Generating Words:
Compounding in Modern Greek

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C o n t e n t s

0. Abstract……..…….p.2

1. Introduction-Theoretical Background……..……...p.2

2. The data: General remarks……..p.6

3. The relations of the constituent parts…….p.15
3.1 Headedness. Endocentric vs. Exocentric compounds…...p.15
3.2 Synthetic vs. Root Compounds……..p.21
3.2.1 Synthetic Compounds……...p.21
3.2.2 Root Compounds……..p.26

4. Generative Templates……..p.29

5. Syntactic analysis on Compounding……p.34
5.1. Background……p.34
5.2. Incorporation-like compounding in Modern Greek……..p.36

6. Compounds in a theory of Competition……..p.42

7. Conclusion…….p.49

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0. Abstract

This work is about compounding and compounds in Modern Greek and its purpose is twofold: on the one hand to expose all possible constructs that can be qualified as compounds in the language and on the other hand to shed light onto the question concerning the manner in which they are formed. Although we make reference to several theories and models of word formation, our starting point is Lexicalism. However, the "traditional" Lexicalist views are being checked against more radical theories. The organization of the work goes as follows: In Part1 we give an overview of major theoretical developments concerning Morphology in the Generative paradigm. Part 2 includes concrete examples of compounds and some "traditional" classificatory attempts. Part 3 deals with all possible relations the parts of a compound can have each one with another. Extra gravity is given to the distinction between synthetic and root compounds and to problems that traditional approaches face in their analysis. In part 4 we deal with the question of how lexical items are put together in order to form a compound. In part 5, we examine a hypothesis according to which certain complex words in Greek should be described syntactically along the lines of the transformational rule known as Head-to-Head movement. Finally, in part 6 we claim that certain inconsistencies and asymmetries shown in the system of compounds can be explained via a theory according to which Syntax and Morphology compete for the generation of complex heads. It is also shown that unpredictable/non-compositional semantics and derivational affixes trigger compound generation.

1. Introduction-Theoretical Background[1]

In this introductory part we will be reviewing some influential theories on word formation put forward throughout the last decades. The goal is not to provide a detailed or systematic analysis, but rather to present a sketch of major developments. What we will be presenting here must be seen as an attempt to give answers to three separate, though related questions: 1. Does Morphology as a word formation mechanism exist? 2. If yes, is it an autonomous component or is it included in other components of Grammar? 3. If no, how is the formation of complex words accounted for?

[1] For a more detailed account see Hammond & Noonan (1988), Baker (1988), Spencer (1991), Halle & Maranz (1993) and Ackema & Neeleman (2005) among others.

In the earliest generative approaches (cf. Chomsky 1957, Lees 1960) there was not only autonomous morphology; there was not even an independent lexicon. Word formation operations, for example affixation and compounding, were handled by syntactic transformations. Latter on, in *Aspects* (Chomsky, 1960), the lexicon was given its autonomy, as a store of lexical items and idiosyncratic information about them. Affixation and Compounding were still a function of the syntax, and the strings of morphemes and accompanying syntactic features that resulted from the application of syntactic rules was done in the phonological component. However, this kind of treatment faced one major problem: Chomsky (1970) noted that the meaning of nominalizations such as "revolution", "reference" and "construction" is not necessarily predictable from the meaning of their corresponding verbs and therefore cannot be derived transformationally, that is syntactically. In the same vein, the meaning of compounds like "blackboard" cannot be derived from the meanings of their component parts. By the early 1970s there was considerable evidence that the transformational approach to word formation was misguided. Thus, Jackendoff (1972) following Chomsky, proposed his *Extended Lexicalist Hypothesis*, whereby transformations could only be used to operate on syntactic constituents-they cannot be used to insert, delete, permute or substitute part of words. This in turn means that they can't be used in derivational morphology and compounding. The place where inflectional processes take place, however, remained controversial. On the one hand, according to some Lexicalist Theories all word formation processes are licensed by rules running into the Lexicon. Such theories had to account for the fact that certain aspects of inflection are accessible to syntactic rules, for example rules of agreement. Theories like these subscribe to the so-called *Strong Lexicalist Hypothesis*. On the other hand, many linguists believe that even though the majority of morphological processes are performed in the lexicon, where they can interact in particular ways with listed lexical items, conditions on inflectional morphology have to be stated at a different level of representation, after the syntax. Such linguists, then, subscribe to the *Weak Lexicalist Hypothesis (or Split Morphology Hypothesis*). It should be noted here that Jackendoff's proposal laid the groundwork for the elaboration of a uniquely (but still not autonomous) morphological component, a task which was taken up by Halle (1973). Halle proposed that the model include a semi-independent morphological component (it was still considered as part of the lexicon) that would be given complete responsibility for the creation of words, thus removing the syntax from word

formation entirely. The new component would consist of a dictionary, which contains all the words of a language, a list of morphemes and a list of word formation rules. Later on, Halle (1973), Jackendoff (1975) and, most important Aronoff (1976) noted that Halle's (1970) model faced severe problems. One major problem concerned the redundant specification of forms in both the list of morphemes and the dictionary. Aronoff (1976) formulated "word formation rules" which applied directly to individual words in the lexicon in a once only fashion, altering their phonological form and adding new semantic and structural properties. The lexicon was conceived as containing whole words and not morphemes-affixes occurred only as part of the structural change of a word formation rule. In the wake of this work, the status of affixes came under debate. Anderson's (1992) *A-Morphous Morphology* and Beard's (1987) *Lexeme-Morpheme-Based Morphology*, consider affixes as lexical processes as well.

Halle and Aronoff's proposals for a (semi-)autonomous morphology were consistent with the general tenor of developments within the new Government & Binding Syntax, which was developing a theory of independent "Modules" having their own sets of principles and interacting with the other modules in the course of a derivation. This is the spirit in which the model of *Lexical Phonology/Morphology* emerge (Mohanan 1982 & Kiparsky 1982).According to this view there is a "layered" application of morphological rules in the part of the lexicon which is responsible for word formation. This means that different word formation processes such as compounding, derivation and inflection, operate separately, that is in different layers (cf. *Extended Level Ordering Hypothesis*, Allen, 1978). Furthermore, a subset of phonological rule applications takes place within the lexicon-morphological component. The application of phonological rules alternates with the application of morphological rules in such a way that each operates on the output of the other.

In a theory put forward by Di Sciullo & Williams (1987) there is also a clear-cut distinction between syntax and morphology which are treated as separate generative systems. This theory provides one of the most thoroughgoing defenses of the (Strong) Lexicalist Hypothesis. Word formation is not directly linked to storage: once a complex word is formed, it may or may not be listed--lexical storage concerns only items with unpredictable (usually of semantic nature) properties. As such, the lexicon as a store-room may also contain items smaller than words, i.e. affixes (compare Aronoff, 1976) and items bigger than words (idiomatic phrases-"syntactic atoms").

Thus, for them the lexicon can be no more than an enumeration of idiosyncrasies. It has no structure on its own, and its only interaction with morphology is to serve as the storage place for the input to and output for morphological rules. It's worth noting here that such a view have certain similarities with the pre-Chomskian structuralist models in recognizing morphology as a central, independent component of the Grammar.

In the mid and late 80's the interest in syntax as a word formation mechanism is reanimated though. Theories put forward by Fabb (1984), Maranz (1984), Sproat (1985), Roeper (1988) and more importantly Baker (1988) and Pollock (1989) claim that certain kinds of complex words are formed in the syntax in terms of syntactic movement (*Head-to-Head movement/Move α*), since their formation seem to comply with well-known principles and constraints which regulate the generation of syntactic phrases such as the "Empty Category Principle" and the "Head Movement Constraint". According to the same theories, however, there are complex words whose constituent parts "come together in the lexicon in the standard way", and not syntactically. In some theories, morphology as a mechanism which regulates word formation is completely disregarded, while in others it has a supplementary role. Baker, for example, claims that morphology is a set of universal and language specific principles which regulate word formation. In this spirit, "Morphological Theory" can be compared to other theories which regulate the generation of syntactic (phrasal) outputs, such as the Government & Binding theory, the Case Theory, the Theta-Theory etc.

In the last 15 years there has been a great interest in language as a modular device, that is, in the thesis that human language consists of distinct subsystems that interact each one with another. Following this path, Spencer (1991) claims that morphology is an autonomous module (and not "a component or a stage through which all derivations pass on their way from semantic or lexical structure to phonological form") in the sense that it has its own set of elements and principles. However, it interacts with all other levels of representation, by the fact that it runs parallel with the rest of the grammatical derivation.

Halle & Maranz's (1993) model of *Distributed Morphology* claims that morphology neither exists as a separate module nor it is anchored in one component of grammar, but rather it is set of rules, distributed among several components. Words are formed by the same processes that guide the formation of syntactic phrases as they apply to

syntactic heads (merge, adjoin and move). A level of morphological structure then adjusts the feature complexes via processes of fusion and fission before they are spelled out as phonological words.

Finally, Ackema & Neeleman (2005) propose a grammar model that consists of three “macromodules”: semantics, syntax and phonology (cf. Jackendoff 1997). Each of these macromodules has two submodules: a generative system for phrasal structures and a generative system for word structures. “Syntax” and “Morphology” correspond to the Phrasal structure and Word structure modules in the syntactic macro-module; hence being distinct the one with each other (though interrelated). The main point is basically that any syntactic account of morphology (cf. Baker and Halle & Maranz among others) must assume extensions to the syntactic theory in order to account for the different behavior of word formation processes and phrase formation processes. Such a qualitative extension to syntax, A&N argue, is tantamount to separating morphology and syntax. However, this model allows for certain interactions between Morphology and Syntax, since both modules are contained in the same macromodule. In part 6 we will be dealing in a more systematic way with this model.

2. **The data: General remarks**

Compounding constitutes a process of word formation and its products are called compounds. Alongside with derivation and inflection, it is one of the major mechanisms of the language responsible for the formation of complex lexical[2] items. Compounding in Greek is traditionally defined as the association of two or more stems which occur as one unit, and compounds are generally classified as nouns, verbs and adjectives[3]. They are made up of constituents, each belonging to one of the categories noun, verb, adjective and adverb. In the most of the cases there must be necessarily an additional inflectional prefix[4], whereas the existence of derivational affixes is optional.

I. Nouns[5]

▪[sime-o-stolizm(ós)] < [simé(a)] [stolizm(ós)]

"flag decoration"= "bunting"

▪[orɣan-o-pékt(is)] < [órɣan(o)] [pékt(is)]

"instrument player"= "musician"

▪[termat-o-fílak(as)] < [térma] [fílak(as)]

"end keeper"= "goalkeeper"

▪[eθn-o-frur(ós)] < [éθn(os)] [frur(ós)]

"country guard"= "militiaman"

▪[xart-o-petsét(a)] < [xart(í)] [petsét(a)]

"paper towel" = "tissue"

▪[jaurt-o-pólem(os)] < [jaúrt(i)] [pólem(os)]

"yogurt war"= "fight with yogurt"

▪[palj-ánθrop(os)] < [palj(ós)] [ánθop(os)]

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[2] Lexical here not in the sense of a "listed item" but in the sense of a "word"

[3] According to Ralli (1992) commonly used adverbial compounds such as [zerv-ó-ðeksa] 'left and right' and [vori-o-anatoliká] 'northeast' are generally derived on the basis of an association of an adjectival compound stem [zerv-o-ðeks-] and [vori-o-anatolik-] with the very productive adverbial suffix [-a]. Put differently, words that superficially seem like adverbial compounds constitute derived words from adjectival compounds.

[4] What is generally considered to be an inflectional ending in both compounds and their constituent parts appears in parentheses. Parentheses are also used for the adverbial suffix [-a] (e.g. [arket(á)]= "enough").

[5] Examples are not written in Greek –we will be just giving their phonological form according to the conventions of the International Phonetic Alphabet.

“old man”= “scum, deceiver”

▪[elafr-ó-petr(a)] < [elafr(á)] [pétr(a)]

“light stone”= “pumice”

▪[eksó-port(a)] < [ékso] [pórt(a)]

“out-door”= “outside door”

▪[piso-jírizma] < [píso] [jírizma]

“back turning”= “going back”

II. Adjectives (Passive Particles & Verbal Adjectives[6])

▪[aspr-ó-mavr(os)] < [áspr(os)] [mávr(os)]

“white (and) black”= “black and white”

▪[mikr-o-kamomén(os)] < [mikr(ós)] [kamomén(os)]

“small made”= “little”

▪[aɖik-o-xamén(os)] < [áɖik(a)] [xamén(os)]

“in vain lost”= “lost in vain”

▪[kak-o-dimén(os)] < [kak(á)] [dimén(os)]

“badly dressed”= “poorly dressed”

▪[efkol-ó-pist(os)] < [éfkol(a)] [píɵ(o)]

“easily-convinced”

▪[anɵ−ó-spart(os)] < [ánɵ(os)] [spart(ós)]

lit. “flower strewn”= “strewn with flowers”

▪[kozm-o-ksákust(os)] < [kózm(os)] [ksakust(ós)]

“world known”

▪[ilj-o-kamén(os)] < [ílj(os)] [kamén(os)]

“sun burnt”

III. Verbs

▪[afis-o-kol(ó)] < [afís(a)] [kol(ó)]

“to poster stick up”= “stick up posters”

▪[xart-o-péz(o)] < [xart(í)] [péz(o)]

[6] Passive Particles are formed with the derivational affix –men-. Verbal adjectives show the derivational affix –t-, the inflectional ending –os. (E.g. anɵ-ó-spar-t-os) and they usually have the meaning of a passive particle.

“to paper, card play”= “play cards”

▪[nixt-o-perpat(ó)] < [níxt(a)] [perpat(ó)]

“to night walk”= “walk in the night”

▪[ɖjaol-o-stéln(o)] < [ɖjáol(os)] [stéln(o)]

“to devil, hell send”= “send to hell, damn”

[xar-o-palév(o)] <[xár(os)] [palév(o)]

lit. “ death fight”= “ be at death’s door”

▪[pijen-o-érx(ome)] < [pijén(o)] [érx(ome)]

“go (and) come”= “come and go”

▪[strav-o-pat(ó)] < [strav(á)] [pat(ó)]

“awkwardly step”= “miss one’s footing”

▪[krif-akú(o)] < [krif(á)] [akú(o)]

“Secretly listen”= “eavesdrop”

▪ [arɣ−o-peɵén(o)] < [arɣ(á)] [peɵén(o)]

“slowly die”= “die a slow death”

According to recent analyses, prepositions are totally absent from the set of possible constituents of compound structures. Nonetheless, Ancient Greek prepositions[7] still appear in morphologically complex word forms. However, they have lost their word status and should be analyzed as prefixes rather than prepositions. As Ralli notes “prepositions productively used in the language today (e.g. [me] “with”, [ja] “for” etc.) do not participate in compound formations”.

Beside the compounds listed above, there are also complex nouns and adjectives where the first constituent is a cardinal number (IV) or a pronoun (V):

IV.

▪ [eptá-lof(os)] <[eptá] [lóf(os)]

“(based) on seven hills”= “seven hilled”

▪[ɖeká-loɣ(os)] < [ɖéka] [lóɣ(os)]

“decalogue”

▪[epta-sfráɣist(os)] <[eptá] [sfraɣist(ós)]

“seven (times) sealed”= “well sealed”

[7] e.g. [pará], [aná], [epí], [ipó] etc in words such as [para-káno] “overdo”, [ana-válo] “postpone”, [epi-válo] “impose”, [ipo-ɵéto] “suppose”

V.

▪[pand-o-ɣnóst(is)] < [pánd(a)] [ɣnóst(is)]

“everything knower”= “know-all”

▪[eɣo-kendrik(ós)] < [eɣó] [kendrik(ós)]

“egocentric”

▪[alil-o-sevazm(ós)] < [alíl(us)] [sevazm(ós)]

“each-other-respect”= “respect for each other, mutual respect”

As we noted previously, compounding in Greek is traditionally defined as the association of two or more stems which occur as one unit. However, throughout the last two decades it has been claimed that Greek also displays nominal multi-word compounds that fall into one of the following three categories: a. Noun +Noun in nominative b. Noun+Noun in genitive and c. Adjective+Noun. In this case the notion of word extends the limits of a morphematic combination and may also cover any unit insertable in X^o nodes (Di Sciullo and Williams, 1987). According to Di Sciullo & Williams they are formed in the syntactic component and enter the lexicon as listed syntactic atoms due to their non-compositional semantics. Despite the fact that there is a strong argumentation in favor of their status as compounds they are often referred to as marginal and structural loans from other languages (mainly English), on the assumption that they deviate in several ways from the structural and phonological patterns genuine Greek compounds comply with. Although we will not be dealing with them systematically, it should be noted that they are qualified as “compounds” on semantic (= non compositional semantics) and syntactic grounds (= not accessible to syntactic rules/lexical integrity), rather than phonological and structural[8]:

VI.

▪[omáɗa erɣasías (gen.)] < [omáɗ(a)] [erɣasí(a)]

“group of working”= “working group”

▪[peɗí ɵávma] < [peɗí] [ɵávma]

“child miracle” = “wonder boy”

[8] For details see Anastasiadi-Simeonidi (1986), Ralli (1991, 1992), Gavriilidou (1995), Ralli & Stavrou (1997).

▪[zóni asfalías (gen.)] < [zón(i)] [asfalí(as)]

“belt for security” = “safety belt”

▪[peʤikí xará] < [peʤik(í)] [xar(á)]

“(of) children happiness= “playground”

In what follows let us examine some major aspects of compounding and compounds in Greek. To anticipate, the discussion here is held on rather Lexicalist grounds.

According to Ralli (1988), Greek compounds are generated by a general context-free rewriting rule of the following type:

Y Z→X

This is Lieber’s (1980) general rule pattern and specific values for X, Y and Z may range among the categories of stem and word, depending on the type of the compound. Y generally has the value of a stem. Z can either be a stem or a word and its particular value, depending on the case, percolates to X[9]. According to the different combination possibilities between a stem and a word which are found in the language, the general rule pattern above may be translated into the following rules[10] (cf Ralli, 1992):

a. Stem Stem→Stem
b. Stem Word→Word
c. Word Word→Word

a. Type 1 [Stem+Stem→Stem]

▪[anɵ−ó-kip(os)] < [anɵ-] [kip-]

“flower garden” “flower” “garden”

[9] The fact that the first constituent is canonically a stem and the possibility for the second constituent to be a stem as well comes in contrary to Aronoff’s (1976) Word-based Morphology, which says that all regular word-formation processes are word-based. A new word is formed by applying a regular rule to a single already existing word. This hypothesis is severely challenged by regular word formation processes shown mainly in agglutinative and fusional languages such as Greek.

[10] The rule Word Stem→Stem does not belong to the grammatical system of Greek because words are generally associations of stems and inflectional endings and inflection is word final. However, Ralli (1992, 2004) shows that there are two marginal categories that can be described as Word Stem combinations: a. Compounds like [panepistimiú-poli] “(of) university town” = “university campus”, where the first constituent (panepistimíu) is a full word in genitive singular, [Neá-poli] “New town”, where the first member (néa) is a full adjective marked for the feminine gender. Compounds like these are either Ancient Greek fossils or neologisms constructed in the ancient Greek manner. b. a few constructs of the category Adv+Noun like [eksó-porta] “out door”= “front door, gate”, [pano-fóri] “up cloath”= “coat”.

▪[tir-ó-pit(a)] < [tir-] [pit-]

“cheese pie” “cheese” “pie”

▪[karav-ó-pan(o)] < [karav-] [pan-]

“sail cloth” “ship” “cloath”

b. Type 2 [Stem+Word→Word]

▪[kreat-aɣor(á)] < [kreat-] [aɣor(á)]

“meat market” “meat” “market”

▪[elaf-o-kiniɣ(ós)] < [elaf-] [kiniɣ(ós)]

“deer hunter” “deer” “hunter”

c. Type 3 [Word+Word→Word]

This type is instantiated by the nominal multi-word constructs shown in IV above. As [Word Word] constructs are also analyzed a few one-unit Adv+Verb compounds like [ksana-ɣráfo] “again write”=”write again”.

According to Malikouti-Drachman & Drachman (1989), Drachman & Malikouti-Drachman (1994), Malikouti-Drachman (1997) and Nespor & Ralli (1996) the main motivation to distinguish Stem compound outputs from Word compound outputs comes from inflection: the inflectional endings of items belonging to the [stem+stem] compounds are, in general, not the same as the ending of the compound’s second member when used as an autonomous word, as show below:

▪[nixt-o-lúluð(o)[11]] “night flower” vs. [lulúð(i)] “flower”

▪[omorf-ó-peð(o)] “pretty child” vs. [peð(í)] “child”

The inflectional endings of [stem+word] (or [word+word]) compounds, instead, always correspond exactly to the ending their second member has when used as an autonomous word, as seen in the examples below:

▪[eθn-o-frur(ós)] cf. [frur(ós)]

“country-man”= “guard”

▪[psix-o-kór(i)] cf. [kór(i)]

[11] “It should be noted though that the ending of the compound differs from the ending of its right-hand member only with respect to the form and the declination class. Both endings are attached to stems of the same category (e.g. nouns) and generally share the same morphosyntactic features” (Ralli 1992).

"soul-daughter"= "adopted daughter"

▪[omáɗa erɣasías (gen.)] cf. [erɣasí(as)]

"group of working"= "working group"

Another decisive factor, however, for distinguishing the relevant structures above is the position the (main) stress occupies in the compound structure. In [stem+stem] compounds a special phonological rule of stressing is applied which posits the stress onto the antepenultimate syllable, irrespectively of the position of the stress that the compound's members carry when found in isolation: in this case compounds don not have any stress to be preserved, since their members do not constitute phonological words. For, compounds like [anɵ−ó-kip(os)] where the inflectional ending of the whole structure is the same as the inflectional ending of the second constituent, when used in isolation ([kíp(os)]), is classified as an instantiation of the type [stem+stem].

On the other hand, this kind of stressing rule is not applied to compounds of the other two types, that is, [Stem+Word] and [Word+ Word][12]. According to Nespor & Ralli (1996) this happens because the second constituent has already acquired the status of a phonological word before entering composition, and its stress cannot be omitted according to a general phonological rule (Stress Preservation Rule, Burzio, 1994). On the contrary, a stem may carry stress properties, but it doesn't carry any stress since it is not a complete phonological word.

To continue with something different, it should be noted that the structure of most compounds treated up to now contains a vowel [-o-] between the first and the second member:

▪[paɣ−ó-vun(o)]

"ice mountain"

A study based on classical Greek insights might consider this vowel as part of the lefthand member of the structure which is usually called a "theme", meaning the combination of a root and a thematic vowel. Note, however, that a possible distinction between a root and a theme has only a diachronic value in Greek. Therefore, any morphological study, trying to determine the form of the first constituent, has either to

[12] Note that the nominal multi-word compounds of this category show two main stresses, since both constituent parts have the status of phonological words, forming together a phonological phrase. (see Nespor & Ralli, 1996).

treat it as a single underived form, i.e. a stem ending in –o-, or to assume that this –o- does not belong to the first constituent and its appearance is triggered by the application of the compound formation rule. As Ralli (1992) states " given our present state of knowledge, it seems clear that the first solution is the less satisfactory one because for most items of the language used as first member in a compound formation, we have to postulate allomorphic variation ending in –o-. […] Consider now the possibility to treat this vowel as a word internal inflectional element-we must explain why its form remains unchanged while the form of common inflectional affixes varies according to the morphosyntactic features denoted by the base to which these affixes attach. For example, in a compound like [aspr-ó-mavr(os)] "white and black", distinct values of case and number do not affect the form of the vowel in question. On the contrary, these values correspond to different forms of word final inflectional affixes (e.g. [aspr-ó-mavr(i) in nominative plural, as compared to [aspr-ó-mavr(u) in genitive singular). We decide then to consider -o- as a linking vowel which makes the transition between the first and second constituent of a compound structure. As such, it may be inserted either by a lexical phonological rule after the compound formation rule has taken place, or by string dependent rule according to Lieber (1980). The former would be justified within the framework of Lexical phonology (cf. Kiparsky 1982) or within more recent models of morphological analysis such as that of Distributed Morphology and that of Ackema & Neeleman, while the latter constitutes a sort of transformation applied to morphological structure in order to explain variations on the form not accounted for by a morphological or phonological rule.

We should add that this –o-does not generally occur before items beginning with a vowel (i), unless it is the case of a "coordinative" (see below) structure (ii)[13]. In the latter case, the linking vowel ensures the structural at least combination of two items, given that semantically the constituent parts of such formations are in a loose relation, since no dependency is encountered:

(i) ▪[aɣri-ánɵrop(os)] "Wild-man"

[13] There are some more exceptional cases with respect to the appearance or no of the linking vowel -o-. See Ralli (1992, 1999)

(ii) ▪[agl-o-amerikán(os) “Anglo-American”

It is worth saying that such linking elements appear in other languages as well. For example, in Dutch the combination of two items is succeeded through the insertion of –s- or –e- (after constituents that form the plural in –en):

a. vogeltjesmarkt “bird market” < vogeltje “bird” markt “maeket”

b. schapewol “sheep wool” <shaap “sheep” wol” “wool”

(Booij 1992, 2002)

A semantic property of the compound formations is that usually they do not develop meanings that derive from the constituent parts they are made of. This characteristic is known as “semantic opacity” or “semantic non-compositionality”. This kind of non-transparency is characteristic of the morphological component of the grammar and it is not (normally) encountered with the products of syntax, i.e. phrases. Semantically non-transparent formations are also those produced by the derivational part of morphology. On the contrary, formations that are subject only to inflectional processes are the least opaque.

(i) Compound	(ii) Nominal Phrase
▪[meɣal-o-karxarías]	▪ [meɣálos karxarías]
“rich and powerful person”	“big shark”
▪[psixokóri]	▪[kór(i) psixís)]
“step daughter”	“Daughter of soul”
▪[avɣolémono]	▪[avg(ó) & lemón(i)]
“kind of sauce”	“egg & lemon”

We note that in the first column (that of compounds) idiosyncratic meanings emerge which are absent from the respective phrases given in the second column. The word [meɣal-o-karxarías] for instance, denotes a “rich and powerful person” and not a “big shark”. In the same truck, the word [psix-o-kóri] has changed meaning, since the meaning “soul” has been omitted completely. Even in the case of the most transparent compound, namely the word [avɣ−o-lémono], the meaning does not come out compositionally from the meanings of its constituent parts (egg & lemon)—the

compound denotes “a kind of sauce” (which is, of course, made of eggs and lemon). In part 5, we will be touching upon this issue more systematically.

3. The relations of the constituent parts

3.1. Headedness. Endocentric vs. Exocentric compounds

The first two rules given in p.11 (Stem Stem→Stem, Stem Word→Word) are generally subject to a number of well-known conventions, such as headedness and percolation[14] (cf. Lieber, 1980, Williams 1981, Selkirk 1982 and Scalise 1984 for a detailed account of these conventions). The notion of head has a long history in syntax but the application of a similar notion in morphology is relatively new, and has been prompted by the development of the lexicalist approach. Williams (1981) states that the rightmost node in any word binary structure will always be the head (“Righthand head rule”). With regard to compounding, this view has been challenged by Scalise (1988), who demonstrates that the position of the head cannot be established by any universal principle of the grammar. Languages may be expected to differ in the way and degree they employ the position of the head. Scalise shows that Italian for example is a language that exhibits two possibilities, that is lefthand and righthand head:

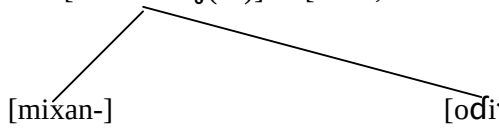
- gentiluomo < gentil(e) (H)uomo vs.
- camposanto < (H)campo santo

Focusing on Greek, it is possible to claim that compounding is a righthand head rule sensitive process in a number of respects. Aspects relevant to our present discussion can be briefly summarized as follows: in compound structures, category and other morphosyntactic properties of the righthand member percolate to the upper node from it[15]:

[14] Feature percolation is a mechanism proposed in Lieber (1980) and Williams (1981) which copies features of one of the members of a morphological construction (usually features of the head) to the node that immediately dominates both members. As a consequence, a complex form inherits (mainly) the properties of its head.

[15] According to Di Sciullo & Williams (1987) 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).

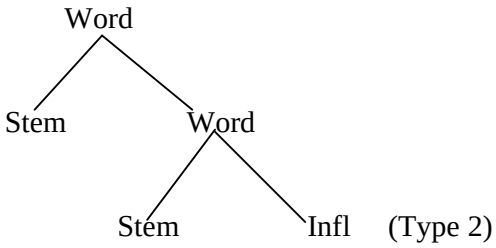
▪[mixanoɗiɣ(ós)] [noun, masculine, singular, nominative, common, “animate”]



[mixan-] [noun, feminine, common, “non-amimate”]

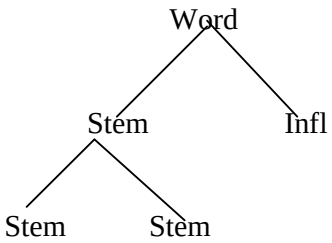
[oɗiɣ(ós) [noun, masculine, singular, nominative, common, “animate”]

According to Ralli the right-handedness of the compound is also confirmed by the location of inflection, which generally appears as the last morpheme in structures based on morpheme associations. The close relation between inflection and the head of the structure has already been discussed by Zwicky (1985). He claims that the head a construction is defined as the morphosyntactic locus, in that it bears the overt inflectional marking of the construction and that it is the item from which morphosyntactic information percolates to the upper node of the construction. According to Ralli (1992, 1999) Zwicky’s definition of morphosyntactic locus, implies the following structure for a Greek compound type:



(Type 2)

As pointed out earlier, this constitutes the generation schema for a large number of productive compound formations. A different generation schema has been suggested for compounds where inflection does not follow the head. It was argued that the latter refers to less productive formations with less coherent semantics:



(Type 1)

It is worth noting here that according to Di Sciullo & Williams (1987) inflectional endings are heads, thus percolation from endings has priority over the features of stems. A different approach is proposed by Lieber (1992a, b), 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 (1992). In particular, she 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 features bundles that represent stems. Whether or not inflectional suffixes constitute heads of inflectional structures is something that goes beyond the scope of this work[16].

The notion "head" is also crucial for the characterization of the semantic representation of compounds, in the so-called "endocentric" compounds (see next section) where there is a dependency relation between the constituent parts of the compound, the class of elements denoted by the compound is a subset of the class of elements denoted by the head. For example, a compound like [aɣri-ó-papç(a)] "wildduck" < [áɣri(a)] [pápç(a)] designates a particular bird that belongs to the class of ducks. As Selkirk (1982) notes, the non-head member of an endocentric compound further specifies the head either by functioning as a modifier or to it, or by assuming the role of an argument to the head, as is the case for verbal compounds.

It should be noted here that right-headedness is also the case in nominal multi-word compounds of the type Adj+Noun & Noun+Noun in genitive. However, this is not what happens in the third type: Noun+Noun in nominative compounds have their head on the left e.g. in [peδí θávma] "child miracle", as opposed to the English "wonder boy" where the righthand constituent has the role of the head.

As we have seen, Greek compounds can be nouns, verbs and adjectives (see footnote 3). We also saw that the grammatical category of the compound comes from the base, that is, from the item that linguistically is known as "head", which for the case of Greek is posited at the rightmost part of the structure. This item is responsible not only for the grammatical category of the whole compound, but also for its morphosyntactic and semantic characteristics such as gender, the basic meaning of the formation etc. As a matter of fact, if we look at the examples given below, we conclude that the righthand constituent is the one that passes to the compound the grammatical category, the gender and the basic meaning:

[16] For more see Ralli (1994).

▪[psar-ó-sup(a)] “fish soop” < [psár(i)] “fish” [súp(a)] “soup”

(N, Fem) (N, Neut) (N, Fem)

▪[xart-o-péz(o)] “play cards” < [xart(í)] “paper, cards” [péz(o)] “play”

(V) (N, Neut) (V)

▪ [kozm-o-ksákust(os)] “famous, well-known” < [kózm(os)] “world” [ksakust(ós)] “famous”

(A) (N, Masc) (A)

In the first example, for instance, the word [psar-ó-sup(a)] denotes a kind of soup and not a kind of fish. It is also feminine in gender, like the word soup, and not neuter like the word [psár(i)]. The compounds [xart-o-péz(o)] and [kozm-o-ksákust(os)] are verb and adjective respectively like their second constituents, and not nouns as their first constituents. As far as the structural position of the head is concerned, Greek resembles to the languages of Germanic origin such as English (see Lieber 1992a, b) and Dutch (see Booij 1992, 2002), since in both languages the head is the rightmost member:

(i) English	(ii) Dutch
Meat soup < meat soup	vleesoep < vlee soep
Pocket money < pocket money	zakgeld < zak geld
Body building <body building	bodybuilden < body builden

On the contrary, Greek is differs form Romanic languages, such as French for example (see Zwaneburg 1992) and Italian (see Scalise 1992, 1994). In these languages the constituent that is characterized as head is not normally the righthand member of the compound[17]:

(i) French

▪coffre-fort “safe” < coffre “box” fort “strong”

▪timbre-poste “postage-stamp” <timbre “timbre” poste “post”

(ii) Italian

▪Crosserossa “Red Cross” < Crosse “cross” rossa “red”

▪pescecane “dogfish” < pesce “fish” cane “dog”

[17] This is true for the so-called native compounds and not for those that can be characterized as loans (non-native compounds) from other languages (cf. French “sociologue”, Italian “sociologo” etc.). Furthermore, according to Scalise (1992) there are Italian compounds with the head on the right of the formation, but these structures are not as productive as the structures with the head on the left.
(cf. gentiluomo above)

In contrast, however, to what we have seen so far, in Greek (like in other languages), it is possible to have "head-less" compounds as well. Take for instance, the compound [kokin-o-mál(is)], which is composed by the stems [kokin-] "red" and [mal-] "hair". Its basic meaning, i.e. the one that has red hair, and its gender (masculine or feminine) do not come out from either stem. Compounds such this, are "exocentric", because it is assumed that the head of the formation is not present in the structure, and thus they differ from the compounds listed right above which are thought to be "endocentric". The question that arises now with respect to exocentric compounds is where their head is. Put differently, which is the constituent that gives the basic characteristics of the compound formation? According to Ralli the majority of these compounds are subject to the process of derivation, where a derivational affix is added to the compound. This affix gives the compound features and specifications that cannot come from the process of compounding. This derivational affix is obvious in exocentric compounds that end in [-is] which form the nominative plural in [-iʤes].

▪[kokin-o-mál-i-(s)] → [kokin-o-mál-iʤ−(es)]

According to Ralli, we assume that the inflectional ending of these compounds in nominative singular is [-s], which is plural becomes [-es]. The derivational affix shows the allomorphic change [-i] ~ [-iʤ-] depending on the number. In other words the structure of such compounds is as follows[18]:

[kokinomális]

[kokinomali-] [-s]

[kokinomal-] [-i-]

[kokin-] [mal-][19]

Let's see now a more problematic case, that is Greek exocentric compounds that do not end in [-is], but in [-os]. The affix [-os] is not derivational but rather inflectional. So, if it is not a derivational one how the presence of new characteristics in the compound can be accounted for? According to Ralli, these compounds are formed again by derivation, but this time via a null derivational affix, that is a phonologically

[18] cf. Extended Level Ordering Hypothesis and Lexical Phonology/Morphology

[19] The linking vowel –o- is not present in the structure. According to Ralli and the model of Lexical Morphology/Phonology (Kiparsky, 1982) this is added post-lexically, at a morphology-phonology interface. It is not a morpheme, since it lacks any information, so its not part of morphology.

non realized affix, which changes the grammatical category of the stem-input. According to this hypothesis, the structure of the exocentric compound [kal-ó-tix (os)] “lucky” < [kal-] “good” [tix-] “luck” is as follows:

[kalótixos]

[kalotix-] [-os]

[kalotix-] [Ø]

[kal-] [tix-]

It is worth noting here that this class of compounds is not a peculiarity of Greek, since such compounds occur in many other languages as well.

(i) English

▪redhead < red head

(ii) Dutch

▪bleekneus “pale-nosed” < bleek “pale” neus “nose”

(iii) French

▪brise-glace “break ice” < brise “brake” (IMPERATIVE) glace “ice”

“who breaks the ice”

(iv) Italian

lavapiatti “dishwasher” < lava “wash” (IMPERATIVE) piatti “plates, dishes”

In the examples given above, adjectives are created either from verb phrases (French, Italian) or from nominal phrases (English, Dutch). As is the case for the Greek exocentric compounds, the adjectival category shown is assigned by a null morpheme.

3.2. Synthetic vs. Root Compounds

3.2.1. Synthetic compounds

Although there is no general agreement among the linguists on where the line has to be drawn between the two categories, we will be taking here as synthetic, compounds like [orɣan-o-péx-t-(is)] "instrument player", [efkol-ó-pis-t-(os)] "easily convinced" and [kokin-o-mál-Ø-(is)] "Red-haired", where in all three cases the two constituent stems can only show up in a compound in the presence of certain derivational affixes[20], given that the non-synthetic constructs *[orɣan-o-pez(o)] "to instrument-play", *[efkol-o-piθ(o)] "to easily-convince" and *[kokin-o-mali] "red-hair" do not exist.

To begin with, what is interesting, is the fact that while cases like *[orɣan-o-pezo] where the nominal category is interpreted as the internal argument of the verbal one are impossible, N-V compounding as such is quite productive in Greek. Here are some examples[21]:

(I)

▪[maljotravó] "I pull sb from the hair" < [mal-] "hair" [trav(ó)] "pull"

▪[ematokiló] "I (make sth) wallow in blood" < [emat-] "blood" [kil(ó)] "wallow"

▪[ʤjaolostélno] "I send (sth/sbd) to hell" < [ʤjaol-] "hell/devil" [stéln(o)] "send"

▪[oksiɣonokoló] "I attach (sth) by using oxygen" < [oksiɣon-] "oxygen" [kol(ó)] "attach"

▪[avɣokóvo] "I by using eggs" < [avɣ-] "egg" "[kóv(o)] "rarefy"

▪[troxoʤromó] (airplanes) "I land by using wheels" or "I run on wheels" < [trox-]

[20] See Di Sciullo & Williams (1987) on the basis of English and Italian, Roeper (1987) and Grimshaw (1990) on the basis of English, Di Sciullo (1992) on the basis of Italian and English.

[21] Di Sciullo & Ralli (1994, 1999) comparing the range of thematic roles that can be satured word internally in different languages, draw the conclusion that Greek and English display a different behavior: while in English the N non-head can sature a limited set of theta-roles, in Greek there is no such limitation, and they attribute this asymmetry to the rich infection that Greek shows, i.e inflectional endings can license extra thematic roles. However, it seems that they do not take into account English N-V root compounds like to breast-feed, to play-act, to air-condition, to colour-code, to pressure-clean, to sky-dive, to hand-make etc. where is shown that the nominal non-head can correspond to a great range of thematic notions. Even more, it seems that the semantic relationship between the two parts in such compounds is much more underspecified in English than in Greek where the semantic relationship between the two members is easier to predict. E.g. to Chomsky adjoin, to head-govern etc.

“wheel” [ɖrom(ó)] “run”

▪[sxinovató] “I walk on a rope” < [sxin-] “rope” [vat(o)][22] “walk”

▪[xartopézo] “I play cards” < [xart-] “paper, card” [péz(o)] “play”

▪[afisokoló] “I stick poster(s)” < [afis-] “poster” [kol(ó)] “stick”

The issue, thus, is why the interpretation in an N-V compound cannot be that of an internal argument[23], while such an interpretation is available in synthetic compounds and in N-V compounds where the N is not interpreted as the verb’s internal argument:

(II a.)		(II.b.)
* [nix-o-kov(o)]	“to nail-clipp”	✓ [nix-o-kóp-t-is] “nail clipper”
* [orɣan-o-pez(o)]	“to instrument-play”	✓ [orɣan-o-pék-t-is] “instrument player”
* [lemon-o-stiv(o)]	“to lemon-squeeze”	✓ [lemon-o-stíf-tis] “lemon squeezer”
* [ele-o-kalierɣ(o)]	“to olive-cultivate”	✓ [ele-o-kaliérj-i-a] “olive cultivation”
* [kozm-o-xala(o)]	“to word-destruct”	✓ [kozm-o-xalaz-m-ós] “word destruction”
* [termat-o-fila(o)]	“to end-keep”	✓ [termat-o-fílak-Ø-as] “end/goal keeper”
* [elafokiniɣ(o)]	“to dear-hunt”	✓ [elaf-o-kiniɣ-Ø-ós] “dear hunter”

In the same vein, it’s worth noting that while Adv-Verb constructs like *[efkol-o-piɵo] “to easily convince sb”, *[arɣ−o-kino] “to slowly-move sth/sb” are ruled out as ungrammatical, adjectival constructs like [efkol-ó-pis-t-os] “somebody who is easy to convince”, [arɣ−o-kíni-t-os] “somebody who moves slowly” are fully acceptable. These adjectives constitute an other sub-class of synthetic compounds in Greek. Being like this, however, there are lots of grammatical Adv-Verb constructs in the language:

(III)

▪[agaliázo sftixtá] > [sfixt-agaliázo]

[22] The verb [vat(ó)] as such never occurs in isolation, it only shows up as part of complex words. It can be described as a pseudo-word/bound stem. For more on this see below in this section.

[23] Actually, in the last two examples in (I), namely [xart-o-pézo] “to card-play” and [afis-o-koló] “to poster-stick” the nominal non-head do correspond to internal arguments. According to Ralli (1989) these compounds represent a highly unproductive case of compounding: they are assigned the status of “backformations”, that is their existence is licensed by the prior existence of the more complex structures [xart-o-péktis] “card-player” and [afis-o-kólisi] “poster-sticking” respectively. However, nothing is said about the systematic existence of N-V compounds when N is not interpreted as the Verb’s internal argument.

“embrace” “tightly” “tightly-embrace”

▪[vrázo siɣá] > [siɣ−o-vrázo]

“boil” “slowly” “slowly-boil”

▪[geló krifá] > [krif-o-geló]

“laugh” “secretely” “secretly-laugh”

▪[simóno kondá] > [kond-o-simóno]

“approach” “near” “near-approach”

▪[peθéno arɣá] > [arɣ−o-peθéno]

“die” “slowly” “slowly-die”

It can be claimed that the category of synthetic compounds also contains compounds whose righthand member never appears as an independent word, even after having been submitted to an inflectional process. Still, the righthand member is interpreted as the internal argument of the verbal base from which the second member is derived:

(i)	(ii)
▪[sizm-o-ɣraf-Ø-(os)] “seismograph”	*[ɣraf(os)]
▪[astr-o-nom-¿-(os)] “astronomer”	*[nom(os)]
▪[tavr-o-max-Ø-(os)] “bull fighter”	*[max(os)]
▪[patr-o-kton-¿-(os)] “patricide”	*[kton(os)]
▪[θavmat-o-pi-Ø-(os)] “miracle maker”	*[pi(os)]
▪[anθ-o-pól-Ø-is] “flower seller”	*[pol(is)]
▪[akr-o-vát-Ø-(is)] “edge walker” (acrobat)	*[vat(is)]

Ralli (1989) names the rightmost part of such complex formations “bound stems”[24] because they can never appear as autonomous words in the language. They resemble the common stems, but they bear the peculiarity of “non-liberalization” even in the case they are combined with inflectional endings. On the contrary, canonical (non-bound) stems get liberalized once they combine with the appropriate inflectional affixes. Bound stems fall into the nominal category and they are derived from verbs without the existence of phonologically realized derivational affix (the affix [-os] in

[24] Scalise (1984) uses the term “pseudo-words”.

the examples given above, is an inflectional and not derivational one). According to Ralli, these stems are produced via either the grammatical process of "conversion" or the process known as "ablaut". The former presupposes the mere change of the stem category, from verbal into nominal, without the existence of any trace which would justify this alternation (e.g. [max-]V→[max-]N "fight"). On the contrary, in ablaut the change of category is accompanied by an alternation in the internal vowel of the stem (e.g. [nem-]V→ [nom-]N "observe")[25]. For purposes that we will be exposing in part 5, we will be taking conversion and ablaut as two morphological processes which involve derivational affixation (shown as Ø and ¿ respectively).

Interestingly, and in relation to what we have seen, when the derivational affix is not present in the structure such combinations are ungrammatical (as bare N-V compounds with internal argument saturation)

*[sizm-o-ɣraf(o)] "to earthquake-write"

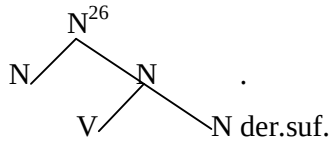
*[tavr-o-max(o)] "to bull-fight"

*[θavmat-o-pi(o)] "to miracle-make"

*[anθ-o-pol(o)] "to flower-sell".

Very crucially for our discussion later on, it has been claimed that synthetic compounds like [orɣanopéktis] for instance, should be analyzed as a special instance of N-N root compounds (see next section), the special instance being that the right-hand member is a deverbal noun which inherits the internal theta-role of its verbal base. Hence, Di Sciullo & Ralli (1999), following Selkirk (1982), Di Sciullo & Williams (1987), Booij (1988) and Nespor & Ralli (1996) claim that synthetic compounds of this type should be analyzed as

[25] Some bound stems resemble words which are encountered in the language and which are derived from the same verbal base. However, they are not of identical meaning e.g. [ðas-o-nóm(os)] "forester" < [ðásos] "forest" [-nóm(os)] "observer" vs. [nóm(os)] "law" both derived from the verb [ném(o)] "attribute".

⇨ 

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. The rationale behind this analysis is that its ingredients are independently motivated: the association of two N (either in the forms Stem+Stem, Stem+Word or Word+Word) is highly attested in Greek:

▪[lik-ó-skil(o)] < [lík(os)] [skil(í)]
"wolf dog"= "wolf-hound" "wolf" "dog"

▪[anɵ-ó-kip(os) < [ánɵ(os)] [kíp(os)]
"flower garden" "flower" "garden"

▪[avl-ó-port(a)] < [avl(í)] [pórt(a)]
"courtyard door" "courtyard" "door"

▪[omáɗ(a) erɣasí(as)] < [omáɗ(a)] [erɣasí(a)]
"group of working"= "working group"

▪[peɗí ɵávma] < [peɗí] [ɵávma]
"miracle child" = "wonder boy"

In addition, the righthand constituent of the compounds listed in (II.b.) above, can appear in isolation in the language: [kóftis], [kaliérjia], [xalazmós] [fílakas] etc. (with the exception of "bound" stems).

Despite, however, the plausibility of this analysis, there is a second possible view according to which synthetic compounds should be analyzed as nouns derived from N-V compounds (see Lieber 1983, Fabb 1984, Sproat 1985a and Ackema & Neeleman 2005). More generally, what is claimed to be happening in synthetic compounds is that an affix (that is, an item which is lexically specified to be morphologically realized) selects for a complex constituent as its non-head. We will

[26] This kind of configurational representation goes back to Allen's (1978) "Extended Level Ordering Hypothesis", according to which the morphological processes of derivation, compounding and inflection take place in different levels within the component of the Grammar responsible for word formation (according to early generative approaches this mechanism was part of the Lexicon). The higher a word formation process takes place in the component, the more productive it is and the more transparent the semantics of its output.

come back to this issue in part 6, when certain asymmetries and gaps will be attributed to the fact that Syntax and Morphology are in competition each one with another. As far as synthetic compounds are concerned, we will argue, following Ackema & Neeleman (2001, 2005) that they exist because they do not have syntactic counterparts.

3.2.2 Root Compounds

As we noted above in 3.2.1 there is no general agreement on the exact criteria that the distinction between synthetic and root compounds should be based on. As it was eluded previously, the decisive factor will be the existence or not of derivational affixes. Thus root compounds are compounds which are formed by the mere concatenation of two lexical items, irrespectively of whether the non-head is interpreted as a verb's argument (in the case of verbal root compounds). Crucially, in root compounds the semantic relation between the two constituent parts is rather indeterminate or/and the overall semantics is non-compositional. As Williams (2003) puts it "although there are quite narrow rules for pronouncing compounds, it would seem we can be no more precise about how to determine their meaning than to say, "find some semantic relation that can hold between the two elements". The tables below illustrate some examples of root compounds in Modern Greek:

I. Nouns N+N

▪[lik-ó-skil(o)] < [lík(os)] [skil(í)]

"wolf dog"= "wolf-hound"

▪[xart-o-petsét(a)] < [xart(í)] [petséta]

"paper towel" = "tissue"

▪[jiaurt-o-pólem(os)] < [jiaúrt(i)] [pólem(os)]

"yogurt war"= "fight with yogurt"

▪[spirt-ó-kuto] < [spírt(o)] [kutí]

"match box"

▪[peʤí ɵávma] < [peʤí] [ɵávma]

“miracle child” = “wonder boy”

▪[zóni asfalías] < [zón(i)] [asfalí(as)]

“belt for security” = “safety belt”

A+N

▪[palj-ánɵrop(os)] < [palj(ós)] [ánɵop(os)]

“scum, deceiver”

▪[elafr-ó-petr(a)] < [elafr(á)] [pétr(a)]

“light stone”= “pumice”

▪[meɣal-o-karxarías] < [meɣál(os)] [karxarí(as)]

“big shark” = “rich, powerfull and corrupted person”

▪[mikrí oɵoni] <[mikr(í)] [oɵón(i)]

“small screan” = “television”

▪[trítos kózmos] <[trít(os)] [kózm(os)]

“third world” = “the undeveloped and poor countries”

▪[mávri lísta] <[mávr(i)] [líst(a)]

“black list” = “a sum of prohibited or bad things”

II. VERBS

Adv+V (see [III] in 3.2.1 for more details)

▪ [siɣovrázo] < [vrázo] [siɣá]

“to boil slowly”

▪[krifogeló] <[geló] [krifá]

“to chuckle”

▪ [kondosimóno] <[simóno] [kondá]

“to come near, approach”

▪[nixtoperpató] < [níxta] [perpató]

”to go out in the night to have all kinds of fun”

N+V (see [I] in 3.2.1 for more details)

▪[ematokiló] < [emat-] [kil(ó)]

“I (make sth) wallow in blood”

▪[oksiɣonokoló] < [oksiɣon-] [kol(ó)]

“I attach (sth) by using oxygen”

▪[avɣokóvo] < [avɣ-] [kóv(o)]

“I make a food by using a sauce-topping made by eggs”

▪[troxoɗromó] < [trox-] [ɗrom(ó)]

(Airplanes) “I land by using wheels” or “I run into wheels”

For all the cases of root compounds we have seen so far, the distinction between non-head and head is possible, and crucial for the overall meaning. However, in compounds such as [aspr-ó-mavr(os)] “white and black”= “black and white”< [áspr(os)] “white” [mávr(os)] “black”and [ben-o-vjén(o)] “go in and out”< [bén(o)] “go in”[vjén(o)] “go out” the kind of relation between the two members of the construction, cannot be characterized as that of a nucleus (i.e. the head) and a dependent part (the non-head). Both constituents are equal with respect to their syntactic and semantic relationship towards the compound. Compounds such as these are known as “coordinative compounds” (or “dvandva”) and they represent concatenations of constituents belonging to the same category, that is, associations of two nouns, two adjectives or two verbs. In coordinative compound structures, constituent parts are placed in a relatively free order[27]. Thus, it is not unusual to find alternating types showing a particular constituent as first or second member of the construction:

▪[sten-ó-makr(os)] “narrow (and) long” and [makr-ó-sten(os)] “long (and) narrow”= “oblong”

▪[ɕon-ó-vrox(o)] “snow (and) rain” and [vrox-ó-ɕon(o)] “rain (and) snow”= “sleet”

To anticipate the discussion in part 6, the existence of Root compounds resides either to the fact that the semantic relation between their constituent parts is indeterminate or to the fact that the semantics of the overall compound encompasses a degree of opacity (idiomatic reading, non-compositionality).

---

[27] However, often, there is a strict order between constituent parts (i) and as far as verbs are concerned alternating compound types are not allowed (ii):

(i). [avɣ-o-lémon(o)] “egg (and) lemon sauce” but *[lemonoavɣ(o)]

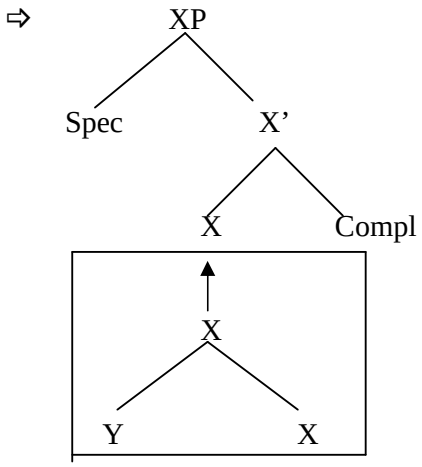
(ii). [aniɣ-o-klín(o)] “open and close” but *[klinoaniɣ(o)]

[ben-o-vɣén(o)] “go in and out” but *[vɣenoben(o)]

One can assume that this order may be imposed by independent semantic or pragmatic reasons: for example, constituents that appear first, express more basic concepts than constituents occupying the righthand position, or they precede as actions.

4. Generative Templates

Compounds are generally treated as adjunct-head configurations in binary representations. This goes back to theories of word formation such as these of Lieber (1980), Williams (1981), Selkirk (1982) and Di Sciullo & Williams (1987) according to which compounds (and more generally complex words) are generated as adjunct-heads, before they ender the syntax via an insertion mechanism[28]. Generation and Insertion are illustrated by the schema below[29]:



The descriptional advantage of this configuration resides to the implication that languages can pick out and merge two lexical items directly, so that possible and impossible formations can be accounted for by mere examination of the properties of the items being merged.

Additionally, theories like these recognize the crucial role the existence of certain derivational affixes play in the saturation of different thematic roles inside the compounds. For example, the Greek derivational affix [-t-] (counterpart of the English –er) which participates in the derivation of agent words such as [orɣanopékt(is)] (< [orɣan-] [pek-] [-t-] [-is]) "instrument player" typically binds the external argument of

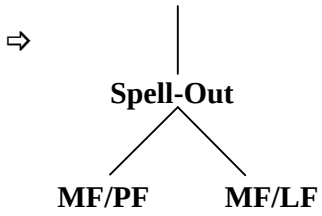
[28] There is no general agreement about the exact nature of this insertion mechanism. Compare among others Di Sciullo & Williams (1987), Beard (1988), Halle & Maranz (1993), Ackema & Neeleman (2005).

[29] It's worth noting here that even in theories which attribute the syntax a word formation capacity (cf. Roeper & Siegel 1978, Fabb 1984, Sproat 1985, Baker 1988, Roeper 1988, Pollock 1989, Halle & Maranz 1993, Julien 2002 etc) compounds are treated as binary constructs as well (see part 5).

its verbal host and makes available an internal argument position into which the latter's internal role can be copied.

Following Di Sciullo & Williams (1987) and Chomsky (1995), Di Sciullo (1996a, b) proceeds to a theoretical extension of the existing view, integrating principles of Chomsky's minimalist program into the theory of morphology and compounding. Di Sciullo & Ralli (1999) check the proposal against Greek data. To anticipate, the proposal constitutes an effort to account for asymmetries occurring in the compounding system of different languages. The analysis goes like this: Morphology is considered as an autonomous component of the grammar which provides structural descriptions for word formations. Assuming that there is only one computational space for the generation of linguistics expressions, word formations are not accessible to the syntactic operations of MERGE and MOVE, as defined in Chomsky (1995). As it is stated, contrary to MERGE, the morphological operations of composition and linking do not create new categories, and contrary to MOVE, the morphological operations are not subject to the Minimal Link Condition[30].The morphological component generates visible, i.e. interpretable head adjunction structures at the interface with the Conceptual-Intentional system. This interface is referred to as the Morphological Form (MF). MF is the X^o dimension of LF interfacing with the C-I systems for X^o interpretation. As Di Sciullo & Ralli note (1999:189) "the existence of an X^o dimension to LF is motivated in Di Sciullo (1996b), where it is shown that word internal interpretation, i.e. conceptual and referential opacity is not obtained in phrasal structure. In phrasal structure, the predicate argument structure interpretation is obtained, thus definite as well as indefinite reference for nominal expressions, and truth values for phrasal expressions".

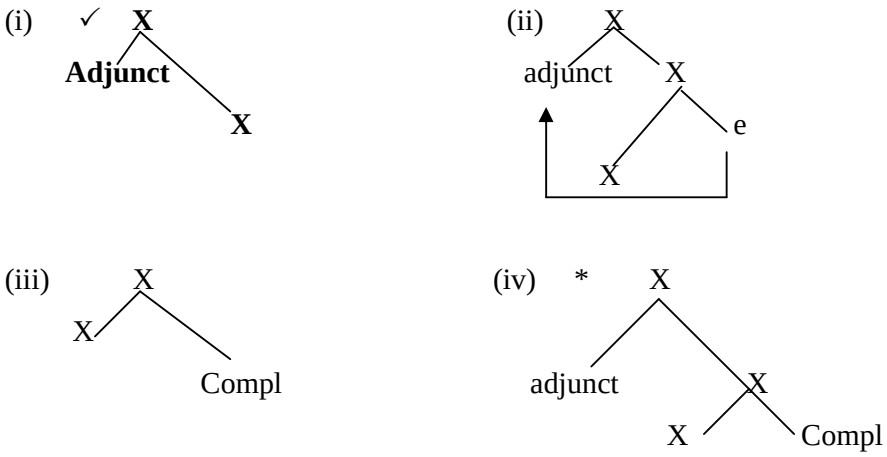
Considering the configurational schema given below, X^o expressions may have a phrasal structure at Spell-Out, but not at MF/LF or MF/PF. At MF/LF, X^o expressions have an adjunct structure[31] and not a specifier-head-complement structure.



[30] "K attracts α only if there is no β, β closer to K than α, such that K attracts β" (Chomsky, 1995:311)
[31] This holds not only for compounds but also for affixed words (derived & inflected).

As Di Sciullo and Ralli note (1999:190) " the configurational approach it should be viewed in conjunction with Kayne's (1994) proposal according to which, in a linguistic expression, the order of constituents determines the structural relation between them (*Linear Correspondence Axiom*). That is, an element that precedes the head of a configuration is an adjunct and an element that follows the head is a complement. It follows then that in a compound, a category that precedes the head is an adjunct".

According to Di Sciullo (1996a), compounds are adjunct-head structures at the interface (i), but they may not be at Spell-Out (iii), given the independent properties of the languages. In (i) the adjunct is not related/linked to an argument position e, as is the case in (ii) The prediction made is that in (i) the (semantic-syntactic) relation between the non-head and the head would be looser than their relation in (ii) and (iii). Furthermore, there are no compound formations which include overtly both adjunct and complement positions at Spell-Out as in (iv):



Since compounds in Greek, as it is the case in English, have the adjunct-head structure at Spell-Out and the adjunct may or may not be linked to an argument position as schematized in (i) & (ii) above, the prediction borne out is that various semantic roles may be expressed in these compounds:

▪ English

exam-giving (Theme) wind-blown (Agent)

student-exam-giving (Goal, Theme) mountain-sky-watching (Location, Theme)

heaven-sent (Location) color-code (material)

▪ Greek

(see part 2 &3 for concrete examples)

This is not what happens in Romance languages, however, where the head-complement configuration is obtained at Spell-Out [(iii)] and thus a restricted set of semantic roles may be satured within the compounds, usually the Theme role, as exemplified below[32]:

▪Italian: porta-ombrelli "umbrella-holder"
▪French: essuie-mans "hand-towel"
▪Spanish: lavaplatos "dish-washer"
▪Portuguese: abre-latas "tin-opener"

According to Di Sciullo & Ralli's view, like in English, Greek compounds have the adjunct-head configuration at Spell-Out because their left-hand noun must not be in a position where case in assigned. This noun is a bare stem without an overt inflectional suffix and, as such, it can not undergo Longobardi's (1994) overt N to D movement, as proposed in Di Sciullo (1996a) for Romance compounds, which are syntactic words. Thus, in Greek, this noun must appear in adjunct position at Spell-Out, a position where case is not visible and a position where a large variety of roles can be expressed.

What's new to the proposal under discussion is the fact that morphology is situated within the computational space of the language faculty and has an interface not only with the Articulatory-Perceptual System (the MF/PF interface), but also with the Conceptual-Intentional System (the MF/LF interface)[33]. This means that some principles may apply to both morphological and syntactic expressions (e.g. headedness), although morphological expressions are distinct from syntactic ones, in that they are product of the morphological module. The existence of an X^o dimension to LF is motivated by Di Sciullo (1996b), where it is shown that word internal interpretation, i.e. conceptual and referential opacity, is not obtained in phrasal structure. In phrasal structure, the predicate-argument structure interpretation is obtained, thus definite as well indefinite reference for nominal expressions, and truth values for phrasal expressions.

[32] Cf. the notion of "syntactic atom" in Di Sciullo & Williams (1987).
[33] It is also assumed that the morphological grammatical module constitutes an interface level between the grammar and the mental lexicon. (see also Smith & Tsimpli, 1995)

The model, thus, by making notions such as Spell-Out and LF relevant to morphology as well, gives appealing explanations to the fact that there are languages such as Italian, Spanish and French that show compounds that deviate from the adjunct-head template attested in English and Greek.

5. Syntactic analysis on compounding

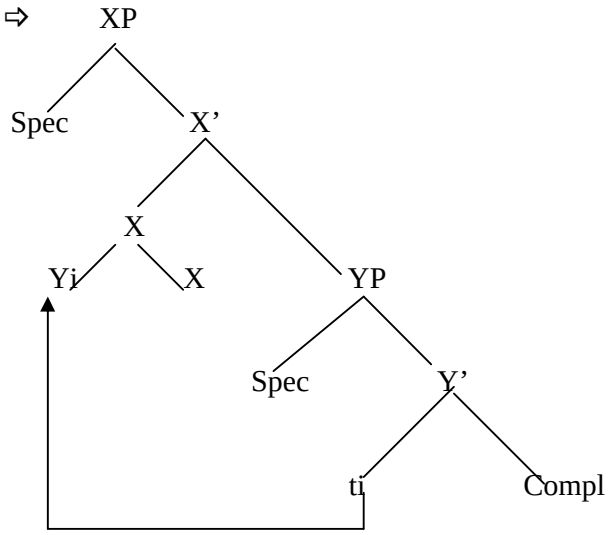
5.1 Background

As we saw in the introductory part of this work, the question "which part of the grammar is responsible for the formation of complex words", has been given different-and many times conflicting-answers. As a remainder, we noted that among the different theories whose aim is to offer a justified account on word formation, there are theories which recognize a prominent role to the syntactic component of the grammar. According to such theories, syntax is not only responsible for the generation of phrases, i.e. for the concatenation of words with hierarchical relations, but it can also be the component which is responsible for the generation of complex words, by concatenating morphemes (stems and affixes).

However, even the theories that attribute the syntax this additional burden vary significantly with respect to the degree that syntactic principles and mechanisms are responsible for the generation of words. As a matter of fact, there are views and theories that deny altogether the existence of morphology (or at least morphology as we have it in mind) , arguing that complex words are generated mainly by the syntactic module of the grammar via well known phrasal operations such as head-to-head movement (compare Roeper & Siegel 1978, Roeper 1988, Pollock 1989, Halle & Maranz 1993, Julien 2002). The main motivation for such an omission is that there is a considerable overlap in the features manipulated by the two systems (morphology and syntax) .As Starke (2002) notes, in both systems there are case features, verbal features (tense features) and phi-features (agreement: features for person, number and gender). In the same vein, both morphology and syntax share the operation of merger, resulting in hierarchical structures that allow for thematic relations, relations of binding. Furthermore, there are striking parallels between syntax and morphology in

the way their constituent parts are put together in complex structures[34]. Thus, their main argument is that a model in which morphology constitutes a separate generative system violates the principle of economy, since it presupposes a significant duplication of grammatical material, principles and operations for the generation of complex words.

For such theories, compounds and complex words in general are formed from syntactic representations with application of the transformational rule known as "Head-to-Head Movement": a selected head Y, leaving a trace behind, moves and forms a complex category with a higher head X. The new category is headed by X while the adjoint head Y functions as the non-head. (see also footnote 36). The process is illustrated below:



On the other hand, however, there are more moderate views as well. For instance, Baker (1988) assumes that word formation is mainly handled by the Lexicon, but he recognizes that there are many word complexes that are built by syntactic head-to-head movement. As a matter of terminology, he talks about "Incorporation"[35] phenomena. The basic cases that Baker discusses involve incorporation of a lexical category into a lexical head (usually noun incorporated into a verb). Baker's

[34] Cf. Baker's (1988) Mirror Principle & Cinque's (1999) Functional Sequence Principle

[35] Note here that what is described as "incorporation" does not necessarily imply a head-to-head movement analysis. The term was originally coined in order to describe a certain grammatical phenomenon, namely the fact that a lexical item can form a unit with its selector satisfying a theta-role of it. However, due to the fact that incorporation phenomena were accounted for by the influential work of Baker via the syntactic mechanism of head-to-head movement, it resulted incorporation to imply a syntactic analysis.

incorporation has the following properties: the incorporated element is itself a head of a phrase and it is assumed that only the heads of arguments can incorporate. Also theta-marking is a prerequisite for incorporation, since what is incorporated must be part of the argument structure of the verb. In other words, only lexically selected items are candidates for incorporation. What this implies (and it is crucial for the analysis of possible incorporations in Greek) is that adjuncts can not incorporate since this would lead to an ECP violation[36], namely, the trace left behind could not be properly governed by the complex that is created.

5.2 Incorporation-like compounding in Modern Greek

Along the lines of Baker, it is proposed by Rivero (1992) that Incorporation, as a grammatical phenomenon analyzed in virtue of syntactic mechanisms, exist in Greek and it is instantiated mainly with Adv-Verb sequences. However, Rivero-even in inadequate manner-claims that Greek shows Noun Incorporation [37] as well.

a. Adverb Incorporation

Crucially, Rivero (exploiting McConnell-Ginet, 1982) distinguishes two classes of adverbs: Manner, Locative and Aktionsart vs. Temporal, Aspectual & Sentential. The first class of adverbs is VP-internal, behaving like complements to the verb, something that gives them the possibility of incorporation since they constitute lexical items which are selected by a higher head (i). On the other hand, Temporal, Aspectual & Sentential adverbs, being VP-external, cannot incorporate[38] (ii). It should be noted, however, that even VP-external adverbs can be part of complex words, but in such a case the formation is lexically/morphologically generated (cf. [efkol-ó-pistos..easily convinced..]

[36] Baker originally assumed that incorporation was constrained by Travis' (1984) Long Head Movement. However, later on Baker & Halle (1990) proposed, instead, that the process is subject to ECP and Relativized Minimality.

[37] Actually, Rivero claims that unproductively Greek shows a third type of Incorporation, namely Pronoun Incorporation (anaphors and reciprocals). However, the view has been criticized as extremely weak. (see Smirniotopoulos & Joseph 1998 and Kakouriotis, Papastathi & Tsangalidis 1997)

[38] Alexiadou (1997) also supports such a view. However, instead of VP-internal and VP-external adverbs, she talks about complement-like and specifier-like adverbs respectively. Only adverbs that belong to the former category can incorporate.

(i) ▪[agaliázo sftixtá] > [sfixt-agaliázo]
"embrace" "tightly" "tightly-embrace" (Manner)
▪[vrázo siɣá] > [siɣ−o-vrázo]
"boil" "slowly" "slowly-boil" (Manner)
▪[geló krifá] > [krif-o-geló]
"laugh" "secretely" "secretly-laugh" (Manner)
▪[miláo ksaná] > [ksanamiláo]
"talk" "again" "again-talk" (Aktionsart)
▪[simóno kondá] > [kondosimóno]
"approach" "near" "near-approach" (Locative)

(ii) ▪[miláo akóma] > *[akomamilao]
"talk" "still" "still-talk" (Aspectual)
▪[kapnízo tóra] > *[torakapnizo]
"smoke" "now" "now-smoke" (Temporal)

According to Rivero, incorporation is constraint not only by the nature of the adverb proper, but sometimes also by the semantics of the incorporator. For instance, while non-stative verbs qualify for incorporators (provided of course that the adverb in question can incorporate), stative verbs do not. Another constraint has to do with the aspect the verb expresses. (perfective vs. imperfective).

Rivero's views have been severely criticized by Kakouriotis, Papastathi & Tsangalidis (1997) and Smiorniotopoulos & Joseph (1998). Their claim is that this composites are regular compounds of the language, generated by the operation of lexical/morphological rules. Rivero's inventories are mainly checked against two criteria: productivity and compositionality. S&J (1998:451-52) note characteristically: "a syntactic rule should be generally quite productive, with at most just a handful of exceptions. By contrast, a lexical rule need not be productive and can show a significant number of arbitrary exceptions. Distributional gaps can thus occur in the output of lexical rules, in the sense that they need not allow for acceptable outputs for every potential input string, and there can be output forms that do not have a corresponding acceptable input string. Thus our basic assertion is that while a syntactic rule MUST be productive and virtually exceptionless, a lexical rule need not

be, but CAN be very productive, indeed even exceptionless. […] The second criterion is compositionality. The output of a syntactic rule should show compositional semantics, so that the meaning of the whole is composed from the meaning of its parts. By contrast, the output of a lexical rule can be non-compositional in its semantics and thus can show meanings that differ in ways that that are unpredictable in relation to the meanings of the individual parts composing it."

However, the data Rivero presents show striking deviations from what it would be expected, since neither distributional regularity nor semantic transparency (compositionality) is always present. For instance:

✓There are lots of manner adverbs which reject incorporation (e.g. [sostá] "properly", [sklirá] "cruelly", [psixrá] "coldly" etc (K,P,& T)

✓Semantically similar adverbs show different behavior. For instance, while the Aktionsart adverb [ksaná] 'again" can incorporate, [páli] "again" can not. Additionally, as is pointed out by K,P & T, the distinction between aspect vs. Aktionsart made by Rivero does not comply with the Greek phrase structure.

On the same truck, semantically similar verbs, e.g. [simóno & plisiázo] "come near", even though both non-statives, show a different behavior. While [simóno] can qualify as incorporator (cf. [kond-o-simóno]), [plisiázo] can not (*[kond-o-plisiazo]). (K,P & T)

✓A large number of Adv-V complexes are semantically non-transparent, that is, the compositional meaning of the analytical form differs radically from the that of the corresponding incorporated unit. For instance:[kalopçáno] < [kalá] "well" [pçáno] "hold" does not mean "hold well" but rather "flatter", [kondostékome] < [kondá] "near" [stékome] "stand" does not mean "stand close to" but rather "hesitate"

✓A large number of Adv+V complexes appear to have no analytic counterpart at all. For instance: [strongil-o-káθome] "sit pretty"< *[strongilá] "roundly" [káθome] "sit", [ksenokimáme] "sleep around" < *[kséna] "elsewhere" [kimáme] "sleep" (K,P & T)

b. Noun Incorporation

Rivero building on fact that Baker attributed Incorporation the status of a grammatical function changing process, assumes that alternations such those below involving the transformation of ditransitive ("double-object") structures into

monotransitive fall into the realm of formations that should be described as Incorporations:

a.[I kinótita ɗíni faɣitó stus ftoxús] →

"the community give (Act) food to +the poor"

b. [I kinótita trofoɗotí tus ftoxús]

"the commuity food+give+Act the poor]

According to Rivero, the fact that the Theme "food" forms a complex form with the verb "give" in sentence b. can be seen as head-to-head movement. In sentence a. the noun "food" is assigned the accusative case from the verb, while the Goal (indirect object) receives its case from the preposition [s] "to". Once the noun incorporates to the verb and it no longer needs to be case marked[39], the accusative case is assigned necessarily to the Goal. Thus, the preposition-case assigner is no longer needed and a grammatical function change is thus achieved.

However, K,P&T (1997) claim that Rivero's view on Noun Incorporation is the weakest part in her analysis since it is extremely restricted and descriptively not justifiable. First of all, it is unclear how [faɣitó+ɗíni] becomes [trof-o-ɗotí] by a mere movement process. The problem becomes even more acute, if we take into account the fact that the verb [ɗotó] does not exist in Modern Greek as such: it is a bound stem which never appears in isolation, but only as a component part in more complex formations.

In the same vein, S&J highlight certain distributional irregularities that arise if the Incorporation analysis is maintained. More concretely, they take the verbal composite [loɣ−o-ɗotó] "account for, give an account for" which is quite parallel to [trof-o-ɗotó] in terms of morphological structure, in that both show a noun stem in –o- combining with an end-stressed verbal stem [-ɗot-]. However, [loɣoɗotó] shows a different behavior in relation to a putative "noun incorporation". The argument goes as follows: just as Rivero posited a lexical decomposition of [trofoɗotó] into "GIVE FOOD TO SOMEONE", accordingly [loɣoɗotó] can be decomposed into "GIVE A REASON TO SOMEONE". However, the syntax of [loɣoɗotó] differs from that of

[39] Baker (1988) assumes that Incorporation is an efficient case-licensing mechanism. The same view is expressed also in Rizzi & Roberts (1989), Sportiche (1993) among others.

[trofoɗotó]. In particular, while the latter is transitive with a direct object, the former is intransitive, marking its remaining object with the preposition [s]:

▪[θa loɣoɗotíso ston patéra mu ja aftó]

FUT account to my father for this

"I'll account to my father for this"

Along the lines of the Incorporation-analyzed case of [trofoɗotó], we would expect for [loɣoɗotó] something like:

▪*[θa loɣoɗotíso ton patéra ja aftó]

Thus, if [loɣoɗotó] derives by Incorporation it should be active and fully transitive, with no prepositional marking of its remaining object. Thus, an Incorporation-based analysis makes wrong predictions, and it is obvious that Noun+Verb constructs such these above constitute a case of "canonical" compounding.

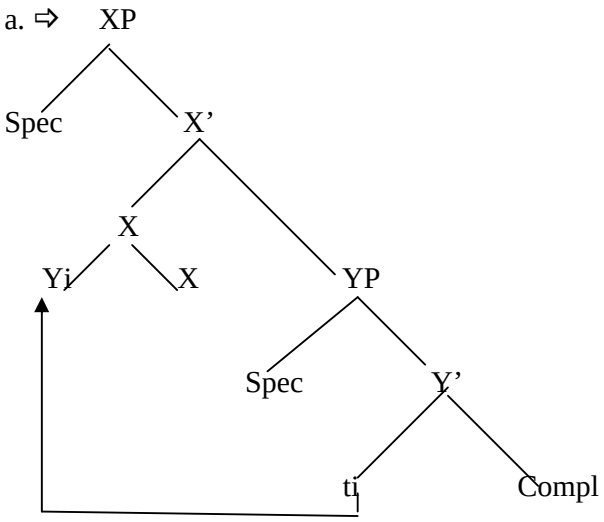
On the same truck, Rivero discusses another possibility as well. Incorporation is also expected to cause the detransitivization of the verb changing its form from active to non-active as a Case Absorption mechanism. When case absorption requirements are not met, Rivero proposes that the composites in question should be treated as lexically derived compounds, as opposed to syntactically derived incorporations. Rivero treats deverbal composites as lexically derived compounds as well, since in Incorporation verbal category is maintained[40].

Besides the argumentation of K,P & T (1997) and S&J (1998) it is worth having a look at some further interesting linguistic aspects of more general nature that could be drawn in our discussion in order to demonstrate the descriptive inadequacy of the syntactic analysis (at least for the Greek data above).

As a remainder, if syntax is the component of the grammar responsible for the formation of complex words, the process is schematized as follows:

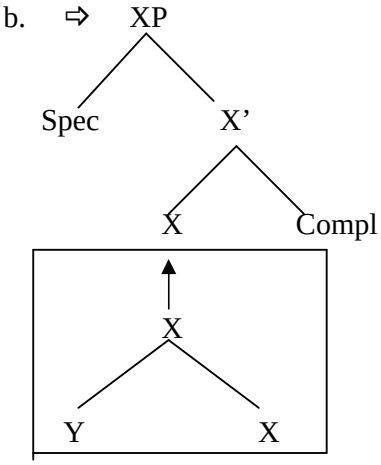
[40] For a more detailed analysis see Rivero (1992) & Alexiadou (1997)

a. ⇨



On the other hand, we saw in part 4 that in theories that opt for a (autonomous or not) morphological component, compounding (among other processes) is better described as

b. ⇨



where two lexical categories merge directly in morphology and then their output is inserted as a whole into a terminal syntactic node[41]:

As Ackema & Neeleman (2005) point out the two views make straightforward predictions about the material that can accompany a complex word. For instance, in the syntactic-incorporation schema in a., the trace of the non-head Y is expected to

[41] For the current purposes of the discussion we leave apart the theoretical complications Di Sciullo’s proposal introduce on adjunction (see part 4).

license the same material as Y does in isolation. If we turn now to the data from Greek, it is easy to find cases where this prediction is not verified:

- ✓ [jeláo krifá apó tus kaθijités]
  laugh secretly from the teachers but
- (??) [krif-o-jeláo $_t$ apó tus kaθijités]
  secretly-lagh from the teachers

On the some truck, even if we assume that [ðíni+faɣitó] becomes [trofoðotí] by a mere movement process (see above), still we can not explain the asymmetrical behavior below:

- ✓[I kinótita ðíni spitikó faɣitó stus ftoxús] →
  "the community give (Act) home-made food to +the poor"
- *[I kinótita trofo$_t$ðotí (*spitikó/i) $_t$ tus ftoxús]
  "the commuity food+give+Act home-made the poor]

Thus, despite that we would expect to be possible for syntactic material to be stranded after the complex category is formed via the movement operation, this expectation is not fulfilled. In the contrary, the morphological model does make any prediction for possible stranded syntactic material, since Y in schema b. above does not project outside the Y-X complex and hence cannot license additional syntactic positions[42].

Before ending, two more things can be said: a morphological theory explains in a more natural and straightforward manner the fact that the so-called "Adjunct Condition[43]" (see Huang, 1982) may be disobeyed in Adv-Verb constructs: two items merge directly in a separate component and no syntactic constraint has to be met while the formation takes place. Instead, a syntactic analysis has to make further stipulations like the one proposed by Rivero, namely that there must be a distinction between external vs. internal adverbs. Also, the fact that morphological/lexical processes are not expected to be of overwhelming power, (partially) explains the fact that only in some cases compounding is possible (see above, page 37).

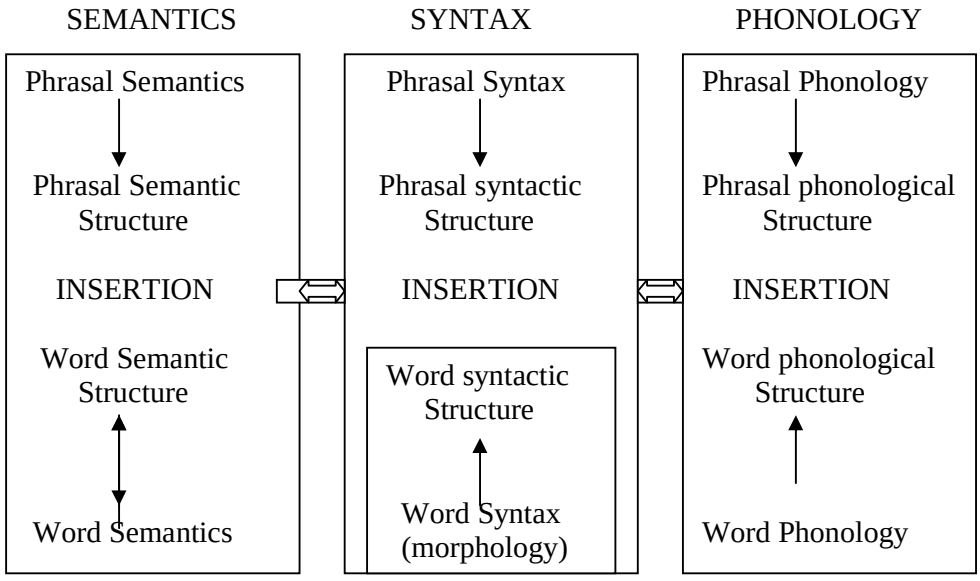
[42] For a more detailed argumentation against Incorporation-oriented analyses on word formation, see Ackema & Neeleman (2005), ch.2.
[43] Adverbs as adjuncts are islands for extraction:

6. Compounds in a theory of Competition

In what follows we will be presenting a theory of Grammar put forward recently by Ackema & Neeleman (2005). This theory offers appealing answers to questions concerning compounding and word formation in general. Its main advantage resides to the fact that word formation is seen as a process which is regulated by principles running within different modules of the grammar, even though there is a distinct morphological component.

To begin with, it is claimed that grammar consists of three macro-modules: syntax, semantics and phonology, each one containing a submodule that generates phrasal representations and a submodule that generates word-level representations. What is usually referred to as "syntax", corresponds to the part of the syntactic macromodule which is responsible for the generation of phrasal structures. This syntactic macromodule also contains a distinct submodule that generates hierarchical structures for words, the "word syntax" which corresponds to what is usually referred to as "morphology"[44]. In the same vein, the phonological macromodule contains two distinct submodules, responsible for the phonological properties of words and phrases, while the submodules of the semantic macromodule deal similarly with the semantic properties of phrases and words. The resulting model of grammar is shown right below (see also Jackendoff, 1997):

[44] Models of grammar that recognize a separate component for the generation of complex words such the one proposed here, are often blamed by models where the syntax undertakes this burden as anti-economical, since usually a duplication of rules and processes is imposed. However, as Ackema & Neeleman (2005:6) note, "this argument would be valid only if their claim was that morphology is a module of grammar on a par with semantics, syntax and phonology. The claim here is that morphology is set of submodules within bigger modules. These submodules can have their own vocabulary and principles, but as a matter of course they also inherit the vocabulary and principles of the module in which they are contained".



According to the module word formation, and thus compounding, is a process regulated both by intra-modular interaction between word syntax (morphology) and phrasal syntax (syntax), and by inter-modular interaction between the syntactic, the phonological (and to a lesser extend) the semantic macromodules.

What is of our interest here, is the intra-modular relations in the syntactic macromodule, that is, the relation between word syntax (henceforth morphology) and phrasal syntax (henceforth syntax). According to the theory syntax and morphology are in competition[45]. If two elements a and b are to form a complex category, they can in principle be combined in either submodule, that is as [a, a b] or [aP, a bP]. This means that complex lexical items can be underspecified as far as their locus of merge is concerned. However it is the case that that syntactic combination blocks morphological combination if all else is equal.

But when structures are in competition? Ackema & Neeleman take a morphological and a syntactic structure to compete (i) when in both structures a and b are merged[46] and when (ii) the semantic relation between a and b is identical in the syntactic and morphological structure. For example, if b is interpreted as a's internal argument in the syntactic structure, but as adjunct in the morphological one, there will be no

[45] Morphology and syntax interact in a different way as well, namely though insertion: morphological structures are inserted into syntactic terminals, and syntactic phrases may be part of complex words. For a detailed account see Ackema & Neeleman (2005 ch.4)

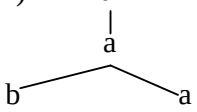
[46] Crucially, as Ackema & Neeleman note "it is irrelevant whether a and b project prior to merger. Because a head and its (extended) projections share identifying features, such a category, competition does not distinguish between merger of the terminals a and b and merger of a with an (extended) projection of b. Thus, a may head a complex category, without this disqualifying the resulting structure as a competitor." (2005:51)

blocking effect. Schematically competition and its blocking effects are illustrated below (✓ for the representation that "wins"):

(I)

(i) ✓ aP

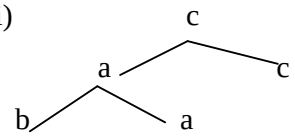
(ii) aP



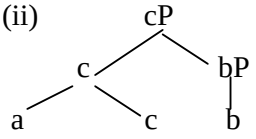
What the whole argument implies is that morphological merger is only an option when there is no syntactic competitor. As far as compounding is concerned, we can distinguish two different cases in which the situation holds. First, morphological merger of a and b may result in a semantics that cannot be expressed by the result of syntactic merger of the two (cf. root compounds), and second, when a complex category [a, b a] with transparent semantics is selected by a category changing affix c to form a complex category [c, a c] (cf. synthetic compounds). However, in this case the possibility the three categories have to merge in syntax is not excluded since the configurational distribution of the three elements in syntax is not efficient for competition to be established:

(II)

(i)



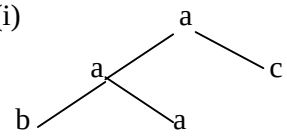
(ii)



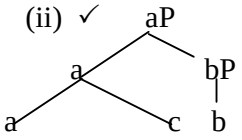
In (i) the final merger is between a and c, while in (ii) between c and an (extended) projection of b. Thus in that case we expect a morphological representation may run in parallel with the syntactic one. However, if c is not a category changing affix, the result is that the syntactic representation blocks the morphological one, since we have merger of the same categories which gives rise to competition:

(III)

(i)



(ii) ✓



Having sketched the main aspects of the theory, let us now demonstrate how competition can account for problems concerning certain distributional gaps and

asymmetries attested in Greek compounds. The discussion here must be seen as an extension of what we have already said about synthetic and root compounds

First of all, we saw that Greek lacks N-V compounds when N is interpreted as the internal argument of the verb. This must not come as a surprise: it is just because a syntactic counterpart exists which blocks its morphological realization. Consider for instance, the pair *[eleokalierɣ(o)] “to olive-cultivate”and [kalierɣ(ó) elj(és)] “to cultivate olives”. The structures here, pattern the schemas given above in (III). Since in both cases the material being merged is the same (V and N), and their semantics identical, the syntactic representation blocks the morphological one.

Accordingly, we showed that while N-V argumental compounding is not attested (due to competition and blocking), it turns, however, to be a possibility when certain derivational suffixes are present in the structure. As a matter of fact, while *[ele-o-kalierɣ(ó)] is ruled out, the noun [ele-okaliérj-i-(a)] “olive cultivation” is a grammatical output, even though it runs in parallel with the syntactic phrase [kaliérji(a) elj(ón)] “cultivation of olives” Their generating schemas are illustrated in (II). The material merged is not the same in the two cases, so competition is not established and both the syntactic and the morphological representations are expected to surface. What is crucial here is the fact that a complex category [V, N V] is selected by a category changing derivational affix [N] and it is not the case that two Nominal categories merge together.

On the other hand, it was underlined previously that N-V compounding is possible when N is not interpreted as a verb’s internal argument. Take as an example of the first case the verb [oksiɣon-o-kol(ó)] “to oxygen-stick”. The existence of this morphological complex is motivated by the fact that the mere concatenation of [koló] + [oksiɣóno] does not lead to the intended meaning. So even though the two structures compete, since the same material merges (N+V), the morphological representation is triggered by semantic requirements. Furthermore, as it is expected, the morphological form [oksiɣonokoló] runs in parallel with the syntactic [koló me oksiɣóno] “to stick with oxygen”.

. An appealing explanation is also provided for the possibility/impossibility an Adv and a Verb have to show up as a compound: as is the case for all root compounds, compounding is possible in the case the meaning of the compound is different from

the meaning the two constituents have when realized in the syntax. The prediction seems to be verified:

▪✓[kal-o-vlépo] “appeal to, like” vs. ✓[vlépo] “see” [kalá] “well” (No comp. sem.)

▪✓[kond-o-stékome] “hesitate” vs.✓[kondá] “near” [stékome] “stand” (No comp. sem.)

▪✓[krif-o-geló] “chuckle” vs. ✓[geló] “laugh” [krifá] “secretly” (No comp. sem.)

▪*[sklir-o-férome] “toughly-behave” vs.✓[férome] “behave” [sklirá] “toughly”(Comp. sem.)

▪*[akoma-milao] “still-talk” vs. ✓[miláo] “talk” [akóma] “still” (Comp. sem.)

Nonetheless, there are cases where the prediction seems not to work. For example the compound [ksana-káno] and the phrase [káno ksaná] being both grammatical, have the same semantics “do again”. Similarly, [sfixt-agaliázo] and [agaliázo sfixtá], both grammatical, both mean “embrace tightly”. However, even in cases like these, some kind of semantic non-transparency must be present in the morphological representation by the means of “extra-bits” of meaning or more ‘marked” meaning/use: indeed, it is not a coincidence that many morphological representations which occur next to syntactic ones, have the status of “termini technici” or similarly, others, are usually restricted in less formal forms of communication.

The theory of competition and its consequences extend to denominal synthetic compounds. As we saw in part 2 and 3 Greek has a productive process of A-N and Q-N compounding. Here are some examples:

▪[ɣlik-ó-riza] “sweet-root” = “liquorice”

▪[asxim-ó-papo] “ugly duck” = “ugly duckling”

▪[palj-ánɵropos)] “old man” = “scum, deceiver”

▪[elafr-ó-petra] “light stone” = “pumice”

▪[trel-o-kóritso] “crazy, insane girl” = “naughty girl”

▪[aɣri-o-ɣúruno] “wild, savage pig” = “boar”

▪[meɣal-o-karxarías] “big shark” = “rich & powerful person”

▪[peɗikí xará] “(of) children happiness” = “playground”

▪[mikrí oɵóni] “small screen” = “television”

▪[trítos kózmos] “third world” = “the undeveloped countries”
▪[mávri lísta] “black list” = “a sum of prohibited or bad things”
▪[mon-ó-stilo] “single column” =something that is written in a single column (newspapers, magazines)
▪[trí-strato] “triple road” = a place where three roads cross

None of these cases have the same compositional semantics as the syntactic combination of a noun and a pronominal AP/QP. [meɣal-o-karxarías] for example, does not mean a big shark, but rather a rich, powerful person or [trítos kózmos] does not denote a “third word in order” but the sum of undeveloped and poor countries”. So, like argumental N-V compounds, the prediction born out is that, A-N and Q-N compounds with a transparent meaning do not occur as such, because they are blocked by their syntactic counterparts:

*[kokin-o-mali] to mean “red-hair” [kókino malí]
*[makr-imali] to mean “long-hair” [makrí malí]
*[skur-o-xroma] to mean “dark-color” [skúro xróma]
*[prasin-o-mati] to mean “green-eye” [prásino máti]
*[makri-lem(os)] to mean “long-neck [makrís lemós]
*[tri-xromata] to mean “three-colour” [tría xrómata]
*[efta-sfaɣiɗ(es)] to mean “seven-seals” [efta sfraɣíɗes]
*[okta-kupç(a)] to mean “eight-oars” [októ kupçá]

The theory of competition correctly predicts their ungrammaticality, since for each compound there is a syntactic counterpart with merger of the same categories and same meaning which blocks their morphological realization. Nonetheless, they can be embedded under a derivational affix that heads the word it derives i.e. an A-N/Q-N compound, since there is no syntactic alternative in which the same categories are merged. As is shown by Ralli for the Greek data, this affix may be phonologically null . Here are some examples:
[kokin-o-mál-i-s] “red haired”
[makri-mál-i-s] “long haired”
[skur-ó-xrom-Ø-os] “dark coloured”

[prasin-o-mát-i-s] “blue eyed”

[makri-lém-i-s] “long necked”

[mon-ó-stil-Ø-o] “one columned”

[trí-xrom-Ø-os] “three colored”

[epta-sfráɣis-t-os] “seven (times) sealed” = very well sealed

[oktá-kop-Ø-os] “eight oared”

According to Ackema & Neeleman, the status of A-N sequences as embedded compounds is clear from the absence of inflectional endings on A. These would be obligatory in the corresponding syntactic phrases. For example, in [prásino máti] “green eye” the adjective carries the inflectional ending –o which shows agreement features with the noun its proceeds. Similarly, the obligatory plural ending of the noun when it follows a numeral (other than one) is absent in Q-N combinations above.

7. Conclusion

We demonstrated that compounding as a word formation process can be described syntactically and morphologically. Theoretical and empirical data, however, opt for the morphological analysis. Compounds are analyzed as adjunct-head configurations, where the adjunct is possible but not necessary to correspond to a verb’s argument in verbal compounds. According to the theory of competition, Syntax and Morphology are in complementary distribution up to an extend: Compounding is an option that languages activate, in the case that certain meanings can not be expressed syntactically (Root compounds) or in the case that a category changing affix selects for a complex non-head (Synthetic compounds). In this case the semantics of the complex non-head is expected to be transparent.

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