphological, in the sense that they constitute substantive information which characterizes morphologically primitive categories and is visible to morphological processes. In addition to their morphological status, certain features, however, may also be syntactically relevant.

Considering features to be attribute-value pairs, I examine Booij's (1993, 1995) distinction between two types of inflection, inherent/morphological and contextual; I argue that inflectional features are basically morphological, while the contextual status for some of these features refers rather to their values than to their attribute part. Nevertheless, since inflectional features belong to a larger set of general linguistic properties, it should be possible for a given feature to be used as one of the basic categories of another grammatical module (see functional categories in syntax), but this must be done independently of any inflectional status in morphology. Evidence presented here from Modern Greek (henceforth simply Greek) exemplifies such a proposal.

This analysis aims to be a contribution to the discussion on the distinction made in recent literature between inflection and other word-formation processes, by arguing against the position according to which inflection must be structurally accounted for by syntactic operations (cf. Anderson 1982, Perlmutter 1988,

* This work is part of a research project financially supported by a grant of the University of Athens Research Committee (Number 4/2170). Versions of this paper have been presented at G. Booij's workshop on inflection during the Vienna Morphology Meeting (February 1996) and at the Dept. of Linguistics (Grammatical Models Group) of Tilburg University (May 1996). I thank the audiences of both meetings for their helpful comments, particularly E. Anagnostopoulou, G. Booij, N. Corver, M. A. C. Huybregts, and H. van Riemsdijk. My special thanks go also to Manuel Español, Brian Joseph, Ian Roberts, and Etienne Tiffou who have read a written version of this work and have provided me with significantly helpful insights.

Halle & Marantz 1993). Furthermore, I agree with Booij (1993, 1995) who argues against approaches splitting inherent and contextual inflection in different grammatical components and points out the need for substantive constraints on the interaction of inflection and word formation.

2. *Features in morphological analysis*

The feature is a formal device that was introduced in linguistics when it became clear that a system of classes involving linguistic categories has to be defined and that some classes were partially overlapping. The use of features started in phonology (cf. Jakobson, Fant, and Halle 1951), but did not remain restricted to phonology for long. Features were also considered for the encoding of morphological and semantic properties of words and larger syntactic constituents (cf., among others, Chomsky 1965, Gazdar et al. 1985). More particularly, in generative morphology, features have been widely used in order to represent percolation of morpho-syntactic information in word structures (cf. Selkirk 1982, Lieber 1989, 1992, etc.), but not always in a systematic way: most attempts to use features in morphological analyses were not based on a clear conception of what a feature is, nor generally, on a well-elaborated theory of representing features. For example, there is no agreement on which categories may be encoded in features nor on how to deal with multi-valued features. For instance, theta-grids are factored as a set of two binary features [+/– Transitive] and [+/– Logical Subject] by Marantz (1984), while in other works (cf. Williams 1981), they are represented as arrays of theta-roles.

Features were conceived of at the beginning as binary systems (see, for example, Chomsky & Halle 1968 for the representation of features in generative phonology). One of the next moves in the evolution of the linguistic feature was the introduction of multi-valued attributes (cf. Karttunen 1986 and Steele 1994, among others):[1] according to Karttunen, a multi-valued attribute has the advantage of imposing a partitioning in more than two subclasses, whereas a binary attribute imposes a partitioning on the set of entities it is defined for in a positive and a negative extension. As a matter of fact, feature binarity seems to be problematic, not to say insufficient, for the representation of inflectional

[1] Note that not all linguists are in favor of the use of multi-valued features: for example, Lumsden (1993) has criticized Farkas (1990) for adopting such a system in the analysis of Rumanian inflection. However, the willingness to keep feature binarity in order to obtain elegant structural representations is often revealed to be problematic. See, for instance, Lieber (1992:89) who avoids adopting specific values for the feature of case in German and admits that ". . . How to represent the four cases in German in terms of features is somewhat less clear. . . . it is enough to suppose that some set of two or more binary features can be found to represent the four cases. . . . I will schematically represent them as [+/– $Case_i$], [+/– $Case_j$]."

information in languages with a rich inflectional system, such as Greek. In both Greek nominal and verbal inflection, most of the features involved have more than two values, as shown in the table below.[2]

case: nominative, accusative, genitive, vocative
number: singular, plural
gender: masculine, feminine, neuter
inflectional class: eight values for nominal inflection and two for verbal inflection
person: first, second, third
tense: present, past, future
aspect: imperfective, perfective, perfect
mood: indicative, subjunctive, optative, imperative[4]
voice: active, passive[5]

Table 1[3]

Since this multi-valued representation constitutes an efficient and economical way of representing these languages, for the purposes of this paper, I follow Karttunen's (1986) approach and assume feature specifications to be ordered pairs of the form <attribute, value>, where an attribute is an atomic symbol and a value has either an atomic character or a multi-valued one. For example, the feature of case in Greek will have the following general form

(1) [case:{nominative, accusative, genitive, vocative}]

where the alternating values of nominative, accusative, genitive, and vocative represent the different values that case may assume in this language.

[2] See Mackridge (1985) and Joseph & Philippaki-Warburton (1987) for a description of these features. See also Ralli (1994) for a detailed analysis of nominal inflectional features and a division of Greek nouns into eight inflectional classes.

[3] Notice that in Ancient Greek, some of these attributes had additional values morphologically realized: dative was a fifth value for case, dual a third value for number, infinitive a fifth value for mood (according to traditional classifications), and middle a third value for voice. It should also be noticed that Ancient Greek nominal and verbal paradigms were distributed differently in inflectional classes (cf. Oikonomou 1991).

[4] In Modern Greek morphology, the optative value is obtained by combining the particle *θa* with the past verbal forms: [*θa* + [(*e*) + Xstem + past endings]] .

[5] The terms "active" and "passive" are labels that correspond to morphologically realized values. Notice, however, that semantically, these labels involve more than two functions, e.g., active, reflexive, reciprocal, etc.

Considering (1) to be a possible symbolism of case, I accept disjunctiveness in the description of a feature characterizing a particular form. For example, the same form can denote either a nominative or an accusative value and belong to more than one inflectional class. However, as already stated in Ralli (1994), disjunctive values should be allowed only to features with no clear semantic import, such as case and inflectional class.[6] A semantically relevant feature, such as number, should be excluded from any description involving disjunctive values when it comes to a particular form. The reason for this choice is obvious: a form denoting, for instance, an object could not possibly express either the notion of singularity or that of plurality. One of the advantages of accepting disjunctive values is that it allows us to describe form syncretism, a phenomenon which is very common in Greek morphology. However, my claim here is not that the use of disjunctive values allows us to predict how syncretism works in the language in general. This is something that needs further study, both synchronic and diachronic, and goes beyond the scope of this paper.

A concrete example taken from Greek nominal inflection may illustrate this claim: *-a* is an inflectional ending added to neuter stems in plural (cf. (2)). It is characterized for number (plural), case (one of the three values, nominative, accusative, vocative), and inflectional class (also one of the three values 5, 7, 8 representing three distinct paradigms among a total of eight paradigms).[7] Thus, words built on the basis of this *-a* are ambiguous with respect to a particular case value. This ambiguity comes from the ending:

(2) vuna < vun a[8]
'mountains' [noun, neuter, nominative/accusative/vocative, plural]

As we see below, the disambiguation of case is something that must be resolved in syntax, when the word is combined with other syntactic constituents. Note, however, that as far as inflectional class is concerned, there is no ambiguity at the word level, although the same ending *-a* may disjunctively denote three different values, i.e., the fifth, the seventh, and the eighth inflectional class. We see in the next section that the reason for this peculiarity is to be sought in the nature of this feature as well as in the manipulation of features in morphology.

[6] Incidentally, features whose values are subject to disjunctiveness coincide with what Kiparsky (1982) has characterized as "weak" features. In Kiparsky's work, these features are shown to be less stable than other "strong" features, in that their extensive allomorphic variations are subject to an analogical levelling.

[7] Following Ralli (1994), case and number characterize the inflectional endings while category and gender are features inherent to the stems. Notice also that *-a* cannot be considered as being underspecified with respect to case and inflectional class, since there are additional values of both features which are never expressed by this ending (e.g., genitive and the values of 1, 2, 3, 4, 6 for inflectional class).

[8] Greek examples in this paper are given in a broad phonological transcription according to IPA conventions.

In Greek, inflectional features are generally spelled out by specific phonological forms. For example, the perfective aspectual value of active verbal forms is generally phonologically realized as *-s-* (cf. Ralli 1988):

(3) xalasa	<	xala	s	a
'I destroyed'		destroy	aspect:perfective	tense:past
				person:1st
				number:singular

It is a well-known fact, however, that in synthetic or semi-agglutinative languages, where inflection is a major morphological characteristic, distinct inflectional features do not imply distinct phonological forms.[9] It is often the case that the same form corresponds to more than one inflectional feature. Traditionally, this form is called a "portmanteau" morpheme. Although Matthews (1972) (and later Anderson 1992 and Aronoff 1994, among others) have questioned the morphematic status of portmanteau forms and call them simple formatives, in this paper, I follow a more traditional approach by considering these forms to be morphemes of an affixal status, that is, entities combining a phonological representation with a grammatical meaning.[10] One of the reasons for making such a decision relies on the fact that it is not always easy to provide a clear definition of what constitutes a derivational affix and what can be considered as an inflectional one. For example, it is often claimed that participial forms constitute inflectional material (cf. Booij 1993). However, the fact that participles may be used as adjectives and, in Greek, are inflected for case and number after being combined with the appropriate nominal inflectional endings, weakens this claim. In my view, a decision concerning the derivational or the inflectional status of some forms must be language-specific. Thus, an approach which treats both forms in a unified way is preferable to an approach which would consider them in a different manner.

[9] See Philippaki-Warburton (1976) for the characterization of Greek as a semi-agglutinative language.

[10] See Jensen (1990) for a similar point of view. Inflectional pieces of information are also given an affixal status in most Government and Binding approaches (cf. Pollock 1989, among others) although it is not clear that in these approaches much really depends on this.

In a featurized approach, morphological entities (morphemes) are viewed as feature bundles. For example, nominal endings are considered to be feature bundle sets which include information about case, number, and inflectional class. Generally, morphemes may contain different kinds of featurized information, namely, of a phonological, morphological, syntactic, and semantic nature.[11] However, in this paper, I deal only with inflectional features, that is, features representing pieces of morpho-syntactic information, whether or not this information may have a semantic import as well, and at least one of whose values is morphologically spelled out on paradigmatic inflected forms.

As mentioned in the introduction, I consider inflectional features to be primarily morphological, that is, visible and manipulated by morphological operations of word formation (cf. also sections 2.1 and 3). Contrary to those proposing to treat inflection as a syntactic process (cf. Anderson 1982, Pollock 1989, etc.), I believe inflection—at least Greek inflection—to be a word-formation process since Greek is a stem-based language and inflected words are generally built by an overt joining of an ending to a stem. That is, assuming that stem formation in Greek is handled either by combining two stems (on compounding in Greek, see Ralli 1992), or by joining a derivational affix to a stem (on derivation in Greek, see Ralli 1988), the formation of inflected words derives from the combination of a stem and an inflectional affix. The following rule has been proposed by Ralli (1988) to account for the generation of Greek inflected forms:

(4) Word → Stem Infl.Aff.[12]

Furthermore, as we see below, there are cases attesting a word-internal inflection which confirm the hypothesis of inflection being listed among the word-formation processes.

2.1 *Percolation of inflectional features in morphology*

Features used for morphological purposes may also be relevant for other grammatical domains. For example, they may be visible to syntactic

[11] In the generative framework, the idea that a morpheme (or a lexical entry in general) is represented as a set of features goes back to Chomsky (1965); it has been elaborated by Lieber (1980), and similar idea has been recently adopted by Chomsky (1995) in his minimalist program.

[12] In Ralli (1988: 92, 94) the following basic rules are also proposed for the generation of other word-formation processes:

Stem → Stem Stem (compounding)
Word → Stem Word (compounding)
Stem → Stem Affix (derivation)

See these works for more details on the word-formation rules.

mechanisms (e.g., agreement). In technical terms, this means that given an inflectional branching structure such as the one in (5), which is generated by the rule given under (4), syntactically and/or semantically relevant features must percolate from word-internal constituents to the topmost word nodes:

(5) Word [F1, F2, F3, . . . , F_n]
Stem Infl.Aff.

where, Word represents an inflected item, and Stem and Infl.Aff. the word-internal constituents respectively. F1, F2, etc. are the features that percolate to the Word node from the lower nodes.

From the word level, features can be accessible to mechanisms of grammatical components other than morphology (e.g., syntax). Strictly morphological features, however, should not be affected by percolation. That is, in order for them not to be visible to other grammatical domains, they must not move from the terminal level to the non-terminal one. As a matter of fact, this is what happens in highly inflected languages, like Greek, where there are some features which are exclusively morphological. An example of such a feature is provided by inflectional class in nominal inflection. As shown in Ralli (1988, 1994), this feature is a purely diacritic marker with no semantic value, whose function is to ensure that the stem is combined with an appropriate set of inflectional endings belonging to a specific paradigm. Inflectional class does not participate in syntactic agreement since, as shown in (6), adjectives and nouns, agreeing in gender, number and case, do not agree as far as inflectional class is concerned:

(6) enas polemoxar**is** anθrop**os**
'a war-loving man'

for, *-is* and *-os* are the endings for the adjective and the noun respectively.

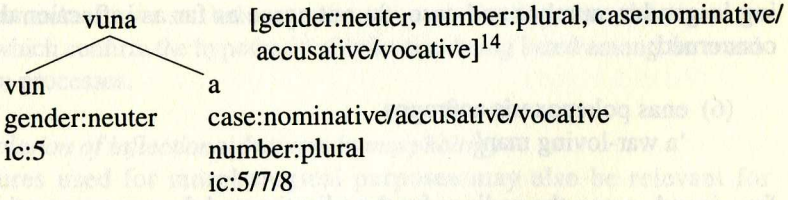
Moreover, contrary to what has been proposed by Harris (1991) for Spanish, in Greek, there is no relation between the inflectional class feature and the feature of gender since nouns of different gender values may be inflected in the same manner, i.e., with the same inflectional endings as shown in (7):

(7) a. anθropos < anθrop -os 'man, nominative, singular, masculine'
b. prooðos < prooð -os 'progress, nominative, singular, feminine'
c. kratos < krat -os 'state, nominative/accusative/vocative, singular, neuter'

Since the only motivation for the presence of inflectional class is to ensure the matching between the two word constituents, that is the stem and the appropriate inflectional affix, we may thus suppose, following Ralli (1988, 1994), that both the stem and the inflectional affix are marked for this feature. As opposed to the affix, however, which may bear different inflectional class values disjunctively specified, the stem is lexically marked for only one inflectional class value: the same affix may appear in more than one paradigm, while a stem is inflected according to one specific paradigm. During the process of inflection, that is, the combination of a stem with an inflectional affix (cf. (8) below), the stem checks its inflectional class value among the different values bore by the affix. If the value of the stem is mapped onto one of the values of the affix, this mapping licenses the creation of an inflected word, otherwise, the construction crashes. It should be noticed, however, that if the checking procedure (which occurs in situ and does not presuppose any movement) succeeds, the particular value is deleted. This deletion is justified by the fact that inflectional class is a [–interpretable] feature for the grammatical components of syntax and semantics: it is interpreted only in morphology because it has no function other than ensuring the matching between a stem and an ending. Deletion, thus, is triggered by Chomsky's (1995) DELETE operation. A deleted feature does not participate in any percolation mechanism of the word structure; since it does not belong to the features of the topmost word node, it cannot be visible to syntax.[13]

An illustration of percolation of featurized inflectional information in a Greek noun is provided below:

(8)



In the structure above, percolation of features is handled according to Di Sciullo and Williams' (1987) conventions, that is, features percolate first from heads (head percolation), and second from non-heads in case the mother node remains unspecified for some feature (relativized head percolation).

[13] Notice that the non-percolation of diacritics has also been observed by Lieber (1992) who, however, simply asserts this fact and does not propose an explanation in terms of grammatical operations.

[14] There is no specific ordering among features in feature bundles (cf. Karttunen 1986).

In Di Sciullo and Williams' work, inflectional endings are heads, thus percolation from endings has priority over the features of stems.[15]

In this section, I have offered a principled account of why diacritics, i.e., purely morphological features, do not percolate in word structures by adopting Chomsky's (1993, 95) views about feature checking and feature deletion, in particular, the idea that [–interpretable] features are deleted after being checked. First, I accepted morphology to be a separate grammatical module. Then, in an attempt to explain the fact that some features are only visible to morphology, I proposed that morphological features, which are [–interpretable] for other modules (e.g., syntax), do not percolate to word nodes since they are checked in morphology and are erased after this checking procedure has taken place.[16]

As opposed to strictly morphological features which are not affected by percolation, other inflectional features, which are not checked within the morphological module, are allowed to percolate from word-internal constituents to the topmost word nodes. From there, they can be accessible to mechanisms of grammatical components other than morphology. These features are eventually checked in larger constructions involving fully inflected words as basic X^0 constituents.

To sum up, in this first part of the paper, there is an examination of features used for inflectional purposes. It has been claimed that these features are

[15] A different approach is proposed by Lieber (1992), who considers inflectional features to be non-heads whose function is to add values which remain unspecified after percolation has taken place from heads. A similar position is also taken by Ralli (1994), who adopts a unification-based formalism along the lines of Steele (1994). Ralli proposes that Greek inflectional structures are headed by stems and inflectional endings unifying with stems contribute to the filling in of specific values only for these features which are listed as unspecified in the feature bundles that represent stems. Whether or not inflectional endings constitute heads of inflectional structures is something that goes beyond the scope of this work. Therefore, for the purposes of this paper, I simply adopt Di Sciullo and Williams' view in considering inflectional endings to be the heads of their formations.

[16] Another example of a purely morphological feature is the feature of voice in verbal inflection. For example, in deponent verbs such as *erxome* 'come' there is no reason why the stem *erx-* should be combined with endings marked for passive voice (e.g., *-me*: [1st person, singular, present, imperfective, passive]). For this reason, Ralli (1988) has proposed a distinction between the features of diathesis and voice in Modern Greek. According to this analysis, the diathesis feature has an impact on both syntax and semantics, but not the voice feature, as it is nothing but a form marker. For instance, verbs like *erxome* 'come' or *kimame* 'sleep' bearing endings which are traditionally analyzed as passive endings are far from behaving as true passive verbs in passive constructions. In the same vein, see also Smirniotopoulos (1992) who simply labels active vs. passive as sets of endings which are selected by different stems marked for the appropriate features.

morphological since they are accounted for in a principled way within the morphological module of the grammar, in that it is morphology which computes them. In examining inflectional features, a distinction is made between [+interpretable] and [–interpretable] features. The former are these which percolate to word nodes (X^0 nodes) and from there are accessible to syntactic mechanisms. The latter are manipulated by morphology and disappear after being checked in situ. A side effect of these claims is that morphology can be considered as a separate grammatical module with its own categories (e.g., stems, affixes, words), operations (e.g., adjunction), and principles (e.g., headedness, checking), but it does not mean that morphology must be completely disjoined from syntax, since some categories, operations, and principles are shared by both modules.

After this brief analysis of inflectional features, let us examine the role of inflectional features with respect to Grammar in general.

3. *Inherent vs. contextual inflectional features*

In his 1993 paper, Booij examines the distinction between two types of inflection, inherent and contextual, where inherent inflection designates the morphological expression of inherent morpho-syntactic properties (features) and contextual inflection the expression of syntactically relevant morpho-syntactic properties (features). By studying the properties of both inherent and contextual inflection, he points out that it is difficult to trace a separation line between the two types: a basic argument in favor of this view relies on the fact that, sometimes in languages, the same inflectional morpheme may express both inherent and contextual inflection (e.g., the nominal endings of Latin paradigms where the same ending expresses both number (inherent inflection) and case (contextual inflection), Booij 1993: 42).

In what follows, I attempt to prove that Booij is right by using evidence from Greek. Furthermore, I argue in favor of a stronger claim, according to which all inflectional features are basically inherent and morphologically relevant. That is, I consider inflectional features to be the morphological expression of some inherent features belonging to a larger set of general linguistic properties. As such, inflectional features differ from one language to another depending upon which features are active in that language. For example, some features that are inflectional in Greek (e.g., case) are not morphologically present in inflectionally poor languages, such as English. I also claim that if an inflectional feature (i.e., a morphologically realized feature) appears to have a contextual status as well, within the same language, this status refers only to some specific value(s), while the feature as an entity (i.e., seen as an attribute-value pair) keeps its morphological status. Nevertheless, since inflectional features represent inherent linguistic properties, it should be possible for a given feature to be used as

one of the basic categories of another component (cf. the postulation of functional categories in syntax), but this should be done independently of any inflectional status in morphology. In other words, what it is proposed here is that the inflectional status of an inherent feature should be considered separately from any possible contextual (syntactic) one. Furthermore, the fact that an inherent feature may be realized as inflectional/morphological, or as both morphological and syntactic, should be viewed as a language-dependent property.[17]

Let us prove the first claim, that all inflectional features are morphological and that inflection is a morphological process.

Booij's basic argument against the split hypothesis, according to which inflection is a syntactic process, is that inherent inflection can feed word formation (1993: 36–42).[18] By bringing evidence from several languages, he also points out that even contextual inflection may appear word-internally but under certain conditions (42–45): he correctly observes that categories with a deictic/referential value (e.g., tense) appear on the morphological head of complex words since from that position, they can percolate to the whole word and be accessible to syntax. The fact that some of these categories appear at the non-head position means that they have already lost their deictic status, since elements in that position are deprived of any referential property (see, for example, the word-internal inflection of Italian compounds such as *porta-chiavi*, lit. "holds keys", 'key-holder', Scalise 1992) borne by the lefthand verbal element.

Greek provides additional evidence to Booij's claims:

a) in multi-word nominal compounding, there are cases where an adjective inflected for case, number and inflectional class, appears as the non-head constituent of a compound:

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[17] In this paper, the term "inherent" is used slightly differently from the way it is in Booij's work where the same term has been mostly used as synomymous with "morphologically relevant", that is relevant to word-formation purposes. Inherent features characterizing lexical entities, that is, stems, words (depending on whether a language is stem-based (Greek) or word-based (English)), and affixes, are not all morphologically relevant: inherent features are not morphologically realized in every single language, and are not manipulated by the same grammatical mechanisms. In other words, my claim is that it depends on every language separately to choose the appropriate inherent features for its grammatical purposes. Thus, a language which is rich in word-formation processes makes extensive morphological use of inherent features. As opposed to this, a morphologically deficient language will also use some inherent features for its morphological purposes but not as many as in the previous case.

[18] From now on, the term "inherent" will be used as synonymous to "morphological", but it should be kept in mind that, in my analysis, an inherent feature refers to something of a more general nature, that is, to an unpredictable linguistic property.

(9) a. psixros polemos < psixr-os polem-os
'cold war' cold war
b. kokini γrami < kokin-i γram-i
lit. "red line" red line
'hot line'

As shown by Ralli (1992) and Ralli & Stavrou (to appear), adjectives and nouns in examples such as the ones above constitute a particular type of compound and are generated by adjoining two simple X^0 categories and not two maximal projections; they are morphological formations of an atomic character, in that their structure is not accessible to syntactic operations. Some of the criteria used to prove this claim are the following:[19]

- the lefthand adjective does not have freedom of its own, "acting" by and for itself. It therefore cannot be conjoined with any adjective, even of roughly the same type, independently of the noun:

(10) a. *psixros ke θermos polemos
cold and hot war
b. *kokini ke θermi γrami
red and hot line

- Adjectives of multi-word compounds cannot be modified (11a) and are not prone to a conjoined reading with another adjective (11b), something common to normal adjectival modification of nouns in syntactically formed noun phrases:

(11) a. *metrios psixros polemos vs. metrios psixri nixta
moderately cold war moderately cool night
b. *kondi, kokini γrami vs. kondo, kokino forema
short red line short red dress

- Moreover, the order of constituents in a definite multi-word compound is also fixed, that is, the definite noun cannot precede the definite adjective, as is the case with normal adjectival modification in Greek:

(12) a. *o polemos o psixros
the war the cold

[19] See Ralli & Stavrou (to appear) for more details about the compoundhood of these formations.

but

b. o kafes o zestos
the coffee the hot

In spite of the fact that formations like the ones given in (9) belong to morphology, they bear a word-internal inflection. This word-internal inflection is added to the adjectival part of the compound which is at the non-head position.

Notice that word-internal inflection has also been a property of traditional one-word nominal compounds in another stage of the language, i.e., in Classical Greek, as shown in the examples below:

(13) a. Neapolis < nea polis
"New city" new (nominative) city
b. Hellēspontos < Hellēs pontos
"Helle's sea" Helle's (genitive) sea
c. nyktilampēs < nykti -lampēs
"who shines at night" night (dative) who shines
d. nounekhēs < noun -ekhēs
"who has brain" brain (accusative) who has
e. bibliagraphos < biblia -graphos
"who writes books" books (accusative plural) who writes

b) In prefixed verbal forms, the past tense prefix *e-* (verbal augmentation) appears word internally, between a non-category changing prefix and the verbal stem, the latter acting as the head of the construction:[20]

(14) a. ipeγrapse < ipo e -γraf -se[21]
's/he signed' under wrote
b. anefere < ana e-fer-e
's/he reported' over brought

c) The perfective aspectual marker *-s-*, traditionally considered to be an inflectional category, appears before the derivational suffix in derived nominals like the ones listed below:

[20] The segment *e-* is a verbal prefix in Ancient Greek, but linguists do not agree with respect to the status of the same element in Modern Greek. For example, Joseph & Janda (1988) treat *e-* as a verbal prefix of Modern Greek morphology. According to other analyses though (e.g., Babiniotis 1972), *e-* is a phonologically inserted element and has no independent morphological status. In this paper, I follow Joseph & Janda's analysis.

[21] In (14a), [f] changes into [p] before [s], and [a] disappears before another vowel [e] in (14b).

(15) a. xalazmos[22] < xala-s m-os
destruction destruct ion
b. perasja < pera-s i-a
passage pass age

As we see from the examples above, it is difficult to split inflection from other morphological processes, i.e., derivation and compounding. Moreover, as the examples (14) and (15) illustrate, it is difficult to split inflection into inherent and contextual since, under certain conditions (e.g., loss of referentiality), even contextual inflection may feed word formation. I thus agree with Booij that a distinction between inherent and contextual inflection is not something that should split inflection into different grammatical components. As a matter of fact, Greek belongs to those languages where the same morpheme may represent both types of inflection. For instance, nominal endings represent the features of number, case and inflectional class (16a), while verbal endings usually represent not only the features of number and person, but also the features of tense and passive voice in the paradigms of present and imperfective tense (16bc).

(16) a. anθropos < anθrop -os
'man' 'man, nominative, singular, second class'
b. ðenome < ðen - o - me
'I am tied' tie 1st person, singular, present, passive[23]
c. ðenomun < ðen - o - mun
'I was being tied' tie 1st person, singular, past, passive

Examples like the ones listed above suggest that it is difficult to treat inflection (or a part of inflection) as a syntactic process. Thus, I would assume that inflection is a morphological process and that features involved in this process are primarily morphological. Furthermore, one can predict that each language, depending on how rich it is inflectionally, chooses the number and the kind of features used for its morphological /inflectional purposes. Thus, Greek, a stem-based language (i.e., a language whose lexical items most often need an inflectional morpheme to acquire word status, see section 2) displays a considerably large number of inflectional morphemes.

Let us examine now the fact that some inflectional features characterizing Greek morphology appear to be contextually relevant as well. As proposed in

[22] The sound [s] becomes [z] in front of [m] which is a voiced consonant. Moreover, [i] acquires the status of a semi-vowel (see *perasja*) in front of a stressed vowel.
[23] The segment *-o-* is a thematic vowel introduced between the verbal stem and the ending and has no morphematic status at all (cf. Ralli 1988 for more details on this).

the first section, contextually relevant features are those which percolate to the word nodes. Nevertheless, it is shown here that this contextual relevance refers only to the value part of the feature and does not include the entire feature, that is, both the attribute and the value parts.

To be noted first is the fact that within the Government and Binding framework (Chomsky 1981), a distinction is made between structural case and inherent case. Structural case concerns the values of nominative and accusative, while there is no structural explanation for the presence of other case values which are considered to be inherent, that is, lexically/morphologically assigned. Note, however that even for nominative and accusative case there is not always a pure syntactic assignment. For example, in some syntactic analyses, a default case assignment is often invoked in order to explain the presence of nominative in constructions like the ones in (17a, b) (cf. Philippaki-Warburton 1990, Catsimali 1990);[24] furthermore, there is no explanation for the presence of an accusative case in nouns of temporal adverbial expressions (17c):

(17) a. i fitites, i kaθijites tus aγapun olus
the-students/NOM the-teachers/NOM them/ACC like/3PL all/ACC
'(As for) the students, the teachers like them all'
lit. "The students (nominative) the teachers like them all"
b. vlepo to vuno Olimbos
see/1SG the-mountain/ACC Olumpus/NOM
"I see the mountain(accusative) Olympus (nominative)"
c. ton Iunio θa fiγo ja tin eksoxi
the-June/ACC FUT leave/1SG for the country
'In June, I will leave for the country.'
lit. "The June, . . . "

Thus, there is no reason why both the nominative and the accusative case assignment should not be handled in morphology. As for the structural case mechanism, wherever it applies, it may be seen as a device that checks and filters out constituents bearing the appropriate case values. If this is true, inflected words are inserted in syntax fully specified for case values and syntactic operations dealing with case are matching procedures ensuring the right combinations between words.[25] Moreover, with respect to case, syntax may also help to disambiguate ambiguous morphological formations, like, for example,

[24] According to Philippaki-Warburton (1990), the different positions that these NPs may assume in a phrase are pragmatically justified.
[25] Notice that this is not different from Chomsky's (1993) recent views.

ambiguities due to case syncretism: we have seen, in the first section, the example of neuter words ending in *-a,* whose morphological form expresses one of the three values, nominative, accusative and vocative, and whose disambiguation is claimed to be resolved in syntax, when neuter words are combined with other constituents.

Second, gender specification in Greek adjectives also offers support in favor of the proposal put forward in this section, according to which, the contextual relevance of some features refers only to their value part. As shown by Ralli (1994), gender in Greek nouns should be considered as a feature characterizing stems and not the inflectional endings because nouns of different gender values are inflected in the same manner, i.e., with the same set of inflectional endings. Examples such as the ones given under (7), repeated here, illustrate this claim:

(7) a. anθropos < anθrop -os 'man, nominative, singular, masculine'
b. prooðos < prooð -os 'progress, nominative, singular, feminine'
c. kratos < krat -os 'state, nominative/accusative/vocative, singular, neuter'

Since in Greek there is no direct relation between the feature of gender and the feature of inflectional class which is responsible for the form of the inflectional endings, it has been postulated that a fully specified gender feature (i.e., an attribute with a specific value) is part of the feature bundle representing the stem, while it is absent from the feature bundle representing the ending. Specific gender values, though, should not characterize adjectival stems, since adjectives are generally inflected for all three gender values, masculine, feminine, and neuter:

(18) kalos kali kalo 'good, nominative, singular'
masculine feminine neuter

Adjectives, thus, acquire their gender specification in syntax. Note, however, that an approach which treats nouns differently from adjectives, with respect to gender, does not take into consideration the fact that both categories belong to nominals and share common properties. Sometimes, e.g., in the case of names designing colors, it is also difficult to decide whether the grammatical category of an item is a noun or an adjective. For this reason, I propose the following: first, a gender feature characterizes all nominal stems, that is, both nouns and adjectives. As opposed to nouns, however, where the gender attribute bears a specific value (e.g., *anθrop*[gender:masculine] 'man'), adjectival stems are

underspecified for specific gender values, where feature underspecification for a stem means that it bears an attribute with no specific value part (e.g., *kal*[gender:X] 'good'). It is, thus, the role of syntax to resolve such an underspecification through an agreement between nouns and adjectives. That is, in a syntactic construction involving an adjective and a noun, where both constituents agree for case and number, an agreement with respect to gender would mean that the noun will be responsible for transmitting its specific value to the underspecified gender feature of the adjective.[26] It is not obvious, however, how agreement between adjectives and nouns occurs in syntax, that is, if it is a [spec-head] agreement requiring the involvement of some specific functional categories. This problem goes beyond the scope of this paper and it is not examined here.

Third, evidence that syntax contributes to the specification of some some underspecified inflected words is also provided by verbal inflection. Consider, for instance, the periphrastic future tense forms of Greek:

(19) a. θa ayapiso
FUT love/1SG.PFVE.ACT
'I will love'
b. θa ayapiθo
FUT love/1SG.PFVE.PASS
'I will be loved'

The forms of *ayapiso* and *ayapiθo* are morphologically specified for person (first), number (singular), aspect (perfective) and voice (active or passive, according to the case), but not for a specific tense value. As Ralli (1988) has shown, the tense value is acquired after these forms are combined with the particle *θa.* That is, underspecification of forms like the ones listed under (19) is resolved in syntax. Within the framework of Chomsky's (1995) checking theory, *θa* may be treated as the functional head of a T(ense)P(hrase) marked for future, which triggers verb movement (V-raising) in order to accomplish feature specification.[27]

[26] Note that there is no agreement between an adjective and a noun as far as the feature of inflectional class is concerned because the two constituents do not match with respect to the form of the inflectional endings.

[27] That *θa* is a future marker and the head of TP, is also proposed by Philippaki-Warburton (1996) and Krapova (1996). In particular, Krapova suggests that a raising of the verb takes place because of a weak feature V, borne by *θa*, which results in a cliticisation of the verb to the particle. Note, however, that in other approaches (e.g., Rivero 1994), *θa* is seen as the head of a M(ood)P(hrase).

The fact that some inflectional feature values are manipulated in syntax proves that the two components, morphology and syntax, are not radically separated and that there is an interaction between them. However, apart from an interaction involving syntactically accomplished feature specification or feature disambiguation of morphologically relevant inherent features, I also propose that, in syntax, some inherent features may act independently of any possible morphological relevance: in specific languages, certain inherent features may play a role in syntax independently of the fact that, in morphology, these features may be realized as inflectional and be closely related to other morphologically relevant features as well (e.g., case related to number), by being parts of feature bundle sets encoding inflectional affixes.

By accepting an inherent feature as playing a role in syntax, independently of its status in morphology and any relationship that may exist between this feature and its partners in morphology (i.e., other features within the same feature bundle), we may explain the following inconsistencies which arise if one wants to consider that pure inflectional features trigger some syntactic phenomena (e.g., movement):

- Although morphology is generally considered to be the source of features represented as functional categories in generative syntax, usually, these functional categories have additional properties in syntax which do not show up in morphology. For example, Tense as a functional category appears to bear a strong NP feature which triggers movement of T to AgrS and licences nominative case in Spec-head position (cf. Lasnik 1993).

- In the syntactic analysis, we find some inflectional features to be distributed in sets entirely different from what appears to be an association of features in morphology. For instance, Di Domenico (1995) has proposed that in DPs of synthetic languages, a functional category representing both gender and number should exclude case from its grouping of features. If we try to apply this to Greek, we end up by having different organizations of features in morphology and syntax: in Greek morphology, gender specifies the stem, while number is combined with case and inflectional class. Moreover, if we look at a proposal put forward by Bobaljik (1993) and Chomsky (1995), case should be dissociated from phi-features (i.e., agreement features). Although this claim may hold for Greek syntactic structures, this dissociation is meaningless as far as Greek morphology is concerned, where case, number and inflectional class are joined together under the same form.

- Sometimes, a functional category postulated in syntax has no correspondent feature in the inflectional morphology of a given language. Looking again at Greek, we find that a functional category Agr0 is important in building up syntactic constructions, such as the one in (20), where there is object agreement on the participial form of the perfect tense. However, in Greek morphology, this particular category plays no role at all:

(20) exo vamen-us tus tix-us[28]
have/1SG paint/PPL.ACC.PL the-walls/ACC
I have painted-Agr0 the walls

On the basis of these observations, we may thus conclude that the use of features in syntax may be defined independently of the use of such features in morphology. Syntactic features, however, partly overlap with the existence of inflectional features in morphology since syntax helps to specify some feature values of underspecified items or resolves ambiguities created by morphology (cf. above). On the other hand, morphology may confirm some overt syntactic phenomena (e.g., subject-verb agreement).

Generally, while there is a one-to-one correspondence between inflectional features and the notion of "morphological relevance", there is no such correspondence between inflectional features and the notion of "syntactic relevance". While morphology makes use of all the inflectional features of a language, syntax can only selectively use them. For example, there are inflectional features ignored by syntax, e.g., inflectional class in Greek.

Notice that this position argues against the approach which considers morphological structures as the mirror image of syntactic ones and vice versa (cf. Baker 1988). As a matter of fact, there are usually problems in most attempts to adopt Pollock's (1989) analysis for Greek I(nflectional)P(hrase)s (cf., among others, Rivero 1990, Philippaki-Warburton 1990, Charalambopoulou 1990, etc.).[29] These analyses run up against problematic cases such as:

- how to treat discontinuous dependencies. For example, in the paradigm of the aorist, information about the past is expressed by both the prefix (augmentation) and the person/number suffix:

[28] I am indebted to Manuel Español Echevarria for pointing out this case to me.
[29] See Joseph (1991) for a well-argued criticism of these attempts, as well as Joseph & Smirniotopoulos (1993).

(21) elises < e li s es
'you untied' past untie perfective 2nd person singular, past

- the fact that Greek inflectional features are not always realized at a fixed position. Take, for instance, the feature of passive voice: in paradigms marked for [perfective], it appears combined with the aspectual feature (22a), while in the non-perfective paradigms, it joins the tense and the person/number features (22b).

(22) a. ðeθikes < ðe θik es
'you were (have been) tied' tie perfective, passive 2nd person, singular, past

b. ðenosun < ðen o sun
'you were being tied' tie 2nd person, singular, past, passive

If there is no such mirror image mapping between morphology and syntax, then the two grammatical domains must be separated, although they share a number of principles (e.g., the principle of headedness) and structural relations (e.g., adjunction structures).

4. *Concluding remarks*

In this paper, I have been concerned with features involved in inflectional processes, that is with features reflecting grammatical properties. Since every grammatical property is not realized as inflection in all human languages, I have focussed only on those features whose values may be detected phonologically on the inflected forms of words in the language under consideration, i.e., Greek. For instance, in examining Greek inflectional features, I have ignored definiteness, inasmuch as it has no relevance to inflection since there are no inflectional forms which may systematically reflect the presence or absence of such a feature.[30] Definiteness, however, may be inflectionally realized in another language and, in my view, conclusions drawn about the morphological status of inflectional features in general will also hold for definiteness in that particular language too. In other words, I believe that there are universal principles governing morphology, but the particular choice of entities (words, roots, prefixes, suffixes, etc.) as well as features involved in the morphological processes of a particular language is language-specific.

[30] Definiteness, however, is important for syntax, since the presence of a strong definiteness feature triggers movement of N to D (cf. Longobardi 1994).

Furthermore, I believe that each language freely chooses its own inflectional features among the range of possible inherent features, independently of the fact that the presence of certain features is crucial for the human computation mechanism, as has been represented in recent syntactic developments (Chomsky 1995). In my view, it is the task of the theory of Grammar in general to discover which features may constitute (or be part of) functional categories in the search for a principled model of computing phrasal linguistic expressions, but this feature inventory only partly interacts with features used for morphological purposes in specific languages where they are subject to general morphological principles.

Notice now that the claims made above about the status of morphology are not entirely different from what has been proposed by Chomsky (1995). I agree with Chomsky that everything that concerns the computational mechanism must be language-independent. I disagree, however, with the view that morphological matters should only concern the particular languages. Although, morphology is very much affected by language-dependent characteristics, it should also be viewed as a component governed by universal principles some of which may be the same as those applying to syntax as well.[31] Such an organization of grammar presupposes that the different modules may be related to one another. As seen in this paper, some aspects of morphology may influence or even determine aspects of syntax and vice-versa. It is morphology, for example, which determines whether there is overt agreement in syntax, and it is syntax which renders specific some underspecified forms of words.

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[31] See Di Sciullo (1993, 1994) for the view that morphology is an independent grammatical module governed by syntactic principles.

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