

*Syntax-LF mapping and the internal structure of comparatives**

JONATHAN R. WHITE

Abstract

The change to a minimalist approach to syntax makes us consider whether previously assumed processes are necessary, including May's Quantifier Raising rule. Following Fox (1995), I argue from the domain of English comparatives, whose degree heads are assumed to be quantifiers, that QR only takes place when base-generated scope relations are changed. Comparatives are analysed as discontinuous heads, whose outer head position encodes the base-generated scopal order. After presenting some arguments about the complement of the second head, I present evidence that further raising of the degree head is needed.

1 Preliminary remarks

Since May (1977, 1985), the assumption in generative grammar has been that syntactic scope relations (c-command) are mapped into logical scope relations at LF. Authors like Dresher (1977) and Rouveret (1978) have argued that degree expressions (*so*, *more*, etc.) are natural language quantifiers, and so take logical scope - this has been semantically encoded by Klein (1980) and Larson (1988) using quantification over a degree variable. The minimalist approach to syntax forces us to ask whether operations like May's QR really exist. The view of Fox (1995) is that under conditions of economy quantifiers only raise if this results in a change in the base-generated scope relations. This paper examines such an approach from the perspective of the comparative construction in English. I argue that *as...as* and *more/-er...than* are discontinuous heads which are projected into a shell-like structure with the linearly first word in the outer head position. This position, I

* I thank Hans van de Koot for his continued support and encouragement; and also Ad Neeleman and Bas Aarts for some perspicuous comments on an earlier draft of this paper. Above all, I thank my parents for their (long-suffering) support.

contend, is where syntactic scope for the degree expression as a whole is taken from. I will also present some evidence concerning the structure of the complement of the second head, and will consider issues relating to the scope properties of degree items raised by Dresher and others from a minimalist perspective.

2 The comparative construction

2.1 Selection and discontinuity

There is evidence to suggest that there is a close relationship between the two instances of *as* in (1a). Compare this with (1b):

- (1) a. John is as tall [as Bill is].
 b. *John is as tall [than Bill is].

The same also holds for *more/-er* and *than*:

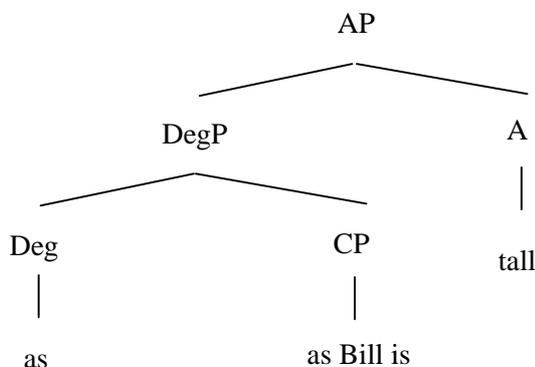
- (2) a. John is more tall/taller [than Bill is].
 b. *John is more tall/taller [as Bill is].

Izvorski (1995) suggests that a selection relationship is the best way to instantiate this. She argues that, semantically, *as...as* and *more/-er...than* are inseparable. Therefore, if we want to compositionally derive the meaning of comparatives from the syntactic structure, having the first part select the second is desirable. A related issue is how we deal with the discontinuity between the degree head and the *than-/as*-phrase.

Bresnan's (1973) seminal work on this construction proposed the following base-generated structure underlying (1a) – degree words were assumed by her to be attached as modifiers of AP¹:

¹ In fact, she placed the degree head within a QP modifier of AP, and also used S and S' as the sentential nodes, but I will continue to use the simplified version in (3).

(3)



The surface word order is achieved by obligatorily extraposing *as Bill is* to the right of AP, with a gapping process deleting *tall* from CP.

One problematic part of this analysis is the obligatory extraposition operation used to derive the discontinuity between Deg and CP, given current assumptions about what drives movement. Such operations in the minimalist program are triggered by the presence of a feature, and what that feature could be in this case is unclear. Another problem with an account based on extraposition has been noted by Corver (1990: 49). Extraction is possible from the complement to Deg⁰ in (3)²:

(4) Who is John as tall as *t*?

Extrapolated constituents are barriers to extraction, as can be seen from the following uncontroversially extraposed *as*-phrase:

(5) *Who was John as tall yesterday as *t*?

The different grammaticality judgements on (4) and (5) suggest that extraposition is not involved in the derivation of (1a).

² Extraction is only possible when the complement to *as* or *than* is a nominal as in (4). From clauses, it is impossible:

(i) *Who is John as tall as *t* is?(ii) *Who is John as tall as *t* is wide?

I will provide an explanation for this contrast in section 3.

2.2 Degree Phrases

A further problem is caused by Bresnan's basic assumption that degree words are base-generated as modifiers of adjectives (henceforth, the *lexical head analysis*):

(6) [_{AP} [_{DegP} Deg] A].

This analysis has been questioned by Abney (1987) and Corver (1990), who argue for a structure (henceforth, the *functional head analysis*) where the degree word selects AP (a process known as c-selection, as opposed to the s-selection by a predicate of its arguments):

(7) [_{DegP} Deg [_{AP} A]].

Let us consider some evidence favouring (7) over (6). Corver notes that *how organized* in (8a) can be preposed, but *how* on its own cannot (Corver 1990: 240):

- (8) a. How organized_i is John t_i?
 b. *How_i is John [t_i organized]?

How will be a phrasal constituent if we assume (6), and so we would expect it to be extractable on a par with the premodifier *how badly* in (9):

(9) How badly_i is John [t_i organized]?

With (7), on the other hand, requirements on structure preservation prohibit extraction of *how*, as required.

Further evidence suggesting that (7) is the correct structure for the extended adjectival projection is provided by the following Dutch example (Corver 1990: 214):

- (10) *[Hoeveel cm te] is Jan lang?
 How-many cm too is Jan tall

Under the lexical head approach, the structure for the AP before movement would be:

(11) [_{AP} [_{DegP} [_{DP} hoeveel cm] te] lang].

We predict from (11) that extraction of *hoeveel cm te* should be possible, since it is a constituent, contrary to fact. Now compare this with the functional head version:

(12) [_{DegP} [_{DP} *hoeveel cm*] [_{DegP} *te* [_{AP} *lang*]]].

In (12) the same string is no longer a constituent, correctly predicting that (10) is out³.

Izvorski (1995) adopts the functional head analysis, and suggests the following base-generated structure for comparatives:

(13) [_{DegP} [_{AP} *tall*] [_{DegP} *as* [_{PP} *as Bill is*]]].

She handles the surface discontinuity by proposing a Larsonian shell structure⁴:

(14) [_{DegP1} [_{Deg1} [*as*]_i *Deg1*] [_{DegP2} [_{AP} *tall*] [_{DegP2} *t_i* [_{PP} *as Bill is*]]]]].

The strongest argument in favour of a shell structure like (14) is that it provides us with the simplest way of encoding logical scope in syntactic structures. As I noted in the introduction to this paper, degree heads like *as* have been argued to be quantifiers, and therefore are logical operators. Klein (1980) and Larson (1988) have proposed formal semantic functions denoting the semantics of comparatives predicated on this assumption. Let us briefly look at Larson's version:

(15) a. Max is taller than Felix is.
b. $\exists d[\neg(d(\text{tall}(\text{felix}))) \ \& \ (d(\text{tall}(\text{max})))]$.

(16) a. Max is as tall as Felix is.
b. $\forall d[(d(\text{tall}(\text{felix}))) \rightarrow (d(\text{tall}(\text{max})))]$.

The operators in (15b) and (16b) quantify over degree values. We can read (16b) as: For every degree value, if Felix is tall to that degree, Max is also tall to that degree. In order to

³ Ad Neeleman (p.c.) points out that (12) also correctly predicts the grammaticality of:
(i) [*Hoeveel cm*] is Jan [*t te lang*]?

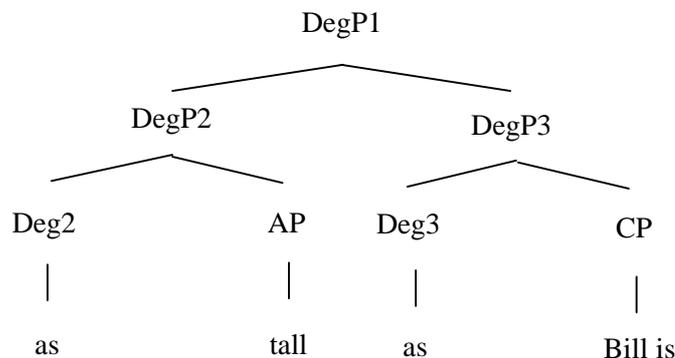
⁴ I proposed a similar analysis to this one for Result clauses in White (1997).

map these logical scope relations off the syntactic structure we assign to (16a), some head position needs to be available to which *as* can raise by (at least) LF c-commanding the predicate *tall* (the mechanism by which *tall* is reconstructed into the embedded clause will be addressed in section 3). The outer degree head Deg1 in (14) provides us with the optimal structure to achieve this mapping, with the degree head taking scope over the clause in which it appears, without needing recourse to scope-motivated LF movement in these cases, in the true spirit of the minimalist approach to syntax (but cf. the discussion in section 4).

2.3 Semantics and syntactic autonomy

Williams (1994) terms sequences like *as...as* “bivalent”, and proposes that structurally they are coordinated constituents. Extending his approach to comparatives, we get a structure like:

(17)



The first point to note is that (17) contains a maximal projection, DegP1, which has no head. A problem, though, is caused by the proposal that it is syntactically coordinative⁵. Extraction facts provide us with evidence against this (but cf. footnote 2):

(18) Who is John more dependent on Susan than t?

If (17) is correct, what we have in (18) is extraction out of one conjunct but not the other, a

⁵ Similar proposals have been made by Emonds (1985) and Donati (1997), but instantiated differently from Williams' version.

violation of the Across-the-Board Constraint, which requires extraction to be out of both conjuncts together. It should be noted that we can extract from just a right conjunct in:

(19) Who did John go and see t?

But as Cormack and Smith (1996) point out, this serial construction may involve a subordination relation between *go* and *see*. When we force a coordinate reading on (19), a clear difference in behaviour with regard to extraction emerges:

(20) *Who did John both go and see t?

Even more problematic are the following where the left “conjunct” allows extraction, but both together cannot – exactly what we would not predict for coordinate structures:

(21) a. Who is John more dependent on t than Mary?
b. *Who is John more dependent on t than t?

The fact that the comparative construction cannot be analysed as a coordinate structure provides support for the thesis that there is an autonomous syntactic component. Recall the semantics proposed by Larson (1988) I presented in the previous subsection, which formalised the meaning of *taller* using logical conjunction, cf. (15b). An ideal analysis for anyone seeking to reduce syntactic properties to those of the semantic component is one like Williams'. However, as we have seen in the discussion presented here, the syntactic properties of comparatives do not coincide with those of coordinate structures. Thus, we are lead to the view that the syntactic properties of this construction cannot be entirely predicted from their semantics, and that an approach to grammatical competence assuming a separate syntax module is on the right track.

The issue underlying this paper - whether an operation like QR always needs to take place - also provides us with an argument against Williams' analysis. Since I want to argue that syntactic scope maps into logical scope directly, we can say that (17) is not the optimal structure for doing this. The outer degree head Deg2 only takes scope over the AP it selects, but not the rest of the structure. For us to be able to map (17) into a semantic representation like Larson's (16b), we would need to assume that QR must operate. As I will argue below, though, there is a structure available where no movement is necessary, the optimal minimalist solution.

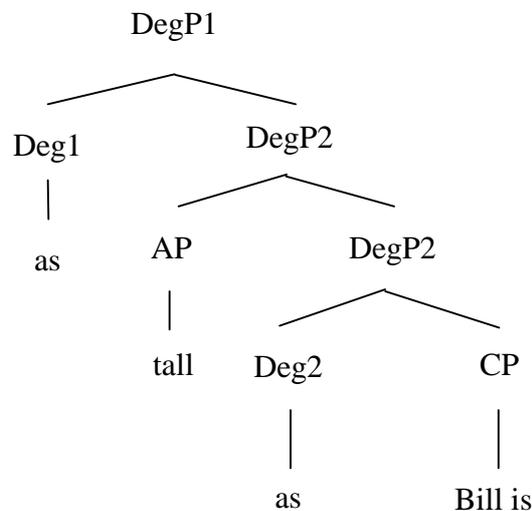
2.4 Discontinuous heads

Let us now turn to my own proposal regarding the structure of comparatives. I adopt (7) as the basic structure of AP, with the degree words *as* and *more* being base-generated in Deg⁰.⁶ Following Chomsky (1995), I take a strong lexicalist position regarding the formation of *taller*, in that I assume such forms to be generated in the lexicon, and that there are a bundle of features in Deg⁰, which I will denote below as *-ER*, which covertly check comparative features on the adjective:

(22) [_{DegP} -ER [_{AP} taller]].

I agree with the point made by Williams (1994) and Izvorski (1995) that *as...as*, etc. act as a single unit semantically. But I would argue that the best way to encode this syntactically is by means of a discontinuous head, which is realised as a shell-like structure where the outer head is filled by *more* or the first *as*. Thus, the structure I assign to (1a) is the following:

(23)



We can treat the cases in (24) similarly, assigning them the same sort of structure as in (23):

- (24) a. John is more tall than Bill is.
 b. John is taller than Bill is.

⁶ For an alternative view that *more* is a modifier, see Doetjes, Neeleman and van de Koot (1998).

Recall, in connection with (24b), that I am assuming that *taller* is base-generated in the lexicon, with some comparative features in Deg⁰, which are checked covertly. We can say that (24b) involves the features *-ER* in the outer head, with *taller* raising covertly to check them.

Why should (23) be the correct way of representing a discontinuous head? First of all, I adopt Williams' (1994) idea that these heads are single units in the lexicon (like other idiomatic expressions). I also assume Kayne's (1994) proposal that asymmetric c-command relations are mapped into linear precedence. Therefore, *as...as* will be projected as the following basic structure (a shell):

(25) [_{DegP1} [_{Deg1} as] [_{DegP2} [_{Deg2} as]]].

(23), in contrast with Williams' (17), does allow us to map the logical scope of the degree head directly without needing to posit any further covert movement operations, and, in contrast with Izvorski's (14), no overt movement is necessary either. From a minimalist perspective, this is the ideal situation.

Where should a modifier of this structure be attached? Consider the following:

(26) John is just as tall as Bill is.

Since *as...as* functions as a unit, we can say that *just* is adjoined to DegP1:

(27) [_{DegP1} [_{AdvP} just] [_{DegP1} as [_{DegP2} [_{AP} tall] [_{DegP2} as [_{CP} Bill is]]]]].

The same will also apply to the following:

- (28) a. John is far more tall than Bill is.
b. John is far taller than Bill is.

Let us consider some extraction facts which favour this structure. *More* may be modified by *how much*, which itself can be extracted:

(29) ?How much_i is John [t_i more tall than Bill is]?

The DP would be in the place of AdvP in (27) above, and so it does not form a constituent

with *more*, entailing that this sequence should not be extractable⁷:

(30) *How much *more*_i is John [t_i tall than Bill is]?

Let us return to an issue raised regarding Williams' (1994) proposal that comparatives are syntactically coordinative. One piece of evidence I used in arguing against this view was the following, where a constituent may be extracted out of a complement to AP:

(31) Who is John more dependent on t than Mary?

This needs some attention, since under my proposal the pre-movement complex AP is the Specifier of DegP2:

(32) [_{DegP1} more [_{DegP2} [_{AP} dependent on who] [_{DegP2} than Mary]]].

As I noted in White (1997), extraction from the Specifier of the lower head of a shell must be allowed in the following VP-shell⁸:

(33) Who did you give [a picture of t] to Mary?

This may be accounted for by saying that the outer head of the shell L-marks (following Chomsky's 1986 *Barriers* framework) the VP following it, which renders the direct object transparent for extraction. By analogy, we can argue here that *more* in (32) allows *who* to be extracted from the AP Specifier since *more* and *than* are the same head.

This now completes the first part of the paper, dealing with the underlying structure of comparatives in English. I will now summarize what has been said, before I go on to other related issues. There were two properties I noted which had to be accounted for by any syntactic analysis: a selection relationship between the degree word and *than*-/as-phrase, and the fact that the two were discontinuous from one another. Bresnan proposed a structure, (3), which required an obligatory extraposition operation to derive the surface

⁷ The following is a problem for the thesis that *more* is always a head and not a modifier:

(i) How much *more* is John [t dependent on drugs than Bill is]?

Example (29) is somewhat strange, but crucially for my argument is much better than (30).

⁸ It should be noted that the same extraction is not possible from the double object construction:

(i) *Who did you give Mary [a picture of t]?

(ii) *Who did you give [a friend of t] my picture?

word order. I argued that this created a number of problems, especially with regard to the possibility of extraction. There were also some problems with her assumptions on the attachment-site of the degree word. I examined an alternative view of comparatives as coordinate structures, (17), using an analysis by Williams (1994). Once again, extraction data was used to argue against this view. With Williams' particular view, there was also the problem that, in order to map the logical scope that degree heads take over propositions, covert movement operations were necessary. I then argued in favour of a structure where no such problems occurred. I followed Williams' view that *as...as*, etc. are a semantic unit, but instantiated it in a shell-like structure, (23). I believe that this approach is preferable to that of Izvorski (1995), in that the meaning of comparatives is more accurately encoded in a syntactically discontinuous head. The next issue I will turn to is that of the complement to Deg2 in (23).

3 The comparative clause

3.1 Introduction

Three types of constituent have been noted in the literature to follow *-er/more...than* and *as...as*. These are illustrated below:

- (34) a. John is taller [than [Bill is]].
 b. John is taller [than [what Bill is]].

(35) John is taller [than [the room is high]].

(36) John is taller [than [Bill]].

I shall deal with each of these in turn, starting with the clausal comparatives in (34) and (35).

3.2 Clausal comparatives

The clausal comparative in (34b) has, since Bresnan (1975), been known to exhibit properties typical of *wh*-movement. Thus, the partial structure below is justified:

(37) [John is taller [than [what_i [Bill is t_i]]]].

However, the precise constituency of the complement to *than* has been subject to debate. Den Besten (1978) and, more recently, Donati (1997) have argued for an intriguing possibility that *what Bill is* may form a free relative clause (they use Dutch and Italian data respectively, but this may be easily extended to English). Donati gives the structure as the following, with *what* raising to Spec, CP, and then the head moving on to D⁰:

(38) [John is taller [than [_{DP} what_i [_{CP} [_{DP} t_j] [_{IP} Bill is t_j]]]]].

This approach does not appear to extend easily to English comparatives, though. Whatever are the merits for Italian and Dutch, the simplest argument against (38) is provided by (34a). This case may be assumed to involve *wh*-movement of a null operator (cf. Larson 1988). One of the prototypical properties of free relatives (as set out in, for example, Grosu 1994) is that they may not be formed by null operators, but only by phonologically overt *wh*-items. If we are to assume that something like (38) is correct for (34b), then (34a) cannot have the same structure, which would force us to miss a useful generalisation that they are syntactically the same. I will therefore reject den Besten's and Donati's suggestion, and will follow Larson's view that the complement to *than* is a CP, containing *wh*-movement of an operator, overt in the case of (34b), but null in (34a):

(39) [John is taller than [_{CP} what/Op_i [_{IP} Bill is [_{DegP} \emptyset [_{AP} t_i]]]]].

This operator will be equated at LF with the AP predicate in the matrix clause, and reconstructed into the position of the trace. This analysis gets support from the fact that extraction out of such a clause is ruled out as a *wh*-island effect:

(40) *[Who_j is John as tall as [_{CP} what/Op_i [_{IP} t_j is t_i]]]?

Let us now turn to the subcomparative in (35):

(35) John is taller than the room is high.

Here, only the degree value, and not the whole predicate, is missing from the clause. One possible analysis of subcomparatives is that of Corver (1993), who treats them as instances of coordination. I just note the following example from Izvorski (1995) which refutes this idea:

(41) [More surprised than Mary was disappointed], John couldn't possibly be.

The bracketed preposed phrase here would not be a constituent under Corver's analysis.

The nicest approach to this type of example would be to treat them on a par with full clausal comparatives, and say that they also contain a moved operator. Bresnan (1975) cited evidence in favour of a movement analysis. For example, the following are typical cases of movement effects caused by a complex NP, (42a), from Bresnan (1975): 51; and a subject island, (42b), adapted from one of Bresnan's examples:

- (42) a. *It has done no less harm than you have [the opinion [that it has done good]].
 b. *You have as many reasons for leaving him as [[that he has excuses for leaving you] is likely].
 (cf. You have as many reasons for leaving him as [it is likely as [that he has excuses for leaving you]])

Let me therefore propose the following structure for (35), where a null Deg⁰ is raised⁹ - something very similar is assumed in Hazout (1995): 3-4:

(43) John is taller [_{PP} than [_{CP} [_C Op_i C] [_{IP} the room is [_{DegP} [_{Deg} t_i] [high]]]]].

The operator will be interpreted with the degree value of *tall* applied to the predicate *high*, viz.: the degree to which John is tall is greater than the degree to which the room is high. With this head movement, we would expect to find an ECP-type subject/object asymmetry (cf. Baker 1988: 220-221), and this does appear to be the case (from Pesetsky 1982: 396):

- (44) a. I saw as many women [as I think you saw [e men]].
 b. *As many women saw me [as I think [[e men] heard you]].

Grimshaw (1987) and Corver (1990, 1993) reject such a movement-based account, and cite some problems with the idea, of which I will only consider two. One cited by both authors is that, if we allow this movement, how can we rule out the overt extraction of a degree word in?

⁹ The presence of the null operator suggests that the example from footnote 2 of a subcomparative which acts like a *wh*-island could be treated in the same way as (40) above. However, I cannot offer any justification for this here.

(45) *How is Bill tall?

But this is not a problem for an analysis adopting Abney's (1987) Degree Phrase structure. Recall that (45) was used by Corver himself in favour of DegPs. *How* cannot be extracted to Spec, CP because it is a head. Alternatively, though, it could be that the head is adjoined to C⁰, just like the null operator does in (43). (45) can be ruled out in the same way as the following, where we can only pied-pipe the full *wh*-NP:

(46) *Which did John read [t books]?

Whatever will account for (46) will also account for (45). Chomsky (1995) argues that the relevant factor could be phonological in nature, which neatly distinguishes these examples from subcomparatives, where I assume there is movement of a null operator.

The final problem for a movement approach to subcomparatives I will consider here is that parasitic gaps cannot be licensed by subdeletion:

(47) *I throw away [more books] than I file [t papers] [without reading [e abstracts]].

On the other hand, clausal comparatives do admit them:

(48) I throw away more books than I file t [without reading e].

Once again, this is only relevant to a Bresnan-type account where *more* is a modifier. These examples are distinguished in that the former involves X⁰-movement, but the latter has XP-movement. This neatly derives this contrast, since only phrasal movement can license parasitic gaps¹⁰.

3.3 Nominal comparatives

Now, in the final part of this section, I will consider (36), repeated from above:

(36) John is taller [than [Bill]].

¹⁰ There is an independent constraint that the gap must be nominal, but this does not affect the argumentation here.

The easiest assumption to make about (36) is that *than* selects a CP even here. It would then be derived via a process of ellipsis from the following underlying structure:

(49) John is taller [than [Bill is tall]].

Hazout (1995) makes just such a proposal for Hebrew. Similar to the theory of Larson (1988), Hazout also argues that *than* and *as* are prepositions, but differs from Larson in the syntactic category of the complement. He states that both clausal and nominal comparatives, analysed by Larson as a DP and CP complement to P⁰ respectively, should, in the case of Hebrew, be CPs. When just a DP surfaces, he argues, the clause has actually undergone ellipsis. Let us consider the following pair of examples:

- (50) a. Dan ohev et Dina yoter mi-aSer et Rina
 Dan loves ACC Dina more than ACC Rina
 “Dan loves Dina more than Rina”
 b. Dan zakuk le Dina yoter mi-aSer Ran
 Dan needs to Dina more than Ran(NOM)
 “Dan needs Dina more than Ran does”

The implication of the Case on *Ran* in (50b) is that we should have a reduced clausal constituent there. The only other assumption we could make is that *mi-aSer* assigns two different Cases, and this would, according to Hazout, set it apart from most other prepositions. Hazout adopts the analysis of Comparative Ellipsis in Pesetsky (1982), and applies it to both cases in (50).

The following cases from Hoeksema (1983), though, refute such an analysis for English:

- (51) a. No man_i is stronger than [himself_i].
 b. *No man_i is stronger than [himself_i is].

The bracketed constituent must be the binding domain for the anaphor in (51b), but not in (51a). Equivalent examples with pronominals reinforce this conclusion:

- (52) a. *Each worker_i is fatter than him_i.
 b. Each worker_i is fatter than he_i wants to be.

Thus, in cases where the nominal complement can be viewed as the logical subject of an elliptical clause, English cannot be analysed in the way Hazout argues for Hebrew.

But what about examples where the complement is a logical object? Let us consider the following with its reconstructed LF in (53b):

- (53) a. John loves Mary more than Susan.
 b. [John loves Mary [more [than [~~John~~ loves Susan]]]].

Maybe binding data will provide a way of distinguishing the two structures in this case as well. It appears on the face of it that it does, since the same judgements come out as in (51)-(52):

- (54) No man_i loves his dog more than himself/*him_i.

But the reconstructed clause will be something like (55), where the subject pronoun binds the anaphor at LF:

- (55) [No man loves his dog [more [than [~~he~~ loves himself/*him]]]].

Thus, no real evidence can be found here which supports either analysis. I will conclude on the basis of theoretical simplicity, though, that my original version is the one to adopt. Given that the subject cases come out clearly in English in favour of a non-clausal analysis, parallel cases with objects should be analysed in the same way.

I conclude from this discussion that (36) has the following structure, with *than* selecting a DP complement:

- (56) [John is [_{DegP1} -ER [_{DegP2} [taller] than [_{DP} him]]]].

Despite the fact that this requires us to add a second selection frame for comparatives, instead of just the one if Hazout's approach had proved to be correct, there is evidence that this is a valid way to proceed. Additional support for this view will be found in the next section.

4 Degree words as quantifiers

Fox (1995) argues that principles of economy, which are the cornerstone of the minimalist approach to syntax, lead us to the conclusion that, where no change in scope relations

results from a particular LF-movement operation, that derivation will be rejected in favour of one where no LF-movement takes place (cf. also Reinhart 1995). To illustrate this, consider the following pair of examples (Fox 1995: 2):

- (57) a. A boy loves every girl.
b. John loves every girl.

(57a) is a standard example of ambiguity resulting from the presence of two quantifiers in a clause. The two readings may be obtained from the following LFs:

- (58) a. $[_{IP} \text{ A boy}_1 [_{VP} \text{ every girl}_2 [_{VP} t_1 \text{ loves } t_2]]]$.
b. $[_{IP} \text{ every girl}_2 [_{IP} \text{ a boy}_1 [_{VP} t_1 \text{ loves } t_2]]]$.

Fox argues that these two derivations will not be compared since they are not logically equivalent. Thus, both are possible LFs.

Now let us consider (57b). Once again two LFs exist, where *every girl* takes a wide- or narrow-scope reading with respect to *John*:

- (59) a. $[_{IP} \text{ John}_1 [_{VP} \text{ every girl}_2 [_{VP} t_1 \text{ loves } t_2]]]$.
b. $[_{IP} \text{ every girl}_2 [_{IP} \text{ John}_1 [_{VP} t_1 \text{ loves } t_2]]]$.

Crucially, these two derivations will be compared, since both have the same interpretation. Economy considerations, Fox argues, favour (59a).

Let us now consider the quantifiers in the following comparative sentences

- (60) a. Someone is smarter than everyone.
b. Someone is smarter than everyone is. (Larson 1988: 4)

The first example is ambiguous just like those in (57), but (60b) is not. I have argued that the latter has a clausal complement after *than*, as follows:

- (61) $[\text{Someone is smarter than } [_{CP} \text{ Op } [_{IP} \text{ everyone is } t]]]$.

Under the standard assumption that QR is clause-bound, there is no way to get *everyone* c-commanding *someone*, even if we allow QR to operate. With (60a), though, I proposed the different analysis in (62):

(62) [Someone is smarter than [_{DP} everyone]].

Here, there is no clause boundary after *than*, and so we are able to raise *everyone* to get the distributive reading. This contrast provides further support for my analysis of nominal comparatives from section 3.3. If we had assumed that Hazout's (1995) analysis carried over to English, and both complement types were clausal in nature, we would not expect there to be a contrast between the two, contrary to fact.

Dresher (1977) and Jones (1990) have noted that the quantificational nature of the degree words in comparatives gives rise to ambiguity in the following:

- (63) a. Mary thinks John has more money than he has. (Jones 1990: 582)
 b. John believes that chess is as hard as it is enjoyable. (Jones 1990: 584)

Consider (63a) first of all. There is a narrow-scope reading for *more*, where Mary believes a contradiction: that Mary thinks, while John actually has a certain amount of money, that John has more money. The second, wide-scope reading is that Mary has a mistaken belief: John has a certain amount of money, but Mary thinks he has more. The same also holds true for (63b). The narrow-scope reading is that John believes that, while chess is enjoyable to a certain degree, it is also that hard. The wide-scope version will be: while chess is enjoyable to a certain degree, John believes it is also just as hard. Many authors have made the assumption that degree words need to adjoin to a clausal node at LF. Let us consider this from the perspective of the minimalist theory of Fox (1995) just presented, using the narrow-scope reading for the examples first of all. The first point that needs to be elaborated on is how much material may be raised at LF. Under the preference principle of Chomsky (1995), only as much material as is necessary for convergence may be moved. Thus, only the formal features of the degree head need raise here¹¹. The two derivations of the narrow-scope reading of (63a) are:

- (64) a. [Mary thinks [John has more money than he has]].
 b. [Mary thinks [more_i [John has t_i money than he has]]].

(64a) is the LF under my proposal, where the narrow-scope reading may be read off the base-generated shell structure. It should be clear after the discussion about (58) above that

¹¹ I follow Kennedy (1997) in assuming that full pied-piping at LF is necessary with Antecedent-Contained Deletion structures:

(i) I read more books than John did.

If only the formal features of *more* raise, (i) will be uninterpretable.

(64a) will be the preferred derivation. There is no difference in interpretation between the two representations, so the one without LF-movement will be chosen. The same will also hold with respect to (63b), which the reader can determine for him-/herself.

But what about the wide-scope reading? Let us compare the version in (64a) above, where no movement has taken place, with (65), where I propose that the formal features of *more* have raised over *Mary*:

(65) [more_i [Mary thinks [John has t_i money than he has]]].

(64b) and (65) cannot be compared under economy considerations, since (64a) only gives us the narrow-scope reading. Therefore, (65) is a legitimate LF in its own right.

Now consider the following (Jones 1990: 582):

(66) Who does Mary think [t has more money than he has].

Despite the presence of the *wh*-chain formed by raising *who*, there is no change in the ambiguity of the sentence, with both readings still possible. I will follow here the theory presented in Kitahara (1996), who adapts the work of Aoun and Li. The following two principles are assumed:

(67) *Minimal Binding Requirement* (Aoun and Li 1993: 11)
Variables must be bound by the most local potential A'-binder.

(68) *Scope Principle* (Kitahara 1996: 194)
A quantifier X may take scope over a quantifier Y iff X c-commands a member of each chain associated with Y at LF.

The most important auxiliary assumption made by Kitahara is that each chain formed by a particular instance of feature checking by a category counts for the purposes of the Scope Principle. Thus, if, say, a category moved once to check Case, and again to check a *wh*-feature, there would be two chains. Let us look at the LF for (66) when *more* takes narrow-scope:

(69) [_{CP} Who_i does [_{IP} Mary think [_{CP} t_i has [_{DegP} more money than has]]]].

The *wh*-chain of *who* c-commands *more*, but *more* does not c-command any part of *who*'s chain, so this only gives us the reading where *who* takes scope over *more*. The alternative

LF, where *more* raises, is:

(70) [_{CP} Who_i does [_{IP} more_j [_{IP} Mary think [_{CP} t_i has [_{DegP} t_j money than has]]]]].

This time, both *more* and *who* c-command part of each other's chains, and so the former can take scope over the latter, as required.

5 Conclusion

In this paper, I have argued for treating comparatives as discontinuous heads. The most important consequence of this proposal is that we have a structure from which we can read off the base-generated logical scope without needing any movement operations, either overt or covert. I note that we need some covert movement to handle the scopal properties of the degree heads. This is the optimal situation from the minimalist perspective on syntax.

References

- Abney, S. P. 1987. The English Noun Phrase in its Sentential Aspect. PhD dissertation. MIT.
- Aoun, J. and Y. A. Li. 1993. *Syntax of Scope*. Cambridge, Mass.: MIT Press.
- Baker, M. C. 1988. *Incorporation: a theory of grammatical function changing*.
- Den Besten, H. 1978. On the Presence and Absence of *Wh*-elements in Dutch Comparatives. In *Linguistic Inquiry* 9(4). 641-671.
- Bresnan, J. W. 1973. Syntax of the comparative clause construction in English. In *Linguistic Inquiry* 4(3). 275-343.
- Bresnan, J. W. 1975. Comparative Deletion and Constraints on Transformations. In *Linguistic Analysis* 1(1). 25-74.
- Chomsky, N. 1986. *Barriers*. Cambridge, Mass.: MIT Press.
- Chomsky, N. 1995. Categories and Transformations. In *The Minimalist Program*. 219-394. Cambridge, Mass.: MIT Press.
- Cormack, A. and N. Smith. 1996. Checking theory: features, functional heads and checking-parameters. In *UCL Working Papers in Linguistics* 8. 243-281.
- Corver, N. 1990. The syntax of left branch extractions. PhD dissertation. Katholieke Universiteit, Brabant.
- Corver, N. 1993. A note on subcomparatives. In *Linguistic Inquiry* 24(4). 773-781.
- Doetjes, J., A. Neeleman and H. van de Koot. 1998. Degree expressions and the autonomy of syntax. Ms. HIL/UCL.

- Donati, C. 1997. Comparative clauses as free relatives: a raising analysis. In *Probus* 9. 145-166.
- Dresher, B. E. 1977. Logical representations and linguistic theory. In *Linguistic Inquiry* 8(2). 351-378.
- Emonds, J. E. 1985. *A unified theory of syntactic categories*. Dordrecht: Foris.
- Fox, D. 1995. Economy and Scope. Ms. MIT.
- Grimshaw, J. 1987. Subdeletion. In *Linguistic Inquiry* 18(4). 659-669.
- Grosu, A. 1994. *Three Studies in Locality and Case*. New York: Routledge.
- Hazout, I. 1995. Comparative Ellipsis and Logical Form. In *Natural Language and Linguistic Theory* 13. 1-37.
- Hoeksema, J. 1983. Negative Polarity and the Comparative. In *Natural Language and Linguistic Theory* 1. 403-434.
- Izvorski, R. 1995. A DP-shell for comparatives. In *Proceedings of ConSOLE III*. 99-121.
- Jones, C. 1990. Some *wh*/operator interactions. In *Linguistic Inquiry* 21(4). 577-589.
- Kayne, R. 1994. *The Antisymmetry of Syntax*. Cambridge, Mass.: MIT Press.
- Kennedy, C. 1997. Antecedent-Contained Deletion and the Syntax of Quantification. In *Linguistic Inquiry* 28(4). 662-688.
- Kitahara, H. 1996. Raising quantifiers without quantifier raising. In Abraham, W. *et al.* eds. *Minimal Ideas*. 189-198. Amsterdam: John Benjamins.
- Klein, E. 1980. A Semantics for Positive and Comparative Adjectives. In *Linguistics and Philosophy* 4. 1-45.
- Larson, R. K. 1988. Scope and comparatives. In *Linguistics and Philosophy* 11. 1-26.
- May, R. 1977. The Grammar of Quantification. PhD dissertation. MIT.
- May, R. 1985. *Logical Form*. Cambridge, Mass.: MIT Press.
- Pesetsky, D. M. 1982. Paths and categories. PhD dissertation. MIT.
- Reinhart, T. 1995. *Wh*-in-situ in the framework of the minimalist program. Ms. Tel Aviv.
- Rouveret, A. 1978. Result Clauses and Conditions on Rules. In Keyser, S. J. ed. *Recent Transformational Studies in European Languages*. 159-187. Cambridge, Mass. MIT Press.
- White, J. R. 1997. Result clauses and the structure of degree phrases. In *UCL Working Papers in Linguistics* 9. 315-333.
- Williams, E. 1994. *Thematic Structure in Syntax*. Cambridge, Mass. MIT Press.