Adjectival Modification and Multiple Determiners*

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1. Introduction

The present paper deals with the distribution of the definite determiner and certain related aspects of adjectival modification in Greek DPs. As (1) shows, determiners in Greek DPs precede adjectives and adjectives precede nouns. All three categories overtly agree in gender, number and case.

> (1) a. *to megalo kokkino vivlio*
>   the big   red   book
>   b. * *to vivlio kokkino megalo*
>   the book red   big

One surprising characteristic of Greek definite DPs is that multiple occurrences of the same definite determiner in the same noun phrase are possible. This is illustrated in (2), where each adjective is accompanied by its own determiner. The pre-adjective determiner is optional for pre-nominal A's (cf. (1a) and (2a)), but obligatory for post-nominal A's: (2b) vs. (1b). The phenomenon exemplified in (2) has been labelled by Androutsopoulou (1995) *Determiner Spreading* (DS).

> (2) a. *to   vivlio to kokkino to megalo*
>   the book the red   the big
>   b. *to megalo to kokkino to vivlio*
>   the big   the red   the book

The order of constituents in Greek noun phrases is rigid in the absence of DS. On the other hand, in the presence of DS a number of different orders become available. (3) illustrates the additional possible permutations for (2). All

orderings receive one and the same interpretation:

(3) a.   *to megalo to vivlio to kokkino*
     b.   *to kokkino to vivlio to megalo*
     c.   *to vivlio to megalo to kokkino*

1.1 Standard approach

The pattern in (2) poses a number of problems for the standard approach to adjectival modification. In a standard syntax, adjectival modifiers are considered to be optional adjuncts to NP inside DP in a right- or a left-branching structure, as in (4b-c):

(4) a. $[_{DP}$ D NP]
     b. $[_{DP}$ D $[_{NP}$ NP AP]] / $[_{DP}$ D $[_{NP}$ AP NP]]
     c. $[_{DP}$ D $[_{NP}$ $[_{NP}$ NP AP] AP]] / $[_{DP}$ D $[_{NP}$ AP $[_{NP}$ AP NP]]]

Under this approach, both the determiner spreading phenomenon itself, and its effect on ordering possibilities, are unexpected. Given that the syntax permits APs to adjoin to NPs, and that semantics can interpret the output, DS seems a quite arbitrary phenomenon. The adjunction theory provides no syntactic reason to expect that A's modifying nominals should require a D (let alone, that the phenomenon should pattern with word order the way it does). From the semantic point of view, DS is even more surprising. It seems at first sight that the additional D's are not required for interpretation; in fact, that they have no independent semantic import (however, see section 3. below and footnote 16). Hence, within a model like (4), we are led to seek an account for (2) in terms of some arbitrary property of Greek which causes adjectives to take determiners in some cases.

Given that *to* is not an inflectional affix, but a free-standing morpheme, a purely morphological account is ruled out.[1] An alternative syntactic hypothesis could be that additional determiners are inserted derivationally in (2) in response to some syntactic requirement (perhaps along the lines of *of*-insertion, triggered by the Case Filter). However, no principle is evident that might trigger such a rule. Another option consistent with (4) would be to suppose that D-A sequences as in (2) are actually DP's with silent NP heads (due to ellipsis, or a base-generated empty NP, e.g. *pro*):

(5) $[_{DP}$ *to* $[_{NP}$ *vivlio*$_j$]] $[_{DP}$ *to* $[_{NP}$ $[_{AP}$ *kokkino*] $[_{NP}$ e$_j$]]
           $[_{DP}$ *to* $[_{NP}$ $[_{AP}$ *megalo*] $[_{NP}$ e$_j$]]

This option also seems to be ruled out (see section 2.6 below).

A straightforward modification of (4) involves the application of the

'extended projection' idea to adjectives. Since lexical categories generally occur as the complements of an associated functional head, perhaps the extra determiners in (2) are instances of functional elements within the extended projection of A (such an idea is pursued by Androutsopoulou 1995, see section 3. below). However, this case does not fit easily with independent proposals concerning the extended projection of APs, according to which the heads involved are those that make up the degree modifier system (cf. especially Corver 1997). DS appears to have nothing to do with degree modification.

   The correct way forward seems to be rather to recognize that adjectives need (or: can need) determiners of their own when they modify DPs. We argue that we come to a closer understanding of the DS phenomenon within a theory in which multiple determiners are required anyway by the syntax of adjectival modification. Such a theory has been put forth by Kayne, quite independently of the Greek facts.

1.2   Determiner complementation

In Kayne (1994:ch.8), adjective phrases modifying nominals are considered to be predicates heading a clausal complement of the D head of the DP. The nominal, usually considered the head of the construction, is analyzed as the subject of the predicative AP. This is illustrated in (6), where α is the nominal subject.

   (6) $[_{DP} \, D \, [_{CLAUSE} \, \alpha \, AP \,]]$

This approach revives earlier proposals that AP modifiers are derived from underlying relative clauses, and analyses them on a par with 'reduced relatives'. Kayne argues that relative clauses are CP complements of an external determiner D; and that D comes to be associated with its head nominal by movement of that nominal up from its base position inside the relative clause ('head-raising').

   In this system, stacked APs involve recursion. Thus, replacing α by (6) yields (7):

   (7) $[_{DP} \, D \, [_{CLAUSE} \, [_{DP} \, D \, [_{CLAUSE} \, \alpha \, AP \,]] \, AP \,]]$

Hence, the analysis predicts that each adjective requires its own determiner. If in addition, α = DP, then we expect $n+1$ determiners in a DP modified by n APs.[2] This prediction is correct for Greek. Thus, the determiner complementation hypothesis delivers a syntax of DP-modification that predicts a phenomenon with the contours of Greek DS, which is a surprising but welcome result.

1.3   Non-predicative adjectives

In (6), the adjective is the main predicate of a (small) clause. In this configuration, AP enters a predication relation with an internal DP, which contains the head noun. Thus, the determiner complementation approach to adjectival modification combines two predictions: that each adjective that modifies a nominal by determiner complementation will require its own independent determiner; and that only predicative adjectives may modify nouns this way. In other words, it is predicted that adjectives that cannot be used predicatively (in copula sentences etc.) should not permit determiner spreading in attributive use.

This is borne out for nonintersective adjectives like *ipotithemenos* ('alleged') and the so-called 'ethnic adjectives'. Consider the following:

(8)   a.   *o   ipotithemenos (*o) dolofonos*
                the alleged   (*the) murderer
        b. * *o dolofonos itan ipotithemenos*
                the murderer was alleged
(9)   a.   *i   italiki (*i)   isvoli*
                the Italian (*the) invasion
        b. * *i isvoli   stin Alvania itan italiki*
                the invasion of   Albania was Italian

Neither type of adjective is permitted in predicative contexts. As predicted, both are ungrammatical when used in DS. This correlation is captured naturally under the determiner complementation analysis; whereas it is unclear how it can be accounted for in the standard (undifferentiated adjunction) approach.

The main goal of this paper is to develop the approach in (6). In addition to the correlation just noted, we will explore how such an approach can account for the word order pattern illustrated in (2)-(3) by invoking DP-internal movement. Another issue to be addressed concerns constructions where additional determiners, expected under the determiner complementation approach, seem to be missing (for instance, in some definites DPs in Gr, in all Gr indefinite DPs). We will argue that the determiner complementation approach is correct for definite DPs only when these display DS. Indefinite DPs, we claim, involve underlying DS, but extra determiners are subject to a PF-deletion rule. We also argue that determiner complementation is not the only mode for adjectival modification. An alternative mode must be assumed for adjectival modification in examples like (8)-(9), where there is no predicative source; and it will be proposed that 'predicative' adjectives may also use this alternative, for example, in the construction (1a).

Before proceeding to the specifics of our own proposal, it is necessary to establish the theoretical and factual background for the discussion to follow. In

the next section, we discuss in some detail the main approaches to adjectival modification and illustrate the characteristics of DS.

2.   Some previous approaches

The distinction between attributive APs (DP-internal modifiers) and predicative APs (DP-external APs, e.g. predicates of copula sentences) is a traditional one. However, several authors have argued for another related distinction among DP-internal APs (cf. Bolinger 1967, Siegel 1976, Sproat & Shih 1988, Cinque 1993, a.o.). Sproat & Shih distinguish 'direct' and 'indirect' modification. Cinque refers to an 'attributive' vs. 'predicative' distinction among DP-internal APs, correlating broadly with the divide between prenominal and postnominal APs English (and Germanic and Romance generally)—cf. *a proud mother* vs. *a woman proud of her children*. This distinction is analysed as reflecting structural differences between two types of AP-modifier: while attributive adjectives are taken to be generated to the left of the N head of DP, the latter are generated to its right. We consider the syntactic distinctions and their analysis below.

2.1   Two types of DP-modifier

Apart from positional-structural differences, two further distinctions have played a role in attempts to sort out two types of DP-modifier. The first is what we have termed 'predicativity'; the second concerns the existence of ordering effects among multiple adjectival modifiers, which we discuss with reference to Sproat & Shih's 'direct' vs. 'indirect' modification.

'Predicativity' distinguishes DP-internal APs according to whether the adjective concerned can occur as a predicate in a copula sentence, while retaining the same meaning. This is related (but not identical) to the distinction between intersective and non-intersective (extensional and intensional) modifiers: generally, non-intersective modifiers do not have predicative uses (10), while adjectives that can be used as predicates in copula sentences may show subtly different meanings in their noun-modifying use (11):

  (10) a. an alleged murderer
      b. * this murderer is alleged
  (11) a. a small mouse
      b. this mouse is small

In (11a), under the (natural) restrictive reading of the modifier, the comparison class used to compute the meaning of *small* is the class of mice (the mouse referred to is small for a mouse), while the comparison class used for (11b)

may but need not be the class of mice (e.g. it is normal-sized for a mouse, but small with respect to a norm for animals in general). We shall not pay much attention to this distinction, as what is more crucial to our proposal is predicativity itself, i.e. whether an adjective can have a source in a clausal (predication) structure at all.

Multiple adjectival modifiers typically observe strict ordering restrictions. Prenominal adjectives in English and other languages observe an ordering in terms of semantic classes (12) (Sproat & Shih 1988):

(12)   a.   QUALITY < SIZE < SHAPE/COLOUR < PROVENANCE
       b.   the beautiful big red Chinese vase
       c.   the nice little round Greek cake

Deviations from this pattern can lead to ungrammaticality (13a vs 13b).[3]

(13)   a.   the big red vase
       b. *   the red big vase
       c.   the bright red, incredibly large vase
       d. ?   the RED big vase

However, orderings not satisfying (12) can be rendered acceptable by different means. Firstly, if two or more APs are realized as separate prosodic units (separated by comma intonation), ordering effects tend to disappear (13c). Secondly, stressing the initial adjective in the illicit sequence (13b) licenses a marked reading, cf. (13d), distinct from the neutral reading associated with (13a). Notice that (13d) contrasts with (13c) in that the adjectives do not form separate prosodic units separated by 'comma intonation'.

Sproat & Shih argue that there is a 'cognitive and semantic basis' for the ordering or 'scale' in (12), i.e. that the source for adjective ordering restrictions is extra-grammatical. They also argue that the scale only governs the ordering of multiple adjectives that are syntactically integrated via direct modification.

They propose that syntactically, direct modifiers are simply bare APs adjoined to a projection of N (i.e. the adjunction analysis (4)), while indirect modifiers are reduced relative clauses that may be adjoined outside the scope of 'specifiers of N' (in terms of the DP-hypothesis, adjoined higher than NP within DP). The authors discuss the syntactic reflexes of the direct/indirect distinction with respect to Mandarin Chinese. In that language, bare adjectives modifying nouns (direct modification) must obey (12). Multiple APs violate (12) only when accompanied by a particle (*de*). Interestingly, this particle is also a relative clause marker, supporting the suggestion that indirect modification is modification by (reduced) relative clauses. *De*-modifiers are further constrained in that they may only contain predicative adjectives (pp. 476-7).

The English example (13a) thus instantiates direct modification, hence (13b) violates (12). The APs in (13c) are suggested to be asyndetically coordinated ('parallel') direct modifiers, which do not violate (12) since they are not hierarchically ordered. (13d) also instantiates direct modification. The marked reading arises from the reanalysis of the 'relative' adjective *big* as an absolute adjective.

The status of (13d) becomes relevant to our discussion of Greek below. Naively speaking, if the adjectives are treated as intersective modifiers, there should be no difference in meaning between (13a) and (13d).[4] Both pick out the intersection of the set of vases with the set of red things and the set of big things. However, (13d) is clearly only licensed in a context in which a set of big books is already established. (13d) then refers back to that set, picking out the intersection of it with the set of red things. We refer to this as the marked reading, associated with the marked order of APs. There is no such marked reading associated with (13c).

Summarizing, Sproat & Shih's claim is that direct modification is characterized by (14), while indirect modification is characterized by (15):

(14)   *Direct modification*
      a.   is subject to ordering restrictions
      b.   permits intersective and non-intersective modifiers
(15)   *Indirect modification*
      a.   is not subject to ordering restrictions
      b.   permits intersective (predicative) modifiers only

As we will show, Greek DS cuts across these distinctions, permitting only predicative APs (hence falling under indirect modification), but being subject to ordering restrictions (a sign of direct modification). Greek DPs without DS clearly instantiate direct modification. We will argue that DPs with DS fall into the class of *indirect* modification, thus demonstrating that indirect modifiers may also be subject to the ordering restrictions (12).

2.2   Attributive adjectives (direct modification)

There are four main syntactic approaches to the status and position of attributive adjectives. The first treats them as AP adjoined to NP (cf. (4) above). The second analyzes such APs as generated in dedicated specifier positions of a number of functional projections between N and D that form part of the N-D extended projection (Cinque 1993):

(16)   [$_{DP}$ D [$_{FP}$ AP F [$_{FP}$ AP F [$_{NP}$ N ...]]]]

According to a third analysis, prenominal APs are integrated in the the N-D

extended projection, with the adjective themselves forming heads on the path between N and D (cf. Abney 1987 and for Gr, Androutsopolou 1995):

(17) $[_{DP}$ D $[_{AP}$ A $[_{AP}$ A $[_{NP}$ N ... $]]]]$

In the fourth approach, attributive adjectives are derived from underlying relative clauses. We return to this approach below.

The first three approaches all have in common the claim that attributive adjectives are generated in situ in prenominal position. A major issue involved in arguing for the 'Spec-analysis' (16) or the 'Head-analysis' (17) as opposed to an adjunction analysis is the ordering effects found among multiple adjectives. By treating multiple APs via iterated adjunction to a single category (NP), the adjunction analysis provides no syntactic basis for accounting for these facts. There are no syntactic principles which could select among different adjunction orders to a single node. The Head-analysis and the Spec-analysis, on the other hand, do make a syntactic account available. In either approach, the ordering (12) can be interpreted as the result of head-head selection in a hierarchy of heads within the N-D extended projection, schematically (18), where H1 = QUALITY, H2 = SIZE, H3 = SHAPE/COLOUR, H4 = PROVENANCE:

(18)   [D [H1 [H2 [H3 [H4 [N ...]]]]]

Under the Spec-analysis, the AP with a relevant feature is in specifier-head agreement with the relevant F°. Under the Head-analysis, each A° selects an AP with the relevant feature as its complement. Thus, to the extent that it is desirable to obtain a syntactic account for the ordering constraint (12), these two approaches appear to fare better than the adjunction approach.

The Head-analysis and the Spec-analysis differ in two further points. The first concerns the possibility for head-movement (N°-raising) within the extended N-D projection. Cinque (1993) argues that certain N-A orderings in Romance result from N raising from its base position within NP across certain pre-nominal APs, within a Spec-analysis. The argument is directed against an alternative approach that takes certain attributive adjectives in those languages to be generated to the right of N; but to the extent that N can be shown not to adjoin to A in such cases, it counts also as an argument against the Head-analysis.

The second difference concerns the possibility for adjectival heads to take thematic complements of their own (i.e. those licensed by A in its predicative use). Specifically, the Head-analysis makes the prediction that prenominal adjectives will not be able to take thematic complements (since they take a phrase of the N-D extended projection as complement). This works for English, where pre-nominal adjectives cannot take complements (19c).

However, there are languages, among them Greek and German, where phrasal APs appear in prenominal position, as shown in (19a,b). Such APs are restricted to post-N position in English (19d), and have been analysed as instances of predicative adjectives:

(19) a. *i [periphani ja to jo tis] mitera*   *Gr*
          the proud for the son her mother
      b. *die [auf ihren Sohn stolze] Mutter*   *Ger*
          the on her son proud   mother
      c. * the proud of her son mother
      d. the mother proud of her son

There is the possibility for mixed analyses, even for prenominal A's. The argument from phrasal APs (19) does not to apply to non-intersective modifiers (*alleged*, *former*, etc), as these seem never to be phrasal in the sense of (19) (cf. Bernstein 1992, Mandelbaum 1994). Thus, the Head-analysis may work for these cases, even if it does not for the intersective modifiers in (19). Mandelbaum argues for a mixed approach, adopting the Head-analysis for nonintersective adjectives, and an adjunction approach for intersective APs (20), within a theory in which this structural distinction reflects the particular semantic properties that these adjectives have:

(20) a. D° [$_{NP}$ AP NP]   (the red book)
      b. D° [$_{AP}$ A NP]   (the alleged murderer)

2.3   Predicative adjectives (indirect modification)

Cinque (1993) identifies a second type of AP-modifer, predicative adjectives, essentially equivalent to Sproat & Shih's indirect modifers, which he argues to constitute an entirely different type of modification from attributive adjectives. In Italian (which has post-N attributive adjectives), predicative adjectives are positionally identified by occurring to the right of N and its complements.[5] The position in question only allows for predicative APs; non-predicative adjectives are barred—cf. (21)-(22). While the predicative *brutale* is possible in the right-peripheral predicative position following the noun and its complement (21a), *principale* can neither occur in this position nor in postcopular position (22b-c), although it can occur as an attributive adjective preceding the noun:

(21) a. *la loro agressione all' Albania BRUTALE*
          the their aggression to-the Albania brutal
      b. *la loro agressione all' Albania è brutale*
          the their aggression to-the Albania is brutal

(22) a.   *questo è il principale motivo della sua partenza*
            this is the main motive of-the his departure
      b. * *questo è il motivo della sua partenza PRINCIPALE*
            this is the motive of-the his departure main
      c. * *questo motivo è principale*
            this motive is main

Like Sproat & Shih, Cinque identifies the base position of predicative adjectives as one internal to a reduced relative clause, maybe a small clause (23), within which the relevant AP forms the main predicate. This AP is predicated of a silent argument subject, itself controlled by the host DP:[6]

(23)   the [$_{NP}$ [$_{NP}$ mother] [$_{SC}$ PRO$_j$ proud of her son]]

Such an approach is strongly supported by the predicativity correlation: APs which occur in the postnominal 'predicative' position must be predicative (i.e. correlate with postcopular APs), for the simple reason that syntactically, they are predicates of (small) clauses. At the same time, the fact that there are many attributive APs to which no predicative usage corresponds, argues against transformationally relating the former class to the latter.

2.4   Generalized reduced relative analysis

As is clear from the previous sections, standard approaches to adjectival modification clearly distinguish between two types of adjectives. Kayne (1994:ch.8), on the other hand, claims that all types of adjectives are reduced relatives, i.e. all types have a predicative source. Kayne develops this approach within his general analysis of relative clauses. In particular, full relatives are analyzed as clauses which are complements of a determiner. The nominal 'head' of the relative originates inside the relative clause, and the external determiner gets associated with that nominal via raising of that DP/NP to Spec,CP:

(24) a.   [$_{DP}$ D CP]
      b.   [$_{DP}$ D [$_{CP}$ DP$_j$ [C° [$_{IP}$ ... t$_j$ ...]]]]   *head-raising*
      c.   [$_{DP}$ the [$_{CP}$ [$_{DP}$ claim]$_j$ that [$_{IP}$ John made t$_j$]]]

Reduced relatives are analyzed similarly. Specifically, a clausal structure is assumed where the DP/NP functions as the subject and the AP as the predicate. If the DP undergoes head-raising to Spec,CP (25b), the postnominal reduced relative results (p.97). Kayne thus dispenses with the empty subject and control relation of (24). The prenominal placement of attributive adjectives

results from fronting of the predicate, i.e. movement of AP across the subject to the Spec,CP (25c), in place of head-raising (pp. 99-101):

(25) a. $[_{DP}$ D $[_{CP}$ $[_{IP}$ DP AP]]]
      b. $[_{DP}$ D $[_{CP}$ DP$_j$ $[_{IP}$ t$_j$ AP]]]   *head-raising*
      c. $[_{DP}$ D $[_{CP}$ AP$_j$ $[_{IP}$ DP t$_j$]]]   *predicate-raising*

Thus the structure (23) for a DP modified by a predicative AP is replaced by (26a). An example with an attributive adjective, e.g. *the yellow book*, starts from an original structure *the book yellow*; AP-fronting to Spec,CP yields the surface structure (26b):[7]

(26) a. $[_{DP}$ the $[_{CP}$ $[_{DP}$ mother]$_j$ C° $[_{IP}$ t$_j$ ... $[_{AP}$ proud of her son]]]]
      b. $[_{DP}$ the $[_{CP}$ $[_{AP}$ yellow]$_j$ C° $[_{IP}$ $[_{DP}$ book] ... t$_j$]]]

While the reduced relative analysis may extend to prenominal adjectives that get an intersective reading, an alternative (direct modification) analysis is necessary for non-intersective adjectives, as these cannot plausibly be argued to have a predicative source.

This approach runs into another potential problem in respect of the fact that it fails to capture order restrictions governing attributive adjectives:

(27) a.   the big red book
      b. *? the red big book

If all APs are reduced relatives which enter their overt position via D-complementation, then both orders (*big < red / red < big*) can be generated:

(28) a. $[_{DP}$ the $[_{CP}$ $[_{IP}$ $[_{DP}$ D $[_{CP}$ $[_{IP}$ book red]] big]]
      b. $[_{DP}$ the $[_{CP}$ **big** $[_{IP}$ $[_{DP}$ D $[_{CP}$ **red** $[_{IP}$ book t$_{AP}$]] t$_{AP}$]]
(29) a. $[_{DP}$ the $[_{CP}$ $[_{IP}$ $[_{DP}$ D $[_{CP}$ $[_{IP}$ book big]] red]]
      b. $[_{DP}$ the $[_{CP}$ **red** $[_{IP}$ $[_{DP}$ D $[_{CP}$ **big** $[_{IP}$ book t$_{AP}$]] t$_{AP}$]]

However, (29b) is ill-formed. It is not clear how this can be given a plausible syntactic account within Kayne's system. Hence, to the extent that adjectives generated via determiner complementation show such ordering effects, the approach which treats the hierarchy in (12) as an output filter, i.e. as a cognitive filter as discussed in Sproat & Shih (1988), seems far more plausible. We follow this path for Greek in our analysis below.[8]

2.5   Determiner Spreading (DS) and predicativity

In section 1.2, we argued that following generalization holds for Gr:

(30)   An adjective permits DS only if it can be used predicatively.

This provides the major argument that modification displaying DS is in fact indirect modification, to be implemented in terms of underlying relative clauses, in which AP is predicated of a DP (and not combined directly with a projection of N). In this section, we demonstrate (30) in more detail.

    As noted, DS is found with adjectives of most classes (QUALITY, SIZE, SHAPE, COLOUR,...). It is also found with quantifier-like adjectives like *pola* 'many'. However, not all quantifier elements can occur preceded by a determiner; DS is impossible for example with *kapia* 'some'. As predicted, precisely those quantifier-like items that occur as predicates in copula sentences also permit DS inside DPs:

(31) a   *ta pola (ta) vivlia*   *cf.* the many books (also *few*, *two*, etc)
           the many the books
      b.   *ta vivlia ine pola*   *cf.* the books are many
(32) a. * *ta kapia vivlia*   *cf.* *the some books (also *no*, *any*)
      b. * *ta kapia ta vivlia*
           the some the books
      c. * *ta vivlia ine kapia*   *cf.* *the books are some

This difference patterns with similar distinctions in other languages. It is reasonable to suppose that the class that prohibits DS (*some*, *no*, *any*, etc) is the class of (non-adjectival) quantificational determiners, which cannot cooccur with definite articles in any case.

    The class of 'non-predicative' adjectives is heterogenous. It includes the following types:

(i)   non-intersective adjectives (*alleged, former* etc., cf. (8) above)
(ii)   'ethnic' adjectives (cf. (9) above), which include the so-called
       referential adjectives that appear in event nominals[9]
(iii) 'ambiguous' adjectives (cf. Bernstein 1992, Mandelbaum 1994).
(iv) adjectives in proper names and in adjective-noun compounds.

    'Ambiguous adjectives' are predicative adjectives that have developed a special meaning in their prenominal (attributive) use, in addition to the core meaning that surfaces in predicative use. In Gr DPs, DS is impossible relative to that special reading. Consider (33) and (34):

(33) a.   the poor man   ('impoverished' / 'pitiable')
      b.   the man is poor   ('impoverished' / *'pitiable')
(34) a.   *o anthropos o ftohos*   ('impoverished' / *'pitiable')

the man   the poor

    b.   *o ftohos o   anthropos* ('impoverished' / *'pitiable')
        the poor   the man
    c.   *o ftohos anthropos*   ('impoverished' / 'pitiable')
        the poor man

An adjective like *poor* in prenominal position is ambiguous between two readings. It can mean both impoverished and pitiable. The latter reading is banned from predicative uses. As expected, it this is reading that is banned from DS as well.

    The impossibility of DS with adjectives contained in proper names and in adjective-noun compounds is illustrated in (35). These adjectives cannot occur in postcopular positions either:

    (35) a.   *o Lefkos (*o) Ikos*   b.   *o Vorios (*o) Polos*
            the White   House   the North   Pole

Clearly, a reduced relative source is not available for the group of non-predicative adjectives. For these types various analyses are possible (cf. section 2.2). (36) illustrates some options. The adjective could occupy a head or a specifier position within the extended projection of N or it could form a compound with the head noun. What is crucial is that the adjective is combined with (a projection of) N before DP is projected:[10]

    (36) a.   D° [.. AP ... N°]   *AP in DP-internal specifier*
          b.   D° [$_{AP}$ A° NP]   *NP as complement of A*
          c.   D° .. [$_{N°}$ A N]   *compounding*

2.6   DS and Apposition

Having identified the types of adjectives that can occur in DS, what needs to be excluded at this point is that these are treated as instances of apposition. There is strong evidence to suggest that an analysis of DS in terms of apposition would be on the wrong track. Two types of appositive structure can be identified. Firstly, as in (37a), an appositive AP can occur at the right periphery of the DP, set off by pauses. Such APs do not permit DS. Rather, these cases involve a depictive AP which is external to DP, with a structural representation like (37b):

    (37) a.   *to spiti   to megalo,* **paljo ke grizo***, itan stin korifi tu lofu*
             the house the big,   old   and grey, was at-the top of-the hill

'the big house, old and grey, was ...'

b.   [_DP _to spiti to megalo]_ , **[_AP_ PRO _paljo ke grizo_]** , ...

Secondly, a D+A string can occur at the right periphery of DP (38a), again set off by pauses. This case is interpreted as DP in apposition, having a structural representation as in (38b).[11]

(38)   a.   _to spiti to kokkino,_ **_to megalo_**_, itan poli akrivo_
             the house the red,   the big,   was very expensive
             'the red house, the big one, was ...'

       b.   [_DP _to spiti to kokkino]_ , **[_DP_ _to megalo_ [_NP_ e]]** , ...

These cases are clearly distinguished from DPs showing DS. The latter form a single integrated intonational unit, in strong contrast to the appositives in (37)-(38). True appositive APs contrast with APs in determiner-spreading DPs in not showing the extra determiner.[12] Appositive D+A sequences on the other hand are not (interpreted like) appositive APs, but rather as independent DPs (with elided NP).

   In the next section, we consider the analysis of DS and associated facts, in terms of the determiner complementation hypothesis.

3.   Word order and empty heads in the Greek DP

There are three criteria which the account of determiner spreading should meet. Firstly, it must be able to capture the correlation between multiple determiners and predicativity of the APs involved. This can be achieved if the analysis ensures that DS is only possible where the APs have a reduced relative source, so that for adjectives that have no reduced relative source, DS is not possible. Secondly, it must provide for an alternative source for such nonpredicative APs. Thirdly, the analysis must account for the complicated surface word order possibilities in DS constructions, to which we turn first.

3.1   Determiner Spreading and Order

In definite DPs with DS, adjectives and noun are each paired with a preceding determiner, so that we find D+A+D+N and D+N+D+A, but never A+D+N+D etc. Beyond this constraint, DPs show remarkable freedom of internal word order. For a DP modified by two APs, i.e. consisting of one D+N and two D+A pairs, we find five of the six logically possible serializations. Thus, for the equivalent of _the big red book_, we have the options in (39):

(39)   a.   the big the red the book   _to megalo to kokkino to vivlio_

|		
b.	the big the book the red	*to megalo to vivlio to kokkino*
c.	the red the book the big	*to kokkino to vivlio to megalo*
d.	the book the red the big	*to vivlio to kokkino to megalo*
e.	the book the big the red	*to vivlio to megalo to kokkino*
f. (*)	the red the big the book	(*)*to kokkino to megalo to vivlio*

The sixth possibility (39f) is ungrammatical with respect to the intended 'unmarked' reading, but it is possible with the marked reading of *the RED big book* (we return to this fact below). The freedom of order for DPs with DS contrasts sharply with the fixed order of DPs without DS. The order (40a) is the only possibility for the unmarked reading:

(40)	a.	the big red book		*to megalo kokkino vivlio*
	b. *	the big book red	*	*to megalo vivlio kokkino*
	c. *	the red book big	*	*to kokkino megalo vivlio*
	d. *	the book red big	*	*to vivlio kokkino megalo*
	e. *	the book big red	*	*to vivlio megalo kokkino*

## 3.2   *Androutsopolou (1995)*

These facts were discussed already in Androutsopolou (1995). Let us briefly examine her proposal.

For the DP without DS, Androutsopolou adopts the proposal that prenominal adjectives are heads in extended N-D projection. Hence (40a) has the structure (41):

(41)
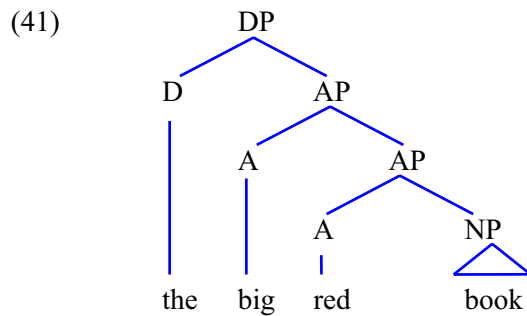
The multiple determiners that appear in DS are analyzed as instances of a new functional head within the DP projection, which she calls Def° (for definiteness). Def° is optionally projected above NP and AP, as in (42). Def° heads host formal agreement features (phi-features, Case and definiteness), which get spelled out by the relevant form of *to*. Crucially, the items introduced under Def are 'expletive'. The definite article that gets interpreted is hosted by the 'real' D°-head, the highest head in the extended projection of N.

D° contains no overt material:[13]

(42)
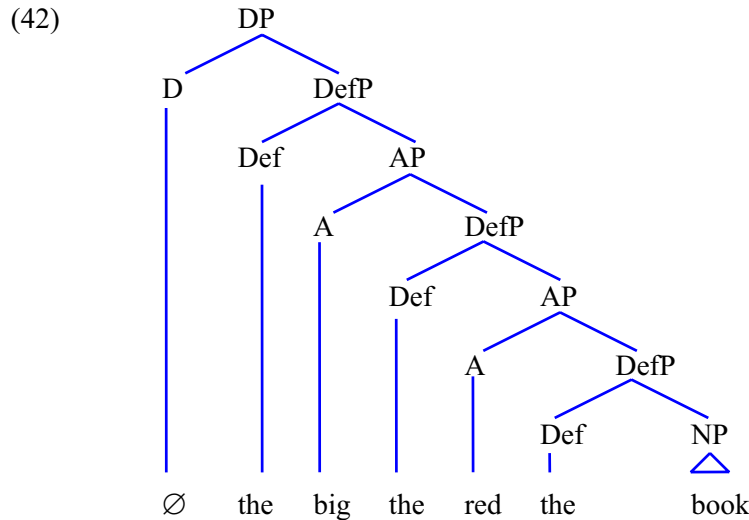
a.   [$_{DP}$ $\varnothing_D$ [$_{DefP3}$ the big [$_{DefP2}$ the red [$_{DefP1}$ the book]]]]
b.   [$_{DP}$ $\varnothing_D$ [$_{DefP3}$ the big [$_{DefP2}$ **[$_{DefP1}$ the book]** the red _]]
c.   [$_{DP}$ $\varnothing_D$ [[$_{DefP3}$ **[$_{DefP2}$ the red [$_{DefP1}$ the book]]** the big _]
d.   [$_{DP}$ $\varnothing_D$ [[$_{DefP3}$ **[$_{DefP2}$ [$_{DefP1}$ the book] the red _]** the big _]
e.   [$_{DP}$ $\varnothing_D$ [[$_{DefP3}$ **[$_{DefP1}$ the book]** the big [$_{DefP2}$ _ the red _]]

On the basis of (42), the ordering possibilities detailed in §3.1. can be captured by the single assumption that any DefP may move to the specifier of a higher DefP.[14] The free order pattern of (39b-e) can then be generated as the output of optional DefP raising operating on the base structure (42). Importantly, the impossibility of (39f) can also be explained.

Starting from the base (42a), there are four possible combinations of DefP-to-Spec,DefP movement. Two involve single-step movements: DefP1 can be raised to Spec,DefP2, giving (42b); and DefP2 can be raised, pied-piping DefP1, to Spec,DefP3, giving (42c). These two options can be combined, as in (42d); or DefP1 can raise alone to Spec,DefP3 (42d). There is no way to derive the missing sixth order (39f) *the red the big the book* from the base structure (42), since *the red* cannot be raised across *the big* without pied-piping *the book*.

Also, the single fixed order for the version without DS (40) follows; since the structure (41) contains no DefP, no movement is possible, and the base-generated structure determines the single surface order directly.

This proposal thus provides an elegant solution to the word order facts of §3.1. However, it suffers from a number of drawbacks. In the next section we develop an alternative which avoids these, while preserving the essence of

Androutsopolou's account of the word order facts. First, let us consider what the problems are.

(i) complex APs. The first problem facing Androutsopolou's proposal has to do with the treatment of adjectival modifiers in DPs as heads. While the head analysis may be correct for simplex adjectival modifiers, it cannot be correct for all. As noted above, Greek allows complex APs containing head-complement structures, in pre-N as well as post-N position:

(43)   a.   *i* [*periphani ja to jo tis*] *mitera*
               the proud   for the son her mother
       b.   *i   mitera   i* [*periphani ja jo tis*]
               the mother the proud for the son her

Hence, the analysis of both types of DP, with DS and without, must provide for the possibility for modification by phrasal APs.[15]

(ii) DefP. Androutsopolou's analysis relies crucially on the assumption of a new functional category. However, it is unclear what gives rise to the appearance of DefP in Greek DPs. There seems to be no motivation to assume such a category in other languages, nor—apart from the facts it is intended to account for—in Greek. Nor is it evident what regulates the distribution of this category; why for example, should APs as well as NPs be governed by such a category?

(iii) Indefinite DPs. Androutsopolou assumes that DefP only shows up in definite DPs. However, the multiple permutation possibilities which it is instrumental in accounting for also show up in indefinite DPs in Greek--in the absence of DS. This is illustrated in (44)—just as in (39), a DP modified by two adjectives shows five of six possible permutations of APs and NP:

(44)   a.   a big red book   *ena megalo kokkino vivlio*
       b.   a big book red   *ena megalo vivlio kokkino*
       c.   a red book big   *ena kokkino vivlio megalo*
       d.   a book red big   *ena vivlio kokkino megalo*
       e.   a book big red   *ena vivlio megalo kokkino*
       f. (*)a red big book   (*)*ena kokkino megalo vivlio*

Clearly, the analysis of (44) should be of a piece with the analysis of (39). The obvious way of achieving this on the basis of (42) is to assume that Def may be present also when D hosts an indefinite article (differing presumably in the value of the 'definiteness' feature). Then, the relation between D, Def and spellout are reversed: in the definite DP, D° is phonetically empty, while each

instance of Def° hosts an article; while in the indefinite DP, D° hosts the indefinite article *ena*, and all instances of Def ° are phonetically empty.

(iv) Predicativity. Though Androutsopolou notes the correlation of DS with the predicativity of the adjectives involved, her analysis provides no principled basis for expressing this correlation. In terms of that analysis, the correlation could only be expressed by making the presence of DefP above an AP dependent on that AP hosting an adjective that can be used predicatively in other constructions. It is unclear how this can be achieved nonstipulatively.

3.3   Determiner complementation approach to DS

All four problems noted above can be resolved by invoking Kayne's analysis of AP-modifiers as reduced relatives, and his approach to relative clauses in terms of determiner complementation.

Consider the resolution of problems (i)-(iii). The first problem (complex APs) requires that prenominal adjectives can be analyzed as phrasal satellites to the N-D projection. We take this to mean that prenominal APs can be specifiers.

The second problem (Def) can be resolved by giving up the assumption of a separate functional category Def. We suppose that Androutsopolou's Def is in fact D. Instead of assuming a twin categorization (Def or D) for *to*, we claim that wherever *to* appears, it heads a DP. At the same time we dispense with the extra empty definite D° of (42).[16]

The third objection, concerning indefinites, is met by extending the account of definite DPs to indefinite DPs. We assume that indefinite DPs can also be constructed via determiner complementation. Instead of a phonetically empty indefinite Def° (cf. the solution within Androutsopolou's theory sketched above), we must allow for instances of indefinite D° with zero realization.
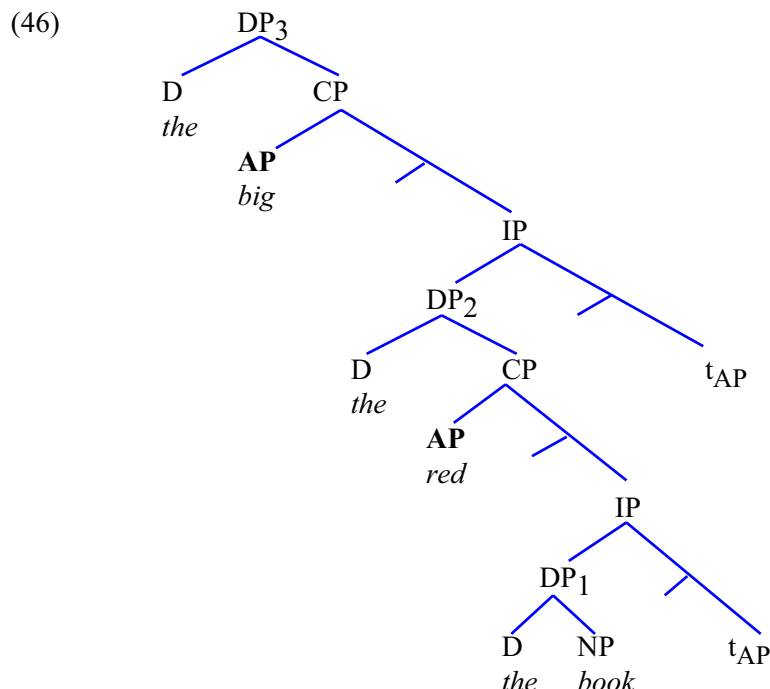
These modifications yield the structure (45) in place of (42):

(45)

```
                    DP3
              ┌──────┴──────┐
              D            ??
              │       ┌─────┴─────┐
              │      AP2         DP2
              │       │      ┌────┴────┐
              │       │      D        ??
              │       │      │    ┌────┴────┐
              │       │      │   AP1       DP1
              │       │      │    │     ┌───┴───┐
              │       │      │    │     D      NP
             the     big    the  red   the    book
              a      big     ∅   red    ∅     book
```
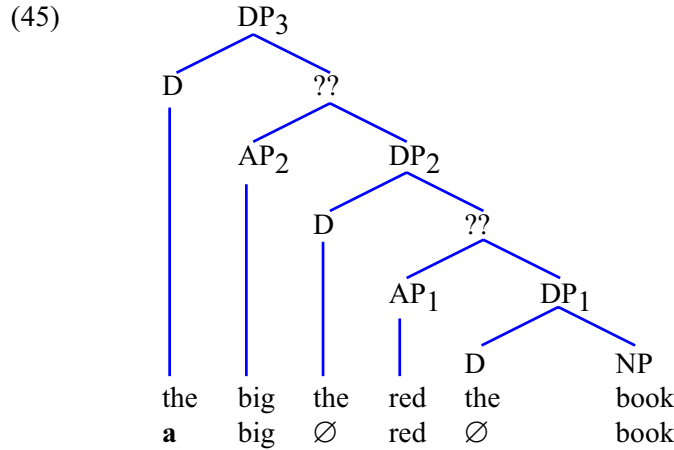
We propose is that the missing structure '??' in this tree is in fact clausal structure. This will provide a principled account of the predicativity-DS correlation (problem iv). The way to capture that correlation is to assume that each AP in a DP with DS stands in a predication relation with exactly one DP (AP$_1$ with DP$_1$, AP$_2$ with DP$_2$, etc). We take this to mean that the relevant DP does not contain the AP, i.e. ?? is not a projection of its DP daughter. Rather, DP and AP stand in a subject-predicate—i.e. clausal—configuration. In terms of the deteminer complementation hypothesis, that clause forms the complement of an external determiner. Where more than one AP is involved, the DP formed by the internal D-clause configuration will function as the subject for the next predicative adjective.

     One possible implementation would be to assume that ?? is a projection of the adjective, yielding a kind of small clause. However, this configuration would not match the usual subject-predicate order of small clauses. Instead, we pursue a more abstract analysis along the lines of Kayne's proposal, in which AP reduced relatives are actually full clauses with a CP and an IP projection. Each subject DP stands in the specifier of the relevant IP.[17]

     Instead of being base-generated on left branches, pre-nominal APs in DPs with DS stand in derived positions. We assume that each AP undergoes obligatory raising to the specifier of its CP. This is predicate raising assumed by Kayne for prenominal APs in English—cf. section 2.4. Example (39a) then has the surface structure (46):

(46)

```
                    DP3
                   /    \
                  D      CP
                 the    /  \
                      AP    IP
                     big   /  \
                        DP2    tAP
                        /  \
                       D    CP
                      the  /  \
                         AP    IP
                        red   /  \
                           DP1    tAP
                          /  \
                         D    NP
                        the  book
```

3.4 Definite DP—free order

We can now adapt Androutsopolou's account for the serialization possibilities for DPs with DS. The assumption that is necessary is that within a complex DP in Greek, subordinate DPs may raise to superordinate Spec,DP positions. This assumption is independently motivated by facts concerning possessor extraction out of DP in Greek, cf. Horrocks & Stavrou (1987). The possibilities for reordering the base structure (47a) (itself the output of AP-raising) by DP-raising are given in (47b-e):

(47) a. [DP3 the big [DP2 the red [DP1 the book]]]
      b. [DP3 the big [DP2 **[DP1 the book]** the red _]]
      c. [DP3 **[DP2 the red [DP1 the book]]** the big _]
      d. [DP3 **[DP2 [DP1 the book] the red _]** the big _]
      e. [DP3 **[DP1 the book]** the big [DP2 _ the red _]]

Given that each D° has at most one specifier position (cf. Kayne 1994), and that DP-raising is subject to locality, there is no other possibility.[18]

Now consider the missing 'sixth order' *the red the big the book* (39f). This serialization is marginally acceptable, with the marked reading of its English counterpart 'the RED big book'. It cannot be derived from from (47a) with the above assumptions. However, it can of course correspond to a

different base, in which the complex DP *to megalo to vivlio* ('the big book') is predicated of the AP *kokkino* ('red') in a higher D-CP structure. AP-fronting alone yields the relevant serialization:

(48) $[_{DP3}$ the $[_{CP}$ **red** $[_{IP}$ $[_{DP2}$ the $[_{CP}$ **big** $[_{IP}$ $[_{DP1}$ the NP $]$ t_{AP} $]]$ t_{AP} $]]$

We conclude that the marked order of APs arises through the choice of an alternative base-generated hierarchy (an alternative sequence of Merge operations, in terms of Chomsky 1995).

This brings us back to the question, noted in section 2.5, of how to account for adjective ordering effects within the Kaynian analysis. (48) and (46) have essentially the same meaning: both pick out a subset of the set of books by specifying the intersection of that set with two other properties. How then to account for the marked nature of (48)? In syntactic terms, the derivations of the (48) and the unmarked (46) are not competitors with respect to economy principles in the sense of Chomsky (1995). Although they begin from the same Numeration, their derivations are equally costly, as they differ solely in terms of the order of Merge operations. Given that all applications of Merge are equally costly (i.e. Merge is costless), at the choice point between the two derivations (i.e. where the base DP *the book* is to be merged with an adjective), neither continuation is cheaper than the other. This indicates that the source of the marked nature of (48) is not syntactic.

Though (46) and (48) mean the same thing, they determine different interpretative routes to that same denotation. (46) picks out a subset of the set of red books, namely, the subset whose members are large; (48) specifies a subset of the set of large books, namely, the subset whose members are red. Thus, the two equally well-formed syntactic derivations can be distinguished by appealing to a principle of interpretation.

The idea that (48) determines a route to the relevant meaning that is marked with respect to that determined by (46) implies that two modes of interpretation compete with one another, with one being preferred with respect to some metric. That metric may be the cognitive hierarchy of Sproat & Shih (1988) mentioned above. Given a notion of 'interface economy' like that proposed by Reinhart (1995), we can state that the marked option (48) can only be used where there is some extra interpretative need that cannot be met by (46). For instance, (46) cannot be used where the speaker intends to refer to a subset of *a preexisting set of big books* (i.e. a set already established in the context); whereas (48) can be. This communicative need may override the interpretive principle that dictates that the cognitive hierarchy be adhered to. However, where the speaker has no such intention, but merely intends to pick out a set of books via the intersection of the two properties, then the interpretative principle prevails, dictating the use of (46).[19]

3.5   Definite DP without DS: empty heads?

As noted above, adjectives that permit determiner spread may also appear in DPs containing only a single initial determiner, when the adjective(s) come before the noun. The question arises as to whether these cases also involve a determiner complementation configuration (49b), or a different syntactic mode lacking multiple DPs (49c):

(49) a.   *to megalo kokkino vivlio* ('the big red book')
      b.   [$_{DP3}$ the [$_{CP}$ big [$_{DP2}$ $\varnothing$ [$_{CP}$ red [$_{DP1}$ $\varnothing$ book]]]]]
      c.   [$_{DP1}$ the [big [red [book]]]

If (49b) is a possibility, then the analysis must allow for the occurrence of phonetically zero definite determiners, and give an account for their distribution. If (49c) is the correct (and only) structure for (49a), then this case does not involve determiner complementation; the sole D° in the construction belongs to a single complex NP (*big red book*) and not to either *big* or *red* independently. Several considerations favour this latter approach.

    Firstly, an alternative (or alternatives) to D-CP along the lines of (49c) is required in any event. This is necessary for all modifiers that fail the predicativity test, as argued above. DPs containing such adjectives pattern just like (49a). They do not permit DS; and they occur in fixed orders in prenominal position.

    Secondly, by utilizing this independently necessary alternative for (49a), we can dispense with the need to allow for phonetically empty definite determiners, and to account for their distribution.

    Thirdly, by adopting (49c), the question of why such DPs do not permit reordering relative to an interpretation does not arise. Reordering is a reflex of the option of raising DP to spec,DP. If (49a) does not contain internal DPs, no reordering is possible—apart from a different base order accompanied by a marked intepretation, as discussed for (48).

    Hence, we adopt a structure such as (50) for (49a):[20]

(50)   [$_{DP1}$ the [$_{NP}$ AP [$_{NP}$ AP [book]]]   (*or:* FPs below D)

    A further desirable consequence of this analysis is that it permits, with no additional assumptions, an account of 'mixed' DPs that display 'partial determiner spreading'. Consider the paradigm in (51):[21]

(51) a. ? *to megalo to kokkino vivlio*   (the big the red book)
      b. ? *to kokkino vivlio to megalo*   (the red book the big)

A DP modified by two prenominal adjectives may appear with two rather than

three determiners. Then, each determiner immediately precedes an adjective in the pattern D1-A1-D2-A2-N (51a). Only one reordered variant is possible: D2-A2-N-D1-A1 (51b). These two examples receive the unmarked (*big<red*) interpretation. A DP corresponding to (51a) is possible with the marked (*red<big*) reading accompanying the reversal in the placement of the adjectives (52a). The sole possible reordering (52b) retains the marked reading:

(52)   a.   ?? *to kokkino to megalo vivlio*   (the red the big book)
       b.   ?? *to megalo vivlio to kokkino*   (the big book the red)

All other conceivable patterns of 'partial determiner spread' are ungrammatical. It is impossible for the second determiner to precede the noun rather than the second adjective (53a); and other reorderings inside DP (53b-d, etc.) are excluded:

(53)   a.   *   *to megalo kokkino to vivlio*   (the big red the book)
       b.   *   *to vivlio to megalo kokkino*   (the book the big red)
       c.   *   *to megalo to vivlio kokkino*   (the big the book red)
       d.   *   *to vivlio megalo to kokkino*   (the book big the red)

These facts fall out neatly if the string D A N = $[_{DP}$ D $[_{NP}$ AP N $]]$, since this DP can itself function as subject to predicative AP in a determiner complementation configuration, giving the following structures for (51)-(52):

(51)' a.   ? $[_{DP2}$ the **big** $[_{CP}$ $[_{IP}$ $[_{DP1}$ the $[_{NP}$ red book $]]$ **t$_{AP}$** $]$
       b.   ? $[_{DP2}$ **$[_{DP1}$ the $[_{NP}$ red book $]]$** the big $[_{CP}$ $[_{IP}$ **t$_{DP1}$** t$_{AP}$ $]$
(52)' a.   ?? $[_{DP2}$ the **red** $[_{CP}$ $[_{IP}$ $[_{DP1}$ the $[_{NP}$ big book $]]$ **t$_{AP}$** $]$
       b.   ?? $[_{DP2}$ **$[_{DP1}$ the $[_{NP}$ big book $]]$** the red $[_{CP}$ $[_{IP}$ **t$_{DP1}$** t$_{AP}$ $]$

The predicative AP raises in each case to Spec,CP. There is one embedded DP (DP1) which can raise to the specifier of DP2. No further options exist.
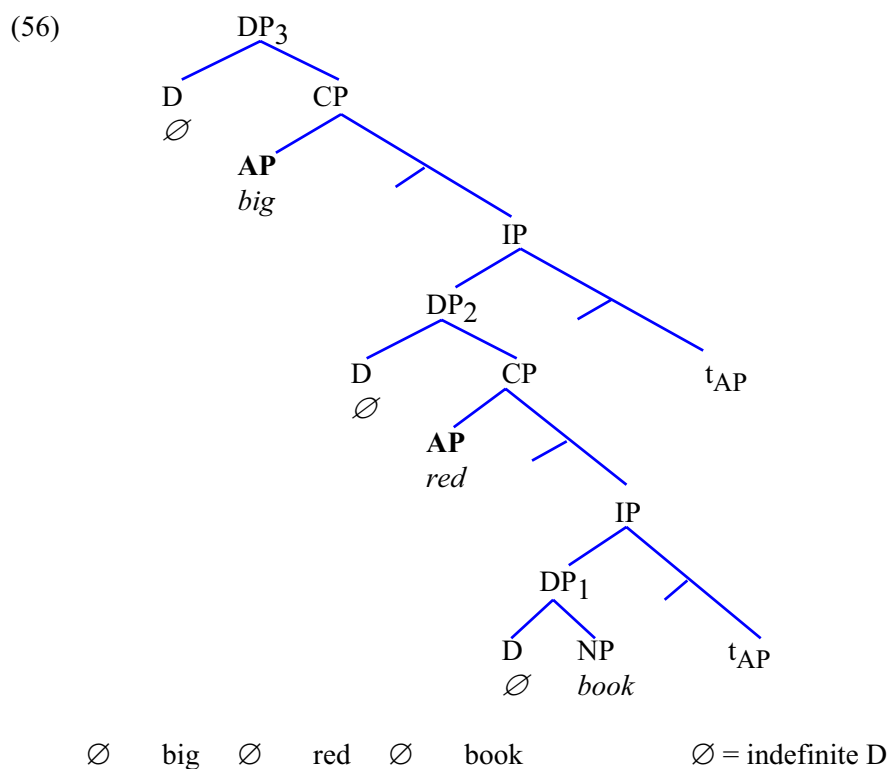
3.6   Indefinites

While definite determiners spread in definite DPs, indefinite determiners do not:

(54)   a.   **to** *megalo* **to** *kokkino* **to** *vivlio*
       b.   **   **ena** *megalo* **ena** *kokkino* **ena** *vivlio*

However, as argued above, the fact the indefinite DPs display the same reordering possibilities as definite DPs requires a unified account for both:

(55) a.   a big red book   *ena megalo kokkino vivlio*
      b.   a big book red   *ena megalo vivlio kokkino*
      c.   a red book big   *ena kokkino vivlio megalo*
      d.   a book red big   *ena vivlio kokkino megalo*
      e.   a book big red   *ena vivlio megalo kokkino*
      f. (*)a red big book   (*)*ena kokkino megalo vivlio*

In the proposal developed here, reordering results from the possibility for DP-raising to DP-specifiers in D-CP structures. Hence the same structure should be available for indefinites:

(56)

          ∅   big   ∅   red   ∅   book   ∅ = indefinite D

    This conclusion raises two further issues. Firstly, an account is required for the distribution of overt *ena* and zero indefinite determiners ∅ in indefinite DPs. Secondly, as A. Grosu (p.c.) points out, if both indefinite and definite DPs can iterate in way we propose, then the question arises as to what ensures that a definite DP cannot contain an indefinite DP, and vice versa. In other words, we need a mechanism that ensures 'definiteness harmony' within DPs displaying DS. We conclude this paper by addressing these two questions in turn.
    Notice that *ena* can be used as a cardinal adjective (meaning 'one') in definite DPs such as (57). However, *ena* cannot be so analysed in its use as an

indefinite determiner, since this would lead to false predictions concerning the positioning of *ena* under DP-raising to Spec,DP, as shown in (58):

(57) a. *to **ena** to kokkino to vivlio*
          'the one red book'
      b. *to vivlio to **ena** to kokkino*
          etc.

(58) a. $\varnothing$ ***ena*** $\varnothing$ *kokkino* $\varnothing$ *vivlio*
      b. * $\varnothing$ *vivlio* $\varnothing$ ***ena*** $\varnothing$ *kokkino*
          etc.
      a'. $[_{DP3}$ $\varnothing$ $[_{CP}$ ena $[[_{DP2}$ $\varnothing$ $[_{CP}$ AP $[[_{DP1}$ $\varnothing$ NP] t_{AP}]]] t_{AP}]]]
      b'. $[_{DP3}$ $[_{DP1}$ $\varnothing$ NP] $\varnothing$ $[_{CP}$ ena $[[_{DP2}$ $\varnothing$ $[_{CP}$ AP $[$ t_{DP1} ..]]] ..]]]

Rather, the *ena* that surfaces string-initially in (55a-e) should be analyzed as the spellout of indefinite D°. This rules out the possibility of analyzing the indefinite determiner as an intrinsically phonetically zero item.

A more plausible approach is to treat the zero realization $\varnothing$ of the indefinite D as the result of a PF-rule that deletes all instances of *ena* within a single DP bar one. In the examples (55b-e), the overtly realized *ena* is not the structurally highest D° (head of the whole construction) but the head of a raised subconstituent. The correct generalization is therefore that it is the linearly initial D° in the DP that is spelled out:

(59) a.   [***ena*** [*megalo* .. [$\varnothing$ *kokkino* [$\varnothing$ *vivlio*] t_{AP} ..] .. t_{AP} ..]]
      b. * [[$\varnothing$ *vivlio*] ***ena*** [*megalo* [$\varnothing$ *kokkino* _ ..]]
      b'. [[***ena*** *vivlio*] $\varnothing$ [*megalo* [$\varnothing$ *kokkino* _ ..]]
      etc.

The fact that a linear (not hierarchical) generalization is at stake can be taken to support the hypothesis that a rule of the PF-component is involved.[22]

Finally, consider the second question raised by indefinite DS—how to account for (in)definiteness harmony? We believe that this harmony effect is a reflection of a local morphosyntactic agreement relation. However, the claim is not trivial, since under our analysis, the multiple determiners in a DS structure such as (46) or (56) are separated by intervening clause boundaries, i.e. they do not stand in a local relation to one another. Thus, (in)definiteness harmony can be explained in terms of DP-internal agreement only if an extra mechanism can be appealed to which establishes locality among the determiners at some level. We suggest that the answer is obtained by attending to another issue so far ignored, namely, how the head noun in a DS-structure gets licensed for Case.

It is reasonable to assume that the noun at the core of a DP with DS must be licensed with respect to Case, just like the head noun in a simple DP. Equally plausible is that the subject position of the clausal complement of D in

a DS-structure is not a Case-licensing position (cf. note 7). Hence, like the noun in a simple DP, the noun in a complex D-CP structure cannot be Case-licensed in situ. The only Case-licensor available is the category which licenses the Case of the whole DP (an external verb or preposition, or whatever).

We suppose that in a simple DP, N raises covertly to D, and is thus able to participate in Case-checking with the external licensor (60a). The same can be assumed for a complex DP, with one crucial difference. If N may only raise to the most local D at any stage, then successive steps of N-D raising will be necessary for N to reach the highest (Case-licensed) determiner in (60b).

(60) a. $[_{DP}$ D .. $[_{NP}$ .. N ..]]
      b. $[_{DP3}$ D .. $[_{DP2}$ D .. $[_{DP1}$ D $[_{NP}$ .. N ..]] ..] ..]

However this idea is implemented technically (e.g. in terms of the 'Attract F' proposal of Chomsky 1995), it should suffice to account for feature-sharing among all determiners and the noun in a DS-structure.

Notes

1   Phenomena in other languages, plausibly related to Greek DS, where adjectives show special inflections in definite DPs, may lend themselves to a purely morphological account; cf. the strong nominal inflection paradigm of Germanic (recently discussed in Kester 1996), or the 'definite' forms of adjectives found in Slavic. The Greek case is also reminiscent of Scandinavian (cf. a.o. Santelmann 1993, Delsing 1993, Kester 1993 for discussion), where the presence of a modifying adjective seems to trigger 'determiner doubling'.
        (i)   *bok-en*   (ii)   *den ny-a bok-en*   (Swedish)
            book-the   the new-def book-the
    However, this case differs from Greek in several ways. While the doubling determiner is a free morpheme, the determiner on the noun behaves like an affix. Also, a second adjective does not trigger a third determiner. Nor may the AP in (ii) appear after the noun.

2   If we hold to the assumption that only DPs (i.e. not bare NPs) can function as syntactic arguments, act as subjects, receive theta-roles, etc., then α in (6)-(7) must be DP even when not modified. As Marcel den Dikken reminded us, this conclusion is at variance with Kayne (1994:98); see section 2.4.

3   Sproat & Shih show that the classes in (12) divide into two groups, 'absolute adjectives' (SHAPE/COLOUR and PROVENANCE) and 'relative adjectives' (QUALITY and SIZE). Deviations from (12) within these classes leads to milder deviance, which may

be lifted by a variety of factors. The stronger deviance of (13b) arises when an 'absolute' adjective precedes a 'relative' adjective.

4   This will not be true if the comparison class entering the computation of the meaning of *big* differs between the two cases.

5   As Cinque (1993: 24) observes, the order N-complement-AP is only possible if there is a sharp intonational break between the complement and the AP, with the AP bearing stress. The intonation is less marked if the AP is heavy, i.e. either coordinated, or containing a specifier or a complement.

6   Cinque (1993: 34) suggests that the reduced relative clause under discussion contains an AGRP.

7   Kayne (1994:98) suggests that the subject of IP in (25)-(26) is NP, not DP, seeking thereby to account for the impossibility of relative pronouns in reduced relatives. Assuming that the trace of the raised nominal needs Case, this can be satisfied by (covert) N-raising to D (*the*) in (i) but not in (ii) where t_k is not the trace of NP *book*:

      (i)   [$_{DP}$ the [$_{CP}$ [$_{NP}$ book]$_j$ C° [$_{IP}$ t$_j$ ... [$_{AP}$ sent to John]]]]

      (ii) *   [$_{DP}$ the [$_{CP}$ [$_{DP}$ [$_{NP}$ book]$_j$ which]$_k$ C° [$_{IP}$ t$_k$ ... [$_{AP}$ sent to John]]]]

Notice however that where the subject of such an IP is itself modified, it must itself be a DP; modification by determiner complementation is not otherwise possible. Given that APs and reduced relatives can stack, we conclude that Case Theory does not exclude DP-subjects of adjectival modifiers. The question thus only arises for the deepest (unmodified) subject in a D-CP structure. We stick to the assumption that only DPs can be syntactic arguments (cf. note 2), so that lowest subject too must be a DP. We return to the question of Case-licensing in section 3.6.

8   To assume that this hierarchy is instantiated in the syntax along the lines of (18), is hardly compatible with Kayne's approach to attributive adjectives. It would mean that a number of functional projections intervene between the CP of the highest 'relative clause' and the external determiner. If attributive APs surface in the specifiers of these projections, then the word order motivation for assuming predicate fronting as in (25c) and (26b) would be obviated. Moreover, adjectives originating in the lower relative clauses would need to undergo long-distance raising to reach these designated specifiers.

9   See Alexiadou & Stavrou (1996a,b) who discuss the properties of this type of adjective in detail.

10   Alexiadou & Stavrou (1996a) suggest that Gr ethnic adjectives occupy the Spec,NP position. Stavrou & Ralli (1996) discuss some instances of (36c). Crucially, there is evidence that both (36a) and (36c) are involved in such types of adjectival modification in Gr.

11   Cf. Stavrou (1995) for a discussion of apposition in Greek.

12   This is reminiscent of the fact that in Swedish, appositive APs modifying definite DPs do not carry the 'strong inflection' obligatory for pre-N APs (Kester 1996:67):

      (i)   *det här vädr-et, kall-t och klar-t*, (*...kalla och klara*)

             the here weather-the cold-indef and clear-indef

             'this weather, cold and clear, ...

      (ii)   *det här kall-a klar-a vädr-et* (*...kallt och klart..*)

             the here cold-def clear-def weather-the

             'this cold clear weather'

13   In fact, nothing would be lost in this approach if *to* in (41) were also analyzed as an instance of Def°, with the real determiner phonetically empty, as in (42):

(i) $[_{DP} \varnothing_{D°} [_{DefP}$ *to* $[_{AP}$ *megalo* $[_{AP}$ *kokkino* $[_{NP}$ *vivlio* $]]]]]$

14   It is also implicitly assumed that neither NP or AP may move DP-internally.

15   The analysis developed below predicts a prenominal AP to have two sources, one involving base-generation of AP prenominally without DS, another involving DS and AP-preposing. For complex prenominal APs, the former is realized by (43a); the latter would yield a string containing two determiners (i).

(i) *   *i periphani ja to jo tis **i** mitera.*

However, for reasons that we do not understand, this example is ungrammatical. Perhaps there is a rule that deletes the second determiner in such cases, yielding the string (43a). Alternatively, it may be that DP-preposing, otherwise optional, is forced where the preposed AP is 'heavy', yielding (43b) as the only output.

16   Androutsopoulou's intuition that the extra determiners found with DS are expletive elements is not shared by all speakers of Greek, including the first author of this paper. Specifically, Anagnostopoulou (1994) points out there is a similarity between clitic doubling of direct object definite DPs, as in (i), and DPs with DS in the sense that both lead to a referential interpretation of the DP, suppressing the attributive reading option.

(i)   *spania* (*ti*) *haidevo ti mikroteri gata*
        seldom cl pet   the smallest cat

According to Kolliakou (1997), DPs with DS are interpreted as unambiguously non-monotone anaphoric, while monadic definites can be either monotone or non-monotone anaphoric.

Finally, Anastasia Giannakidou (personal communication) suggests that the DS cases in Greek express strong familiarity in the sense that they require existential and uniqueness presuppositions in both the speaker's and the hearer's models.

Clearly, more needs to be said about the licensing and distribution of these determiners. We leave this matter open for further investigation.

17   We take no stand on whether this clause might also contain an abstract V (headed by a null copula); or whether the DP subject of AP originates within AP (cf. the predicate-internal subject hypothesis).

18   Locality permits DP_j to be extracted out of the immediately dominating DP_k only via the specifier of DP_k. This enforces successive-cyclic movement in (37e). Questions arises as to the nature and trigger of DP-raising. If Spec,DP is an A'-position (as suggested in Horrocks & Stavrou 1987), then this is A'-movement. This raises a potential conflict with the assumption that APs move to Spec,CP, also an A'-position. We are forced to assume that AP-raising does not interfere with DP-raising. This can be achieved in terms of the Attract/Move model of Chomsky (1995:ch.4), if the feature of D° that attracts into its Spec a lower DP is not of the same type as the feature of C° that attracts APs. Since the relevant features are 'strong', the simplest assumption is that each complementizer of the relevant type has an A-feature, while determiners optionally acquire a D-feature. A and D being categorially distinct, Chomsky's Minimal Link Condition will ensure that AP's in Spec,CP do not intervene with DP-raising any more than DPs interfere with AP-fronting.

19   The marked base order (48) should in principle also allow internal DP-raising of the pattern (47), so that in addition to (i), all of (ii-v), but not (vi), should be possible for a

DP with the marked red<big reading (as pointed out by Markus Steinbach and Hans-Martin Gärtner):

(i)	the red the big the book	*to kokkino to megalo to vivlio*
(ii)	the red the book the big	*to kokkino to vivlio to megalo*
(iii)	the big the book the red	*to megalo to vivlio to kokkino*
(iv)	the book the big the red	*to vivlio to megalo to kokkino*
(v)	the book the red the big	*to vivlio to kokkino to megalo*
(vi) (*)	the big the red the book	(*) *to megalo to kokkino to vivlio*

It seems that only (i) possesses the marked reading (red<big), though on this, intuitions are rather unclear. There is a possible explanation. Unlike (i), all of (ii-v) are possible for the unmarked reading (big<red). This might create a garden-path situation which causes difficulty in accessing the marked reading in those cases.

20   We do not choose here between an adjunction analysis, and one that places predicative APs in specifier positions of prenominal functional heads. Recall however, that the possibility for complex prenominal APs to appear in (49) argues against treating such adjectives as heads in the N-D extended projection. (see Alexiadou 1994, 1997 and Alexiadou & Stavrou 1996a,b).

21   Note that Stavrou (1995) makes a similar proposal. She also proposes that the lower adjective *kokkino* is within the NP. Her analysis differs from ours in that she argues that *to megalo* is found in the specifier of the projection that has as its head the definite determiner, thus manifesting agreement in definiteness.

22   We might speculate that the contrast between definite and indefinite determiners with respect to multiple overt realization in DS-structures is related to the more general difference between definites and indefinites with respect to discourse functions. While a definite DP associates with a referent already established (i.e. familiar) within the discourse, an indefinite is constrained to introduce a novel referent (cf. Heim 1982). In a DS-structure, where each DP is associated with one and the same referent, repetition of an indefinite determiner (but not of a definite determiner) would lead to a violation of the novelty condition. However, our claim is that in the syntax, indefinites with DS contain multiple instances of the determiner just as definites do. So to attempt an explanation along these lines would require a distinction to be made between overt and covert instances of the indefinite determiner with respect to the novelty condition.

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