Complements of Adj and Deg, and the Head Final Filter

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The following observation has been a long-standing puzzle: On the one hand, as illustrated in (1), degree heads (**boldfaced**) select morpho-syntactically specific kinds of complements (*italicized*). On the other hand, Deg heads and their selected complements may not occur adjacent to each other, at least in languages where adjacency yields the linear order *Deg – $Compl_{Deg}$ – Adj/Adv*, as illustrated in (2); in other words, in such languages, rightward 'extraposition', however implemented, appears to be obligatory, yielding data like (1). However, some languages allow an alternative way of avoiding the unacceptable order, by permitting the order *Compl – Deg – Adj/Adv,* as illustrated with Hungarian data in (3).

(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)[1] a. *John is [more than Bill (is)] intelligent.
b. *John is [more than he is fit] intelligent.
c. *This proposal is constructed [more than your proposal (is)] carefully.
d. *This proposal is constructed [more than it is constructed carefully] interestingly.

(3) Mari [Jánosnál] kevésbé magas
Mary John-at less tall
'Mary is less tall than John.'

The constraint illustrated in (2) appears to extend recursively to data where a DegP-containing AP/AdvP is embedded within another AP/AdvP and/or NP, as illustrated in (4)-(6), which show that the complement of Deg needs to be extraposed "all the way."

(4) a. *John has [more than Bill has] houses.
b. John has more houses than Bill has.
c. *John is a [cleverer than Bill is] man.
d. John is a cleverer man than Bill is.
(5) 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.
(6) 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.

[1]Data like these may be rendered acceptable with a different intonation and meaning:

(i) Bob is, *more than his brother is*, intelligent.

A possible paraphrase of (i) is 'it is more appropriate to say that Bob is intelligent than to say this of his brother'. Thus, (i) can be appropriately uttered by a speaker who thinks that Bob's brother is cunning, but not really intelligent, as well as by one who thinks he is a genius, and that the term 'intelligent' does not do him justice.

In earlier studies, two major tacks were adopted, each with its own drawbacks. One type of approach, found, e.g., in Chomsky (1965), Selkirk (1970), Bresnan (1973), and Heim (2001), is to generate Deg and its complement as a constituent, accounting for selectional restrictions, but also assuming obligatory extraposition without an obvious independent motivation. Another type of approach, found, e.g., in Abney (1987), Larson (1988), Corver (1990, 1993), and Kennedy (1999, 2002) is to assume that structures like (1) are base-generated, thereby leaving it unclear how selectional restrictions are to be captured, and facing the task of accounting for more complex data like (4)-(6). In a recent paper, Bhatt a& Pancheva (B&P: *LI* 2005) propose to deal with all these problems by assuming QR of Deg to the right, and by allowing 'late merger' of degree complements, with ultimate 'pronunciation' of the lower copy of the chain created by QR (an adaptation of Fox & Nissenbaum's 1999 approach to relative clause extraposition). The obligatory extraposition effect is accounted for by assuming that 'too early' merger of a degree complement would result in semantic contradiction or triviality, an account that crucially assumes the non-conservativity of Degs. In a reply to this proposal, Grosu & Horvath (G&H: *LI* 2006) showed that this approach is unsatisfactory in a number of ways: First, not all Degs are non-conservative, but extraposition is always 'obligatory'. Second, data like (2) and (4)-(6) are ill-formed, but to the extent they can be interpreted, they are neither contradictory nor tautological. Third, G&H provided Romanian data which show that extraposition is not always obligatory.

In an attempt to deal with the relevant facts in a more adequate way, G&H proposed to assume early merger of Deg's complement (thereby accounting for selectional restriction), and an independently needed principle for ruling out data in which the complement has not been 'extraposed' far enough. Unfortunately, they overlooked the need for proposing an **implementation** of 'extraposition', thereby leaving unaddressed the suspension of Condition C effects (illustrated in [A]), a state of affairs found in extraposed relatives, but not in extraposed noun complements.

[A] a. I told him$_i$ a sillier rumor (yesterday) [than John$_i$ ever told ME].
b. I sent him$_i$ far more books (yesterday) [than John$_i$ ever asked me to buy].

At the moment, we do have an implementation of extraposition that 'works', but since we know of no independent motivation for it at the moment, I relegate it to an Appendix, and concentrate in the talk on the way in which G&H sought to exclude 'non-extraposed' structures. I believe their approach was on the right track, and propose to bolster it with novel evidence.

G&H's idea was that both data like (4)-(6) **and** data like (2) can be brought under the more general umbrella of the Head Final Filter (HFF), which G&H, building on earlier characterizations of it, formulated as in (7).

(7) **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.

The HFF had been appealed to in earlier literature in relation to data like the following, where XP is a pre-nominal AP, and where unacceptability arises whenever AP ends with a complement of A, rather than with the head A.

(8) a. 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.
c. An exceedingly *eager* (*to get a PhD) student has registered in our department.
d. An exceedingly *eager* student (*to get a PhD) has registered in our department.

(9) a. Der [*stoltze* (*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 *stoltze*] 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.'
c. Der Lehrer ist [stoltz auf unsere Errungenschaften].
the teacher is proud on our achievements
'The teacher is proud of our achievements.'

(10) a. [*Elégedetlen* (*a fizetésükkel)] munkások nem dolgoznak jól.
dissatisfied the salary-their-with workers-nom not work-3pl well
b. A [fizetésükkel *elégedetlen*] munkások nem dolgoznak jól.
the salary-their-with dissatisfied workers-nom not work-3pl well
'Workers dissatisfied with their pay don't work well.'
c. A munkások nem voltak *elégedetlenek* a fizetésükkel.
the workers not were dissatisfied-pl.agr the salary-their-with
'The workers were not dissatisfied with their salary.'

Two remarks are in order here: The first is that the HFF, as formulated in (7), assumes that attributive APs are *adjuncts* (a view which is not uncontroversial, but which I will nonetheless assume in this talk as well). The second remark is that G&H proposed to view DegPs as semantic modifiers of AP/AdvP (by adapting analyses in Kennedy 1999, Neeleman, Van de Koot, and Doetjes 2004, and Kennedy and McNally 2005), rather than as semantic arguments of A/Adv, as proposed in Heim (2001), and assumed by B&P (2005). This assumption, which G&H argued for on a number of grounds, enabled them to bring not only (4)-(6), but also (2), under the umbrella of the HFF. Note that (4)-(6) fall under the HFF effortlessly, the only difference between them and (8)-(10) being that the HFF is violated by a complement of Deg in the former and by a complement of A in the latter, but (2) requires the further assumption that DegPs are adjuncts/modifiers.

G&H tacitly assumed that the HFF is a universal principle of language, and tried to explain away certain facts of Russian that suggest, at first blush, that DegPs and APs behave differently with respect to the HFF. The principle purpose of this talk is to show that the Russian data examined by G&H are not fully representative of what happens in Russian, and that when more complete data are taken into account, the following two conclusions emerge: (A) the HFF is not a universal principle of grammar, and (B) DegPs do behave like APs with respect to the HFF.

Relying on earlier literature, G&H noted the existence of acceptable Russian data with the crucial properties of the unacceptable data in (8)-(10), i.e., [[$_{AP}$ A+Compl$_{A}$] N]. Illustrations are provided in (11), and for completeness, an illustration from Modern Greek (kindly conveyed to us by Artemis Alexiadou, p.c.) is provided in (12).

(11) 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.'

(12) O etimos na pai sto strato andras …
the ready to go to-the army man
'The man ready to volunteer for military service …'

G&H also brought up the unacceptable data in (13) and (14), which seem to show that structures of the form [$_{NP}$ [$_{AP}$ Deg+A+Compl$_{Deg}$] N] and [$_{AP}$ [$_{DegP}$ Deg+Compl$_{Deg}$] A] respectively are excluded in Russian, much like in English.

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

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

To account for all these facts, G&H proposed to assume that Russian obeys the HFF, and that the acceptability of data like (11) is due to a productive process of re-analysis, operating in the syntax on structures of the form [$_{AP}$ A+Compl$_{A}$] and turning them into complex lexical items (cf. the non-productive English process that yields lexical compounds like *ready-to-wear*).

However, more careful subsequent field work revealed that the degraded status of both (13) and (14) is misleading, and that, when certain interfering factors are properly controlled for, acceptable data comparable to (4a&c) and (2a) exist, pointing to the conclusion that the HFF is absent from the grammar of Russian, and that APs and DegPs behave alike with respect to the HFF.

Acceptable data with the crucial properties of (13) are provided in (15)-(16); the complex NPs function as predicates and arguments respectively. Observe that (15a) is simply (13) with an added emphatic item (boldfaced). For reasons we do not yet fully understand, such items are sometimes needed for felicity, but not invariably (e.g., (15c) and (16b) are fine without such an item, and numerous data without emphatic items were found in the Tübingen corpus). – For completeness, an example from Modern Greek analogous to (15a) is provided in (17).

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

b. Piter – [**kuda** bolee točnaja čem Moskva] model' našego obščestva.
St. Petersburg – much more precise than Moscow model of-our society
'St. Petersburg is a much more faithful model of our society than Moscow.'

c. 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.'

(16) a. …sosredotočil v svoix rukax kontrol' nad [**gorazdo** bolee značitel'nymi
accumulated in self.pl. hands control over [much more significant,
čem v Moskve] finansovymi i informacionnymi potokami.
than in Moscow] financial and informational flows
'(He) accumulated in his hands control over financial and informational resources
far more significant than (there are) in Moscow."

b. Redaktor posulil Petrovu [bolee vysokie čem v 'Uorld'] gonorary.
editor promised Petrov.acc more high than in 'World' author's-fees
'The editor promised Petrov higher fees than in 'World'.'

(17) O Janis ine enas **poli** pio eksipnos apo ton Petro andras
the-John-nom is a much more clever than the-Peter.acc man-nom
'Janis is a far cleverer man than Peter."

As for (14), it is not really parallel to (2a), since the latter exhibits an AP predicate with the structure [$_{AP}$ [$_{DegP}$ Deg+Compl$_{Deg}$] A], while the former exhibits an NP predicate with the more complex structure [$_{NP}$ [$_{AP}$ [$_{DegP}$ Deg+Compl$_{Deg}$] A] N]]. It turns out that the simpler structure raises no problems in Russian, as illustrated in (18). In fact, even the more complex structure is not completely impossible, provided the complement of Deg is as 'light' as possible, e.g., with a pronominal; an example from the Internet (www.board.abitu.ru/pk/m_4q91.html) is provided in (19).

(18) a. Vasja – [$_{AP}$ [$_{DegP}$ lučše čem Petja] vospitan].
Vasya 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.'

(19) 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…'

The twin conclusions that emerge from the facts presented above is that Russian does not obey the HFF *as a grammatical principle*, and that DegPs are free to disobey it, just like APs. What still remains to be elucidated is why emphatic items are sometimes needed for acceptability, exactly under what circumstances they are (in)dispensable, and why 'intervening' complements of Deg had better be reasonably 'light' and not 'too deeply' embedded. Plausibly, the HFF has its underpinnings in prosody, and it is possible that the prosodic constraints that underlie it play a role even in languages where the HFF is not part of the grammar. Hopefully, future work will yield more precise answers to these queries.

APPENDIX

I outline here a technical implementation of extraposition of Deg-complements which captures both selectional restrictions and the absence of Condition C effects.

I schematically show in (20a-d) the syntactic analyses of a phrase like *more intelligent than DP* assumed by Heim (2001), Kennedy (1999), G&H, and us in this talk respectively; the corresponding semantic translations of *more* (or *-er*) are provided in (21a-d).

(20) a. [$_{AP}$ [$_{DegP}$ [$_{Deg'}$ [$_{Deg}$ more] [than DP]]] [$_{A}$ intelligent]]
b. [$_{DegP}$ [$_{Deg'}$ [$_{Deg}$ more] [$_{AP}$ intelligent]] [than DP]]
c. [$_{AP}$ [$_{DegP}$ [$_{Deg'}$ [$_{Deg}$ more] [than DP]]] [$_{AP}$ intelligent]]
d. [$_{AP}$ [$_{DegP}$ [$_{Deg'}$ [$_{Deg}$ more^{F}]]] [$_{AP}$ intelligent]]

(21) 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. $[[\text{more}]]: = \lambda y_{<e>}.[\lambda G_{<e,deg>}.[\lambda x_{<e>}.G(y) < G(x)]]$
d. $[[\text{more}]]: = [\lambda G_{<e,deg>}.[\lambda x_{<e>}.G(y) < G(x)]]$

I confine myself to noting how the present account differs from that in G&H. Instead of necessarily merging Deg with its complement as early as possible, each Deg is assumed to be provided with a feature that selects the appropriate type of complement. Crucially, this feature may be passed up recursively to hosts of adjuncts, thereby allowing the complement to be merged at various levels of structure. Only those mergers will emerge as acceptable which do not violate the HFF. Concerning the semantics, the y variable is left free, and it gets abstracted over only when this is coerced by the need to combine with the complement. The fact that 'extraposed' complements are merged directly at higher levels of structure accounts for the suspension of Condition C effects.

As hinted at earlier, the feature mechanism and its upward percolation are at the moment without independent motivation. Here, too, further research is called for.