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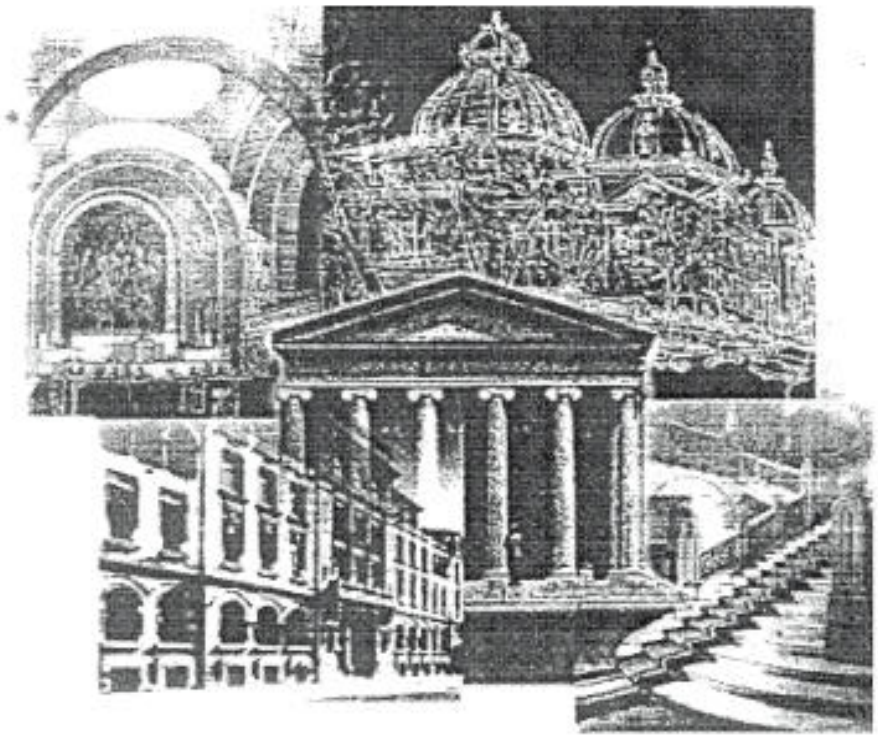

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DegPs as adjuncts, and the Head Final Filter

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1. Some background

The theoretically oriented research of the last forty years or so has shown considerable interest in the syntax and/or semantics of comparatives, as well as of degree constructions of other sorts. Within this extensive research, one may detect a number of approaches which, in addition to numerous other concerns, attempted to deal in part or in whole with the following puzzling state of affairs (found in English and a number of languages with comparable properties): On the one hand, degree elements (which may be viewed as functional heads of category Deg°) select complements with specific morpho-syntactic and semantic properties, as can be gathered from (1), where Degs are boldfaced and their selected complements are italicized; note that the complements in the various sub-cases cannot be freely interchanged, e.g., substitution of, say, the complement in (1a) for the one in (1f) yields an ungrammatical result (**John is so crazy than Bill (is)*). On the other hand, Degs and their complements may not form a surface constituent, as illustrated with respect to *more* in (2).

(1) a. John is **more** [**-er**+much] intelligent *than Bill (is)*.
b. John is **less** [**-er**+little] tall *than Bill (is)*.
c. John is (at least, at most, exactly) **as** tall *as Bill (is)*.
d. John is **too** tall *to play with your kids*.
e. John is tall **enough** *to make the basketball team*.
f. John is **so** crazy *that he eats ants*.

(2) a. *John is [more than Bill (is)] intelligent.
b. *John is [more than he is fit] intelligent.

We will note four earlier approaches, focusing on what they had to say about the puzzle at issue.

A first type of approach, adopted, e.g., in Chomsky (1965), Selkirk (1970), Bresnan (1973), and Heim (2001), proposes to base-generate Deg and its complement as a DegP constituent, thereby allowing a straightforward account of selectional restrictions; this DegP was embedded on a left branch of a gradable category, in particular, AP or AdvP. A problematic consequence of this approach was that in order to account for the grammatical surface order, it was necessary to assume obligatory rightward extraposition of the complement, something for which no interesting explanation was provided, and which contrasts with other forms of extraposition that are optional, e.g., the extraposition of noun complements and relative clauses.

A second type of approach, adopted, e.g., in Abney (1987), Larson (1988), Corver (1990, 1993), and Kennedy (1999, 2002), proposes that Deg and A/Adv form a constituent to which the complement of Deg is right-attached, so that Deg is now a functional head within an extended adjectival or adverbial projection. The constructions in (1) are now directly base-generated, avoiding the problems raised by obligatory extraposition, but a different set of problems arises. First, an account of selectional restrictions is less natural under these circumstances, and – more seriously – it is necessary to countenance an arbitrarily large number of base structures, since the procedure just noted does not in general guarantee acceptability. Thus, when Deg and the gradable category it combines with are left-embedded within another category, AP, AdvP, or NP, a process that may be recursively iterated, acceptability is achieved just in case the complement of Deg is merged maximally far to the right. This can be appreciated by examining the various sub-cases of (3)-(5).

(3) a. *John is a [more intelligent than Bill (is)] man.
b. John is a more intelligent man than Bill (is).
(4) a. *John is a [more unusually than any of you (is)] dressed student.
b. *John is a [more unusually dressed than any of you (is)] student.
c. John is a more unusually dressed student than any of you (is).

(5) a. *John is a [more strikingly than any of you (is)] unacceptably dressed student.
b. *John is a [more strikingly unacceptably than any of you (is)] dressed student.
c. *John is a [more strikingly unacceptably dressed than any of you (is)] student.
d. John is a more strikingly unacceptably dressed student than any of you (is).

A third type of approach, which aimed at preserving the desirable features of the first approach outlined above, while avoiding its problematic consequence, i.e., the unexplained obligatory character of extraposition, was put forward in Bhatt & Pancheva (2005). The gist of the approach, which combines aspects of Heim (2001) with the analysis of relative clause extraposition in Fox and Nissenbaum (1999), was to assume that Deg and its complement are merged as a constituent, but not necessarily at the stage where Deg first enters the derivation. Rather, Deg is viewed as a determiner heading a Generalized Quantifier which undergoes Q(uantifier) R(aising) to the right, and takes advantage of the option of merging the complement 'counter-cyclically', i.e., merging it with the *higher* copy of the Deg-chain generated by QR. Combined with the further assumption that it is the lower, rather than the higher, copy of the Deg-chain that gets 'pronounced', this analysis accounts for the observed surface order, i.e., for the extraposition effect. Concerning the obligatory status of extraposition, Bhatt & Pancheva offer the following explanation: In contrast to 'ordinary' determiners, Degs are non-conservative determiners. If the complement is merged cyclically, i.e., with the lower copy of the Deg-chain generated by QR, then the Trace Conversion procedure proposed by Fox (2002) for interpreting A'-chains that consist of full copies yields a contradictory or tautologous result when the determiner is non-conservative. In sum, Bhatt & Pancheva proposed that extraposition, analyzed as counter-cyclic merger, is an optional syntactic process for both relative clauses and Deg-complements, but argued that in the latter case, non-extraposed structures are ruled out on semantic grounds.

A fourth approach to degree constructions was put forward in Grosu & Horvath (2006), who argued that Bhatt & Pancheva's account of obligatory extraposition effects is untenable for a number of reasons. First, they showed that not *all* Degs are non-conservative, but obligatory extraposition effects do not distinguish between conservative and non-conservative Degs. Second, they pointed out that Bhatt & Pancheva's characterization of the deviance of degree constructions like (2) and the starred sub-cases of (3)-(5) fails to reflect the intuition that such constructions are unacceptable, but not felt to be either contradictory or tautologous. Third, they provided some data from Romanian in which failure of extraposition did not result in unacceptability.

In outlining an alternative approach, Grosu & Horvath proposed to subsume the deviance of the data at issue under an independently needed principle known by a variety of names, and which, following Van Riemsdijk (1998), they formulated as in (6):

(6) **The Head Final Filter (HFF)**
An XP left-adjoined to a head-initial projection needs to exhibit its own X head at its right edge.

Note that this is a constraint on *adjuncts*, not arguments, and furthermore it applies only to adjuncts that are attached to the left of head initial projections. The HFF has been prominently appealed to in relation to APs that modify NPs, and accounts for the deviance of data like (7b) and (8b).

(7) a. A runner [**eager** *to win this race*] has just registered for the competition.
b.*An [**eager** *to win this race*] runner has just registered for the competition.
c.*An **eager** runner *to win this race* has just registered for the competition.
(8) a. A task [**difficult** *for us to carry out*] was assigned to us yesterday.
b.*A [**difficult** *for us to carry out*] task was assigned to us yesterday.
b. A **difficult** task *for us to carry out* was assigned to us yesterday.

(7a) and (8a) are allowed by the filter, because they are *right*-adjoined to NP, and their acceptability is unsurprising. (7b) and (8b) are ruled out, because AP is *left*-adjoined to NP and its boldfaced head fails to be AP-final. (7c) and (8c) are both allowed by the filter, but (7c) is ungrammatical for a different reason: the extraposition of complements of A is highly restricted in English (as far as we can tell, it is allowed only with adjectives that belong to the *tough* class). Observe here that the HHF does

not specify the ways in which its violation may be avoided, in particular, it does not specifically require or license extraposition of the constituent that intervenes between the A head and the AP's right edge. Thus, in addition to extraposition of that constituent, as in (8c), and beyond the option of the right-adjunction of AP to NP, as in (7a) and (8a), violations of the HFF may also be avoided by preposing the complement of A, in languages where such preposing is independently available. This alternative way of circumventing the HFF is illustrated with German data in (9) (for an additional illustration with Hungarian data, see Grosu and Horvath's (47)).

(9) a.*Der [**stolze** *auf unsere Errungenschaften*] Lehrer wird bald eine Rede halten.
the proud on our achievements teacher will soon a speech hold
b. Der [*auf unsere Errungenschaften* **stolze**] Lehrer wird bald eine Rede halten.
the on our achievements proud teacher will soon a speech hold
'The teacher (who is) proud of our achievements will soon deliver a speech.'

Grosu & Horvath pointed out that all the ungrammatical sub-cases of data like (3)-(5) are straightforwardly ruled out by the HFF, since in all of them, a left-adjunct of some head-initial category fails to exhibit its head at its right edge due to an intervening complement of Deg. Thus, observe that in (5), the AdvP headed by *strikingly* is left-adjoined to the AdvP headed by *unacceptably*, which is in turn left-adjoined to the AP headed by *dressed*, which is in turn left-adjoined to the NP headed by *student*, and unacceptability is found whenever one of these left-adjuncts is prevented from satisfying the HFF by a complement of Deg.

Grosu & Horvath also pointed out that data like (2) do not automatically fall under the HFF, because the status of DegP has been moot. In particular, Heim (2001) analyzed DegP as a semantic argument of A (with Generalized Quantifier status), and Kennedy (1999), who developed a non-quantificational semantics for Deg, did not even have a constituent consisting of just Deg and its complement. To bring DegPs of the form [Deg+Complement] under the umbrella of the HFF, Grosu & Horvath proposed to view DegPs as left-adjoined to a gradable category (AP or AdvP), and to adopt a variant of Kennedy's non-quantificational analysis of Degs, for which they pointed out a number of independent advantages. Under this analysis, the deviance of data like (2) is predicted, and Hungarian data like (10), which are parallel to the German data in (9), are correctly accounted for; note that in both cases, the head of the bracketed adjunct may form a constituent with its complement when the latter precedes it, since in that case the HFF is not violated.

(10) a.*Mari [**kevésbé** *Jánosnál*] magas.
Mary less John-at tall
b. Mari [*Jánosnál* **kevésbé**] magas
Mary John-at less tall
'Mary is less tall than John.'

For perspicuousness, we schematically indicate in (12) the syntactic analyses assigned to (11) under each of the four approaches to degree constructions outlined above. In (13), we indicate the corresponding semantic translations of *more*.

(11) more intelligent than Bill
(12) a. $[_{AP}\ [_{DegP}\ [_{Deg'}\ [_{Deg}$ more] [than Bill]]] $[_{A}$ intelligent]] + *Extraposition*
b. $[_{DegP}\ [_{Deg'}\ [_{Deg}$ more] $[_{AP}$ intelligent]] [than Bill]]
c. $[_{AP}\ [_{DegP}\ [_{Deg'}\ [_{Deg}\ more_i]]]\ [_{AP}$ intelligent]] ..... $[_{DegP}\ more_i$ than Bill]
d. $[_{AP}\ [_{DegP}\ [_{Deg'}\ [_{Deg}$ more] [than Bill]]] $[_{AP}$ intelligent]]
(13) a. $[[\text{more}]] = \lambda S \in D_{<deg,t>}.\lambda M \in D_{<deg,t>}.\max(\lambda d.M(d)) > \max(\lambda d'.S(d'))$
b. $[[\text{more}]] = \lambda G_{<e,deg>}.[\lambda y_{<e>}.[\lambda x_{<e>}.G(y) < G(x)]]$
c. same as in (a)
d. $[[\text{more}]] = \lambda y_{<e>}.[\lambda G_{<e,deg>}.[\lambda x_{<e>}.G(y) < G(x)]]$

In (12a), DegP, consisting of Deg and its complement, is merged in [Spec, AP], and the complement is subsequently extraposed. DegP is construed as a semantic argument of A, and *more* translates as a determiner of degrees in (13a). In (12b), Deg takes AP as its syntactic complement, and the *than*-

phrase selected by Deg is in (a right-hand) [Spec, DegP]. Gradable adjectives are functions from individuals to degrees, and *more* is construed in (13b) as a function from gradable adjectives to a relation between the degrees possessed by two individuals. In (12c), DegP is merged as an argument of A, just as in (12a), except that the complement of Deg has not been merged with it; merger occurs later, after DegP has undergone QR (the two copies of the chain created by QR have been italicized and co-indexed for perspicuousness; as noted earlier, the 'higher' copy remains unpronounced). The construal of *more* is just as in (13a). In (12d), DegP has the same internal structure as in (12a), but is merged as an adjunct of AP, rather than as an argument of A. The translation of *more* in (13d) relies on the same basic ingredients as in (13b), with the only difference that the order of its first two arguments is reversed. As for the way in which extraposed structures are created, Grosu & Horvath did not specifically address this point, tacitly assuming an extraposition transformation, just as Fox & Nissenbaum assumed for noun complements; we return to this point in an appendix.

This concludes our presentation of earlier approaches to the puzzle noted at the beginning of this paper. In what follows, we will offer novel evidence in support of Grosu & Horvath's hypothesis that DegPs are adjuncts, and that the distributional privileges of Deg's complements follow from the HFF.

2. *Russian and the Head Final Filter*

Grosu & Horvath's proposal makes the following prediction: If the grammar of a language fails to exhibit the HFF, all the deviant data from English and other languages that were blamed on the HFF ought to be possible in that language. In this section, we propose to show that this prediction is confirmed with respect to Russian.

Earlier literature on Russian and Modern Greek has noted that data like (7b), (8b), and (9a) are possible in these languages; illustrations are provided in (14) and (15) respectively.

(14) a. Vdali vidnelis' dva [$_{AP}$ edva **zametnyx** *na*
far-away were-seen two barely noticeable.gen.pl on
fone beskonečnogo snežnogo prostora] malen'kix domika.
background endless.gen snow.gen space.gen small.pl.gen houses.gen
'Visible in the distance were two small houses (that were) barely noticeable against the background of the endless stretch of snow.'

b. [$_{AP}$ **Privykšij** *vypit' rjumku po utru*] zabuldyga
used to to-drink a-glass in the-morning debauchee
metalsja po komnate v poiskax spirtnogo.
was-moving-frantically around room in search of alcohol.
'A drunkard used to having a glass first thing in the morning was frantically searching for alcohol around the room.'

(15) O [$_{AP}$ **etimos** *na pai sto strato*] andras ... [Artemis Alexiadou, p.c.]
the ready to go to-the army man
'The man ready to volunteer for military service ...'

Grosu & Horvath showed awareness of this fact, but were not led by it to the conclusion that the HFF is absent from the grammar of Russian, because two examples they considered (their (54a) and (58a), reproduced below as (16) and (17) respectively) were interpreted by them as indicating that data like (3a) and (2a) are excluded in Russian as well.

(16) ??Ivan – [bolee umnyj čem Petr] mužik.
Ivan more clever than Peter man
'*Ivan is a [cleverer than Peter] man.'

(17) *Ivan – [bolee čem Petr] umnyj mužik.
Ivan more than Peter clever man
'*Ivan is a [more than Peter] clever man.'

We propose to show, however, that these data are not representative of Russian in general, and that when more carefully selected data are considered, the HFF turns out to block none of the constructions that are ruled out by it in relation to English and comparable languages.

Concerning (16), which Grosu & Horvath starred, but which is in fact marginal, rather than totally out, there exist comparably structured impeccable data, such as those in (18). Furthermore, even (16) can be rendered fully acceptable by adding an emphatic item, as in (19), where the emphatic item is boldfaced.

(18) a. Del'fin – [bolee razumnoe čem šimpanze] mlekopitajuščee.
dolphin more intelligent than chimp mammal
'A dolphin is a more intelligent mammal than a chimp.'
b. Èto – [bolee složnye čem bakterii] formy žizni.
this – more complex than bacteria forms of life.
'This is a form of life more complex than bacteria.'

(19) Ivan – [**kuda** bolee umnyj čem Petr] mužik.
Ivan far more clever than Peter man
'Ivan is a far cleverer man than Peter.'

It is not important in the present context to pinpoint the exact causes of the marginality of (16), but we suspect it has something to do with the fact that the noun *mužik* is semantically and pragmatically redundant in this case. In (18), the nouns that follow the AP arguably serve a useful discourse function in indicating that the scales of intelligence and complexity need to be relativized to mammals and to forms of life respectively, rather than to something else, but in (16), it hardly makes sense to relativize Ivan's and Peter's intelligence to anything other than humans, making it possible to suppress the noun without affecting the message. This conjecture seems to be supported by the observation that when the predicative complex nominal in (16) is used argumentally, in which case the noun cannot be suppressed without inducing ungrammaticality, the result is fine, as illustrated in (20).

(20) Ya nikogda ne videl' [bolee umnogo čem Petr] mužika.
I never not saw more clever than Peter man
'I have never seen a cleverer man than Peter.'

All these facts, taken in conjunction with the observation that the extraposed version of (16) is fine, despite the redundancy of the noun (see (21)), point to the following hypothesis: Structures of the form [[bolee Adj čem DP] N], while grammatical, are stylistically more 'marked' than structures of the form [bolee Adj N čem DP], in the sense that they need some kind of (contextual) 'justification', such as the pragmatic contribution of the noun in (18a-b). As for the improving effect an emphatic item (see (19)), which, we note in passing, is also observable in Modern Greek (see (22)), we surmise that it provides justification in another way, in particular, by giving the entire asymmetric relation, i.e., with inclusion of the standard of comparison provided by the čem-phrase, greater prominence.

(21) Ivan – bolee umnyj mužik čem Petr.

(22) O Janis ine enas ??(**poli**) pio eksipnos apo ton Petro andras [Artemis Alexiadou, p.c.]
the-John-nom is a much more clever than the-Peter.acc man-nom
'Janis is a far cleverer man than Peter."

Be this is as it may, what matters for current purposes is that structures like the bracketed noun phrase of (3a) (repeated below for convenience), are certainly grammatical in Russian, notwithstanding the special stylistic 'licensing' they seem to require.

(3) a. *John is a [[more intelligent than Bill (is)] man].

It remains to consider the significance of the deviant example in (17). It is important to note that this example is not an exact counterpart of (2a) (repeated below for convenience), since it does not merely exhibit the structure [[Deg + Complement] Adj], but involves a more complex structure in

which the preceding serves as left-adjunct of an NP. If we consider examples that exhibit only the simpler structure, no unacceptability is detectable, as illustrated in (23).

(2) a. *John is [more than Bill (is)] intelligent.
(23) a. Vasja – [$_{AP}$ [$_{DegP}$ bolee/lučše čem Petja] vospitan].
Vasya more/better than Peter bred
'Vasya is better bred than Peter.'
b. Radioslušateli – [$_{AP}$ [$_{DegP}$ bolee čem telezriteli] lojal'ny k reklame].
Radio-listeners more than tv-viewers loyal to advertising
'Those who listen to the radio are more tolerant of ads than TV viewers.'

The acceptability of such examples is important in a number of ways. First and foremost, it shows that in the absence of the HFF, not only non-head-final APs, but non-head-final DegPs as well are free to occur on the left-branches of containing categories, pointing to the conclusion that Grosu & Horvath's proposal to analyze them in the same way, namely, by considering DegPs as adjuncts, was on the right track. Second, it reinforces Grosu & Horvath's argumentation (contra Bhatt and Pancheva) that Degs and their complements may in fact be cyclically merged, without inducing semantic anomaly.

As for the deviance of (17), we will not attempt to investigate its causes, but we surmise that they are probably not (strictly) structural, since data with comparable structural properties are, if rare, nonetheless attested, as illustrated by (24) (from the internet site www.board.abitu.ru/pk/m_4q91.html.)

(24) Prošu [$_{NP}$ [$_{AP}$ [$_{DegP}$ bolee čem ja] informirovannyx] ljudej] soobščit'...
I-ask more [than I] informed people to report/inform...
'I ask people who are more informed than me to report/inform...'

3. Summary

We believe this paper has achieved two related goals. On the one hand, it has provided evidence that the HFF is absent from the grammar of Russian, contrary to what was assumed by Grosu & Horvath (2006), and is thus not a universal principle of grammar. On the other hand, it has strengthened Grosu & Horvath's analysis of DegPs as adjuncts and their HFF-based account of the obligatory extraposition effect, by providing evidence that non-head-final A/AdvPs and DegPs are not only both excluded from the left branches of head-initial projections in English and other languages, but are also both allowed under comparable circumstances in at least one language, i.e., Russian. We are hopeful that subsequent careful research on additional languages will shed further light on the nature and underpinnings of the HFF.

APPENDIX

As noted in section 1, Grosu & Horvath tacitly assumed that structures like (11) are derived from structures like (12d) by means of a (rightward) movement transformation (both examples are repeated below for convenience).

(11) More intelligent than Bill
(12) d. [$_{AP}$ [$_{DegP}$ [$_{Deg'}$ [$_{Deg}$ more] [than Bill]]] [$_{AP}$ intelligent]]

This seems natural enough, given the proposals made in Fox & Nissenbaum (1999), where an extraposition transformation was envisaged for noun complements, the option of counter-cyclic merger being reserved for relative clauses (and adjuncts in general). Nonetheless, Bhatt & Pancheva maintained that complements of Deg, despite their complement status, pattern with relative clauses, rather than with noun complements, insofar as the suspension of Condition C effects under

extraposition is concerned, and proposed to attribute this state of affairs to the fact that Degs do not assign *thematic roles* to their arguments. To account for (what they viewed as) the suspension of Condition C effects, they proposed to extend the counter-cyclic merger option to complements of Deg.

Now, the claim that Condition C effects are suspended in extraposed complements of Deg relied on data like (25a), where a coreferential reading of the co-indexed elements is possible.

(25) a. I will send him$_i$ far more books to the address you kindly provided than John$_i$ ever thought I would buy for him.
b. I will send him$_i$ far more books than John$_i$ ever thought I would buy for him to the address you kindly provided.

However, for the absence of Condition C effects in data like (25a) to count as *suspension*, it is necessary to establish the presence of such effects in (presumably) non-extraposed data like (25b). The native informants we consulted were unable to detect any difference between the two sub-cases of (25), pointing to the conclusion that, at least for them, Condition C effects are not found at all in such structures (a fact which, if solid, is of some independent interest, but one that we cannot address here). Given such judgments, there is no need to allow counter-cyclic merger for complements of Deg, and consequently no need to distinguish complements of Deg from complements of N in terms of counter-cyclic merger options available to them. Of course, the absence of Condition C effects in complements of Deg versus their (widely assumed) presence in the case of noun complements would still need to be accounted for.

All of this notwithstanding, since it is not impossible that other informants may report greater difficulty in getting a coreferential reading in data like (25b) than in data like (25a), we will also consider what analysis would be appropriate under such circumstances. Since we believe that Grosu & Horvath's arguments for a non-quantificational analysis of DegPs were solid, we cannot implement counter-cyclic merger in the manner envisaged by Bhatt & Pancheva, i.e., by relying on QR of DegP. Instead, we envisage an alternative technical implementation along the following lines:

Assume that the selectional requirements of a Deg head need not be satisfied immediately, but may be postponed by (optionally) passing up a selection-marking feature F to the Deg's maximal projection, and then from adjunct to host in a recursive fashion. This would enable a Deg marked with such a feature to project a DegP all by itself, as schematically shown in (26a), and given the percolation option, the complement of Deg may be merged with any F-possessing (higher) category. A grammatical output will result just in case the HFF is not violated, and Condition C effects in cases like (25a) can correctly get suspended. Concerning the semantics of *more* indicated in (13d), it needs to be slightly adapted by leaving the y variable free, as in (26b). Abstraction over this variable will take place at the stage where *than Bill* is merged, and the resulting abstract can then be applied to the denotation of *Bill*.

(26) a. $[_{AP}\ [_{DegP}\ [_{Deg'}\ [_{Deg}\ \text{more}^{F}]]]\ [_{AP}\ \text{intelligent}]]$
b. $[[\text{more}]] = [\lambda G_{<e,deg>}.[\lambda x_{<e>}.G(y) < G(x)]]$

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