# Reply to Bhatt and Pancheva's "Late Merger of Degree Clauses": The irrelevance of (non-)conservativity*

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## ABSTRACT

In this reply, we undertake a thorough evaluation of B(hatt) & P(ancheva)'s (2004) central thesis, which holds that two effects they attribute to degree constructions, i.e., obligatory extraposition effects and scope rigidity effects determined by the superficial position of degree phrases/clauses, can be given a unified analysis in terms of an extension of Fox & Nissenbaum's (1999) analysis of extraposition in conjunction with the non-conservativity of (certain) degree words. We show that, under full preservation of B&P's theoretical assumptions, their account is open to criticism on at least three counts, namely, (i) of the two phenomena they propose to unify, the one involving scope effects has no reality; (ii) (non-)conservativity is irrelevant to obligatory extraposition effects; and (iii) Trace Conversion, contrary to their position, is at most an optional procedure for DegP chains.

We propose an alternative non-semantic treatment of obligatory extraposition effects, which subsumes them under an independently needed adjacency constraint on pre-head modifiers. Furthermore, we note that the facts brought up in B&P's article and in the present reply call into question the quantificational approach to degree constructions.

*Keywords:* (quantificational vs. non-quantificational analyses of) degree constructions, extraposition, QR, full-copy chains, Trace Conversion, (non-)conservativity, adjacency, (counter-cyclic) late merger.

## 1. Introduction

In this article, we address certain word order and scope effects that have been studied by syntacticians and/or semanticists over the last forty years or so; in particular, we reply to Bhatt and Pancheva's (B&P; 2004) proposed account. These effects are found in 'adjectival' and 'nominal' degree constructions like those illustrated in (1) and (2) respectively. For ease of reference, we will call the constructions in the (a)-(f) sub-cases of (1)-(2) comparatives of superiority, comparatives of inferiority, equatives, *too*-constructions, *enough*-constructions, and *so…that* constructions, respectively[1].

(1) a. John is tall-**er** *than Bill (is).*

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 has more [**-er**+many] houses *than Bill (has).*

b. John has few-**er** houses *than Bill (has).*

c. John has (at least, at most, exactly) **as** many houses *as Bill (has).*

d. John has **too** many friends *to be depressed.*

e. John has **enough** friends *to get through any difficulties.*

f. John has **so** many friends *that he can't remember their names.*

The word order effects just alluded to concern contrasts like those between the various sub-cases of (3) and the corresponding sub-cases of (4). The scope effects concern the kind of ambiguity found in data like (5).

(3)[2] a. *John is [more than Bill (is)] tall.

b. *John is [more than he is fit] tall.

c. *John has [more than Bill (has)] houses.

d. *John has [more than he has cars] houses.

(4) a. John is taller than Bill (is).

b. John is taller than he is fit.

c. John has more houses than Bill (has).

d. John has more houses than he has cars.

(5) (Context: Last year, junior faculty were required to {publish, submit} 5 papers)

This year, non-tenured faculty members **{need, are required} to** {publish, submit} [fewer papers than {that, 5}] to get an extension of contract.

If the bracketed DP in (5) does not receive focus intonation, and it is contextually assumed that non-tenured faculty members may be penalized for 'polluting' the journals with too many

versions of the same article (or for making the senior faculty 'look bad' by comparison), we get a reading which says that the number of papers published/submitted this year needs to be **strictly smaller** than 5. If, on the other hand, the bracketed DP receives focus intonation and it is contextually assumed, in line with the 'normal' assumption that productivity is rewarded, we get a reading which says that the **minimal requirement** for a renewal of contract is lower than 5. As Heim (2001)[3] shows, this ambiguity can easily be explained by assuming that the bracketed expression takes scope either below or above the boldfaced intensional verb.

In earlier literature, there have been two well-known approaches to the internal syntax of degree constructions insofar as the configurational properties of the boldfaced Deg(ree) heads and of the italicized constituents in (1)-(2) are concerned. The two analyses are schematically shown in (6a-b).

(6) a. [$_{AP}$ [$_{DegP}$ **[$_{Deg'}$ [$_{Deg}$ -er] [degree clause]]**] [$_{A}$ tall]] ← **The 'classical' view**

b. [$_{DegP}$ **[$_{Deg'}$ [$_{Deg}$ -er] [$_{AP}$ tall]]** [degree clause]] ← **A common alternative**

Note that in (6a), Deg takes the degree clause as its complement, and forms a constituent with it in underlying representation, projecting a DegP; this DegP is in the Spec of an A(djective), with which it forms an AP. In (6b), on the other hand, Deg is a functional head that takes AP as its complement and projects a DegP that constitutes an extended adjectival projection; the degree clause occurs in the Spec of this DegP.

Semanticists who assumed one of these two syntactic analyses have typically proposed quantificational analyses of Deg when assuming (6a), and non-quantificational analyses when assuming (6b). For example, within the quantificational analysis proposed in Heim (1999, 2001), Deg is a Det(erminer) of degrees, and DegP is a generalized quantifier (GQ) of degrees which serves as first argument of a gradable adjective, the latter being a function from degrees to properties of individuals (and thus, of type <deg, <e,t>>). On the other hand, in the non-quantificational analysis proposed in Kennedy (1999), gradable adjectives are functions from individuals to degrees (and thus, of type <e, deg>), and Deg is a function from gradable adjectives to something else (the exact type varies depending on a number of factors, such as whether the subordinate constituent is clausal or not, and in the former case, whether it involves 'subdeletion' or not).

A point of some importance, as will be seen in what follows, is that the correlation between the syntactic analyses in (6a)-(6b) on the one hand and semantic quantificational/non-quantificational analyses of DegP on the other is not accidental, quantificational properties being typically associated with arguments, but not with APs or other predicates or adjuncts/modifiers (see, on this point, Landman 2004 chapter 3, Landman 2005b, and footnote 8 below).

Each of the syntactic analyses in (6a-b) have, at least *prima facie,* certain advantages and certain disadvantages. Thus, (6a) appears to provide a straightforward account of morphological selectional restrictions between Deg and the corresponding italicized constituents in (1)-(2); for example, *-er* requires a *than*-phrase, *too* an infinitival clause, and *so* a *that*-clause. If (6a) is coupled with a quantificational semantic analysis, it provides a straightforward account for the scope ambiguities in data like (5). Its major apparent drawback is that it seems to have to assume obligatory extraposition in order to account for contrasts like those between the corresponding sub-cases of (3) and (4), even though extraposition from complex XPs is not in general obligatory. For example, relative clauses and noun complements are not obligatorily extraposed.

The analysis in (6b), on the other hand, straightforwardly accounts for the contrast between (3a-b) and (4a-b) without positing obligatory extraposition, since the latter are directly base-generated, and the former never have a chance to arise. However, more complex constructions, such as (7)-(9), constitute a challenge for an approach that seeks to ensure the correct surface position of degree clauses through direct base generation. In particular, as the complexity of such constructions increases, additional base structures need to be devised in order to ensure the co-occurrence of *–er* and the degree clause in the correct positions.

(7) a. *John is a [cleverer than Bill is] man.

b. John is a cleverer man than Bill is.

(8) 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.

(9) 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.

Furthermore, stating the morphological selectional restrictions between Degs and their degree clauses is a less straightforward matter than in the approach in (6a), since the degree clause, within the approach in (6b), is not a syntactic complement of Deg. Finally, a non-quantificational analysis, at least *prima facie*, has a problem with scope ambiguities like those in (5), for which a quantificational approach has a straightforward solution.

At the same time, a non-quantificational approach has (at least) one arguable conceptual advantage over its competitor in that it does not need to assume the existence of non-conservative Dets (as will be seen forthwith, some Degs are not conservative), and may thus retain the conceptually desirable thesis that all Dets of natural language are conservative (as forcefully argued in Keenan and Stavi 1986). Of course, this conceptual advantage needs to be carefully weighed against possible empirical problems that do not otherwise arise, such as those noted in the preceding paragraph.

We wish to note at this point that, as Chris Kennedy (p.c.) pointed out to us, not all the structural properties in (6b) are essential elements for an adequate non-quantificational semantic alternative. For example, structure (6c) below also invites a non-quantificational analysis; it exhibits all the structural properties of (6a), except one crucial property: DegP is an adjunct of AP, rather than an argument of A.

(6) c. [$_{AP}$ [$_{DegP}$ **[$_{Deg'}$ [$_{Deg}$ -er] [degree clause]]**] [$_{AP}$ tall]]

In section 4, we will provide semantic translations for *-er* in the three structures in (6a-c) (see (57a-c)), and will also re-address in greater depth the issue of the 'competition' between the various syntactic-semantic approaches brought up above, bringing to bear on this matter results we will achieve in subsequent sections.

B&P propose an analysis of degree constructions that has among its principal goals the preservation of the virtues of the approach in (6a) in ways that also make it possible to deal with obligatory extraposition effects in a non-stipulative way. A second avowed goal of B&P's study is to account for certain limitations on scope options in degree constructions, which, to the best of our knowledge, had not been brought up in earlier literature. B&P's analysis of the two phenomena they focus on, i.e., obligatory extraposition and scope limitations, attempts to elegantly subsume them under a unified set of principles. Among the ingredients of their analysis, the following play a central role: (i) non-conservative Dets, (ii)

chain formation with full copies (Chomsky 1993), (iii) non-cyclic (or 'late') merger of certain types of constituents (Lebeaux 1990, Chomsky 1993, Fox and Nissenbaum 1999), (iv) the 'phonological' theory of QR (Fox and Nissenbaum op. cit.), and (v) Fox's Trace Conversion procedure (Fox 2002).

In view of the elegance of this analysis and of its potential ability to shed further light on the constructs and principles just listed as (i)-(v), we consider it important to undertake a careful evaluation of the foundations and success of B&P's proposed account. In section 3 of this paper, we submit B&P's proposals to a thorough critical examination, after outlining the gist of these proposals in section 2. The principal conclusions of our evaluation are (a) that one of the two phenomena they address, the alleged limitation on scope, does not in fact exist, so that an analytical unification of two phenomena is an impossibility; (b) that their account of obligatory extraposition effects is empirically deficient in a number of ways, suffering, among other things, from lack of generality, as well as from an intuitively incorrect characterization of the kind of deviance found in non-extraposed constructions; (c) that their appeal to semantic non-conservativity in connection with the facts they examine is a move in the wrong direction; and (d) that, contrary to what they tacitly assume, Fox's Trace Conversion cannot be the only mechanism by which full-copy traces are interpreted. In section 4, we propose a non-semantic account of obligatory extraposition effects, which derives them from a principle needed independently of degree constructions.

Finally, we wish to stress that in evaluating B&P's account in section 3, we entirely preserve their theoretical assumptions, in particular, those they adopt from Fox's and Heim's works cited above. Each of these assumptions can in principle be questioned, and in fact has been, on both conceptual and empirical grounds (see, e.g., Jacobson (2002a,b) for a critique of grammars with full-copy chains, and Schwarzschild & Wilkinson 2002 for a critique of aspects of Heim 2001, the possible correctness of the latter being in fact acknowledged by Heim herself in her footnote 21; see our footnote 13). Considering the data addressed by B&P within all the frameworks that have been envisaged so far in relation to degree constructions is a task that goes beyond the scope of a reply. Nonetheless, in section 4 we will note certain facts that are straightforwardly explainable within a non-quantificational approach to degree constructions, but not within a quantificational approach, and which point to the desirability of rethinking the overall analysis of degree constructions.

## 2. Bhatt and Pancheva's proposals

B&P take as point of departure the analysis of degree constructions in Heim (2000, 2001), which, as noted in section 1, assumes the syntax in (6a) and a quantificational analysis of Degs. An important modification of Heim's analysis by B&P is to adopt for degree clauses the analysis of extraposition put forward in Fox and Nissenbaum (1999) with respect to relative clauses. This modification aims at providing an explanation for the obligatory extraposition effects, by relying on a mechanism for interpreting traces proposed in Fox (2002) in conjunction with the non-conservativity of certain Degs (those that B&P explicitly discuss).

Fox and Nissenbaum (op. cit.) propose (i) that QR operates on DPs prior to Spell-Out, (ii) that the impression of covert movement results from the fact that the higher copy of the chain created by QR remains 'unpronounced', (iii) that QR may adjoin the ultimately unpronounced copy to the right of a host constituent, and (iv) that relative clauses, but not noun complements, may be merged counter-cyclically with the higher copy of a QR chain. The impression of 'extraposition' is thus created by the fact that the only pronounced constituents of the complex DP are the lower copy of the simplex DP chain and the relative clause adjoined to the silent higher copy.

In earlier literature, and in particular, in Fox and Nissenbaum (1999), late merger of relative clauses was assumed in an attempt to account for the observation that certain violations of Condition C in constructions with non-extraposed relatives are not detectable in minimally different constructions with extraposed relatives (this state of affairs contrasts with the one found in data with noun complements, whose extraposition preserves Condition C violations). B&P propose that degree clauses, despite their complement status, may be merged with their Deg head counter-cyclically. The data they themselves provide in support of this claim (reproduced in (10) with their acceptability judgments) are not very convincing, but data like (11) (kindly brought to our attention by an anonymous referee), show quite clearly that a DP within an extraposed degree clause can function as the antecedent of a pronoun in the matrix[4].

(10) a.??I will tell him$_i$ a sillier rumor (about Ann) [than Mary told John$_i$].

b. I will tell him$_i$ a sillier rumor (about Ann) tomorrow [than Mary told John$_i$].

(11) a. I told him$_i$ a sillier rumor (yesterday) [than John$_i$ ever told ME].

b. I sent him$_i$ more books (yesterday) than John$_i$ ever asked me to buy.

We conclude that within the framework of a theory that accounts for the suspension of Condition C effects in terms of late merger, it is justified to assume that complements of Deg may be merged late.

B&P propose to combine the result just noted with a mechanism for the interpretation of traces put forward in Fox (2002). This move is aimed at providing a unifying account of two *prima facie* unrelated phenomena: (i) contrasts of the kind illustrated in (3)-(4), and (ii) a(n alleged) limitation on the scope of DegPs (to be illustrated below). Fox's mechanism, shown in (12), converts 'traces' in a chain formed by copying (Chomsky 1993) into semantically interpretable objects, and constitutes an alternative to the conversion mechanism proposed in Chomsky (op. cit.), which simply replaced a copy with a free variable.

(12) *Trace Conversion*

a. *Variable Insertion*

(Det) Pred → (Det) [Pred λy (y = x)]

b. *Determiner Replacement*

(Det) [Pred λy (y = x)] → the [Pred λy (y = x)]

The exact import of the output of T(race) C(onversion) can be more easily appreciated by replacing Fox's somewhat unconventional notation with the more transparent one in (13).

(13) the [λy. Pred (y) & y = x]

Much like Chomsky's conversion procedure, Fox's TC introduces a free variable, but in addition equates it with another variable which is locally bound by a definiteness operator and **restricted by the trace-internal predicate** (in the case of a DP-trace, by Det's NP complement). In view of their analysis of DegPs as GQs, B&P propose to extend the application of TC to DegP chains, and furthermore (tacitly) make the crucial assumption that TC is the **only** available procedure for interpreting traces created by QR (and presumably, by A'-movement in general).

When Det is conservative (and the interpretation does not involve 'reconstruction'), the restriction on variables introduced by TC is merely redundant, but this is not so when Det is

non-conservative. Basically, a Det is conservative if intersecting its second argument with the first preserves truth value, and is non-conservative otherwise; more formally, a Det is conservative if the following equivalence holds:

(14) Det (A)(B) $\Leftrightarrow$ Det (A)(A $\cap$ B) , where A, B are sets

Now, as B&P observe, *–er* (or, equivalently, *more* in the case of superiority comparatives) is non-conservative. This can be appreciated by noting that the truth conditions for *–er/more* are not identical in (15a) and (15b) (where S and M stand for the sets of degrees denoted, respectively, by the subordinate degree clause, and by the matrix clause after application of QR to DegP).

(15) a. [[ -er]]($S$)($M$) = 1 iff $S \subset M$

b. [[-er]]($S$)($S \cap M$) = 1 iff $S \subset S \cap M$

Thus, if John is taller than Bill, the sentence *John is taller than Bill is* correctly predicted to be true under (15a), but incorrectly predicted to be false under (15b), because in a situation where $S \subset M$, $S \subset S \cap M$ is equivalent to the contradictory proposition $S \subset S$.

Putting the non-conservativity of *–er/more* together with the assumption that TC is a necessary procedure for interpreting traces, B&P show that cyclic merger of a complement of Deg in a superiority comparative yields a contradiction, and that the contradiction can be avoided by merging the complement counter-cyclically. To see this, compare (16b) with (16c), where the former is the representation that results in the derivation of (16a) from cyclic merger of the comparative clause with Deg, QR, TC, and abstraction over the free variable introduced by TC, and the latter is the representation that results if the comparative clause is merged counter-cyclically after QR. The output of TC is shown in the format in (13), and the variable restriction introduced by this operation is indicated in (16b) by boldfacing.

(16) a. John is taller than Bill is.

b. [more [than Bill is tall]] $\lambda d$ [John is the [$\lambda d_i$**.Bill is** $\boldsymbol{d_i}$ **–tall** & $d_i = d$] tall]

c. [more [than Bill is tall]] $\lambda d$ [John is the [$\lambda d_i . d_i = d$] tall]

In view of B&P's heavy reliance on the semantics in Heim (2000, 2001), we assume that the translation of *-er/more* they have in mind is something like (17a) or (17b), and that the translations of (16a-b) – assuming, for the nonce, (17a) – are as shown in (18a-b).

(17) a. [[-er]] = $\lambda S \in D_{<deg,t>}.\lambda M \in D_{<deg,t>}.\max(\lambda d.M(d)) > \max(\lambda d'.S(d'))$

b. [[-er]] = $\lambda S \in D_{<deg,t>}.\lambda M \in D_{<deg,t>}.\lambda d.M(d) \supset \lambda d'.S(d'))$

(18) a. $\max(\lambda d$ [John is the [$\lambda d_i$**.Bill is** $\boldsymbol{d_i}$ **–tall** & $d_i = d$] tall]) > $\max(\lambda \boldsymbol{d_k}$**.**Bill is $d_k$ –tall**)**

b. $\max(\lambda d$ [John is the [$\lambda d_i.d_i = d$] tall]) > $\max(\lambda \boldsymbol{d_k}$**.**Bill is $d_k$ –tall**)**

Note that (18a), but not (18b), implies that Bill's maximal height is greater than itself. Therefore, only a derivation in which the degree clause is merged counter-cyclically results in a non-contradictory interpretation of (16a). Relying on this, B&P's propose that the deviance of the various sub-cases of (3) is due to the fact that they are necessarily contradictory. We reemphasize that these data are contradictory only if TC is assumed to be an obligatory procedure, because under replacement of a copy-trace with an unrestricted variable, the translation of (16a) is equivalent to (18b).

As noted in the Introduction, B&P also propose to use the machinery they brought to bear on data like (3)-(4) for the purpose of analyzing a certain limitation on scope, which, they claim, is found in degree constructions. The limitation is that the scope of a DegP is rigidly determined by the position in which its complement is pronounced. According to them, this limitation is masked in data like (5) by the fact that the complement may be attached (to an unpronounced copy of Deg) either in the infinitival subordinate clause or in the matrix, but is detectable in (19)-(20) (= their (53)-(54)), where the complement is clearly in the subordinate clause in the (a) sub-cases, and in the matrix in the (b) sub-cases. According to them (19a)-(20a) have only the narrow scope reading, and (19b)-(20b), only the wide scope reading.

(19) a. John is **required** [to publish *fewer papers* this year [*than that number*] in a major journal] [to get tenure].

b. John is **required** [to publish *fewer papers* this year in a major journal] [to get tenure] [*than that number*].

(20) a. John is **required** [to publish *exactly 5 more papers* this year [*than that number*] in a major journal] [to get tenure].

b. John is **required** [to publish *exactly 5 more papers* this year in a major journal] [to get tenure] [*than that number*].

B&P propose to account for the inability of DegP to take matrix scope in (19a)-(20a) by observing that such a construal requires the complex DegP in the subordinate clause to undergo QR *in toto*, thereby leaving in the subordinate clause a trace that induces contradiction. Note that B&P tacitly assume not only that the chain-copy that marks the position of the bound variable **necessarily** undergoes Fox's TC, but also that **all** the copies below the one that marks scope do[5]. In this way, the effects in (3)-(4) and those in (19a)-(20a) are unified by the generalization in (21) (= their (90)).

(21) Degree clauses can *only* be merged in their ultimate scope position.

At this point, we have in effect concluded our presentation of the central points in B&P's proposals. However, before turning to an evaluation of these proposals, we wish to draw attention to a *prima facie* beneficial consequence of (21) that B&P did not explicitly point out.

So far, we have glossed over the fact that the bracketed structures in (3) do not transparently reflect the cyclic merger of *–er* with its complement, since, as B&P note in their footnote 4, degree heads like those boldfaced in (1)-(2) 'require that their sister be an adjective', and when this requirement cannot, for some reason, be satisfied, the dummy adjectival base *much* is resorted to, as in (3)[6]. The point is that *–er* does not really form a constituent with its complement in (3), since it is suffixed to *much*, just as it is suffixed to *tall* in (1a), where the kind of constituency at issue is not assumed. Should one then assume that the data in (3) are derived just like (1a), i.e., by QR and late merger of the complement? And if this assumption is made, how can the difference in acceptability between (1a) and (3) be accounted for?

An answer to the questions just raised is implied by B&P's discussion of (22) (= their (20)). They propose that this sentence has a derivation in which the complex DegP is formed at the level of AP, which, 'given predicate internal subjects, … is the lowest position where the DegP can be interpreted'.

(22) Bill wants to be taller than John is.

If so, we may assume that if data like those in (3) are generated by late merger, DegP is too low to be interpreted (being embedded within an argument of the matrix), and raising it to a position where interpretation is possible would run afoul of (21).

We are now in a position to point out the consequence of (21) we alluded to three paragraphs above. Observe that in all the deviant sub-cases of (7)-(9), the complement of Deg is too low to be interpreted, and all these data thus need to violate (21). This means that B&P apparently have a neat, unified account of both the contrasts in (3)-(4) and those in (7)-(9), something which, as noted in the Introduction, is not obviously available to earlier theories that relied on either (6a) or (6b).

## 3. Critical evaluation of B&P's proposals

We begin our evaluation of B&P's account by examining the empirical underpinnings of one of the phenomena targeted by their attempt at an analytical unification: the alleged inability of DegPs to take scope wider than the overt position of their complement. The informants we consulted found the highly complex data in (19)-(20) extremely difficult to process, and were unable to decide whether the (a) sub-cases do or do not exclude a wide scope reading of their DegPs, as B&P claimed[7]. To circumvent this problem, we constructed the examples in (23), which are easier to process in view of the fact that the time adverb *this year* does not 'split' the bracketed constituent. Note that the data in (23) differ from those in (5) only in the presence of an additional (italicized) constituent within the infinitival clause. This constituent, however, ensures that the bracketed constituent, and in particular, the *than*-complement within it, are internal to the infinitival clause. These data thus have the crucial structural properties of B&P's original examples reproduced in (19a)-(20a).

(23) (Context: same as for (5))

a. This year, non-tenured faculty members **{need, are required} to** publish [fewer papers than {that, 5}] *in LI* to get an extension of contract.

b. This year, non-tenured faculty members **{need, are required} to** submit [fewer papers than {that, 5}] *to LI* to get an extension of contract.

Our informants reported that the wide scope reading is not harder to get in (23) than in (5), provided the bracketed constituent gets focus intonation (a step also needed to facilitate the wide scope reading in (5)), and provided the italicized constituent in (23) is de-accented. For whatever they are worth, our own judgments fully concur with theirs. Crucially, there is no need for an intonational break before the italicized constituent, which indicates that the latter need not be viewed as an after-thought belonging to a separate utterance, so that the bracketed constituent is securely 'trapped' within the infinitival clause [8].

This is a result of some importance. First, it indicates that B&P's claim concerning the inability of DegPs to take scope beyond the surface position of their complement is false. Second, it points to the conclusion that TC cannot be an obligatory procedure, at least insofar as intermediate traces are concerned, since the wide scope reading of (23) is perfectly well-formed. Third, it shows that, contrary to what seemed to be the case at the end of section 2, B&P do NOT have an account of (3) and of the deviant data in (7)-(9). It may perhaps seem that this last conclusion can be circumvented by assuming that QR can apply to a constituent just in case the latter will ultimately have appropriate scope from the position to which it is raised. Such a move is, however, undesirable, since it needs to assume look-ahead capability. For example, at the stage where QR has adjoined a sub-constituent of AP to AP, it cannot be known whether this AP will ultimately be merged as a sentential predicate (as, e.g., in (22)) or as an adnominal modifier (as, e.g., in (7a)). We thus do not view the possibility just contemplated as a viable way of salvaging B&P's theory insofar as its ability to deal with (3) and (7)-(9) is concerned.

In sum, we have seen that B&P's theory can in principle target only one of the phenomena it proposed to unify, since the other phenomenon, namely scope rigidity, does not exist; moreover, its ability to deal with the former is in doubt. In the ensuing three sections, we present three additional objections to B&P's account of obligatory extraposition effects.

### *3.1. Insufficient generality*

Although B&P's discussion was carried out almost entirely in relation to comparatives of superiority and inferiority, they explicitly stated in their footnotes 1 and 2 that their account is intended with respect to **all** degree constructions. Now, the obligatory extraposition effects

that they noted in relation to comparatives of superiority are also found in all other degree constructions, as illustrated in relation to adjectival and nominal constructions in (24)-(29) and (30)-(35) respectively. However, **not all Deg heads are non-conservative**, as will be seen below. The account at issue thus misses what seems to be a significant generalization.

(24) a.*John is [less than Bill (is (fit))] tall.

b. John is less tall than Bill (is (fit)).

(25) a.*John is [too (much) to play with your kids] old.

b. John is too old to play with your kids.

(26) a.*John is [exactly as (much) as Bill (is (imaginative))] intelligent.

b. John is (exactly as intelligent as Bill (is (imaginative)).

(27) a.*John is [(at least, at most) as (much) as Bill (is (fit))] tall.

b. John is {at least, at most} as tall as Bill (is (fit)).

(28) a.*John is [enough to make the basketball team] tall.

b. John is tall enough to make the basketball team.

(29) a.*John is [so (much) that he eats ants] crazy.

b. John is so crazy that he eats ants.

(30) a. *John has [fewer than Bill has (cars)] houses.

b. John has fewer houses than Bill has (cars).

(31) a. *John has [too many to qualify for a tax deduction] houses.

b. John has too many houses to qualify for a tax deduction.

(32) a. *John has [exactly as many as Bill has (cars)] houses.

b. John has exactly as many houses as Bill has (cars).

(33) a. *John has [{at least, at most} as many as Bill has (cars)] houses.

b. John has {at least, at most} as many houses as Bill has (cars).

(34) a. *John has [enough to live comfortably ever after] money.

b. John has enough money to live comfortably ever after.

(35) a. *John has [so (much) that his sanity is in danger] money.

b. John has so much money that his sanity is in danger.

To show that not all Degs are non-conservative, we will first establish what relations between the S(ubordinate) and the M(atrix) sets are implied by the truth conditions for the

various Degs. We have already seen that comparatives of superiority rely on the proper subset relation. In comparatives of inferiority, the relevant relation depends on whether *less* and *fewer* are viewed as semantically atomic items (as in Kennedy 1999), or whether they are semantically decomposed into *–er* and *little/few* (as in Heim 1999). In the former case, the relevant relation is the proper superset relation, in the latter case, it is the proper subset relation, because *-er* is interpreted exactly as in comparatives of superiority and *little* is interpreted as negation. The result is that, e.g., *John is less tall than Bill (is)* is true (for Heim) iff the complement of the set of heights possessed by Bill is properly included in the complement of the set of heights possessed by John. In view of their reliance on Heim's earlier work, we assume that B&P meant to follow Heim in this respect as well (see, however, footnote 9).

*Too*-constructions also rely on the proper subset relation. For example, for (25b) to be true, it must be the case that the set of ages John needs to have to play with your kids is properly included in the set of ages he actually has (see, e.g., Meyer 2003 for the semantics of *too, enough,* and *so … that* constructions).

Equatives with *exactly* clearly rely on the identity relation, and equatives with *at least,* on the subset relation. As for equatives with *at most,* they rely on the superset relation if this item is semantically atomic, and on the subset relation if it is decomposed into *at least* and negation. We will assume the latter, for the sake of consistency with the assumption we proposed to make for *less/fewer*.

Finally, *enough* and *so … that* constructions rely on the subset relation. Thus, for (28b) to be true, the set of heights John needs to have to make the basketball team must be identical to or properly included in the set of heights he actually has, and for (29b) to be true, the set of degrees of craziness John needs to have to eat ants must be identical to or properly included in the set of degrees of craziness he actually has.

We have thus established that degree constructions fall into three subclasses, according to whether they rely on the proper subset, identity, or subset relations. We now proceed to check the conservative/non-conservative status of these three relations. Three possible states of affairs are relevant in the present context: (i) S is properly included in M, (ii) S is identical with M, and (iii) S properly includes M. We exhibit in the left columns of (36)-(38) the truth/falsity of constructions that rely on the proper subset, identity, and subset relations respectively, in each of the three situations (i)-(iii); the right columns show the corresponding

truth values under intersection of M with S.

| | | | |
|---|---|---|---|
| (36) | (i) | T | F |
| | (ii) | F | F |
| | (iii) | F | F |
| (37) | (i) | F | T |
| | (ii) | T | T |
| | (iii) | F | F |
| (38) | (i) | T | T |
| | (ii) | T | T |
| | (iii) | F | F |

(36)-(38) show that the proper subset and the identity relations are non-conservative, the truth values in the left and right columns being different for (36i) and (37i). The subset relation is, however, conservative, because the left and right columns show identical truth values for all the sub-cases of (38).

Thus, equatives with *at least/at most*, *enough* constructions, and *so …that* constructions all rely on the subset relation, and therefore involve a conservative Deg. Consequently, we conclude that B&P's account fails to address the contrasts in (27)-(29) and (33)-(35), and is thus deficient in failing to capture what appears to be a solid generalization[9].

### *3.2. Incorrect characterization of deviance*

Another way in which B&P's account is arguably problematic concerns the kind of deviance it attributes to (3), (26a), and (32a). In particular, it predicts that (3a) differs from (4a) (only) in implying that Bill is taller than himself, and that (32a) differs from (32b) (only) in being judged true in a situation where John has more houses than Bill has (cars), in view of the fact that it implies that Bill has exactly as many houses/cars as he has. But these predictions seem incorrect. Thus, (3a) is felt to be ill-formed (deviant, degraded, ungrammatical, etc.), but to the extent that an interpretation can be assigned to it, it does not seem to be contradictory; rather, if anything, it seems to be synonymous with (4a); in contrast, the sentence *Bill is taller than himself* is contradictory, but is not felt to be ill-formed in the way (3a) is. Similarly, (32a)

is ill-formed in the above sense, and to the extent that it can be interpreted, is felt to be synonymous with (32b). In contrast, the sentence *Bill has exactly as many houses/cars as he has* is tautological, but not ill-formed. Thus, the semantic anomalies predicted by B&P's theory do not seem to materialize, and the ill-formedness of the data is not predicted. All this points to the conclusion that in appealing to semantics for an account of obligatory extraposition effects, B&P were on the wrong track.

### *3.3. Counterexamples from Romanian*

In this section, we discuss certain data from Romanian which directly contradict B&P's claim that non-conservativity induces obligatory extraposition effects.

As we pointed out at the beginning of section 3, data like (23) clearly show that intermediate traces can escape the application of TC, and may thus undergo conversion to an unrestricted variable, or be deleted altogether. This, however, does not yet show that a copy at the foot of a chain does not need to undergo TC. In English, it is difficult or impossible to check what happens, because, for one reason or another, 'pure' DegPs containing nothing other than Deg and its complement can in general not be observed directly. Most of the Degs are either affixes, e.g., *-er,* or arguably clitics, e.g., *as, too, so,* and all these require an adjectival/adverbial (contentful or dummy) host. *Enough* is not a clitic, but it also needs to right-adjoin to an adjective in adjectival degree constructions. It is only in nominal constructions like (34) that it appears without adjectival support. If we assume that there is no null *much/many,* and that the scale such items provide is implicit in the meaning of *enough* (an assumption that requires the recognition of two distinct semantics for *enough* in adjectival and nominal constructions), then we do have a pure DegP in (34a), but the deviance of this datum shows us nothing about the obligatory/optional status of TC, because *enough* is conservative (see section 3.1).

Fortunately, there exist data from Romanian that provide a 'window' on the behavior of cyclically created pure Degs. Romanian has a number of non-clitic Degs, which, unlike those of English, are morphologically separated from their adjectival bases by means of the dummy preposition *de* (e.g., *atât de* 'so', *destul de* 'enough', *la fel de* 'as'). The presence of this intervening *de* makes it possible for cyclically generated complex DegPs to arise under a restricted set of circumstances (basically, when the complement is non-clausal, and not 'too

heavy'). We illustrate this state of affairs in (39)-(43).

(39) a. Ion este (exact) la fel de deştept ca tine.
Ion is just as of clever as you
'Ion is (exactly) as clever as you.'
b.(?)Ion este [(exact) la fel ca tine] de deştept.
Ion is exactly as as you of clever

(40) a. Ion bea (exact) la fel de mult lapte ca tine.
Ion drinks exactly as of much milk as you
'Ion drinks (exactly) as much milk as you.'
b.(?)Ion bea [(exact) la fel ca tine] de mult lapte.
Ion drinks exactly as as you of much milk

(41) a. Ion are (exact) la fel de multe case ca tine.
Ion has exactly as of many houses as you
'Ion has (exactly) as many houses as you.'
b.(?)Ion are [(exact) la fel ca tine] de multe case.
Ion has exactly as as you of many houses

(42) a. Ion este (exact) la fel de puternic pe cât eşti tu (de deştept).
Ion is just as of strong on how-much are you of clever
'Ion is (exactly) as strong as you are (clever).'
b.?*Ion este [(exact) la fel pe cât eşti tu] (*de deştept) de puternic.
Ion is just as on how-much are you of clever of strong

(43) a. Ion este destul de înalt ca să joace basket.
Ion is enough of tall Czer Mood play.3 basket-ball
'Ion is tall enough to play basket-ball.'
b.* Ion este [destul ca să joace basket] de înalt
Ion is enough Czer Mood play.3 basket-ball of tall

In (39)-(41), where Deg's complement is a PP, the (b) sub-cases are basically fine, if slightly stylistically marked (the indication '(?)' purports to convey this status). In (42)-(43), the (b) sub-cases are degraded, most of all in (43), possibly due to the overt complementizer of Deg's complement. This shows that, under 'favorable' conditions (a characterization we will make

precise in section 4), pure DegPs may occur in the position of initial merger of Deg without inducing ill-formedness. Importantly, in the full versions of (39b)-(41b), Deg is non-conservative, but these sentences are not tautological. For example, (39b) is not judged true in a situation where Ion is more intelligent than 'you.' We conclude from this that the bottom copy of a chain, just like intermediate ones, does not **have to** undergo TC.

Does the view that TC is optional for DegPs, as suggested by the above discussion, have implications for the theory of DPs? On the reasonable assumption that TC has the same properties in relation to DP- and DegP-chains, we can see at least one important implication. Thus, while an optional TC suffices for an account of reconstruction effects and the interaction of reconstruction and extraposition, Fox's most interesting result, i.e., the ability to **derive** (from the syntax) Keenan & Stavi's (1986) hypothesis concerning the conservativity of natural language determiners, is lost. Instead, it becomes necessary to assume, as in the earlier semantic literature of the eighties and nineties, that conservativity is an **inherent** semantic property of determiners, i.e., one independent of QR and TC.

Observe, however, that Fox's result is lost **only if** DegPs receive a quantificational analysis. Under a non-quantificational analysis, DegP's do not undergo QR, DegP chains do not arise, TC becomes irrelevant to degree constructions, and Fox's interesting result can be preserved. In section 4, we reach, on completely independent grounds, the conclusion that the optimal analysis of degree constructions, insofar as the facts considered in this paper are concerned, is a non-quantificational one. Note that our conclusion derives further conceptual support from its ability to leave Fox's account of the conservativity of determiners unaffected.

## 4. Towards an alternative approach to 'obligatory extraposition'

The preceding section has demonstrated that any attempt to predict obligatory extraposition effects in degree constructions on the basis of semantic non-conservativity is doomed to failure. The insufficiency of non-conservativity (shown in section 3.1), its intuitively incorrect characterization of the nature of the deviance found in the absence of extraposition (section 3.2), and its actual irrelevance, in view of the non-obligatory status of TC (see the comments following example (23) and section 3.3) point to the need for an alternative approach. In the present section we motivate such an approach. The thrust of our alternative proposal is that the deviant DegP data of the kind brought up in earlier sections in connection

with obligatory extraposition effects fall under a broader generalization. Though the precise *raison d'être* of this generalization is not entirely clear, it is crucially needed independently of degree constructions. It effortlessly accounts for most of the data that concern degree constructions, and with a particular change in theoretical orientation, for all of them.

Earlier literature has attempted to make sense of a variety of constructions that exhibit adjacency effects between heads (for recent discussion, see van Riemsdijk 1998 and references therein). One of these constructions, discussed, for example, in Emonds (1976), Horvath (1981, 1986), Maling (1983), van Riemsdijk (1992), (1998), Grosu (2003, section 7.5), and Haider (2004), arguably involves the left-adjunction of a phrase to a head-initial projection. A typical instantiation of this state of affairs concerns pre-nominal APs: in English and in numerous other languages, pre-nominal APs need to have their head adjacent to the head of the host NP[10]. An illustration of this adjacency requirement is provided in (44) with English data.

(44) a. An [interesting (*for all of us)] proposal was made last night.
b. A [difficult (*for us to carry out)] task was assigned to us yesterday.

This kind of head-to-head adjacency effect arises under adjunction, but not under merger of arguments, and it seems to be confined to left-adjuncts of head-initial hosts. We are not aware of a convincing explanation for either of these two properties. Van Riemsdijk suggests that heads in adjunction constructions need to be reanalyzed as a single head, and notes that under such a view, adjacency does not need to be stipulated, but he fails to provide a reason for why such reanalysis needs to take place.[11] While we do not have at present an interesting account for the various aspects of the effect illustrated in (44), what we do propose to show is that this head-to-head adjacency constraint can go a long way towards explaining most, and possibly all, of the so called obligatory extraposition effects in degree constructions.

We will consider below some major characteristics of this adjacency requirement, then will show that the case of degree constructions manifests striking parallelism; thus what has been referred to earlier as "obligatory extraposition effects" in DegPs properly falls under the above general head-to-head adjacency constraint.

In constructions that do not involve degrees, there are at least two potential strategies for avoiding the deviance found in the full versions of (44), while conveying their intended

import. Such data may in principle be 'salvaged' by extraposition, if the language allows the offending intervening constituent to occur to the right of the modified head; for example, the deviant full version of (44b) may be salvaged in this way, as shown in (45). Extraposition is, however, not the only way of avoiding deviance. Another strategy, which is available, e.g., in German and Hungarian, consists in placing the offending constituent to the left of the modifying head. As shown in (46c) and (47c), an adjective may in principle be followed by its complement, but not when the adjective is pre-nominal, as shown in (46a), (47a). (46b) and (47b) demonstrate that deviance can be avoided by pre-posing the adjective's complement.

(45) A difficult task for us to carry out was assigned to us yesterday.

(46) 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.'

(47) 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.'

Notice now that degree constructions manifest parallel behavior: violations of the adjacency constraint by an intervening complement of Deg can be circumvented, just as in the case of complements of A, not only by placing the troublesome constituent to the right of the

modified head, i.e., by "extraposition", but also by placing it to the left of the modifying head. The following data from Hungarian (cf. with (46), (47)) illustrate this option. Thus, (48a-b) show that the complement of Deg can in principle occur either after or before an adjective in predicative position, and (49a-b) show that when the adjective is pre-nominal, only the latter option exists. The (c) subcases of (48)-(49) show that Deg's complement may not intervene between Deg and the adjective.

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

(49) a.*Egy kevésbé magas [Jánosnál] lány lépett be.
a less tall John-at girl stepped in
'A girl less tall than John walked in.'
b. Egy [Jánosnál] kevésbé magas lány lépett be.
a John-at less tall girl stepped in
'A girl less tall than John walked in.'
c. *Egy kevésbé [Jánosnál] magas lány lépett be.)
a less John-at tall girl stepped in

An apparent relaxation of this head-to-head adjacency constraint on modification may be found in Russian; however, this arguably does not constitute true counter-evidence to it. In Russian, complement(s) and/or adjunct(s) of an A may intervene between it and N, but only so long as they are not exceedingly 'heavy'. Illustrations (from Babby 1975, or by Helen Trugman, p.c.) are listed below (for perspicuousness, the heads of APs are boldfaced).

(50) a. [**polnaja** solnca] komnata [= Babby's 1.5]
full sun.Gen room
'a room full of sunlight'

b. [**gotovyi** na vse] student [= Babby's 1.6]
ready on everything student
'a student ready for anything'

(51) a. [**zalitaja** solncem] komnata [H. Trugman]
flooded sun.Instr room
'a room flooded with sunlight'

b. [**pridirajuščijsja** k učenikam iz-za pustjakov] učitel' [= Babby's 1.10]
finding-fault to students because-of trifles.Gen teacher
'A teacher finding fault in the students over trifles'

(52) a. [**privykšij** vypit' rjumku po utru] zabuldyga [H. Trugman]
used-to drink.Inf glass in morning debauchee
'a drunkard used to drinking a glass in the morning'

b. [**nesoglasnyj** davat' pokazanija] součastnik prestuplenija [H. Trugman]
non-agreeing.Nom give.Inf testimony accomplice.Nom crime.Gen
'an accomplice of the crime unwilling to testify (in court)'

(50)-(51) exhibit APs with non-clausal complements/adjuncts, the A being a participial in (51); in (52), the complement is an infinitival.

However, Russian does not have a 'blank license' to ignore the head-to-head adjacency requirement. Consider for instance (53) below, where the complement is a complex PP containing a subjunctive clause.

(53)??[**nesoglasnyj** na to, čtoby ego vodili za nos s pervogo dnja
non-agreeing.Nom on that Czer him.Acc make-a-fool from first day
sovestnoj žizni,] molodoj suprug [H. Trugman]
common life young spouse
'a young spouse unwilling to be made a fool of from their first day of life together'

As Helen Trugman pointed out to us, when the complements are 'too complex', as in (53), acceptability is degraded, and such data are in any event marginally possible only if the subjunctive clause serves as complement to the essentially empty demonstrative *to*.

In all the data in (50)-(53), the elements which intervene between A and N are 'dependents'

of A (i.e., arguments or adjuncts of A). Can the intervening elements be dependents of some other pre-adjectival head, in particular, one whose maximal projection is itself a dependent of A? Our ability to investigate this issue is hampered by the fact that the only suitable kind of maximal projection that seems to be available in Russian is DegP. Of course, it would have been desirable to be able test this matter independently of DegPs, for example, with adverbial modifiers of A, but these do not seem to allow complements in Russian any more than they do in English (see Jackendoff 1977, section 3.2), according to our informants. We can thus check the matter under consideration only with DegPs. As shown in (54), complements of Deg cannot occur between A and N any more than they can in English (cf. with (7)).

(54) a.*Ivan – [bolee umnyj čem Petr] muzhik
Ivan more clever than Peter man
'*Ivan is a [cleverer than Peter] man.'
b. Ivan - bolee umnyj muzhik čem Petr
Ivan more clever man than Peter
'Ivan is a cleverer man than Peter.'

As noted in the conclusion of section 2, B&P seemed to have a *prima facie* neat account of data like (7), and if we ignore what was said in section 3, Russian facts like (54) taken in conjunction with facts like (50)-(53), might appear to argue for a separate treatment of adjectival modification and degree constructions, in particular, for B&P's account of the latter. However, we saw in section 3 that B&P's account of degree constructions is untenable for a number of reasons. Accordingly, until and unless a separate treatment of degree constructions that avoids all our objections is offered, we propose to assume that Russian has a productive (syntactic or post-syntactic) counterpart of the lexical process that forms complex As like the bracketed one in (55a) in English, where this process is not productive (cf. (55a) with (55b)). In particular, we propose to assume that this process applies to **simplex As and their adjacent dependents**, and superficially masks the effects of the constraint on modification in Russian. In what follows, we will see that a comparable process, subject to strikingly similar applicability conditions, operates in a different environment in Romanian. Arguably, the latter process increases the plausibility of the one we have proposed to assume for Russian.

(55) a. She bought herself some [ready-to-wear] clothes.
b. *She was assigned a [hard to carry out] task.

Having illustrated the independent existence of the adjacency constraint on modification, we now proceed to defend our alternative proposal, which is that what we have so far called 'obligatory extraposition effects' are (largely or entirely) traceable to this particular constraint. The data we will address fall into two categories: (i) some that are straightforwardly predicted by what has been said so far in this section, and (ii) some that require further discussion.

Data that belong to category (i) are (7)-(9) and arguably (3c-d). For convenience, we reproduce (3) and (7)-(9) below, with minor adaptations aimed at facilitating the discussion; in particular, we indicate morphological decomposition in (3), and we italicize heads that violate the constraint (by failing to be adjacent). There is no italicization in (3a-b), for reasons that will become clear in what follows.

(3) a. *John is [much-er than Bill (is)] tall/aggressive.
b. *John is [much-er than he is fit] tall/aggressive.
c. *John has [*many*-er than Bill (has)] *houses*.
d. *John has [*many*-er than he has cars] *houses*.
(7) a. *John is a [*clever*-er than Bill (is)] *man*.
b. John is a *clever*-er *man* than Bill (is).
(8) 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).
(9) 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).

In (7a), the bracketed structure is an AP headed by *clever* within the quantificational theory of Degs we have so far been assuming. Since A is separated from N by the degree clause, this

example is straightforwardly ruled out. In (8a), the bracketed expression is an 'AdvP' (in more precise terminology, a phrase headed by an ad-adjective) which modifies an A. Under the null hypothesis that the head-to-head adjacency requirement under discussion extends to such forms of modification, (8a) is excluded because a degree clause intervenes between Adv and A. (8b) is excluded on the same grounds as (7a), and (7b) and (8c) are fine because the grammar of English allows the degree clause to occur to the right of N. In (9a), the bracketed expression is an AdvP modifying and Adv (more precisely, an ad-ad-adjectival phrase modifying an ad-adjective), and deviance is attributable to the fact that the italicized heads are not adjacent. The comments we made about (8a-c) apply to (9b-d) respectively. Finally, as far as (3c-d) are concerned, they belong in the same category as (7a), under the widely held view that *many* is a gradable adjective; similar comments apply to comparable constructions with *much-er* and a mass noun, as well as to parallel data with *few-er* and *little-er*.

We now turn to the residual DegP data, starting with (3a-b). Observe that in this case, *much* is not obviously an ad-adjective like *unusually* in (8), and a similar remark applies to comparable data with *less.* In contrast to (3c-d), where *many* provides a degree argument that DegP can bind, the noun having no such argument, *much* in (3a-b) plays no comparable role, because the adjective does provide a degree argument. As observed in Heim (1999), *much* is a dummy, and *little* may be viewed as being simply negation. Heim proposes to analyze *little* in such cases as a modifier of DegP (of type <deg, <<deg,t>,t>>>), rather than of the adjective, and a similar analysis is appropriate for *much*, except that the latter needs to be construed as an instance of the identity function. If so, the bracketed phrases in (3a-b) are DegPs, not AdvPs, and these data do not obviously fall under the adjacency requirement on modification. To account for the deviance of such data, one may try to appeal to the fact that *much/little* are morphologically identical in nominal and adjectival constructions (in English and many other languages), and attempt to bring (3a-b) under the same umbrella as (3c-d) on this basis. We do not quite see that this can be done in a non-*ad-hoc* fashion, but even if it could be done, it would still not ensure coverage of all relevant data, since the Romanian adjectival data in (43), reproduced below for convenience, as well as comparable nominal data, such as those in (56), cannot plausibly be brought under a common umbrella with (3c-d) and (44)-(47).

(43) a. Ion este destul de înalt ca să joace basket.
Ion is enough of tall Czer Mood play.3 basket-ball
'Ion is tall enough to play basket-ball.'

b.*Ion este [destul ca să joace basket] de înalt
Ion is enough Czer Mood play.3 basket-ball of tall

(56) a. Ion are destul de mult vin ca să se îmbete turtă.
Ion has enough of much wine Czer Mood Refl inebriate pie
'Ion has enough wine to get dead drunk.'

b.*Ion are [destul ca să se îmbete turtă] de mult vin.
Ion has enough Czer Mood Refl inebriate pie of much wine

It thus seems necessary to recognize that a DegP also needs to have its Deg head adjacent to an adjective/adverb of which it serves as degree argument. Actually, the very fact the Degs are often morphologically combined with adjectives/adverbs (as affixes or clitics) may well be a secondary (historical) development ultimately brought about by the adjacency requirement just noted. The question is then why such a requirement should exist, and whether it can be brought under a common umbrella with the requirement that concerns incontrovertible modifiers.

As far as we can see, there is no natural way to extend the constraint on modification to (3a-b), (43b) and (56b), so long as the DegPs in the latter are analyzed as (quantificational) arguments. A straightforward extension of the constraint is, however, available, if one analyzes DegPs as (non-quantificational) modifiers, as was recently proposed, for example, in Neeleman, van de Koot and Doetjes (2004) and Kennedy and McNally (2005). For concreteness, let us return to the semantics of the various subcases of (6), reproduced with inconsequential modifications in (6‘) below, paying special attention to (6’c), which, as noted in section 1, was suggested to us by Chris Kennedy in a p.c.

(6’) a. [$_{AP}$ [$_{DegP}$ **[$_{Deg'}$ [$_{Deg}$ -er] [degree phrase/clause]]**] [$_{A}$ tall]]

b. [$_{DegP}$ **[$_{Deg'}$ [$_{Deg}$ -er] [$_{AP}$ tall]]** [degree phrase/clause]]

c. [$_{AP}$ [$_{DegP}$ **[$_{Deg'}$ [$_{Deg}$ -er] [degree phrase/clause]]**] [$_{AP}$ tall]]

Heim (2001), who assumed the structure in (6a) and viewed gradable adjectives as monotonic functions of type <deg, <e,t>>, proposed (57a) as the semantic translation of *–er*, while Kennedy (1999), who assumed the structure in (6b) and viewed gradable adjectives as non-monotonic functions of type <e, deg>, proposed the translation in (57b) (where G, as

indicated by its subscript, stands for a variable of the type of gradable adjectives). All that is needed for a Kennedy-type translation of (6'c) is to switch the order in which *-er* combines with gradable adjectives and the degree phrase/clause, as shown in (57c). We remind the reader that the non-quantificational translation of (6'c) is not an arbitrary choice, but rather is motivated by the well-supported assumption that QR does not apply to adjuncts/modifiers.

(57) a. $[[\text{-er}]] = \lambda S \in D_{<deg,t>}.\lambda M \in D_{<deg,t>}.\max(\lambda d.M(d)) > \max(\lambda d'.S(d'))$

b. $[[\text{-er}]]: = \lambda G_{<e,deg>}.[\lambda y_{<e>}.[\lambda x_{<e>}.G(y) < G(x)]]$ [12]

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

Now, given the adjunct/modifier status of DegP in (6c'), degree constructions naturally fall under the general constraint on modification, and the deviance of (3a-b), (43b) and (56b) ceases to be mysterious. In short, all the instances of 'obligatory extraposition' considered above in this paper are now straightforwardly predicted.

Under the alternative theory just envisaged, it is also possible to make good sense of the varying degrees of acceptability of the (b) sub-cases of (39)-(43). All we need to assume is that Romanian has a process of complex head formation analogous to the one that is operative in Russian (to which we have already alluded in our discussion of the Russian data), with the only difference that this process is applicable only to A and its adjacent dependents in Russian, and only to Deg and its adjacent dependents in Romanian (that Russian and Romanian do not have *exact* replicas of the other's type of process is illustrated in (58a) and (58b) respectively).

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

b. O interesantă (*pentru noi toți) propunere a fost făcută noaptea trecută.
an interesting for us all proposal has been made night-the last
'An interesting (*for us all) proposal was made last night' [= (44a)]

Such differences in the range of applicability of language-specific processes are in no way unexpected. APs and DegPs are distinct categories, but they both function as

adjuncts/modifiers. The constraint on modification can thus be maintained in its full generality, once the masking effect of various language-specific processes is recognized.

Can all the facts brought up in this paper be successfully handled within a non-quantificational analysis of degree constructions based on the structure in (6'c)? In addition to its success in relation to obligatory extraposition effects, it also has the ability, just like analyses based on (6'a), to capture selectional restrictions between Deg and the degree phrase/clause by viewing the latter as a complement of the former. At the same time, there is one fact it does not automatically account for, i.e., the ambiguity of data like (5), (23) and (i) of footnote 8, for which an analysis based on (6'a) had a straightforward solution, based on narrow/wide scope of QR. An in-depth consideration of available options goes beyond the scope of this paper, but we note here a possibility, suggested to us by Manfred Krifka (p.c.), which is consistent with both quantificational and non-quantificational approaches, and which consists in assuming that the boldfaced modal verbs and the corresponding adjacent infinitival verbs may optionally undergo re-analysis as a single complex verb (note the parallelism with a comparable assumption widely made in earlier literature in relation to certain verbs in Romance languages). Under this view, wide/narrow scope effects can be attributed to whether re-analysis does/does not take place.

For completeness, we wish to remind the reader that the properties of degree constructions considered in this paper are certainly not the only ones that need to be taken into account when comparing quantificational and non-quantificational theories (for a recent survey of the relevant properties and existing analytical proposals, see, e.g., von Stechow 2003). Many properties that did not come up in this reply are currently the focus of intensive investigation (see, e.g., Schwarzschild & Wilkinson 2002[13], Landman 2005a), and an overall comparison of the two kinds of approaches must await further advances in the field. We will thus not attempt such a comparison here, and confine ourselves to the conclusion that, insofar as the facts addressed in this paper are concerned, an analysis of DegPs as non-quantificational adjuncts appears to be superior to one that views them as quantificational arguments on two counts: (i) its ability, stemming from the adjunct property, to bring **all** the facts considered in this section under the umbrella of the head-to-head adjacency requirement on pre-head modification, and (ii) its ability, stemming from the non-quantificational property, to preserve Fox's syntactic account of the conservativity of 'standard' determiners.

## 5. Summary and conclusions

We believe that this paper has achieved the following results:

First, it has established that of the two phenomena that B&Ps proposed to address and unify, i.e., obligatory extraposition effects and scope rigidity in degree constructions, only the former phenomenon has any reality.

Second, we have shown that determiner non-conservativity is irrelevant to obligatory extraposition effects.

Third, we have provided evidence that if degree constructions are assigned a quantificational analysis, then Fox's Trace Conversion for the interpretation of chain-copies below the scope-defining copy cannot be an obligatory procedure, a result with adverse consequences for TC's ability to derive the conservativity of 'standard' determiners from their syntactic properties.

Fourth, we have shown that all the relevant facts can be adequately accounted for by an independently needed head-to-head adjacency requirement on pre-head modification, provided that a non-quantificational analysis, whose feasibility was demonstrated, is adopted. We also noted that a non-quantificational analysis, if adopted, has the additional advantage of making it possible to retain Fox's result just referred to.

Concerning the on-going debate between proponents of quantificational and non-quantificational analyses, we did not attempt to adjudicate in favor of one of them, but noted that, as far as the facts discussed in this paper are concerned, the latter emerges as preferable to the former for the two reasons alluded to in the preceding paragraph.

## FOOTNOTES

* We wish to express our gratitude to two *LI* referees, and especially to one of them, whose highly detailed comments on two earlier versions of this paper have led to what we hope is a substantially improved version. We are also most grateful to Chris Kennedy, Tal Kedar, Manfred Krifka, Fred Landman, Omer Preminger, Roger Schwarzschild, and Penka Stateva for useful discussion of various issues tackled in this paper, as well as to audiences at the *Incontro di Grammatica Generativa XXXI,* Rome, February 2005, and at the *Zentrum fuer*

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None of these persons is in any way responsible for the use we have made of their ideas, and all remaining inadequacies are entirely our own.

[1] In (1a',b) and (2a), we indicate within square brackets a morphological decomposition of *more* and *less* that goes back at least as far as Bresnan (1973). This decomposition has been attributed syntactic and/or semantic significance by numerous earlier authors, although not by all. We return to various aspects of this matter at a number of points in the remainder of this paper.

[2] For completeness, we note that there exist acceptable constructions which superficially resemble those in (3), but which exhibit a different prosodic contour, and furthermore differ semantically from those in (3).

(i) a. Bob is, *more than his brother is*, intelligent.
b. Bob has, *more than Bill does*, courage.

A possible paraphrase of (ia) might be 'it is more appropriate to say that Bob is intelligent than to say this of his brother'. Note that (ia) can be truthfully uttered by a speaker who thinks that Bob's brother is wily, 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. Similarly, (ib) can be used by some who thinks that Bill's behavior is more appropriately described as reckless than as courageous.

In these constructions, the italicized constituents do not 'modify' the adjective, but plausibly some clausal constituent. Such data are irrelevant in the present context, and have been mentioned only to avoid confusion.

[3] Bhatt and Pancheva (2004), whose proposals constitute much of the focus of this article, refer to Heim (2000), which was subsequently published as Heim (2001), with minimal modifications that do not affect the issues addressed here. Since we only had access to Heim (2001), our own references will be to this work.

[4] The informants we consulted reported that coreference is quite difficult in both (10a) and (10b), but easy in (11). We surmise the reason for this contrast is that in (10), but not in (11), *John* is in a position where it normally receives (sentence) stress, and stress on a purported antecedent seems to make backwards anaphora harder in general, as suggested by the contrast in (i), where stress is indicated by capitalization.

(i) a. ??Her$_i$ mother-in-law hates MARY.

b. Her$_i$ mother-in-law HATES Mary.

[5] While B&P do not make explicit the way in which contradiction may be introduced by chain-copies occupying a position hierarchically intermediate between the copy that defines scope and the one that defines the position of the bound variable, we feel it is appropriate to clarify this matter here, in view of the importance of the generalization in (21) for what follows.

What needs to be made explicit is the sequence of steps by which an intermediate trace can introduce a restriction on a variable in the position of the lowest trace (we are grateful to Uli Sauerland for clarifying this matter for us). For simplicity, we indicate the relevant steps in the derivation of a three-copy chain resulting from wh-movement, in particular, the one in (ib).

(i) a. Which man did you say Mary saw?

b. *Which man$_3$* did you say *which man$_2$* Mary saw *which man$_1$*

(ii) a. *Which man$_3$* did you say *which man$_2$* Mary saw *the[λx.M(x) & x=y]*

← TC of *which man$_1$*

b. *Which man$_3$* did you say *the[λz.M(z) & z=w]* Mary saw *the[λx.M(x) & x=y]*

← TC of *which man$_2$*

c. *Which man$_3$* did you say *the[λz.M(z) & z=w]* λy.Mary saw *the[λx.M(x) & x=y]*

← abstraction over *y*

d. *Which man$_3$* did you say Mary saw *the[λx.M(x) & x= the[λz.M(z) & z=w]]*

← application, λ-reduction

e. *Which man$_3$ λw.*did you say Mary saw *the[λx.M(x) & x= the[λz.M(z) & z=w]]*

← abstraction over *w*

The crucial steps are (iib-d). At (iib), TC applies to the intermediate trace, yielding an expression of type <e>. At (iic), the free variable *y* is abstracted over, yielding an abstract of type <e,t>. At (iid), application of the abstract to the intermediate trace, followed by lambda reduction, places the converted intermediate trace in the position of the lowest trace, introducing at this level the free variable *w,* which is abstracted over at stage (iie) and gets ultimately bound by the GQ denoted by *which man*$_3$. Crucially, *w* is restricted via equation by the predicate within the intermediate trace (as well as by the one within the lowest trace, of course).

In the above example, where Det is conservative, multiple restriction of the variable is merely redundant, but in cases with non-conservative Dets, any chain-copy lower than the one in scope position can introduce contradiction.

[6] We note that B&P also glossed over this fact, since they write, in connection with their (11)-(14) (which are essentially like (3)-(4)) that *prima facie* 'evidence against the constituency of *–er* and the degree clause seems to come from the fact than in general, it is not possible for the two to appear together', which we interpret to mean that the two cannot form a constituent.

[7] We note in passing that many of our informants also had difficulty getting the wide scope readings of Heim's ambiguous examples (reproduced below) that B&P cited as illustration of scope ambiguities.

(i) (The draft is 10 pp. long)

a. The paper is **required** to be *exactly 5 pages longer than* that.

b. The paper is **required** to be *less long than that*.

However, none of them had difficulty getting such a reading in (5) (under the circumstances indicated in the text), which points to the conclusion that Heim was correct in maintaining that scope ambiguity is in principle possible. The greater opacity of wide scope readings in the specific illustrations she used need not concern us here.

[8]In constructing the data in (23), we (tacitly) retained B&P's assumption that data like (19)-(20) can only be generated by application of QR to DegP. A referee points out that it is in principle possible to view the scope of DegP as 'parasitic' on the scope of DP, by assuming that expressions like *fewer … than {that,5}* are analyzable as determiners. Under this view, (19)-(20) (with the acceptability values assumed by B&P) lose all relevance to their thesis that the scope of DegP is determined by the surface position of Deg's complement. At the same time, (23) also fails to argue against this thesis, and the conclusions we urge in the next paragraph in the text do not follow.

To avoid an indeterminate state of affairs and to demonstrate that our conclusions follow even if expressions like *fewer … than {that,5}* are viewed as determiners, the referee suggests we construct data comparable to (23), but using (predicative) adjectival, rather than nominal comparatives, on the (widely assumed) view that APs do not have scopal properties, and thus cannot undergo QR. Thus, consider the data in (i), which we constructed in accordance with the referee's suggestion.

(i) (Context: Assuming a ranking of productivity on a scale from 1 to 10, junior faculty were required last year to seem to their employers to be productive to degree 8)

This year, junior faculty {**need, are required**} to seem less productive than {that, 8} *to their employers* to get an extension of contract.

Since (i) is ambiguous in exactly the ways in which (23a-b) are, readers who doubt the relevance of (23) to the conclusions we propose may view them as based on data like (i).

[9] This conclusion remains basically unchanged if instead of assuming semantic decomposition of *less* into *–er+little* (as in Heim 1999), we view it as a semantic atom (as in Kennedy 1999). In such a case, as noted earlier in the text, comparatives of inferiority rely on the proper superset relation, and by parity of reasoning, equatives with *at most* rely on the superset relation. As shown in (i)-(ii) (which assume the same states of affairs as (36)-(38) in the text), the proper superset and the superset relations are, respectively, conservative and non-conservative, with the result that B&P's predictions of ill-formedness apply to the latter, but not to the former (under Heim's analysis, the converse is the case, as can be gathered from our discussion of the few preceding pages of the text).

| | | | |
|---|---|---|---|
| (i) | (i) | F | F |
| | (ii) | F | F |
| | (iii) | T | T |
| (ii) | (i) | F | T |
| | (ii) | T | T |
| | (iii) | T | T |

[10] As van Riemsdijk (1992, 1998) observes, 'adjacency' needs to be viewed as holding at a level more abstract than superficial representation, because in coordinations or sequences of stacked APs, each AP needs to exhibit its head at its right edge.

[11] The head-to-head adjacency requirement interacts in certain languages with mechanisms that sometimes tighten and sometimes relax the distributional privileges of pre-nominal APs. A factor that usually induces tightening is found in Dutch and German in cases of overt morphological agreement between A and N, where it is not sufficient for the head of AP to be adjacent to N; rather the inflection-bearing word within the A head must be, too. Thus, while (ia) satisfies the adjacency requirement in virtue of the fact that *enough* adjoins to strong, forming a complex A adjacent to N, the German example in (ib) is ungrammatical because the agreement-bearing word is not adjacent to N. The need to satisfy this additional requirement is also detectable in the fact that if the adjectival inflection is realized on *genug*, which is not an inflectable adjective, but an uninflectable Deg, as in (ic), the result, although ungrammatical by prescriptive standards, is often used in the colloquial language, in contrast to (ia), which is not. The requirement in question is in fact so strong that its satisfaction can also induce a relaxation of the head-to-head adjacency constraint. Thus, (id) is acceptable, although the agreeing adjective adjacent to N is not the head of AP (note that a non-elliptical paraphrase of the bracketed constituent might be 'as fast as it is possible for you to answer d-fast', with *possible* predicated of *for you to answer d-fast*, not of the noun that follows AP).

(i) a. A [strong enough] man
b. *Ein [stark-er genug] Mann
a strong-Agr enough man

c.??Ein [stark genug-er] Mann

a strong enough-Agr man

d. Ich bitte um die [so schnell wie Ihnen möglich-e] Beantwortung meines Briefes

I ask for the as quick as you.Dat possible.Agr reply my.Gen letter

'I am requesting as fast a reply to my letter as possible.'

[12] Kennedy uses three distinct translations of *–er* for phrasal comparatives like the reduced version of (1a), for clausal comparatives like the full version of (1a), and for clausal comparatives with 'subdeletion.' For purposes of illustration in the text, we confine ourselves to the first of these three in both (57b) and (57c).

[13]In her footnote 21, Heim (2001) refers to an earlier version of this paper, and notes that certain facts prominently addressed in it, but **not** addressed in her own article, require a reconsideration of some of her basic assumptions, concluding with the remark '…before I manage to do this, there is reasonable doubt as to whether this paper is even asking the right questions.'

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