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(Dis)obeying the Head-Final Filter

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1. Introduction

It is a well-known fact about English that ad-adjectival dependents (both adjuncts and complements) of any syntactic category are not allowed to intervene between pre-nominal attributive adjectives and their head nouns. This is illustrated in the following example from Williams (1982), in which the PP *of his children* cannot appear in between the noun and the adjective of which it is a complement. Crucially, however, there is no problem for *proud* to take this PP to its right when *proud* is used predicatively.

- (1) a. *the [_{AP} proud of his children] man (Williams, 1982)
b. The man is proud of his children.

In view of this fact, Williams (1982) assumes that English (and German) have a constraint that bars post-head material in pre-nominal modifiers and calls it the *Head-Final Filter* (HFF). Thus, the HFF is an adjacency requirement that holds between the head of a pre-nominal modifier and the modified noun and is formulated in terms of the modifier's head-finality (see also Emonds' (1976) *Surface Recursion Restriction*).

Subsequent work has argued that the HFF is possibly more general and also holds for modifiers of verbs and adjectives (Escribano, 2004) and for degree constructions (Grosu & Horvath, 2006). In this paper, we will however be only concerned with modifiers of nouns, and we will concentrate primarily on adjectival modifiers. More importantly, it has also been argued that the HFF is also more general in terms of its cross-linguistic coverage and that it is not a language-specific constraint, which only holds for certain individual languages such as English and German, but a linguistic universal (Philip, 2012; Sheehan, 2017). Accordingly, we will use the following operational definition of the HFF, which views it as a universal constraint:

- (2) **Head-Final Filter (HFF)** (based on Williams, 1982)

In languages with pre-nominal modifiers, modifier phrases must not contain any post-head material.

According to the current state of knowledge based on reports in the literature (cf. Cinque, 2010 and Sheehan, 2017 for overviews) and/or our own data collection, the HFF is obeyed in at least the following languages: Dutch, English, German, Icelandic, Swedish (Germanic); French, Italian, Portuguese, Romanian, Spanish (Romance); Czech, Serbo-Croatian, Slovenian (Slavic); Armenian (Indo-European isolate); Estonian, Finnish, Hungarian (Uralic); Georgian (Kartvelian).

Note that the languages listed above obey the HFF in a non-trivial manner: in all of them, the right-branching A \succ PP order is possible with predicative adjectives (sometimes in addition to PP \succ A), but is not available for attributive adjectives (\succ stands for 'precedes'). By contrast, languages with strictly head-final APs, such as e.g. Japanese or Turkish, comply with the HFF trivially: the A \succ PP \succ N order, which would violate the HFF, is ruled out on independent grounds simply because right-branching APs are not allowed in these languages in general (cf. Sheehan, 2017).

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The goal of this paper is to show that, in a broader cross-linguistic perspective, the HFF in (2) not only does not explain the nature of these adjacency effects between attributive adjectives and their head nouns, but also does not provide an adequate descriptive generalization for them (section 2). The paper proposes an alternative descriptive generalization, which relates word order flexibility to the richness of agreement morphology, and introduces a set of assumptions that allow to model the empirical facts successfully (section 3). The workings of the proposed analysis are illustrated for languages of different types (section 4), and the paper concludes by discussing the possibilities of deriving its key assumptions from independently needed mechanisms (section 5).

2. Non-HFF-compatible languages

We have seen in the previous section that many languages impose a linearization constraint on their pre-nominal modifiers, which has been commonly formulated in terms of the modifier's head-finality, i.e. as the HFF in (2). In what follows, we will show however that, for two different reasons, the HFF is not descriptively adequate to account for the adjacency effects between pre-nominal modifiers and the nouns they modify. First, there is a number of languages which do, in fact, allow for the HFF-violating $A \succ PP \succ N$ order, rendering the HFF formulated in terms of head-finality too restrictive. Second, some languages with *post*-nominal modifiers disallow the mirrored $N \succ PP \succ A$ order, requiring their APs to be head-initial in their attributive use. Thus, they are subject to an analogous restriction, but the HFF is not defined to apply to them, i.e. it is not restrictive enough in this case. We will discuss each of these types of languages in turn.

2.1. HFF-violating languages

It is well-known in the literature that, despite the cross-linguistic tendency for languages to obey the HFF, as discussed above, some languages do in fact permit HFF-violations. On the one hand, this is true of a number of languages that have affixal agreement marking on adjectives, such as Bulgarian, Polish, Russian, Ukrainian; Modern Greek; Latin, Old Romanian. In these languages, APs are generally pre-nominal and head-initial, and the $A \succ PP \succ N$ order is grammatical and well-attested, as demonstrated by the following corpus examples for Greek and Russian.¹

(3) **Modern Greek** (Corpus of Modern Greek)

Afto to [simantiko gia tis arxes] zitima tha paramini ipo sizitisi.
 this the important for the authorities issue will remain under discussion

'This important issue for the authorities will remain under discussion.'

(4) **Russian** (Russian National Corpus)

[Zavisimyje ot eksporta nefi i gaza] strany razrabatyvajut razlicnyje programmy
 dependent from export oil and gas countries develop various programs
 dejstvij.
 actions

'Countries that are dependent on oil and gas export develop various programs of actions.'

On the other hand, HFF-violations are also attested in languages in which adjectives carry special markers when they are used as noun modifiers (known as *attributivizers*, or *linkers*), but these markers are free words or phrasal clitics, rather than affixes. This is the case, for instance, in Mandarin Chinese and Tagalog, whose pre-nominal APs do not have to be head-final, as the examples below show.²

¹ It has been claimed in the literature that the possibility of the $A \succ PP \succ N$ order in languages like Greek and Russian is only marginal (cf., e.g., Sheehan, 2017). However, the results of our consultations with native speakers and, crucially, of the small corpus studies conducted for these languages do not support this conclusion.

² We use the following abbreviations in glosses: ABL ablative, ART article, ATTR attributivizer, AV actor voice, CL classifier, COM common (gender), DAT dative, GEN genitive, INSTR instrumental, LNK linker, M masculine, NEUT neuter, NOM nominative, PL plural, PROG progressive, REF referential, SG singular, SUP superlative.

(5) **Mandarin Chinese**

(Bingfu Lu, p.c.)

yi-ge [duli yu fumu] **de** qingshaonian
one-CL independent from parents LNK teenager

‘a teenager who is independent of his parents’

(6) **Tagalog**

(Schachter & Otones, 1972:246; gloss ours)

Naghahanap ako ng [bagay (para) sa bata]=**ng** damit.
AV.PROG.search 1.SG.NOM GEN suitable for DAT child=LNK dress

‘I am looking for a dress (that is) suitable for the child.’

The examples above show that, if formulated as the “Head-Final Filter” in (2), the relevant constraint clearly suffers from exceptions, which, in one way or another, must be taken into account.

2.2. *HFF-mirror-image languages*

To the best of our knowledge, it has never been discussed before that some languages with post-nominal modifiers seem to display the mirror image of the HFF. A representative example of this type of language is Basque. Adjectives in Basque are strictly phrase-final with respect to their complements or adjuncts (7a), and they are post-nominal when used attributively (7b). Crucially, complex attributive APs containing a complement/adjunct of the adjective are ungrammatical (7c) and must be transformed into (pre-nominal) relative clauses instead. In other words, the order $N \succ PP \succ A$, which is the mirror image of the order banned by the HFF, is systematically ruled out in Basque.

(7) **Basque**

(Urtzi Etxeberria, p.c.)

a. Jon bere gurasoetaz burujabe-a da.
Jon his parents.INSTR independent-ART is

‘John is independent of his parents.’

b. Jon ume burujabe bat da.
Jon child independent a is

‘John is an independent child.’

c. *Jon ume [bere gurasoetaz burujabe] bat da.
Jon child his parents.INSTR independent a is

Intended: ‘John is a child who is independent of his parents.’

This fact cannot be explained by the HFF in (2) because it is not defined to apply to post-nominal modifiers. Naturally, examples like (7c) could be ruled out on independent grounds, e.g. by placing a similar requirement on post-nominal modifiers to be head-initial. However, this approach would miss the relevant generalization: that the constraint behind the ungrammaticality of the $A \succ PP \succ N$ order in a language like English and of the $N \succ PP \succ A$ order in a language like Basque is a matter of adjacency rather than head-finality and head-initiality, respectively.

Note, finally, that the ban on the $N \succ PP \succ A$ order can be lifted in some languages, in the same way as in the case of the $A \succ PP \succ N$ order. This is illustrated by the following examples from Atong, whose attributivizer is a clitic that attaches to the modifier phrase like in Tagalog (dependent-marking), and Persian, where the attributivizing clitic *ezafe* attaches to the head noun (head-marking).

(8) **Atong**

(van Breugel, 2010:518)

[naŋʔ=məŋ gore [jal=na rak-khal] =**gaba**] =aw
2SG=GEN horse run=DAT strong-SUP =ATTR =REF

‘your fastest running horse (strongest in running)’

(9) **Persian**

(Zahra Mirrazi, p.c.)

madar-an-e [be farzand-an-e xod moftaxar]
mother-PL-LNK in child-PL-LNK own proud

‘mothers proud of their children’

Thus, languages with post-nominal modifiers seem to exhibit exactly the same pattern as languages with pre-nominal modifiers: some require the head of the modifier phrase to be adjacent to the modified noun, while others allow for other material to intervene in between. This calls for a unified explanation.

3. A novel approach

3.1. Descriptive generalization

The previous sections have shown that the HFF defined in (2) is not only descriptively inadequate to account for the adjacency effects described above. It is also analytically inadequate, since it is merely a descriptive statement, which does not explain *why* head-finality (or head-initiality) is a requirement for modifier phrases. Hence, the question arises what determines whether a language allows some material to intervene between modifying adjectives and the nouns they modify or not. On the basis of a survey of around 30 languages³, we claim that three relevant factors determine the behavior of languages in this respect: (a) the presence or absence of an overt attributive marker, (b) the affixal or non-affixal nature of this attributive marker, and in the affixal case, (c) the amount of nominal features encoded in it. More specifically, the conditions under which intervening material is permitted between an attributive adjective and its head noun can be stated in terms of the following descriptive generalization:

- (10) The linear order $A \succ PP \succ N$ (or $N \succ PP \succ A$, if adjectives are post-nominal) is possible iff:
- i. the linear order $A \succ PP$ (or $PP \succ A$) is available in the predicative position, *and*
 - ii. there is an overt attributive marker which is a clitic or a free word form, *or else*
 - ii'. all case and φ -features of N are overtly marked on both attributive and predicative adjectives if the attributive marker is a suffix (a prefix).

We have already seen in section 2 that the affixal vs. non-affixal nature of the attributive/agreement marker plays a role with respect to whether the language does or does not allow for the non-adjacency of attributive adjectives and their head nouns, which motivates condition (10ii) above. Let us now also see some empirical evidence for condition (10ii'), which concerns the requirement for affixal agreement markers to be featurally rich/complete. Note, first, that all “HFF-violating” languages listed in section 2.1 have adjectives which are marked for all nominal φ -features and, crucially, also for case. A particularly telling example is Latin, whose adjectives (and nouns) are marked not only for φ -features, but also for case, differently from most modern Romance languages, which do not have overt case marking and are also “HFF-obeying”. The examples below illustrate this difference in marking for Latin and Italian.

(11) **Latin**

(Cic. Fam. 1.9; Chiara Gianollo, p.c.)

in [praestantibus in re publica gubernanda] viris
in excellent.ABL.M.PL in thing public to.be.governed man.ABL.M.PL

‘in men who excel in the government of the republic’

(12) **Italian**

negli uomini [eccellenti nel governo della repubblica]
in.the.M.PL man.M.PL excellent.M.PL in.the government of.the republic

‘in the men (who are) excellent in the government of the republic’

³ In addition to the HFF-obeying languages listed in section 1, our sample also includes Atong (Sino-Tibetan), Mandarin Chinese (Sino-Tibetan); Basque (language isolate); Bulgarian, Polish, Russian, Ukrainian (Slavic); Latin, Old Romanian (Italic); Modern Greek (Hellenic); Persian (Indo-Iranian); Tagalog (Austronesian).

Second, it is not sufficient that adjectives are fully marked for nominal features only when they are used as attributive modifiers, they must have the same rich marking when acting as independent predicates too. This is shown by the fact that languages like German are “HFF-obeying” despite having fully inflected attributive adjectives: German predicative adjectives are bare, whereas “HFF-violating” languages like Greek have identical full feature marking on both attributive and predicative adjectives, as the examples below illustrate.

(13) **German**

- a. Er ist stolz*(-er).
he is proud-M.SG.NOM
- b. ein stolz*(-er) Vater
a proud-M.SG.NOM father

(14) **Greek**

- a. (Aftos) einai perifan*(-os).
he is proud-M.SG.NOM
- b. enas perifan*(-os) pateras
a proud-M.SG.NOM father

The discussion above makes it clear that the rationale behind potential HFF violations has to do with the familiar issue concerning the balance between the rigidity of the word order and the richness of the morphological marking: a modifying adjective can be placed at a distance from its head noun only if it is sufficiently marked as belonging to that noun, either by means of an affix or by means of a clitic or free word. In what follows, we will sketch an analysis that derives this descriptive generalization.

3.2. *Towards an analysis*

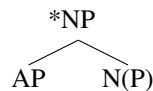
The idea that linear adjacency becomes a necessity when overt morphological marking is absent or insufficient to mark elements as being part of a single syntactic dependency is better stated in terms of a constraint that we call the *Phrase Continuity Requirement* (PCR), which replaces the HFF.

(15) **Phrase Continuity Requirement (PCR)**

The head of a modifier phrase must be linearly adjacent to the modified noun, unless this head is marked as belonging to the noun by means of overt morphology specified for all nominal features.

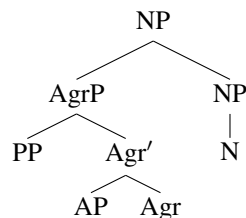
In this paper, we argue that the PCR can be modeled by making the following assumptions. First, direct modification of N by A is not possible, cf. (16): an attributively used adjective always requires an additional, potentially covert, morphological marker that contains all (case and φ) features available in the DP of that language. We will discuss possible ways of deriving this assumption from independently needed principles in section 5.

(16)

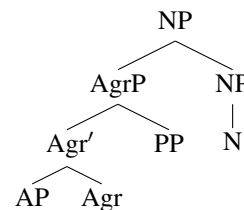


Second, logically speaking, there are two ways in which this morphological marker of all nominal features can enter the derivation. On the one hand, it may be available already in the extended adjectival projection (xAP), in which case it will also be present in predicatively used adjectives. The syntax of pre-nominal adjective modification involving a suffixal version of this type of agreement marker, which we call Agr, is depicted below. The structures with post-nominal APs and/or a prefixal Agr are analogous.

(17) a.



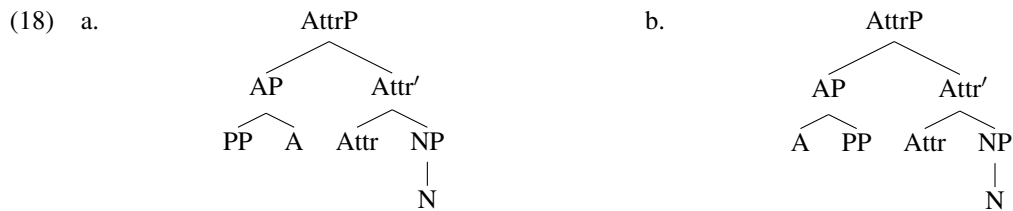
b.



We are not committed to some specific analysis concerning the identity of Agr: it may be a separate functional head, a category-defining little *a* head in the sense of Distributed Morphology, or even just a

part of the featural specification of the lexical A head. Crucially, we assume that it is Agr rather than A that takes a PP, after it has combined with the AP (for recent arguments that PPs are selected by *a* and not by A, see Merchant, 2019). Thus, if Agr is fully specified for all available nominal features, the PCR is satisfied, and PPs may precede or follow the adjective, cf. (17a) and (17b), in the latter case occurring between the adjective and the noun.

On the other hand, if the relevant morphological marker is not already present in the xAP and thus visible on predicatively used adjectives, it must be introduced inside the extended NP (xNP), as shown in the structures below. We call this type of agreement marker Attr to distinguish it from Agr, though it may in fact be categorially identical with Agr (which would presuppose that Agr is a functional head).



Finally, third, the morpho-phonological status of a functional head as an affix or a clitic determines the range of elements that can serve as its host. In particular, following Ackema & Neeleman (2000), we assume that, unlike clitics, which can attach to any linearly adjacent element inside the constituent they select for, affixes are more selective and can only attach to the head of the relevant phrase. The following constraint proposed by Ackema & Neeleman (2000), which they call the Input Correspondence Principle (ICP), formulates this restriction concerning possible hosts of affixes.

(19) **Input Correspondence Principle (ICP)** (Ackema & Neeleman, 2000)

If an AFFIX takes a head Y or a projection of Y as its input, the AFFIX is phonologically realized as /affix/, and Y is phonologically realized as /y/, then /affix/ takes /y/ as its input.

The affix/clitic distinction does not matter for structures involving Agr, i.e. (17a) and (17b), because the AP is the sister of Agr in this case, while the PP is merged higher and thus cannot intervene, which means that the adjective is linearly adjacent to Agr anyway. However, the situation is different in cases involving Attr, since the adjective does not have to be adjacent to it, as in (18b). Hence, in languages in which Attr must morpho-phonologically attach to the AP as an *enclitic* or free morpheme, A can take a PP to its left (18a) or to its right (18b), but if Attr is a *suffix*, the ICP allows the adjective to have only a leftward PP, i.e. as in (18a), but not (18b). Finally, Attr may also form a morpho-phonological unit with the noun and not with the adjective, thus following the head-marking strategy, as it is the case in Persian, cf. (9).

4. Language-specific analyses

Let us now see how the assumptions presented in the previous section derive the different types of behavior that languages can exhibit with respect to the “HFF”. We will first consider Greek, German, and Mandarin Chinese, which are all straightforwardly captured by the proposed analysis. Based on a discussion of Dutch, we will then argue that also languages with covert (or partially covert) agreement morphology, such as English and Italian, are subject to the same restrictions as well.

4.1. Overt morphology: Greek, German, Mandarin

Greek and other affixal languages listed in section 2.1 have xAP-internal agreement marking (Agr) that is fully specified for case and all φ -features available in the DP, as can be seen by the fact that it is present already on the predicative forms of adjectives, cf. (14). Therefore, given that adjectives in these languages can take rightward dependents (which will be introduced in the AgrP), attributive adjectives can be separated by them from their head nouns, as shown in (17b). Note that the fact that Agr encodes all available nominal features makes the presence of Attr in the structure unnecessary.

In German, by contrast, there is an asymmetry between predicative and attributive adjectives with respect to feature marking, cf. (13). While predicatively used adjectives must be bare forms, attributive adjectives carry obligatory overt case and φ -agreement morphology: bare forms/zero markings are not possible for any gender-number-case combination, in any declension paradigm. This asymmetry means that the agreement morphology on attributive adjectives is introduced in the xNP, by a functional head we call Attr. Given that Attr is realized as an affix in German, it is subject to the ICP in (19) and so can only have the head of the AP that it selects syntactically as its host. Moreover, since Attr is specifically a suffix, it can only attach to head-final APs, with which it can be adjacent to the head. Therefore, even though German allows for both right-branching (20) and left-branching (21) predicative APs, only the latter can be used attributively, cf. (22) vs. (23). In other words, Attr must be adjacent both to the NP (which it takes as its complement) and to the A head, and this implies that no ad-adjectival material may intervene between the adjective and the noun, which is exactly what we find.

- | | |
|---|---|
| (20) Marie ist [stolz auf ihren Sohn].
Marie is proud on her son | (22) *die [stolz auf ihren Sohn]-e Mutter
the proud on her son-ATTR mother |
| (21) Marie ist [auf ihren Sohn stolz].
Marie is on her son proud | (23) die [auf ihren Sohn stolz]-e Mutter
the on her son proud-ATTR mother |

Finally, in Mandarin Chinese, Attr is realized as the morpho-phonologically independent attributive marker *de* (cf. (5)), to which the ICP does not apply. Since Attr is a free morpheme, it does not have to be adjacent to the head of the AP, which allows ad-adjectival material to intervene in between. Hence, differently from German, the structure in (18b) is predicted to be grammatical in Mandarin, as desired.

4.2. Null morphology: Dutch, Italian, English

Dutch is similar to German in that predicatively used adjectives are always bare forms and in that they can take their dependents to their right or to their left. It differs from German, however, insofar as nouns do not always trigger overt agreement morphology on attributive adjectives: attributives take an overt ending (schwa), except when they modify an *indefinite neuter singular* noun, in which case their ending is null. When the attributive marker is the overt schwa-morpheme, things work in the same way as in German: being a suffix, it must right-attach to the head of the AP which it selects syntactically, as required by the ICP. Crucially, however, the situation is also not different when the agreement marker is a null morpheme, as the examples below demonstrate.

- | | |
|---|---|
| (24) *een [trots op haar vader]-e vrouw
a proud of her father-ATTR woman.COM | / *een [trots op zijn vader]- \emptyset kind
a proud of its father-ATTR child.NEUT |
| (25) een [op haar vader trots]-e vrouw
a of her father proud-ATTR woman.COM | / een [op zijn vader trots]- \emptyset kind
a of its father proud-ATTR child.NEUT |

We take this to confirm that the adjectival zero morpheme in Dutch is indeed an instance of a covert attributive marker and, importantly, that null attributive morphology does not behave in a different way from overt instances of Attr with respect to the ICP. Thus, underneath the morphological surface, Dutch is completely like German as far as the linearization inside modifier phrases is concerned.

This conclusion can now be applied to languages in which null agreement morphology in adjectives is more ubiquitous. Perhaps surprisingly, this is in fact the case in modern Romance languages such as, e.g., Italian. Italian does not have poor adjectival agreement morphology: both gender and number are marked symmetrically on both predicative and attributive adjectives, like in Greek. However, differently from Greek and in fact Latin, Italian does not encode *all* relevant nominal features on its adjectives, as they are not marked for *case*. Since case features are not introduced in the xAP by Agr (which carries gender and number features), they must enter the structure in the xNP on Attr, which, even if covert, is subject to the ICP. This then explains why Italian pre-nominal APs must be head-final, being strikingly different from Latin adjectives in this respect.

What the discussion above shows is that languages in which predicative and attributive adjectives are identical in their forms, but do not spell out all nominal case and φ -features, require a null Attr-head to be present in the xNP to carry the missing features. This also means that languages in which both the predicative and the attributive forms are bare, like in English, will exhibit the adjacency effects between attributively used adjectives and the nouns they modify.

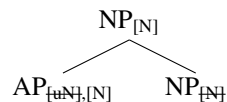
5. Conclusions and open questions

So far, the descriptive generalization from section 3.1, which replaces the HFF, as well as a number of related language-specific properties follow from the assumptions made in section 3.2. The question arises, however, as to why these assumptions should hold and, most notably, why a direct modification of N by A should be impossible (cf. (16)), but must be mediated through a functional element which is specified for all nominal features. Naturally, one could assume that lexical categories in general cannot merge directly with other lexical categories (an assumption that may also underlie abstract case). Yet, it is not clear why such a constraint should hold in the first place. Here we will sketch a tentative answer to this question.

The reason why a mediating functional element specified for all nominal features is needed could have to do with the Agree relation between D and N (and other heads in the xNP). Given that APs carry nominal features, they could intervene in this Agree relation and prevent the DP from being φ -complete and thus accessible for agreement from outside, unless they are inherently specified for all the features present on the noun. The problem with this approach would be, however, that adjectives are standardly analyzed as adjuncts or specifiers, and as such they are not expected to be able to act as interveners for probing heads.

We suggest that the combinatorial principles behind adjectival modification may provide a solution to this problem. In line with the proposal in Escribano (2004) and ideas in categorial grammar, one can think of attributive adjectives as elements that carry the features [N] and [uN]. This captures both their nominal character and the fact that, in a sense, they ‘select’ a noun for modification.

(26)



Now, if APs select an NP and return an NP, then the source of the nominal feature of the resulting phrase comes from the adjective and not from the noun itself. As this is the highest nominal feature of the entire NP, it is this feature that D must target. Hence, unless the adjective is specified for all nominal features as well, which will percolate up together with its [N]-feature, the DP will not be φ -complete.

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