THE DENOTATIVE-REFERENTIAL DIMENSION OF LEXICAL ITEMS

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1. INTRODUCTION: GENERAL FRAMEWORK AND BASIC PROPOSAL

Over the past two decades the lexicon has attracted a great deal of attention in the field of Generative Grammar. A part of the discussion has focused on whether there should be an independent lexical component within the general make-up of the grammar, a component that would hold the principles necessary for the explanation of the properties of words, or whether, on the other hand, a modular approach should be adopted, so that the same set of general principles can be assumed to account for the properties of both phrasal and morphological expressions (see Di Sciullo and Williams [1987] and Sproat [1985] for arguments for and against the existence of such a component, respectively).

Be that as it may, there is no denying that there has to be a lexicon in at least one sense: a store or list of entries in which lexical items are associated with their properties. This sense of the lexicon has played a central role throughout the history of Generative Grammar, and this role is even more important in recent theorical formulations, in particular, in the Government

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and Binding (henceforth GB) framework, where many authors (for example, González Escribano [1991]) assume that the derivation of phrases begins with the projection of lexical units and their associated information in such a way that the semantico-structural representation of a given expression is built up out of the properties of the lexical items plus the operation of a few general principles such as Government, the Projection Principle, Case Theory, etc. (Haegeman [1991] offers an introductory treatment of basic GB notions—along with the original sources—that may help the less specialized reader).

Of the assorted information associated with lexical items, the notion of *Argument Structure* (A-Str) is probably the aspect that has been given most attention by linguists: A-Str occupies such a prominent position in the make-up of natural languages that whenever a new theoretical proposal appears in the field of morphology or syntax its author has to take a stand on this issue. Different views on A-Str may be found in Williams (1981), Zubizarreta (1987) and Grimshaw (1990), who has put forward quite an elaborate proposal.[1]

The aim of this paper is to claim that in addition to the argumental dimension there is a second dimension or level of analysis that has to do with the meaning of lexical items and that must be kept separate from the notion of A-Str. We will call this entity the *Denotative-Referential Structure* (DR-Str) of lexical items.

One of the first authors to study this aspect of the meaning of words was Williams (1981), who assumed that nouns (Ns) have an argument, which he called R (=Reference), that shows up both in predicative and referential uses of noun phrases (NPs). Thus, in *John is a fool* the NP *a fool* is predicated of *John*, and *John* is therefore its R argument, whereas in *The fool left* R is satisfied referentially in the sense that it is represented by the denotation (the extralinguistic referent) of the NP itself (cf. Williams [1981: 86], Williams [1982: 286] and Di Sciullo and Williams [1987: 32]). For these authors, then, R corresponds to the denotation of the noun ("event," as in *destruction*, "individual," as in *fool*, etc.) or to an NP of which the N in question is predicated. An additional feature of this proposal is that R belongs to the A-Str of the lexical item—where it bears the role of external argument—even though it cannot be seen as a thematic role, i.e. an Agent, Theme... (see note 1). Thus, the A-Str for the N *destruction* is (R, Agent, Theme), where the underlined argument is the external one.

Another author who has dealt with this dimension of words is Sproat (1985). Sproat follows Higginbotham (1985) and defends the existence of a

modality of thematic satisfaction which he calls "thematic binding," by means of which the SPEC[2] position of NPs restricts the reference of these expressions because it binds an open position (a kind of argument variable) that is carried by all Ns. For example, the article *the* in *The fool left* occupies that position and it restricts the reference of the NP in such a way that it is not any fool that has left, but a particular fool.

The two approaches sketched above have one thing in common: both Williams and Sproat see the referential side of nouns as something that may be integrated in the A-Str of lexical items (Williams) or that has a thematic nature (Sproat), i.e. they conceive of this level as part of the argumental dimension.

As we have already stated, our claim is that there is a denotative-referential side (DR-Str) to the meaning of lexical items that is conceptually different (and also technically different, at least partially—see below) from the notion of A-Str. Whereas the A-Str of a given predicate codifies the lexico-conceptual properties of the predicate, in the sense of the participants among which the predicate establishes certain relations ("Agent of," "Patient of" (i.e. Theme), etc., cf. note 1), DR-Str has to do with the general denotation of lexical items and the way this denotation is integrated or embedded in the larger linguistic context (the phrase) the item belongs to and linked up to the (extralinguistic) world of reference. Roughly speaking, verbs denote events or states, nouns may be classified into those that denote events and those that refer to results or objects (see section 2 below), and adjectives denote properties. Now, these contents or denotations need "referential windows" that are capable of restricting them; otherwise native speakers would not be able to use language to talk about *particular* events, objects or properties.[3]

To sum up, DR-Str is a unifying notion since it applies to the three major lexical classes (Ns, Vs and As), all of which have to achieve a certain degree of referential saturation; it is conceptually different from A-Str and for this reason alone it is worth exploring in some depth; it has an advantageous spin-off: the existence of this level of analysis allows us to preserve a homogeneous picture of A-Str, one that includes only participants or thematic roles.

The sections that follow are dedicated to the study of the DR-Strs of nouns and adjectives, which are quite interdependent. As regards verbs, for our present purposes we will assume, after Sproat (1985), that the position known as INFL (which in the standard GB framework represents the inflectional properties of the verb in a given sentence) contributes to fix or define reference by restricting the verbal action to a given point in time or period of

time (past, present, future). Therefore, for the time being we leave the deeper investigation of the DR-Str of verbs as a subject matter for future inquiry.

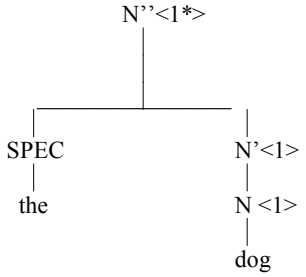
2. THE DENOTATIVE-REFERENTIALSTRUCTURE OF NOUNS

It has been assumed in a number of recent studies (Zubizarreta 1987, Grimshaw 1990, Lebeaux 1986, Murasugi 1990, Van Hout 1990, etc.) that nouns may be classified into two large groups: event nouns (ENs) and result nouns (RNs). Result nouns are those that do not denote events; they may refer to the result of an event or to any type of object, but they do not have an eventive meaning. Williams (cf. references cited above) and others (for example, Grimshaw [1990]) have associated these Ns with an argument R, which has led to a certain amount of confusion because R may be taken as representing the denotative value or semantic type of the N (i.e. "result") and in such a case we would be faced with a contradiction since both the predicate (result noun) and its argument would be identified by means of the same notation. A different type of notation must therefore be used to represent the argument (more specifically, the argument variable or open position) that is satisfied by some element capable of binding the noun's denotation to the world of reference: Sproat (1985) uses the open position <1>, which we will adopt (see Figure 1 below), whereas we will keep R to represent the denotation of the N.

A second, and probably more important, drawback that undermines Williams' proposal is the fact that whereas his R argument is explicitly satisfied or saturated when the N is used predicatively (i.e. after a predicative verb), since in this case there is an independent NP that satisfies it (the subject: see section 1), there is no such thing when the N has what Williams calls a referential use, i.e. when there is no predication (as in *The fool left*): in this case he does not associate R with any structural node or category and as a consequence it is very difficult to see how R is saturated. In our theory of DR-Str this vagueness disappears: the denotation of lexical categories must be constrained by means of what we have called "referential windows." These are not abstract entities but have a clear structural correlate, i.e. they are associated with structural positions. In this matter we coincide with authors like Sproat (1985) and Zubizarreta (1987) in that the SPEC node of NPs is responsible for the satisfaction of the <1> position of nouns (note that

Williams establishes no relation with the SPEC node of NPs), although we disagree with the idea that this is a kind of "thematic" satisfaction. In short, then, the variable <1> is discharged within the NP; thus, Sproat (1985: 156-157) provides the following representation for the NP *the dog*, where the asterisk indicates that <1> has been satisfied[4]:

(1)



Let's now consider event nouns (ENs). In the tradition we have been assuming (in particular, in Sproat [1985] and Grimshaw [1990], not in Williams [1981, etc.]) these nouns (eg. *destruction, assignment*, etc.) are associated with an argument (or rather, an argument variable) E (for "event"). As we suggested in relation with the R argument in Williams, we think that this notation is unnatural in so far as "event" is the denotation of the predicate, that is, the lexical head, and so it is misleading to use E to refer to an argument of that predicate. We propose then that the denotative-referential variable of ENs be represented by <1> and that the features R and E be kept to mark the semantic value or denotation of result nouns and eventive nouns respectively.[5]

The relation with the SPEC node we examined in relation with RNs is equally important for ENs: the position <1> is discharged in this node because the specifier binds the denotation of the noun to the world of reference. Nevertheless, Grimshaw (1990: 67) notes that the system of determiners is sensitive to the distinction between result and event and in her opinion the only determiner that is compatible with eventive interpretations is *the*. Hence the ungrammaticality in (2):

(2) *a / *this destruction of the city

We think the reason for this limitation on ENs has to do with their abstract denotation: the bigger the degree of abstraction the more difficult it is to associate the noun with a specific referent.

From what we have said so far it can be gathered that we assume that the basic referential needs of nouns are covered by the SPEC node of noun phrases (see below for those cases in which there is no overt specifier, e.g. *I love flowers*). But this claim must be made compatible with the fact that, regardless of the specifier, NPs (like other phrases, cf. Williams [1980]) may be used predicatively:

(3) John is a / the / that boy

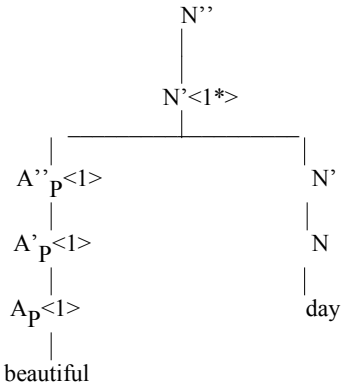
Our position is that the predicative use of NPs contributes to further restricting the referential entities that are invoked. In other words, predication, in addition to its creating expressions that are associated with a truth value, is a mechanism that plays an important role when it comes to tying an expression to the world of reference. But independently of this device, there are resources within the internal structure of NPs whereby a certain degree of referential saturation may be achieved. As we have defended, this is the role of the SPEC node. We will say more about predication in section 4.

3. THE DENOTATIVE-REFERENTIAL STRUCTURE OF ADJECTIVES

A number of authors have argued for different types of mechanism to capture the relation that exists between adjectives (As) and the nouns they are combined with. In our framework, such a relationship may be quite naturally interpreted as one more manifestation of the DR-Str of lexical items. Like the other lexical categories, adjectives have their own denotation (roughly, "property," "attribute"), a denotation that is restricted and linked to the world of reference in the linguistic discourse. If the primary referential window for nouns is the SPEC node (leaving aside the restriction involved by predication), we claim that in the case of adjectives the noun itself plays the role of referential window. The denotation of adjectives, property, is clearly a dependent or relational notion (i.e. "property of"), that is, it needs a bridge that can link it to the world of reference since properties do not exist by themselves, they only exist in the objects or entities that have those

properties, and the objects, in turn, are represented by the nouns. That is why we think that nouns constitute the referential window of adjectives. The technical counterpart of our proposal is that As are associated with the denotative-referential position <1> and the feature P (for "property"). Thus, the representation for the expression *beautiful day*, which contains an adjective, is that shown in (4):

(4)



Note that, as in Figure (1), once the position <1> has been satisfied, in this case by the N, that saturation is marked with an asterisk in the dominating node, in this case N'. Moreover, for the sake of clarity, in (4) we have disregarded the DR-Str of the noun itself: only that of the adjective is represented. For the X-Bar version we have followed in (4) see note 4 at the end of this paper and references cited there.

Sproat (1985) and Grimshaw (1990) assume that the relation between adjectives and nouns is captured by a modality of thematic satisfaction which (following Higginbotham 1985) they call "thematic identification." According to Sproat:

> The intuition we want to capture is that *white house* refers to those entities which are both white and house. Assuming that both *white* and *house* have a theta role, we will say that those roles are identified, this identification being notated by a line connecting the two relevant places in the grids. (1985: 157)

In our view, this approach presents a clear flaw: no direct relationship is established between the denotation of the adjective and that of the noun since the open position (a thematic position for Sproat, not for us; cf. above) borne by the adjective is not satisfied by the N and its nominal properties. This is not in accordance with the idea we have defended that N is the referential window for the A; we consider that the referential properties of the adjective are satisfied by the noun, independently of the fact that the N has its own referential needs that are expresed by an open position that is saturated or bound by the SPEC node. The open position carried by N accounts for its integration in discourse and its linkage to the extralinguistic world of reference, but it is independent of the relation between N and A.

Apart from the argumentation above, when Sproat and Grimshaw relate the open position of the adjective with that of the noun they allow for the possibility of relating any A with any N, since those positions or variables belong to the respective lexical classes and not to particular Ns or As. This is not supported by the empirical facts given the unacceptable combinations of (5):

(5) (a) *handsome stone
(b) *pregnant tree
(c) *stupid air

These examples prove that the adjective selects the noun it is combined with, i.e. the N is a thematic argument of the adjective, which leads us to the conclusion that in the case of adjectives the argumental-thematic dimension (the one that has to do with thematic roles, which we have called A-Str) and the denotative-referential dimension (DR-Str) meet at the same nominal node: N is the link that connects the A to the world of referents by saturating its position <1>, and at the same time N realizes a thematic argument of the thematic predicate A. This argument may be represented by the variable x. (The difference between argumental-lexical variables and referential variables is explained in more detail in section 4).

A piece of empirical evidence in favour of the hypothesis that adjectives are associated with both argumental and referential variables (or open positions), i.e. that the two of them are necessary and independent from each other, is provided by derived As, for example those that take a verbal base (like *amusing,* in *amusing activity*). In such cases the suffix determines the adjectival category and denotation of the complex word and is therefore asso-

ciated with the position <1>, just as we saw when considering noun-forming suffixes (cf. note 5). However, the suffix alone cannot select a thematic argument (and cannot therefore be associated with a thematic position): the adjective that results after suffixation inherits that argument and the variable that represents it from the verbal base, in such a way that it ends up being associated with two variables, <1> and <x>.

As for non-derived adjectives (like *happy*), these originally (originally in the sense that they are not subject to derivation) bear those two variables: *happy* [<1>,<x>]. This notation must be interpreted as follows: the lexical item *happy* belongs to a lexical class that denotes "property" whose referential requirements, represented by the position <1>, are satisfied by the lexical class of nouns. In addition, that item is a thematic predicate because it must be combined with a noun, represented by the variable <x>, whose lexical properties are selected by the adjective.[6]

We will finish this section on adjectives by considering Zubizarreta's proposal. For this author (1987: 19-20) adjectives constitute a lexical category whose lexical properties are expressed in the notation $<A + AGR_y>$. This means that besides being associated with the category A, adjectives bear the morphological marker AGR (for "agreement"), which, according to Zubizarreta, "agrees in person, number and gender with the noun of which the adjective is predicated . . . or with the noun which the adjective modifies." That N corresponds to $_y$ in this author's notation. But Zubizarreta also admits that her morphological marker receives no explicit realization in English. We think it inappropriate to postulate such inexistent categories from a synchronic point of view—although it is true that such an agreement morpheme existed in earlier stages of the language—especially if what needs to be explained can be accounted for in some other satisfactory way.

To sum up, <1> must be substituted for AGR and the relation between Ns and As may be quite naturally integrated in what we have called the denotative-referential dimension of lexical items.

4. COMPARING ARGUMENT STRUCTURE AND DENOTATIVE-REFERENTIAL STRUCTURE

One of the most important claims we have put forward so far is that the denotative-referential side of lexical items must be kept separate from the the-

matic dimension both from a technical and from a conceptual point of view. A-Str has to do with the lexical-thematic properties of lexical predicates, whereas DR-Str deals with the way lexical items (both predicates and non-predicates, from a thematic point of view) are integrated into phrasal units endowed with the elements necessary for the expression of reference.

Those two levels of lexical structure include variables that must be saturated by elements that occupy specific structural positions. As the levels are different, we will talk about two different types of variable: thematic variables, for which we will use the notation x, y, z, etc., and referential (or denotative-referential) variables, <1> for all lexical heads. The former belong to each particular predicate, but the latter do not belong to specific items but to the major lexical categories (N, V, A), which correspond to major denotational categories ("property," etc.—see above). In spite of the notational uniformity, the position <1> is satisfied differently depending on the denotation of the head: the saturator is SPEC in the case of nouns, the N itself in the case of adjectives, and the INFL node in the case of verbs.

We think Zubizarreta (1987: 13-14) is right in claiming that thematic variables (which she calls lexical variables) are satisfied (or "evaluated," in her own words) by lexical indices whereas referential ones are given value by referential indices. Zubizarreta argues that each lexical unit is identified in the dictionary by a lexical index that represents the concept or type (Frege's "sense") expressed by the item. For example, *man* would carry the index *j* because it denotes *j*. In this way, in a sentence such as *The man left*, that index would be assigned to the thematic variable representing the Agent of *leave*, say x, and thematic saturation would be achieved. Likewise, the item *stone* would be associated with an index *k* because it denotes *k*, but such an index is unable to satisfy the variable x of *leave* because the type denoted is not adequate.

Zubizarreta (1987: 14) is clear about the fact that "a lexical index, borne by lexical items, is not to be confused with a referential index, borne by noun phrases which function as referential expressions in a discourse." That is, the indices that evaluate referential variables do not belong to lexical items; in her own words (1987: 51), "the referential index is borne by the determiner and inherited by the Spec node that dominates it." At first sight it is logical to argue that the determiner is the element that bears such an index since it has the function of restricting reference, but upon further consideration it turns out that the SPEC position may be occupied by elements other than determiners, for example, Saxon Genitives like *yesterday's* or *Peter's*, or quantifiers like *some* or *every*. That is why we think that Zubizarreta's hy-

pothesis should be modified: we propose that the SPEC node itself should bear an abstract referential index that receives a specific value from the element that is realized under SPEC. The same goes for the verbs: the INFL node is associated with an abstract index that is given a specific value by the tense morpheme.

Adjectives constitute an exception in relation to the idea that referential variables are evaluated by referential indices since we have defended that the <1> variable of adjectives is assigned value by the noun the adjective is combined with. N (or its projection N', which is a sister to the adjective phrase (A'') in the structural phrase marker; see Figure 4) does not have a referential index to evaluate the <1> of adjectives: on the contrary, it has its own <1> variable to be evaluated by SPEC. Our proposal is that in this case the lexical index of N itself can assign a value to the <1> of adjectives because that index represents a nominal denotation and such a denotation is always closer to the world of reference than the denotation of an adjective. In other words, with respect to adjectives, nouns may establish a certain degree of linkage with reference; they allow adjectives a certain degree of referential capacity. Nouns, in turn, have their own linkage, SPEC, but it must be clear that this is the referential window for Ns, not for As. All this leads us to the conclusion that there are different types of referential window or different degrees of referential saturation. A consideration of Ns and As together may yield a gradation or cline with three different degrees, as shown in Figure (6), where (a), (b), and (c) represent the minimal, medial and maximal degree, respectively:

(6) (a) beautiful day
(b) the beautiful day
(c) Sunday was the beautiful day

In short, the N above links *beautiful* to the world of reference; the N' *beautiful day*, in turn, is further restricted or vinculated by the determiner *the*; and the predicative mechanism in (c) further narrows the referential circle so that the NP in predicative position has a specific referent.

Predication probably offers the highest degree of referential saturation and it must be remembered that all maximal projections (i.e. all phrases) can be used predicatively (Williams 1980: 206), so that predication may be seen as a default mechanism that has a cross-categorial effect and makes it possible for all categories to achieve a similar degree of saturation. Predication in principle does not lead to the satisfaction of a thematic

variable unless the maximal projection that is used as a predicate has one unsaturated variable. This is the case of the AP in an example like *the day was beautiful*. As we saw in Section 3, in the case of adjectives the thematic dimension and the referential dimension conflate in the accompanying noun (or noun phrase), so that *the day* satisfies both the thematic and the referential variable of *beautiful*. But in *Sunday was [the [beautiful]* $_{AP}$ *day]* $_{NP}$ both variables are satisfied within the NP and the predicative structure further restricts the referential scope of the NP. We think, with Williams (see reference cited above), that predication is a coindexing mechanism: the predicative mechanism itself assigns the same index to subject and predicate when the latter does not have unsaturated variables, whereas if there are unsatisfied variables predication takes care that the subject assigns them a value (that is the case of the example above, *the day was beautiful*).

One possibility we have not considered yet is that in which an NP does not bear a specifier and is not used predicatively either, which means that its referential variable receives no interpretation. This is the case of expressions such as *I love [flowers]* $_{NP}$. In our view, the most natural approach to this situation is to assume that sometimes the communicative needs of speakers require that denotation should not be vinculated to specific referents and therefore natural languages allow high degrees of abstraction. In such cases the referential variable is simply left unsaturated.

5. CONCLUSION

The main hypothesis that has been developed in this paper was presented in section 1 (Introduction). It is the claim that there is a level of analysis in the meaning of lexical items that, contrary to what some authors have proposed, is distinct from the level traditionally known as Argument Structure (A-Str) and that can be identified by the expression Denotative-Referential Structure (DR-Str). This is a self-explaining designation since this level is about the way the general denotation of major lexical classes is restricted in discourse so that speakers can use nouns, verbs and adjectives to refer to particular entities, events and properties.

Section 2 explores the case of nouns. Williams (1981, etc.) is rejected on the grounds that his notation is confusing and his proposal structurally and conceptually vague. It is claimed that nouns have a “referential window” that

corresponds to the specifier node of noun phrases and, with authors like Sproat (1985) and Zubizarreta (1987), we assume that the formal counterpart of this idea is that nouns in general are associated with an open position <1> that is assigned a value by the element realized in the specifier position.

In section 3 we focus on how the denotation of adjectives is referentially restricted. First, we provide a critical assessment of the hypothesis of Sproat (1985) and Grimshaw (1990) that this is achieved through a modality of thematic satisfaction which they call "thematic identification." This idea encounters two flaws: no direct relation is established between the denotation of adjectives and that of nouns, and it leads to the incorrect prediction that any adjective may be combined with any noun. Secondly, we argue that, as was the case with nouns, adjectives are associated with a position <1> that in this case is saturated by the N that is combined with the adjective. This captures the intuition that Ns are closer to the world of reference than adjectives and therefore constitute their referential window, and at the same time it allows us to claim that the relation N - A is one more manifestation of the Denotative-Referential Structure of lexical items. Thirdly, in the case of adjectives A-Str and DR-Str are considered to conflate at the same nominal node due to the fact that adjectives are thematic predicates and as such they select their nouns. Finally, Zubizarreta (1987)'s postulation of an Agreement marker for English adjectives is discarded as counterintuitive.

Section 4 compares A-Str and DR-Str. These two dimensions differ not only conceptually, but from a technical point of view too. Both of them have open positions (or variables), but whereas thematic variables belong to each particular lexical item, referential variables belong to each major lexical class. Furthermore, the former are given value by lexical indices that identify specific items in the lexicon, whereas the latter are saturated by referential indices, although adjectives represent an exception since the lexical index of the N is the one that satisfies their referential open position. The phenomenon of referential saturation is conceived of not as an "all or nothing" issue, but as a cline along which there are different degrees of saturation; thus, whereas the relation A - N probably represents the lowest degree, the highest level may be provided by predication, a cross-categorial mechanism that contributes to constrain reference.

All in all, we believe that there are well-founded reasons for studying the meaning of lexical units from the point of view of the mechanisms that natural languages use to restrict the general denotation of word classes and link it to the world of reference.a

NOTES

1. The notion of A-Str entails the idea that lexical items may be seen as predicates that take certain arguments: in the case of verbs (Vs) or eventive nouns (ENs) the arguments are the participants in the event. For example, in *John sold a car to Mary* the predicate *sell* takes three arguments (or thematic roles), an Agent (*John*), a Theme (*a car*), and a Goal (*to Mary*). Those arguments that belong to the scope of the Verb Phrase (VP), in traditional terms, the complements of the verb, are called "internal arguments" in the GB framework, whereas the argument that falls outside that scope, i.e. the subject, is known as the "external argument."

2. SPEC stands for "specifier" and the SPEC position in a phrase marker is a structural position, i.e. a node, that is meant to hold any specifier that a NP can take: articles, demonstratives, Saxon genitives and the like.

3. Zubizarreta (1987: 4-5) emphasises the importance of phrase structure as the frame in which reference is determined or fixed: "phrase structure provides the background against which the order among referential entities in the sentence is computed. If this were not the case natural languages would be essentially reducible to a system of complex-word compounding."

4. The version of X-Bar theory adopted in this representation is that which Chomsky has consistently assumed from his "Remarks" paper (1970) to his *Barriers* monograph (1986). As can be seen in Figure (1), in this version the specifier position of NPs is structurally a sister of N' and a daughter of N''. See also Radford (1988).

5. Note that in the case of derived Ns the semantic value of the N is usually determined by the affix. For example, *-ion* and *-ing* tend to form eventive nouns, whereas *-ee* and *-er* produce nouns that denote individuals, not events. In such cases it is logical to associate the markers E and R (respectively) with the affixes, since these are responsible for the denotation of the noun.

6. Although perhaps the majority of adjectives take only one thematic argument, some of them take more. For example, *fond (of)* and *keen (on)* take two: *John is fond of Mary, Peter is keen on maths*. The one that is introduced by a preposition is the internal argument, whereas the argument that is realized in subject position is the external one. See note 1 for parallel examples with verbs.

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