

COMPARATIVE DELETION

Winfried Lechner, National and Kapodistrian University of Athens

wlechner@gs.uoa.gr

v1.5, April 2017

(to appear in *The Oxford Handbook of Ellipsis*,
van Craenenbroeck Jeroen and Tanja Temmerman, eds., Oxford: Oxford University Press.)

1. Introduction

The surface appearance of the comparatives in (1) is shaped by six deletion operations – Gapping, VP-Ellipsis, Pseudogapping, Stripping, Across-the-Board-(ATB)-movement and Right Node Raising (RNR) – which are also attested in other syntactic environments, typically coordinate structures (unpronounced parts marked by angled brackets):

- (1) a. Ann liked Berlin more than Cleo <liked> Dubai. (Gapping)
- b. Ann liked Berlin more than <Ann liked> Dubai. (ATB-movement and Gapping)
- c. Ann liked Berlin more than Cleo <liked Berlin>. (Stripping/Gapping)
- d. Ann liked Berlin more than Cleo did <like Berlin>. (VP-Ellipsis)
- e. Ann liked Berlin more than Cleo did <like> Dubai. (Pseudogapping)
- f. More people liked <the place> than disliked the place. (RNR)

All of the deletion processes in (1) are, *modulo* the presence of *do*, optional. The examples in (2) document another type of ellipsis found in comparatives, traditionally referred to as COMPARATIVE DELETION (CD; Bresnan 1973, 1975), which renders unpronounced the gradable property ((2)a) or the common noun minimally including the gradable property ((2)b,c) inside the clause following *than*. Unlike the ellipsis processes in (1), CD is construction specific and obligatory:¹

- (2) a. The ship is longer than the train is (*long).
- b. Korea built better ships than Greece owns (*good ships/*ships).
- c. Korea built more ships than Greece owns (*ships).

The present chapter surveys the main characteristics of the deletion mechanisms illustrated in (1) and (2) above, and explores analytical options that have been pursued in attempts to account for the principles underlying these phenomena. Central to the discussions will be three questions which over the last 40 years have time and again served as a practical vantage point for studying ellipsis phenomena (see recent surveys in Merchant 2017 and Aelbrecht 2016):

- (3) a. Does the unpronounced part of the construction contain syntactic structure?
- b. What are the identity conditions on the ellipsis and its antecedent?
- c. What are the licensing requirements for ellipsis?

As already anticipated by the non-accidental grouping in (1) and (2), in comparatives, these

¹Two notable exceptions are MEASURE PHRASE COMPARATIVES (see (i)), which are non-elliptical on all extant accounts and COMPARATIVE SUBDELETION ((ii); Corver 2006; Lechner and Corver, to appear); subdeletion will be ignored throughout.

(i) The ship is longer than 100m.

(ii) The ship is longer than the shipyard is wide.

questions will be seen to materialize in two partially overlapping guises, depending on whether they are directed towards ellipsis operations that happen to be also attested in comparatives, or comparative specific deletion processes. Understood in the first sense, the triad (3) helps to clarify whether degree constructions afford new insights into the principles governing ellipsis. For instance, if (1)a–(1)c are actually the result of forward verb deletion and movement, two processes that are known to be restricted to coordinate structures, how come that comparatives, which are usually held to establish a subordination relation, emulate the behavior of coordinations?

On the other hand, it is also possible to use (3) in an attempt to gain a better understanding of the comparative construction itself. Here, in particular two topics have attracted a significant amount of attention in the literature, both of which will be treated in some depth below: the nature of Comparative Deletion (see (2)), and the mechanisms responsible for the formation of PHRASAL COMPARATIVES (PCs), illustrated by (1)b and (1)c. Superficially, PCs are simply comparatives in which the particle *than* combines with a single, typically nominal constituent. Since the early 1970s, it has been recognized, though, that there are two competing analytical strategies to capture this observation in that PCs can be parsed either as reduced clausal comparatives embedding hidden syntactic structure, or base-generated PPs that are introduced by *than* (Hankamer 1973). At the time, cross-linguistic variation had been thought to be related to a typological universal. Interestingly, recent studies have revealed that PCs do not form a homogeneous class in that PCs react to routine tests for the presence of silent syntactic structure in some languages, including English, but not in others, among them Japanese and Hindi (Lechner 2004; Bhatt and Takahashi 2009). The debate leading up to this conclusion, which has important consequences for the proper semantic treatment of degree constructions more generally, will be traced in some detail in the sections to follow. In this context, a concomitant question to consider will be whether those instances of PCs for which the diagnostics indicate the presence of hidden structure are best uniformly treated as the outcome of standardly sanctioned ellipsis operations, or whether there are designated kinds of deletion processes only operative in comparatives.

The chapter is organized as follows. Subsequent to some preliminaries on the syntax and semantics of comparatives in section 2, section 3 turns to CD, comparing three competing analyses in terms of ellipsis and movement which mainly diverge in the amount of hidden structure they allocate inside the CD-site. Section 4 expands on the different kinds of ellipsis in comparatives, leading up to the discussion of PCs in section 5. As both the phenomenology of and the literature about comparatives is extraordinarily rich, the presentation will by necessity be selective and limited in depth. Complementary surveys of comparatives which also treat ellipsis phenomena are Klein (1991), Corver (2006), Pancheva (2012), Morzycki (2014), Lechner (to appear) and Lechner and Corver (to appear).

2. The syntax and semantics of comparatives

DEGREE CONSTRUCTIONS, which include comparatives, equatives, superlatives and *enough/too*-constructions, form a class of structures which express an ordering between two degrees or two sets of degrees. Comparatives induce an asymmetric ordering between the degree introduced by the main clause and the degree specified by the DEGREE COMPLEMENT (henceforth *than*-XP). For instance, (2)a, repeated below as (4)a, translates into the proposition that the degree of the ship's length exceeds the degree of the train's length, while the ATTRIBUTIVE COMPARATIVE (4)b and THE AMOUNT COMPARATIVE (4)c assert that the quality and quantity of ships built by Korea

exceeds the quality and quantity, respectively, of ships owned by Greece:

- (4) a. The ship is longer [$_{\text{than-XP}}$ than the train is].
 b. Korea builds better ships [$_{\text{than-XP}}$ than Greece owns].
 c. Korea built more ships [$_{\text{than-XP}}$ than Greece owns].

Following a widely adhered to terminological convention, the second degree of the comparative relation is also referred to as STANDARD OF COMPARISON, whose left edge is demarcated by the STANDARD MARKER (*than*). While the standard in (4) is EXPLICIT, it can also be left IMPLICIT, as in *John is tall, but Sam is taller*.

The degrees themselves are supplied by a GRADABLE PROPERTY, typically represented by a gradable adjective denotation, as in (4)a (*long*) and (4)b (*good*), or by the DEGREE HEAD *much/many*, as in (4)c. Degree adjectives have been analyzed in two ways, as measure functions from individuals to degrees (logical type $\langle e, d \rangle$; Bartsch and Vennemann 1972; Kennedy 1999), or as relation between degrees and individuals (type $\langle d, \langle e, t \rangle \rangle$; Cresswell 1976; von Stechow 1984, among others). Here, I will adopt the latter strategy, without any discernable consequences for the argumentation. On this conception, *long* denotes the relation which maps each degree to the individuals which are long to that degree. As mentioned above, the gradable property is removed from the comparative complement by CD; for details see section 3.

Degree clauses share various properties with relative clauses. Just like relative clauses denote derived predicates of individuals, clausal *than*-XPs can be analyzed as predicates of degrees, or, equivalently, as sets of degrees. In both instances, set formation is the semantic reflex of empty operator movement to a clause initial position (von Stechow 1991; Heim and Kratzer 1998). In the case of comparatives, movement is usually interpreted as λ -abstraction over the degree variable inside the gradable property which has been silenced by CD. The LF of the degree complement for our sample comparative (4)a accordingly looks as sketched in (5)a, and denotes, as seen in (5)b, the set of degrees to which the train is long (von Stechow 1984; Rullmann 1995; Heim 2000, among many others):²

- (5) a. [$_{\text{than-XP}}$ than [$_{\text{CP}}$ OP λ_1 [$_{\text{TP}}$ the train [$_{\text{VP}}$ is $\langle d_1\text{-long} \rangle$]]]] (LF for *than*-XP of (4)a)
 b. [[(5)a] = {d|the train is d-long} (equivalently: $\lambda d.$ the train is d-long)

Syntactic evidence for OP-movement comes from the observation that comparatives respond to barriers imposed by islands, among them the Complex Noun Phrase Constraint in (6)a and the Coordinate Structure Constraint (CSC) in (6)b (Ross 1967; Chomsky 1977):

- (6) a. *Korea built more ships
 [λ_1 than Greece had discussed [$_{\text{DP}}$ a plan to buy $\langle d_1\text{-many ships} \rangle$]].
 b. *Korea built more ships [λ_1 than Greece bought [tanks and $\langle d_1\text{-many ships} \rangle$]].

Expression of the comparative relation is delegated to an abstract degree head MORE which projects a DEGREE PHRASE (DegP; Abney 1987; Corver 1990) that combines with the degree complement and the gradable property. The fine-grained constituency of (4)a looks then as in (7).

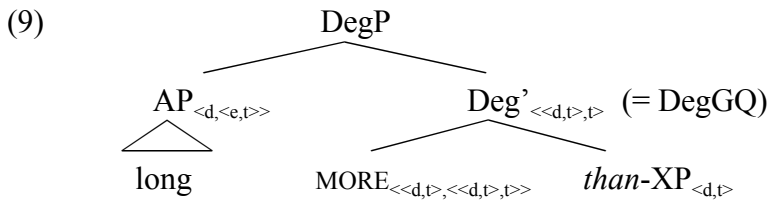
²*Than* will be assumed to be vacuous throughout; see Alrenga et al (2012) for an analysis on which *than* has a semantic contribution. The empty operator will be ignored for the moment.

(7) The ship is $[_{\text{DegP}} \text{long MORE } [_{\text{than-XP}} \text{than the train is } [_{\text{DegP}} \langle \text{d-long} \rangle]]]]$.

On a popular analysis, which models degree heads in analogy to quantificational determiners in the individual domain (logical type $\langle \langle e, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle$), MORE denotes a two-place second order relation between degrees (type $\langle \langle d, t \rangle, \langle \langle d, t \rangle, t \rangle \rangle$). One of various possible implementations is given in (8) (Gawron 1985; Heim 2000, 2006; Bhatt and Pancheva 2004):

(8) $[[\text{MORE}]] = \lambda D_{\langle d, t \rangle} . \lambda D'_{\langle d, t \rangle} . D \subset D'$ [Bhatt and Pancheva 2004]

The DegP of (7) can then be expanded into the tree in (9), with AP occupying SpecDegP (Izvorski 1995; Lechner 2004) and the degree complement in complement position:



In (9), the unit consisting of MORE and the *than-XP* (henceforth also DegGQ) denotes a generalized degree quantifier, that is a second order property of degrees. Similar to generalized quantifiers in the complement position of individual predicates, this DegGQ is not type compatible with its sister node and therefore needs to undergo Quantifier Raising (QR), as spelled out in (10)a (Heim 2000).³ The moved DegGQ in (10)a binds a degree variable which serves as the inner argument of the matrix AP. Together with the lexical semantics of MORE and the degree complement, the semantic representation is (10)b, which demands that the set of degrees to which the train is long forms a proper subset of the set of degrees to which the ship is long (or, equivalently, that the maximal degree of the ship's length exceeds the maximal degree of the train's length; for maximality analyses see von Stechow 1984; Rullmann 1995).

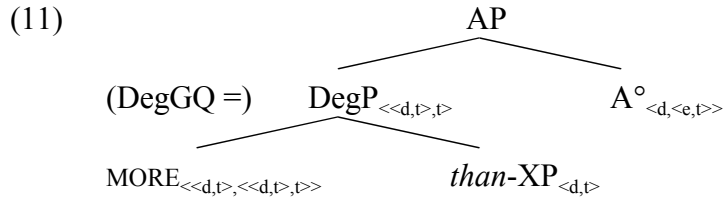
(10) a. $[[[_{\text{DegGQ}} \text{more } [\text{than } \lambda_1 [\text{the train is } \langle \text{d}_1\text{-long} \rangle]]]] [\lambda_1 [\text{the ship is } \text{d}_1\text{-long}]]]$
 b. $[[\text{(10)a}]] = [[\text{MORE}]] ([[\text{than } \lambda_1 \text{ the train is } \langle \text{d}_1\text{-long} \rangle]]) ([[\lambda_1 \text{ the ship is } \text{d}_1\text{-long}]]) = \lambda d. \text{the train is } d\text{-long} \subset \lambda d. \text{the ship is } d\text{-long}$

Note that on this account, comparatives have come to parallel propositions with universally quantified objects both in their logical syntax and meaning. Discussion of empirical predictions generated by a corollary of the assumption that DegGQs undergo QR will be taken up presently.

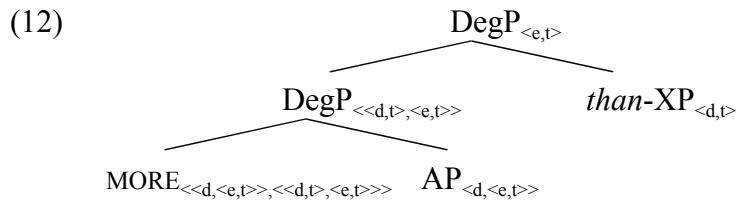
The factorization in (9) is only one of the three main approaches towards the constituency of gradable predicates that have been pursued, all of which associated with a distinct set of consequences. On the 'classical' view, sketched in (11) (Chomsky 1965; Selkirk 1970; Bresnan 1973; Heim 2000), which is equally compatible with the semantics above, the DegGQ is not a daughter of DegP, but is situated in the specifier of AP. If the DegP is organized as in (11), QR targets the specifier of AP, instead of the sister of AP. The differences between (9) and (11) are rather minor, but will be seen to render the phrase structure (11) inconsistent with a particular

³Concerns that QR affects an intermediate projection (Deg') can be defused by adopting Bhatt and Pancheva (2004)'s Late Merge hypothesis or Alrenga et al (2012); see discussion of (14) below. Just like covert movement of nominal quantifiers, QR in (10)a leaves a movement copy (not represented). Again, see discussion of Late Merge surrounding (14) below.

perspective on CD (to anticipate, the raising analysis of CD; see section 3).



Finally, the DegP has also been assigned the template (12), in which MORE and the AP form a constituent to the exclusion of the degree complement. The *than*-XP joins the derivation as a DegP adjunct, resulting in (12), or is merged as the external argument of the degree head (von Stechow 1984; Abney 1987; Larson 1988; Corver 1990, 1997; Rullmann 1995; Kennedy 1999):



Due to this structural modification, either the lexical entry of MORE has to be adjusted, or the order in which the components are assembled needs to be changed. The former option can be operationalized by adopting the meaning rule (13)a, which while retaining the subset condition of the generalized quantifier analysis does not require scoping. Alternatively, it is also possible to switch to a semantics that treats the *than*-XP as a nominalized degree term, as in (13)b (von Stechow 1984 and Rullmann 1995; for a third option in terms of measure functions see Kennedy 1999). The typing in (12) reflects (13)a:

- (13) a. $\llbracket \text{MORE}^? \rrbracket = \lambda \text{AP}_{\langle d, \langle e, t \rangle \rangle} . \lambda \text{D}_{\langle d, t \rangle} . \lambda x_e . \text{D} \subset \lambda d . \text{AP}(d)(x)$
 b. $\llbracket \text{MORE}^{??} \rrbracket = \lambda \text{AP}_{\langle d, \langle e, t \rangle \rangle} . \lambda d_d . \lambda x_e . \max \{ d' \mid \text{AP}(d')(x) \} > d$ [von Stechow 1984]

But the phrase structure in (12) can also be made consistent with the generalized quantifier analysis in (8) by abandoning the standard phrase structure axiom that all syntactic trees grow strictly monotonically. Specifically, a variant of (12) becomes interpretable if Bhatt and Pancheva (2004)'s hypothesis is adopted that only the degree head MORE moves at LF and that the degree complement is counter-cyclically inserted in the scope position of MORE by Late Merge (Lebaux 1990). On this conception, the derivation of (7) starts with the base-generated structure in (14)a. Next, MORE raises covertly, leaving a degree trace that serves as the inner argument of the AP-denotation ((14)b). Finally, the *than*-XP is Late Merged as a sister node of MORE ((14)c).

- (14) a. The ship is $[_{\text{DegP}} \text{MORE long}]$.
 b. MORE $[\lambda_1 \text{ the ship is } [_{\text{DegP}} d_1 \text{-long}]]$
 c. $\llbracket \llbracket \text{MORE } [_{\text{than-XP}} \text{ than } \lambda_1 \text{ the train is } \langle d_1 \text{-long} \rangle] \rrbracket_{\langle\langle d, t \rangle, t \rangle} [\lambda_1 \text{ the ship is } [_{\text{DegP}} d_1 \text{-long}]] \rrbracket_{\langle d, t \rangle}$

The resulting LF-representation (14)c for all intents and purposes parallels (10)b, except that the derivation does not create a movement copy in the base position of the *than*-XP. This has, as Bhatt and Pancheva point out, various desirable consequences. Among others, the Late Merge hypothesis improves on the standard QR-account in that it offers an explanation for systematic correlations between the semantic scope of MORE and the size of ellipsis that the *than*-XP is able to embed, captured by the ELLIPSIS-SCOPE GENERALIZATION (15) (adapted from Bhatt and

Pancheva 2004: (59); Williams 1974, chap. 4; Gawron 1995; Fox 2002; Lechner 2004: 199):

(15) The LF-position of the degree complement matches the scope position of MORE.

Empirically, (15) manifests itself, among others, in the observation that in elliptical comparatives, possible coreference patterns reflect the height of attachment of the *than*-XP, which in turn regulates possible choices for the ellipsis antecedent. To illustrate, (16) admits coreference between *Mary* and the pronoun *her* in case the missing VP is construed with broad ellipsis, paraphrased in (16)b, whereas the narrow ellipsis reading (16)a incurs a Principle C violation:⁴

- (16) Her father tells her to work harder than Mary's boss does.
 [Bhatt and Pancheva 2004: 31, (69)]
- a. *Her father tells her₃ to work harder than Mary₃'s boss works.
- b. Her father tells her₃ to work harder than Mary₃'s boss tells her to work.
- c. *her father tells her₃ [[_{<<d,t>,t>} MORE than [_{<d,t>} λ₁ Mary₃'s boss <works d₁-hard>]]
 [_{<d,t>} λ₂ PRO to work d₂-hard]](tell > MORE)
- d. [[_{<<d,t>,t>} MORE than [_{<d,t>} λ₁ Mary₃'s boss <tells her PRO to work d₁-hard>]]
 [_{<d,t>} λ₂ her father tells her₃ PRO to work d₂-hard]] (MORE > tell)

The paradigm is accounted for as follows. The narrow ellipsis reading in (16)a requires the degree complement to be merged in the embedded clause ((16)c), triggering a disjoint reference effect between the name and the c-commanding coindexed pronoun (underlined). By contrast, construing MORE with wide scope, as in (16)b/d, makes it possible to Late Merge the *than*-XP within the matrix clause, above *her*, which removes the name from the c-command domain of the pronoun. Essentially, what (16) then demonstrates is that matrix scope for MORE does not entail that the degree complement is syntactically represented in a position next to the degree adjective, schematically shown by (17)a:

- (17) a. Late Merge: [MORE [_{than-XP} ... name₃ ...]₁ ... [... pronoun₃ ... t₁...]]
 b. Cyclic Merge: *[MORE [_{than-XP} ... name₃ ...]₁ ... [... pronoun₃ ... [_{than-XP} ...name₃ ...]₁]]

The behavior of degree complements mimics in this respect that of extraposed relative clauses ((18)b), which are equally able to escape the verdict of Principle C by Late Merge (Fox and Nissenbaum 1999; Fox 2000, 2002, among others):

- (18) a. I gave him₃ a book yesterday [that John₃ liked]. [Fox 2002: (23)]
 b. ??I gave him₃ a book [that John₃ liked] yesterday.

Two remarks regarding the Ellipsis-Scope Generalization (15) are in order. First, on the assumptions above, the effects of (15) cannot be derived from the denotation of MORE in (13)a or (13)b. This supplies an argument for the generalized quantifier analysis of the degree head (8).

Second, it should be noted that not all researchers agree that the best account of the

⁴The full paradigm also involves a licit reading on which MORE and the degree clause take matrix scope but the ellipsis is identified narrowly, by the embedded VP *works hard* ((69)c in Bhatt and Pancheva 2004). This documents the well-known, yet orthogonal, phenomenon that VP-ellipsis can reach into embedded clauses in search for their antecedents (Fiengo and May 1994).

Ellipsis-Scope Generalization (15) resides with the Late Merge theory. Alrenga et al (2012), for example, capture (15) by designing a semantics that admits multiple possible attachment sites for the comparative complement. Crucial for the analysis, which models the *than*-XP (instead of a larger unit including the degree head) as a degree quantifier, is the unorthodox hypothesis that comparative semantics is encoded in three different positions, viz. the standard marker *than* and two occurrences of MORE in the matrix clause and the comparative complement, respectively. For details, see Alrenga et al (2012).

To recapitulate, although syntactically, comparatives fit at least three distinct syntactic templates, the generalized degree quantifier analysis limits the analytical options: while the structures (9) and (11) can be embedded both within a conservative QR analysis and the Late Merge account, (12) is compatible with the latter only. Further consequences of this finding will be discussed in section 3. Moreover, Late Merge and, concomitantly, the second order degree predicate analysis of the comparative relation was seen to receive support from its ability to handle systematic correlations among scope, Principle C and ellipsis (but see Alrenga et al 2012). Similar interactions between ellipsis and comparatives will be taken up again in section 4, following a survey of empirical and theoretical challenges posed by Comparative Deletion (CD) in the next section.

3. Comparative Deletion

It is possible to distinguish among at least three families of approaches towards CD, which diverge mainly in whether they endow the silent gradable property with syntactic structure or not, and the mechanism which identifies the elliptical gradable property. More specifically, CD has been analyzed as (i) the result of *syntactic ellipsis* in combination with movement of a degree operator (which, on some accounts, itself consists of a deleted constituent); (ii) a designated type of *movement* operation ('head raising'), and (iii) an instance of *semantic ellipsis*, with the CD-site being syntactically inert. The present section provides a synopsis and outlines how the syntactic and semantic assumptions collected in section 2 align with these competing perspectives on CD.

3.1. The movement and deletion (matching) analysis of CD

Proponents of the movement-and-deletion analysis (Lees 1961; Hankamer 1973; Chomsky 1977; Kennedy 2002) agree that CD combines fronting of a constituent inside the comparative complement with the instruction to forgo pronunciation of the degree predicate, possibly together with other nodes. What exactly moves or is deleted depends on the particulars of the theory, though. To exemplify, the classical empty operator analysis (Chomsky 1977; Stechow 1984; Heim 1985; Izvorski 1995; Rullmann 1995, among others) postulates movement of a null operator to SpecCP. From there, the operator binds a degree variable within the gradable predicate, which is deleted by a construction specific ellipsis operation. In a recent incarnation, developed in Kennedy (2002), displacement targets the whole DegP-complex instead of just the null operator, followed by ellipsis of the higher occurrence of DegP. Kennedy's analysis also diverges from the classical account in that the variable is not located within the degree predicate, but is syntactically represented by the lower copy of the DegP. On this view, the effects of which are exposed in (19), CD is a manifestation of matching the unit $[_{DegP} Deg^{\circ} long]$ in SpecCP with

the external head of the degree clause [*MORE long*]:⁵

- (19) The ship is [[_{DegP} MORE long] [_{than-XP} than
[_{CP} < [_{DegP} Deg° long]> the train is < [_{DegP} Deg° long]>]].
(‘The ship is longer than the train is’)

Modeling CD in terms of DegP-movement has two immediate consequences. First, it is no longer necessary to stipulate a designated ellipsis operation affecting the lowest DegP-occurrence, because deletion follows from the general principles regulating the distribution of audible copies. Second, the semantic part of the analysis, to be expanded on momentarily, includes a device which operationalizes the matching relation between the higher DegP and the external head.

Adjusted to current assumptions according to which gradable adjectives denote relations between degrees and individuals, the abstract degree head Deg° of Kennedy (2002) can be defined as in (20)a.⁶ (20)b repeats from above the non-scoping version of MORE’ and (21) supplies relevant parts of the semantic calculation for (19). The LF to be compositionally interpreted is (21)a:

- (20) a. [[DEG°]] = $\lambda AP_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda R_{\langle \langle e, d \rangle, t \rangle} \cdot R(\lambda x \lambda d. AP(d)(x))$
 b. [[MORE’]] = $\lambda AP_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda D_{\langle d, t \rangle} \cdot \lambda x_e \cdot D \subset \lambda d. AP(d)(x)$ (= (13)a)
- (21) a. LF: (than) [_{DegP} Deg° long] λ_1 the train (is) [_{DegP} Deg° long]₁
 b. [[λ_1 the train [_{DegP} Deg° long]₁]] = $\lambda T_{\langle e, \langle d, t \rangle \rangle} \cdot T(\text{the train})$
 c. [[Deg° long]] = $\lambda AP_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda R_{\langle \langle e, d \rangle, t \rangle} \cdot R(\lambda x \lambda d. AP(d)(x)) (\lambda d. \lambda x. \text{long}(d)(x)) =$
 $= \lambda R_{\langle \langle e, d \rangle, t \rangle} \cdot R(\lambda x \lambda d. \text{long}(d)(x))$
 d. [[[[Deg° long] λ_1 the train T₁]]] =
 $= \lambda R_{\langle \langle e, d \rangle, t \rangle} \cdot R(\lambda x \lambda d. \text{long}(d)(x)) (\lambda T_{\langle e, \langle d, t \rangle \rangle} \cdot T(\text{the train})) =$
 $= \lambda T_{\langle e, \langle d, t \rangle \rangle} \cdot T(\text{the train}) (\lambda x \lambda d. \text{long}(d)(x)) =$
 $= \lambda x \lambda d. \text{long}(d)(x) (\text{the train}) =$
 $= \lambda d. \text{long}(d)(\text{the train})$

As shown by (21)b, the lower DegP translates as a variable of type $\langle e, \langle d, t \rangle \rangle$ which is bound by the λ -operator created by DegP-movement to SpecCP. Semantically, abstraction over T generates a predicate of ‘passivized’ (i.e. $\langle e, \langle d, t \rangle \rangle$ instead of $\langle d, \langle e, t \rangle \rangle$) gradable adjective meanings. Once this derived predicate is combined with the DegP-denotation, given in (21)c, the derivation produces, as desired, the predicate of degrees to which the train is long ((21)d). The output of (21)d can finally be picked up by the comparative head MORE’ (20)b.

A noteworthy feature of this setup is that the identity condition between the internal head in SpecCP and the external head is defined syntactically, yet the content of CD is restored in semantics, by β -converting the degree predicate inside the fronted DegP into the CD-site. Moreover, as DegP movement to SpecCP arguably leaves a copy, the gradable property inside the *than-XP* contains silent structure in SpecCP, as well as in its base position.

As observed by Kennedy (2000, fn.2), the derivation in (19) is reminiscent of the matching analysis of relative clauses (Hulsey and Sauerland 2006; Bhatt 2015) in that a category which is

⁵On why the two occurrences of DegP in the matrix clause and fronted position of the *than-XP* do not need to be strictly identical (*MORE longer* vs. *Deg° long*) see (Kennedy 2002: 590). For an analysis that observes strict identity see Alrenga et al (2012).

⁶For the original analysis, on which adjectives denote measure functions, see Kennedy (2002: 572f).

internal to the relative/degree clause is raised and elided under identity with an external head. Syntactically, the proposal is based on the constituency for the DegP in (12), which, as exposed by (22)a, guarantees that the internal DegP ([Deg° AP], underlined) actually finds a constituent which supplies a matching external head ([MORE AP], double underlining):

- (22) a. [_{DEGP} [_{DEGP} MORE AP] [_{than-XP} ... <[_{DEGP} DEG° AP]> ... <[_{DEGP} DEG° AP]>]] (à la (12))
 b. [_{DEGP} AP [_{DEG°} MORE] [_{than-XP} ... <[_{DEGP} DEG° AP]> ... <[_{DEGP} DEG° AP]>]] (à la (9))
 c. [[_{DEGP} MORE] [_{than-XP} ... <[_{DEGP} DEG° AP]> ... <[_{DEGP} DEG° AP]>] A(P)] (à la (11))

None of the alternative syntactic templates for DegP satisfy this requirement. Both in (22)b (which models the DegP after (9)) and (22)c (which follows (11)), the internal DegP lacks a corresponding external head that excludes the *than-XP*, suggesting that the matching analysis is compatible only with the phrase structure (12).

While the observation above does not have any detrimental effects in itself, it relates to another, more problematic trait of the analysis: the matching account is, at least in its present form, inconsistent with the Late Merge hypothesis. This follows from the fact that the two theories impose two conflicting sets of requirements on the constituency of MORE and the AP. On the one hand, the Late Merge account mandates that the *than-XP* be inserted as the sister of MORE, instead of as a sister to the unit [MORE AP]. That is, MORE has to form a unit with *than-XP* to the exclusion of the AP. By contrast, the matching analysis makes just the opposite kind of demand since the local context must supply an external head – for matching with the internal DegP – which needs to contain both MORE and the AP, but which must not include the *than-XP*. Put differently, counter-cyclical Merge inevitably locates the *than-XP* in an environment that cannot provide an external head.⁷ Note, moreover, that the problem generalizes into two directions. First, it is not restricted to the particular template in (12) but extends to the alternative two phrase structures. Neither (9) nor (11) is able to reconcile the assumption that the *than-XP* is Late Merged as a sister of MORE with the need of the internal DegP for an external matching [MORE AP] unit. Interestingly, while this finding poses a substantial challenge for the matching analysis, a similar (yet not identical) shortcoming will also be seen to impinge upon its main competitor to be addressed in the next subsection. Second, it is hard to see how the matching analysis derives scoping of the comparative relation MORE in the first place, given that (i) MORE and the *than-XP* do not form a constituent, which prohibits them from QRing as a unit, and (ii) movement of MORE in isolation bleeds Late Merge. Naturally, it would of course be possible to scope only the *than-XP*, but there is no discernable strategy for transporting MORE together with the *than-XP* into their scope positions. This second generalization of the problem makes the matching analysis incompatible with the standard degree quantifier approach. An implementation that avoids this complication can be found in Alrenga (2012).

3.2. *The raising analysis of CD*

Similarities between relative clause and comparative are also exploited by the second group, which construes comparatives in analogy to the head raising analysis of relatives clauses (Rivero 1981; Kayne 1994; Bhatt 2015; on head raising in comparatives see Donati 1997). In Lechner

⁷The problem does not arise in head external relative clauses, because the node that is moved prior to Late Merge is also the head of the relative.

(2004), it is proposed that the gradable property is attracted by a feature on the matrix degree head, landing in its specifier position, where the feature is morphologically expressed by comparative morphology under spec-head-agreement:

- (23) The ship is $[_{DegP} [_{AP} \textit{long-er}] [_{Deg'} Deg^{\circ}_{[+comp]} [_{than-XP} \textit{than} [\lambda_1 \textit{the train is} [_{DegP} <[_{AP} \textit{long}]> [_{Deg'} Deg^{\circ}_{[E]} d_1]]]]]]]$

Just like in the head raising account of relative clauses, only the higher copy is spelled-out. This can be made to follow from the assumption that the lexical specification of the lower, semantically inert degree head contains an ellipsis feature [E] (Merchant 2001), which instructs the grammar to forgo pronunciation of SpecDegP.⁸ Moreover, semantic considerations demand that both the higher and the lower copy of the gradable property are interpreted, resulting in an instance of movement without chain formation.⁹ Since the relation between the comparative AP and the CD-site is defined in terms of movement, the identity condition on CD is the same that are found in other instances of dislocation. There is no need to grant special dispense to the relation between the external head [MORE AP] and the internal head [Deg^o AP] from the laws defining syntactic or semantic identity, as was necessary in the matching analysis (see also fn. 5). In general, the raising analysis does not make it necessary to stipulate a construction specific, obligatory deletion process for comparatives; rather, the core properties of CD fall out from the universal principles regulating movement.

It is obvious that for head raising to succeed, the internal structure of gradable APs must be like (9), because only (9) ensures that the pronounced, morphologically marked AP c-commands the *than*-XP and at the same time resides in the specifier of the degree head. Once head raising has applied, the quantificational degree determiner MORE in (8) together with the *than*-XP undergoes QR, providing the requisite logical syntax for interpretation. The LF-representation and corresponding interpretation was already introduced by (10).

Independent support for the phrase structure in (10) comes from an observation due to Bresnan (1973), who notes that in attributive phrasal comparatives, the size of CD systematically correlates with the position of the degree complement. Only (24)a admits a sensible reading, while of (24)b entails that Sally is a man, triggering a category mistake. This indicates that the CD site comprises of the AP in (24)a, but includes the NP in (24)b:

- (24) a. Mary met a man $[_{DegP} [_{AP} \textit{older}] [_{than-XP} \textit{than Sally} <\textit{old}>]]]$.
 b. #Mary met an $[_{DegP} [\textit{older man}] [_{than-XP} \textit{than Sally} <\textit{old man}>]]]$.

⁸It has been suggested that there is an additional functional layer above DegP, which hosts measure phrases and *more* in synthetic comparatives (*5cm more distant*). On this view, the [E]-feature is hosted by the head of this projection, and ellipsis affects the complement, instead of the specifier of DegP. Crucially, adopting the more fine-grained structure ensures uniformity with Merchant (2001) and subsequent work, according to which [E]-features always affect the complement domain.

⁹Multiple LF-copies are also attested in other domains. On the raising analysis of relative clauses, the higher copy can but, crucially, does not *have* to be ignored by the computation. The same rationale is also underlying the explanation of disjoint reference effects with A'-movement and QR. For instance, (i)a is assigned the LF in (ii), in which both copies are interpreted (see Fox 2000; Sauerland 1998 for details):

- (i) a. *Which picture of John₁ did he₁ like best
 b. *He₁ liked every picture of John₁
 (ii) [[which picture of John₁] λ₂ [did he₁ like <the λx.x=2 ∧ picture of John₁(x)> best]

A successful analysis of the contrast above hinges on finding a way to secure that the size of CD is functionally determined by syntactic properties such that the CD-site corresponds to the sister node of the *than*-XP as expressed by Gawron's (1995: 343) '*Hypothesis A*':

(25) *Hypothesis A*

The scope of comparison is exactly the semantics of the sister of the *than*-phrase.

On the raising analysis, Hypothesis A follows directly from the c-command condition on movement. By contrast, the matching account, which posits the structure in (22)a repeated below, either has to stipulate that identity in comparatives ignores the difference between 'MORE AP' and 'Deg° AP', or needs to assume that the matching operation reaches into the external head, targeting the complement of Deg°:

(22)a $[_{DEGP} [_{DEGP} \underline{\text{MORE AP}}] [_{\text{than-XP}} \dots <[_{DEGP} \underline{\text{DEG}^\circ \text{AP}}]> \dots <[_{DEGP} \text{DEG}^\circ \text{AP}]>]]$

If the latter option is chosen, matching is no longer defined in terms of c-command, and the matching analysis loses an account for Hypothesis A.

But the raising analysis comes at a cost, too. Similar to what was observed with the matching account, an independent, yet inherent feature of the head raising mechanism renders the analysis incompatible with the Late Merge hypothesis. The raising account of CD presupposes that the *than*-XP is merged early, as a sister of MORE, so as to allow movement out of the *than*-XP into SpecDegP. But this is clearly inconsistent with the assumption that the *than*-XP joins the derivation only at a later stage, once MORE has reached its scope position. Thus, unlike in the matching analysis, the complication is created by conflicting criteria on the sequencing of derivational steps, and not by a conflict of constituency.¹⁰

One possible response to this challenge consists in assuming that *than*-XPs are merged cyclically after all, but fail to create movement copies due to independent factors which are operative in comparatives, but not in relative clauses. These factors might in turn be reduced to logical properties that distinguish comparatives from other clause types. More precisely, Bhatt and Pancheva (2004: 39f) point out that LF-configurations in which the *than*-XP is merged cyclically lead to logical contradictions. Together with a principle that prohibits certain, formally definably, representations with trivial truth conditions (L-triviality; Gajewski 2002), this would be sufficient to guarantee that QR of the unit [MORE *than*-XP] leaves a degree variable, instead of a copy. Moreover, as contradictions are limited to comparatives, Late Merge of relative clauses would, as desired, still be possible. While this looks like a promising move for rendering the raising analysis of CD consistent with the Ellipsis Scope Generalization, a more careful investigation of the problem has to await another occasion.

3.3. Semantic theories of CD and diagnostics for structure

On semantic theories of CDs, the unpronounced gradable property is either λ -converted into the degree clause (Kennedy 1999, 2002; see (21)) or treated as an instance of discourse anaphora (Lerner and Pinkal 1995; for alternatives see also Klein 1980; Larson 1988; Heim 2006). By

¹⁰Note incidentally that the same complication shows up in relative clauses, yet with diametrically opposite effects. Extraposed, i.e. Late Merged, relative clauses actually resist a raising construal, as witnessed by the absence of reconstruction effects, among others (see Bhatt 2015 for an overview).

nature, these accounts require a syntax in which the external head of the comparative is already present at the point where CD is interpreted. In principle, this configuration can be provided both by a raising syntax or a matching derivation.

While the specific mechanism implicated in restoring the CD-site is not of direct relevance for our present concerns, there is an important property discriminating between the semantic analysis and the other two approaches. Both the deletion and the raising analysis have in common that the CD-site is predicted to contain hidden structure that should react to standard diagnostics. By contrast, semantic analyses (Lerner and Pinkal 1995; Kennedy 1999) generate the expectation that the CD-site is syntactically inert. Various tests document that CD indeed generates unpronounced structure, in compliance with the syntactic approach (Lechner 2004). To begin with, names inside the CD-site induce Principle C violations ((26)a), indicating that the degree complement contains an unpronounced copy of the gradable AP and its complement. CD behaves in this respect just like VP-ellipsis ((26)b). Moreover, CD also parallels VP-ellipsis in that clausal embedding of the name ameliorates the disjoint reference effect, as shown by (26)c and (26)d (vehicle change; see Fiengo and May 1994; Safir 1999, among others):

- (26) a. *Mary is prouder of John₁ than he₁ is <d-proud of John₁>.
 b. *Mary is proud of John₁ and he₁ is <proud of John₁>, too.
 c. Mary is prouder of John₁ than he₁ believes that I am <d-proud of John₁>.
 d. Mary is proud of John₁ and he₁ believes that I am <d-proud of John₁>, too.

Second, the CD-site can host reflexives and reciprocals, which are commonly assigned sloppy readings.¹¹ For theories which express the conditions on anaphor licensing structurally, this entails that the abstract structural representation of the degree complement has to include unpronounced occurrences of the bound variables:

- (27) a. Mary₁ is prouder of herself₁ than Sally₂ is <d-proud of herself₂>.
 b. The girls₁ are prouder of each other₁ than the boys₂ are <d-proud of each other₂>.

Next, extraction from the CD-site is subject to the CSC, a condition which is commonly held to be verified at the syntactic level of LF (Fox 2000). The contrast receives a natural explanation under the syntactic account, but is difficult to reconcile with the tenets of semantic theories, which lack the means to express conditions on LF-representation.

- (28) a. a person who₁ Mary is [more proud of t₁] than Peter is <d-proud of t₁>
 b. *a person who₁ Mary is [more proud of t₁] than Peter is <d-proud of t₂> (of) John₂
 c. *a person who₁ Mary is [more proud of John] than Peter is <d-proud of t₁>

Finally, the fact that the silenced AP in (28)a can contain a trace whose binder is located outside the elliptical node provides further, independent confirmation that the CD-site contains hidden structure. Thus, it can be concluded that CD is an operation that either consists in movement and deletion or head raising.

To recapitulate, while the ellipsis process that renders unpronounced the degree predicate inside the comparative displays all the signatures of a syntactic operation, the exact nature of CD is still somewhat elusive. On the one hand, it was seen that some of the core properties of CD are successfully captured by the matching analysis. On the other hand, the raising account avoids

¹¹For exceptional strict readings see Hestvik (1995) and Kennedy and Lidz (2001).

complications regarding the identity condition on the CD site and its antecedent, and offers at least the prospect of an explanation for Late Merge effects.

After this brief, by necessity selective survey of theories of the obligatory process of CD, the discussion to follow elaborates on optional ellipsis operations in comparatives. For more information on CD see Pancheva (2012), Morzycki (2014) and Lechner and Corver (to appear).

4. *Ellipsis in comparatives - Comparative Ellipsis*

It has been observed at least since Hankamer (1973) that various kinds of reduction processes that are attested in coordinate structures can also be found in comparatives. (29) provides a representative sample from coordinate contexts, and (1), repeated from above, examples of arguably the same phenomena in comparatives (nothing bears on the particular parses):

- (29) a. Ann liked Berlin and Cleo <liked> Dubai. (Gapping)
 b. Ann_i [t_i liked Berlin and <t_i liked> Dubai]. (ATB-movement and Gapping)
 c. Ann liked Berlin and Cleo <liked Berlin>, too. (Stripping/Gapping)
 d. Ann liked Berlin and Cleo did <like Berlin>, too. (VP-Ellipsis)
 e. Ann liked Berlin and Cleo did <liked> Dubai. (Pseudogapping)
 f. Ann liked <the place> and Cleo disliked the place. (RNR)
- (1) a. Ann liked Berlin more than Cleo <liked> Dubai. (Gapping)
 b. Ann_i [t_i liked Berlin more than <t_i liked> Dubai]. (ATB-movement and Gapping)
 c. Ann liked Berlin more than Cleo <liked Berlin>. (Stripping/Gapping)
 d. Ann liked Berlin more than Cleo did <like Berlin>. (VP-Ellipsis)
 e. Ann liked Berlin more than Cleo did <liked> Dubai. (Pseudogapping)
 f. More people liked <the place> than disliked the place. (RNR)

There are three topics which have historically been central to the study of ellipsis in comparatives. First, can all manifestations of ellipsis in comparatives be subsumed under independently attested ellipsis operations, or are there processes that are only operative in degree constructions (*Comparative Ellipsis*; Bresnan 1973; Pinkham 1985)? Second, are all seemingly elliptical comparatives actually elliptical? More specifically, do all phrasal comparatives (PC), exemplified by (1)b and (1)c, embed unpronounced structure, or are there also base-generated PCs? And third, it has, to a lesser extent, also been asked how phenomena that are generally confined to coordinate structures are licensed in the subordinate environments provided by comparatives. The present section reports findings relevant to the first and third domain, while the dispute about PCs will be taken up in section 5.

Before proceeding, a brief methodological note is in order. It is important to keep in mind that degree complements are (unless the remnant is a measure phrase) elliptical as a result of CD. When lining up comparatives and coordinations, the CD-site should therefore, all things being equal, be phonologically filled in the corresponding coordinate structures. Thus, the analogous coordinate structure of (30)a is (30)b, and not (30)c.

- (30) a. [Ann gave him more expensive presents] than [he gave her <d-expensive presents>].
 b. [Ann gave him expensive presents] and [he gave her expensive presents].
 c. *[Ann gave him expensive presents] and [he gave her].

Throughout, I will assume that the right-hand side bracketed unit in (30)a corresponds to the second conjunct in a coordination, with *than* usurping the role of a syntactic coordinator.

4.1. *Ellipsis in comparative and coordinate structures*

While it is uncontroversial that the reduction processes in (1) have the appearance of standard ellipses, demonstrating that the comparatives in (1) and their coordinate analogues (29) actually share a common derivational history turns out to be a less trivial task. In what follows, I will present reasons to believe that this strong hypothesis is correct at least for Gapping, ATB-movement and RNR (Pinkham 1985; Hendriks 1995; Moltmann 1992; Lechner 2004).

4.1.1. *Gapping*

Gapping is a deletion operation exclusively found in coordinate structures ((31)a vs. (31)b) which targets a proper subset of verbs in non-initial conjuncts ((31)c; Johnson, this volume, for an overview).

- (31) a. Lisa visited Millhouse and Otto <visited> Bart.
 b. *Lisa visited Millhouse although/after/because Otto <visited> Bart.
 c. *Lisa <visited> Millhouse and Otto visited Bart.

Six signature characteristics which are known to define the behavior of coordinate Gapping are also attested in comparatives (Lechner 2004):

(i) Gapping operates progressively only, in coordinations as well as in comparatives:

- (32) a. Lisa visited Millhouse more often than Otto <visited> Bart.
 b. *Lisa <visited> Millhouse more often than Otto visited Bart.
- (33) a. More people visited Millhouse than <visited> Bart.
 b. *More people <visited> Millhouse than visited Bart.

(ii) Gapping cannot affect infinitives to the exclusion of finite verbs. This is shown for coordinate structures in (34)a and adverbial, subject and object comparatives in (34)b-d. (For expository convenience, the discussion will focus on a single exponent of the paradigm from now on.)

- (34) a. *Lisa tried to visit Millhouse and Otto promised <to visit> Bart.
 b. *Lisa tried to visit Millhouse more often than Otto promised <to visit> Bart.
 c. *More people tried to visit Millhouse than promised <to visit> Bart.
 d. *Lisa tried to visit more people than Otto promised <to visit>.

(iii) Just like Gapping is prohibited from targeting finite, embedded clauses in coordinate structures ((35)a), it cannot do so in comparatives ((35)b):

- (35) a. *Lisa said that some visited Millhouse and Otto claimed that others <visited> Bart.
 b. *Lisa said that some visited Millhouse more often than Otto claimed that others <visited> Bart.

(iv) In both constructions, the results are strongly degraded if the Gap includes finite sentence boundaries:

- (36) a. ??Lisa said that some visited Millhouse and Otto <claimed that others visited> Bart.
 b. ??Lisa said that some visited Millhouse more often than Otto <claimed that others visited> Bart.

(v) In V2-languages such as German or Dutch, Gapping must not operate across overt

complementizers (Hendriks 1995):

- (37) a. Ich glaube daß mehr Leute das Buch lesen als (*daß) den Artikel_{ACC} <lesen>.

I believe that more people the book read than that the article read

'I believe that more people are reading the book than the article.'
- b. Ich glaube daß Hans das Buch liest und (*daß) Maria den Artikel_{ACC} <liest>.

I believe that Hans the book reads and that Mary the article reads

'I believe that John is reading the book and Mary the article.'

(vi) In V2-languages, it is only marginally possible to Gap clause final, finite auxiliaries to the exclusion of the main predicate ((38)). The results improve drastically if the finite verb undergoes V2 ((39)):

- (38) a. *?weil viele Leute Sue besucht haben und einige Otto eingeladen <haben>

since many people Sue visited have and some Otto invited have

'since many people visited Sue and some invited Otto'
- b. *?weil mehr Leute Sue besucht haben als Otto eingeladen <haben>

since more people Sue visited have than Otto invited have

'since more people visited Sue than invited Otto'
- (39) a. Gestern haben viele Leute Sue besucht und einige <haben> Otto eingeladen.

yesterday have many people Sue visited and some have Otto invited

'Yesterday, many people visited Sue and some invited Otto.'
- b. Gestern haben mehr Leute Sue besucht als Otto eingeladen <haben>.

yesterday have more people Sue visited than Otto invited have

'Yesterday, more people visited Sue than invited Otto.'

4.1.2. Right Node Raising

Unlike Gapping, RNR removes material from non-final constituents and targets strings that contiguously extend from the right edge of the first conjunct ((40)), largely ignoring locality conditions such as the Right Roof Constraint ((41)b; Hartmann 1998; Sabbagh 2007). RNR treats comparatives and coordinations alike (see Lechner 2004 for further details):

- (40) a. Lisa tried to visit <Bart> and Otto promised to invite Bart.

b. Lisa tried <to visit Bart> and Otto promised to visit Bart.

c. More people tried to visit <Bart> than promised to invite Bart.

d. More people tried to <visit Bart> than promised to visit Bart.
- (41) a. Some people told us that Clinton would win <the election> and others tried to convince us that she would lose the election.

b. More people told us that Clinton would win <the election> than had tried to convince us that she would lose the election.

In OV-languages, RNR overrides the prohibition on auxiliary ellipsis seen above. Thus, finite auxiliaries can be RNRed ((42)), but not Gapped ((38)).

- (42) a. weil viele Leute eine Zeitung gekauft <haben> und einige ein Buch gelesen haben

since many people a newspaper bought have and some a book read have

'since many people bought a newspaper and some read a book'
- b. weil mehr Leute eine Zeitung gekauft <haben> als ein Buch gelesen haben

since more people a newspaper bought have than a book read have

'since more people bought a newspaper than read read a book'

- (43) a. weil viele Leute eine Zeitung <gekauft haben> und einige ein Buch gekauft haben
 since many people a newspaper bought have and some a book bought have
 ‘since many people bought a newspaper and some bought a book’
 b. weil mehr Leute eine Zeitung <gekauft haben> als ein Buch gekauft haben
 since more people a newspaper bought have than a book bought have
 ‘since more people bought a newspaper than bought a book’

Finally, comparatives, just like coordinations, tolerate RNR in certain non-coordinate contexts. The status of RNR in marginally acceptable subject relative clauses ((44)a/(45)a; Hudson 1976) parallels that of subject comparatives ((44)b/(45)b; Lechner 2004). In (45)b, RNR generates a PC.

- (44) a. ?weil viele Leute die ein Buch gekauft <haben> eine Zeitung gelesen haben
 since many people who a book bought have a newspaper read have
 ‘since many people who bought a book read a newspaper’
 b. ?weil mehr Leute als ein Buch gekauft <haben> eine Zeitung gelesen haben
 since more people than a book bought have a newspaper read have
 ‘since more people read a newspaper than bought a book’
- (45) a. ?weil viele Leute die ein Buch <gekauft haben> auch eine Zeitung gekauft haben
 since many people who a book bought have also a newspaper bought have
 ‘since many people who bought a book also bought a newspaper’
 b. ?weil mehr Leute als ein Buch <gekauft haben> eine Zeitung gekauft haben
 since more people than a book bought have a newspaper bought have
 ‘since more people bought a newspaper than a book’

The findings above corroborate the hypothesis that comparatives can be modulated by RNR.

4.1.3. Across The Board Movement

Direct evidence for ATB-movement in comparatives comes from examples like (46)a, in which relativization reaches both into the matrix clause and the *than*-XP, suggesting an analysis that assigns to (46)a a representation similar to that of the coordinate structure in (46)b:¹²

- (46) a. the book OP_1 [John read t_1 more often] than [Bill read t_1]
 b. the book OP_1 [John read t_1] and [Bill read t_1]

(47) adds a semantic argument for the existence of ATB-movement in comparatives. The missing indefinites in the coordination (47)a and the comparative (47)b, respectively, are interpreted as variables bound by the existential subject. Given that there is no ‘small conjunct’ analysis for comparatives, which would equally be able to derive the intended reading (see Hirsch 2016 for recent implementation), it is hard to escape the inference that the subject has been removed by ATB-movement:

¹²A reviewer points out that the well-formedness of (i) suggests that (46)a does not implicate ATB-movement, but is a parasitic gap (Hendriks 1995). While this is a viable analytical option, (i) is also compatible with the view that comparative coordination is optional and that the degree clause in (i) is subordinated. See discussion of German V2 below for evidence in support of this assumption.

(i) the book OP_1 [John read t_1 more often] than [Bill read t_1]

- (47) a. Someone₁ [t₁ bought books for the library] and
 [<t₁ bought> magazines for the school].
 b. Someone₁ [t₁ bought more books for the library] than
 [<t₁ bought d-many books> for the school].

ATB is also implicated in the curious exception to the ban on auxiliary Gapping in (39). The puzzle disappears once it is recognized that the verb (*haben*) is not Gapped but has reached its surface position by ATB-verb second movement (ATB-V2), as in (48) (Lechner 2004: 3.4):

- (48) Gestern haben₁ [mehr Leute Sue besucht t₁] als [Otto eingeladen t₁].
 yesterday have more people Sue visited than Otto invited
 ‘Yesterday, more people visited Sue than invited Otto.’

That the deletion process at work in comparatives targets a genuine coordinate structure becomes apparent by inspecting the effects of the Coordinate Structure Constraint (CSC) in paradigm (49). (49)a illustrates a legitimate combination of two ATB-movements, viz. V2 and subject raising. No conflict arises, because both operations presuppose a coordinate parse. But whenever one of the two movements skips a conjunct, the results drastically degrade. In (49)b/c, ATB-subject raising to SpecTP establishes a coordinate structure, such that asymmetric V2 is bound to incur a violation of the CSC (traces that do not abide by the CSC are marked by \bullet). Conversely, (49)d/e are blocked by the CSC due to illegitimate asymmetric subject movement out of a coordination established by ATB-V2:

- (49) a. Zweifellos hat₁ Hans₂ [t₂ mehr Brote bestellt t₁] als [t₂ gegessen t₁].
 doubtless has John more sandwiches ordered than eaten
 b. *Zweifellos bestellte₁ Hans₂ [t₂ mehr Brote \bullet t₁] als [t₂ gegessen hatte].
 doubtless ordered John more sandwiches than eaten had
 c. *Zweifellos hatte₁ Hans₂ [t₂ mehr Brote bestellte] als [t₂ gegessen \bullet t₁].
 doubtless had John more sandwiches ordered than eaten
 d. *Zweifellos hat₁ Hans₂ [\bullet t₂ mehr Brote bestellt t₁] als [seine Mutter gegessen t₁].
 doubtless has John more sandwiches ordered than his mother eaten
 e. *Zweifellos hat₁ Hans₂ [seine Mutter mehr Brote gegessen t₁] als [\bullet t₂ bestellt t₁].
 doubtless has John his mother more sandwiches eaten than ordered
 intended for all: ‘John undoubtedly ordered more sandwiches than he/his mother ate.’

The effects visible in (49) are replicated for ATB-V2 and object extraction in (50):

- (50) a. Diesen Film₂ haben₁ wohl [mehr Leute bestellt t₁] als [t₂ auch gesehen t₁].
 this movie have particle more people ordered than also seen
 ‘More people ordered the movie than saw the movie.’
 b. *Diesen Film₂ haben₁ wohl [mehr Leute bestellt \bullet t₁] als [t₂ auch gesehen haben].
 this movie have particle more people ordered than also seen have
 c. *Diesen Film₂ haben₁ wohl [mehr Leute bestellten] als [t₂ auch gesehen \bullet t₁].
 this movie have particle more people ordered than also seen
 d. *Dieses Buch₂ haben₁ wohl [mehr Leute \bullet t₂ bestellt t₁] als [den Film gesehen t₁].
 this book have particle more people ordered than the movie seen
 e. *Diesen Film₂ haben₁ wohl [mehr Leute das Buch bestellt t₁] als [\bullet t₂ gesehen t₁].
 this movie have particle more people the book ordered than seen
 intended: ‘More people ordered the book than saw the movie.’

Finally, what (51) demonstrates is that the coordinate parse for comparatives is, unless forced by

independent factors such as ATB-movement, optional. In absence of other ATB-dependencies, the *than*-XP can be parsed into a position subordinate to the matrix clause, which enables syntactic operations to target the two clauses individually, accounting for the availability of asymmetric V2-movement of the finite auxiliary *hat* (see Lechner 2001, 2004, 2015 for details):

- (51) Zweifellos [*hat*₁ Hans₂ t₂ mehr Brote gegessen t₁] als [seine Mutter bestellt hat].
 doubtless has John more sandwiches eaten than his mother ordered has
 ‘John undoubtedly ate more sandwiches than his mother ordered.’

In sum, the standard diagnostic for coordination (CSC) yields solid evidence that comparatives which include ATB-movement establish a coordinate structure. This is expected if the symmetric deletion processes observed above actually consist in ATB-movement.

4.1.4. Other ellipsis operations in comparatives

Additional ellipsis operations that have been observed to target comparatives include MODAL COMPLEMENT ELLIPSIS ((52)b; Aelbrecht 2010), and NULL COMPLEMENT ANAPHORA (NCA; (53)). Just like NCA in coordinate structures ((54); Jacobson 1992), ellipsis is possible with control, but not with raising predicates:

- (52) a. She wanted to read the book but she couldn’t.
 b. She wanted to read more books than she could.
- (53) a. More people offered to support Clinton than refused/tried/remembered.
 b. *More people offered to support Clinton than seemed/happened/turned out/tended.
- (54) a. While some offered to support Clinton, others refused/tried/remembered.
 b. *While some offered to support Clinton, others seemed/happened/turned out/tended.

In German, NCA co-occurs with the expletive *es*, a requirement that carries over to comparatives:

- (55) a. Maria versuchte uns anzurufen, und Peter versuchte *(es) auch.
 Mary tried us call and Peter tried it too
 b. Maria versuchte uns öfter anzurufen, als Peter *(es) versuchte.
 Mary tried us more often call than Peter it tried

Interestingly, comparatives permit SENTENTIAL ARGUMENT ELLIPSIS also with verbs like *think* and *seem*, which usually do not license NCA (Kennedy and Merchant 2000a; Pancheva 2012, attributing (56) to Irene Heim):

- (56) a. Mary grew taller than I thought <she would grow d-tall>.
 b. *Mary grew tall even though I didn’t think <that she would grow d-tall>.
- (57) a. We are more vulnerable than we seem <(to be) d-vulnerable>.
 b. *We seem (to be) divided but I don’t think that our enemies seem <(to be) d-divided>.

The effect, yet to be accounted for, appears to be restricted to stative predicates:

- (58) a. *We are running faster than we seem <to run d-fast>.
 b. *Mary won more often than she seemed <to win d-often>.

An additional puzzle is raised by German sentential argument ellipsis in (59). The contrast in (59) demonstrates that the deletion may consist of a discontinuous string made up of a finite

auxiliary (*wurde*) and the complement clause, provided that the stranded participle is embedded in a passive clause. (The active version (59)b is well-formed with a finite auxiliary):

- (59) a. Dies wird sich schwieriger umsetzen lassen als gedacht
 this will self more difficult to.realize let than thought
 <wurde, dass dies sich umsetzen lassen wird>.
 was that this self realized let will
 ‘This will be more difficult to realize that thought.’
 b. *Dies wird sich schwieriger umsetzen lassen als ich gedacht
 this will self more difficult to.realize let than I thought
 <hatte dass dies sich umsetzen lassen wird>.
 had that this self realized let will

To summarize, the observations collected in the last four subsections provide strong support for the claim that comparatives can be targeted by the same kinds of deletion operations – specifically Gapping, RNR and ATB-movement – that are operative in coordinate structures. Sentential argument ellipsis, which is attested in comparatives only, is a to date poorly understood exception to this generalization. Note, incidentally, that in all the examples examined up to now, ellipsis and ATB-movement do not discriminate between PCs and elliptical comparatives with more than one remnant. This parallelism will become relevant again in the discussion of different approaches towards PCs in section 5.

4.2. Coordination vs. subordination

Even though the question why comparatives are able to emulate the behavior of coordinations is largely unexplored, there are a few speculations in the literature. In principle, three factors have been identified to influence the availability of a coordinate parse for comparatives: linearization, non-containment and morphosyntactic properties of the standard marker (*than* in English).

The contrast between (60)a/b and (60)c/d illustrates that Gapping and ATB-movement in comparatives is contingent upon extraposition of the *than*-XP, suggesting that the degree complement must, just like regular non-initial conjuncts, be properly linearized to the right of the matrix clause. Notably, (60)c can only be blocked by linearization conditions on the whole conjunct since (60)c satisfies the requirement that the antecedent precede the Gap:

- (60) a. [Someone visited more people at Christmas] than [Otto <visited> on his birthday].
 b. Someone_i [t_i visited more people at Christmas] than [t_i <visited> on his birthday].
 c. *[Someone visited more people than [Otto <visited> on his birthday] at Christmas].
 d. *Someone_i [t_i visited more people than [t_i <visited> on his birthday] at Christmas].

Proper linearization can be effected in various ways: by extraposition of the *than*-XP (Pinkham 1985; Lechner 2004); by Late Merge of the *than*-XP subsequent to covert rightward movement of MORE (which is, of course, nothing else than the current way to model extraposition); by overt QR of the DegGQ; or by using an enriched phrase structures, such as multidimensional trees (Moltmann 1992) or multidominance (Sabbagh 2007; Gracanin-Yuksekk 2007).

Second, elliptical comparatives in which the *than*-XP contains hidden structure are constellations of antecedent contained deletion (ACD; Wold 1995). The *than*-XP accordingly has to attach to a node c-commanding the ellipsis site at the point in the derivation where ellipsis is resolved. Importantly, while containment is related to linearization, the two criteria do not define

the same class of expressions. In the structure (61)a, the degree clause is properly linearized, but still contained inside the (VP)-node which embeds the antecedent. Hence, ACD-resolution requires re-bracketing, for instance as in (61)b:

- (61) a. John met [more people than [Sally <met>]]
 b. [[John met more people] than [Sally <met>]]

As with linearization, the proper factorization can be achieved by movement of the *than*-XP or the degree quantifier. Which of these options is best suited to account for the coordinate behavior of comparatives in selective environments is not clear at the moment.

A third factor apart from linearization and containment implicated in coordination formation is the lexical inventory of standard markers provided by a language. Greek, Polish and Serbo-Croatian, for instance, distinguish between two versions of *than* (see (70) below), only one of which licenses ellipsis. Similarly, Hankamer (1973) suggested that English *than* is ambiguous between a coordinating complementizer and a preposition. A modern implementation of this line of thought is Alrenga et al (2012).

In sum, the fact that comparatives replicate the restrictions on deletion operations typically attested in coordinate structures makes it seem likely that the processes at work are the same. Naturally, it was not possible in the confines of the presentation to demonstrate that the analysis is complete. Further evidence in support of the claim that all deletion in comparatives is reducible to the union of the operations exclusively targeting coordinations (Gapping, ATB-movement, RNR) and more liberal deletion processes also attested in subordinate contexts like VP-ellipsis or Pseudogapping (Kennedy and Merchant 2000b) is collected in Hendriks (1995) and Lechner (2004).¹³

5. Phrasal comparatives

From the early 1970s on, there has been an ongoing, productive debate about the proper treatment of PCs, illustrated in (62).

- (62) a. Ann is taller than Bill.
 b. Ann met a taller man Bill.

Scholars have noticed that PCs meet certain, but not all criteria typically associated with elliptical constructions (Hankamer 1973), which led to the formation of two groups of approaches: the DIRECT ANALYSIS (DA), which analyzes PCs as base-generated PPs headed by a prepositional version of *than*, and the REDUCTION ANALYSIS (RA; terminology by Bhatt and Takahashi 2011), adherents of which hold that PCs embed hidden syntactic structure.¹⁴ In general, the standard heuristics for detecting the effects of RA has been that PC-formation by ellipsis affords phenomenologically richer structures than by DA.

Over the first decade of 2000, a consensus has emerged that the choice between DA and RA

¹³On ellipsis in comparatives see also Napoli (1983); Moltmann (1992); Hendriks (1995); Pinkham (1985); Lin (2009), among many others. Complications for Lechner (2004) are noted in Osborne (2009).

¹⁴On the debate of DA vs. RA see also Hankamer (1971, 1973); Bach (1974); Bresnan (1975); Brame (1983); Pinkham (1985); Napoli (1983); Heim (1985); McCawley (1988); Kennedy (1999, 2009); Xiang (2003); Lechner (2004, 2016); Pancheva (2006, 2010); Beck et al (2009); Lin (2009); Merchant (2009) and Sudo (2014), among others.

is not universal, but appears to be subject to typological variation, such that some languages employ DA, while others opt for RA. More recent results indicate that both strategies might be employed even within a single language. This final section traces synoptically the most important steps of this still ongoing controversy, which not only affects the analysis of comparatives and ellipsis, but also has broader repercussions for the theory of the lexicon, language typology and learnability, among others. The remainder of this section falls into three parts. Reporting findings from the classical literature of the 1970s and 1980s, as well as two more recent studies, section 5.1 lists in a synoptic form arguments in support for DA, accompanied by a brief critical assessment. Next, in section 5.2, I present the compositional semantics for PCs, turning from there to evidence in support of RA in 5.3. Before proceeding, a final note on terminology. The DP following *than* will be referred to as the REMNANT, while the category which takes up the same grammatical function as the remnant in the main clause is the CORRELATE. In (62), for example, *Bill* serves as the remnant and *Ann* is the correlate.

5.1. Arguments for DA

Arguments for DA, and thereby for the claim that at least some PCs are base-generated and lack hidden syntactic structure, include observations about the morphology of the standard marker or the remnant; the syntax of PCs; and interpretive properties exclusively found with PCs. In the remainder of this section, I will list arguments in support for DA culled from the literature.

(i) English PCs with subject accusative remnants ((63)a) lack a clausal source ((63)b), and have therefore been argued to be base-generated (Hankamer 1973; Napoli 1983). But accusative subjects are also found in elliptical conjunctions ((63)c) and fragment answers ((63)d; Merchant 2004), suggesting that the contrast (63)a vs. (63)b does not reflect the clausal vs. phrasal distinction, but is an artifact of whatever mechanism is responsible for the distribution of default case (Lechner 2004; Merchant 2008).

- (63) a. Ann is taller than me/*I.
 b. Ann is taller than *me am/I am.
 c. Ann is eager to see the movie, and me (*is) too.
 d. Who's watered the plants? Me/*I.

(ii) Extraction and preposition stranding is possible from PCs only ((64)a; Hankamer 1973). At first sight, the best analysis of (64)a seems to reside with the assumption that the remnant is a base-generated prepositional complement which has been separated from its head under preposition stranding:

- (64) a. Who are you taller than t?
 b. *Who are you taller than is t?

There is another conceivable explanation of the phenomenon, though, which treats (64)a as an instance of island repair under ellipsis (Merchant 2004, 2008). One possible implementation of this idea involves the two assumptions that degree complements are inherently islands for extraction, and that the ellipsis in (64)a, but not in (64)b, is large enough to include all offending intermediate traces. As a result, the representation of (64)a, relevant parts of which are given in (65)a, does not contain any illegitimate syntactic objects, while (64)b, where ellipsis affects a node lower than TP ((65)b) embeds at least one non-locally bound trace:

- (65) a. Who₁ are you taller than <[_{CP} *t₁ [_{TP} t₁ is d-tall]]>
 b. *Who₁ are you taller than [_{CP} *t₁ [_{TP} t₁ is <d-tall>]]

On this conception, (64)a could be elliptical, after all. Naturally, various challenges remain, most prominently the observation that ellipsis does not amend island violations in comparatives ((66)a) in the same way it does under Sluicing (66)b:

- (66) a. *More people live in the country that Putin governs than
 Obama₁ <live in the country that t₁ governs>.
 b. Ben wants to live in a state that is governed by a Democrat, but I can't remember
 which₁ <Ben wants to live in a country that t₁ is governed by a Democrat>.

However, given that as to date, there is no satisfactory account for the contrast in (66), the island repair analysis of (65) cannot be excluded as a plausible analytical alternative to DA.

(iii) Reflexives can be externally licensed in PCs, but not in clausal degree complements, suggesting that PCs lack a clause boundary, as predicted by DA (Hankamer 1973; Brame 1983):

- (67) a. Nobody is taller than himself.
 b. *Nobody is taller than himself is.

Again, an alternative interpretation of the data exists, though, which is equally compatible with RA. It is also possible to treat (67)a as a small clause isomorphic to (68)a. The small clause analysis has the added benefit that it provides a reason for why the subject remnant in (63)a surfaces with accusative case: it is a small clause subject, just like the embedded subject of (67)b:

- (68) a. Nobody considers [_{small clause} himself tall].
 b. Ann considers [_{small clause} me tall]. [Lechner 2004: 181; Pancheva 2006]

That clausal degree complements do not always have to include functional heads but also come as small clauses was already seen in (24), repeated below as (69). In the intended readings, the remnant is followed by a single adjectival ((69)a) or nominal ((69)b) projection made up by the CD-site:

- (69) a. Mary met a man older than Sally <d-old>.
 b. Mary met an older man than Bill <d-old man>.

(iv) On the DA, the PC remnant is a prepositional complement. Since prepositions generally select a single, nominal complement, one is led to expect that genuinely phrasal comparatives admit only a single remnant and resist prepositional remnants. Although these predictions are not confirmed for English, which generally treats PCs as reduced clauses (see section 5.3 for justification), they accurately characterize PCs in languages such as Greek, Polish, Russian and Serbo-Croatian, where base-generated PCs and clausal comparatives are morphologically distinguished by the shape of the standard marker (Pancheva 2006; Merchant 2009). To exemplify, Greek PCs formed with the standard marker *apo* display all properties typically associated with the DA, while the particle *ap'oti* introduces elliptical, clausal comparatives. This division of labor is reflected by the fact that only *apo*-PCs abide by the single remnant restriction ((70)) and the prohibition on prepositional remnants ((71)) discussed in Merchant (2009: 139):

- (70) a. Perisoteri anthropi milisan me ton Gianni tin Kyriaki ap'oti [ibid, (21b)]
 more people spoke with the Giannis the Sunday than.clausal
 [PP me ton Anesti] [NP to Savato].
 with the A. the Saturday
- b. *Perisoteri anthropi milisan me ton Gianni tin Kyriaki apo [ibid, (22b)]
 more people spoke with the Giannis the Sunday than.phrasal
 [PP me ton Anesti] [NP to Savato].
 with the Anestis the Saturday
 'More people spoke with Giannis on Sunday than with Anestis on Saturday.'
- (71) a. Perisoteri anthropi menun stis IPA ap'oti [PP sti Rosia]. [ibid, (21a)]
 more people live in.the USA than.clausal in.the Russia
- b. *Perisoteri anthropi menun stis IPA apo [PP sti Rosia]. [ibid, (22a)]
 more people live in.the USA than.phrasal in.the Russia
 'More people live in the US than in Russia.'

Furthermore, as will be seen in some detail in 5.3, whenever a language makes available a clausal and a prepositional strategy to form PCs, RA and DA properties cluster together.

(v) In some languages, among them Greek and Polish, the formation of PCs is limited to certain grammatical functions. As observed by Pancheva (2006), in those Slavic languages that possess a designated standard marker for base-generated PCs, the comparative DP must not surface as a subject. The same restriction is operative in attributive comparatives in German (Lechner 1997, 2016).¹⁵

- (72) a. Der Dirigent_{NOM} unterstützte bessere Komponisten als der Regisseur_{NOM}
 the conductor supported better composers than the director
 'The conductore supported better composers than the director.'
- b. *Bessere Dirigenten unterstützten den Komponisten_{ACC} als den Regisseur_{ACC}.
 better conductors supported the composer than the director
 'Better conductors supported the composer than the director.'

In Slavic (as well as in German), the judgements are gradient and subject to speaker variation, but clearly distinguish between PCs that fall under the DA and those which are derived by RA.

To recapitulate, even though morphosyntactic and syntactic criteria (i) - (iii) provide some suggestive initial evidence for the existence of base-generated PCs, none of the classical arguments for DA survive exposure to closer scrutiny; in all three cases, alternative ellipsis analyses for the phenomena were seen to exist, partially with broad empirical coverage. By contrast, criteria (iv) and (v), which historically entered the debate more recently, provide solid evidence for the hypothesis that at least in some languages, some PCs are base-generated, as posited by DA.

5.2. Interpreting PCs

PCs can be interpreted compositionally by defining a type homomorphic lexical entry for the

¹⁵More generally, the restriction demands that in attributive degree comparatives, the correlate c-commands the comparative DP. For unknown reasons, the effect disappears with numerical/amount DPs, the German equivalent of *More conductors supported the composers than the directors* is impeccable. See Lechner (2016) for discussion.

comparative degree head that applies to the remnant meaning first, and then combines with the gradable property and the subject denotation, in any order. A variant of this three-place version $MORE_3$, adopted from Bhatt and Takahashi (2011, henceforth BT) and originally due to Heim (1985), is given in (73). On this view, first explicitly argued for in Hankamer (1973) and recently defended in Bhatt and Takahashi (2011), *more* is lexically ambiguous between (73) and the two-place interpretation $MORE_2$ ((8), repeated below), which generates clausal comparatives:¹⁶

$$(73) \quad [\text{MORE}_3] = \lambda x_e. \lambda A_{\langle d, \langle e, t \rangle \rangle}. \lambda y_e. \lambda d. A(d)(y) \subset \lambda d. A(d)(x) \quad [\text{à la BT}]$$

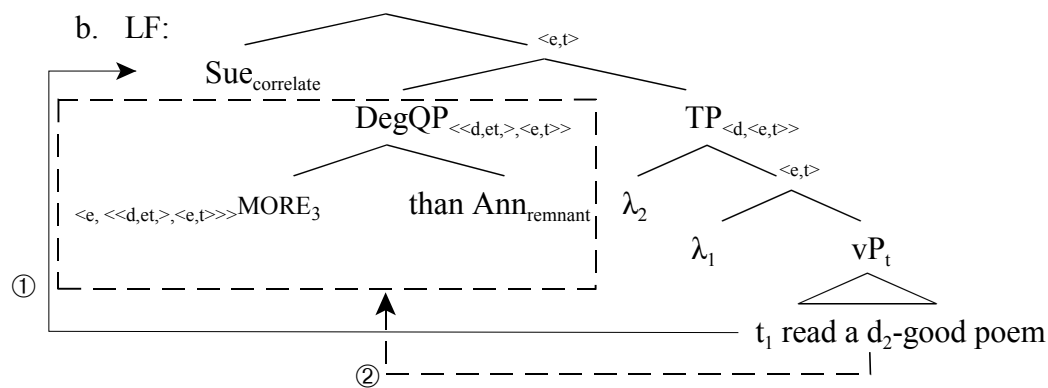
$$(8) \quad [\text{MORE}_2] = \lambda D_{\langle d, t \rangle}. \lambda D'_{\langle d, t \rangle}. D \subset D' \quad [\text{Bhatt and Pancheva 2004}]$$

BT defend the conjecture that the choice between $MORE_2$ and $MORE_3$ is subject to cross-linguistic variation, in that some languages, among them English and German, treat PCs as reduced clauses formed with the help of $MORE_2$, while others parse them as base-generated PPs introduced by $MORE_3$ (Hindi-Urdu). Still others, such as Greek (Merchant 2009) and Polish (Pancheva 2006) employ both options. (74) provides a sample derivation for predicative PCs based on the individual comparison degree head $MORE_3$, which proceeds without changes in the surface constituency:

$$(74) \quad \begin{aligned} & [[_{\text{TP}} \text{The ship is } [_{\text{DegP}} \text{longer } \text{MORE}_3 \text{ } [_{\text{than-XP}} \text{than the train}]]]] = \\ & = [\text{MORE}_3] ([[\text{the train}]]) ([[\text{long}]]) ([[\text{the ship}]])) = \\ & = \lambda d. \text{the train is } d\text{-long} \subset \lambda d. \text{the ship is } d\text{-long} \end{aligned}$$

By contrast, the overt representations of nominal attributive PCs such as (75)a are not compositionally interpretable, and need to be manipulated by two covert movement operations (Bhatt and Takahashi 2007; Kennedy 2007). First, the correlate *Sue* moves (① in (75)b) and the binder index is attached to the sister node of the moved category (Heim and Kratzer 1998). Then, the degree quantifier [$_{\text{DEGQP}} \text{MORE}_3 \text{ than Ann}$] raises (②) and lands inbetween *Sue* and the binder index of *Sue*, resulting in a configuration of PARASITIC SCOPE (Barker 2007; Sternefeld 1998; Nissenbaum 1998; Beck and Sauerland 2000). As detailed by (75)c, Parasitic Scope supplies DegQP with a two-place relation between degrees and individuals.

$$(75) \quad \text{a. Sue}_{\text{correlate}} \text{ read a better poem than Ann}_{\text{remnant}}.$$



$$\begin{aligned} \text{c. } & [\text{MORE}_3] ([[\text{than Ann}]]) ([[\lambda_2 \lambda_1 t_1 \text{ read a } d_2\text{-good poem}]])) ([[\text{Sue}]])) = \\ & = \lambda d. \text{Ann read a } d\text{-good poem} \subset \lambda d. \text{Sue read a } d\text{-good poem} \end{aligned}$$

¹⁶Kennedy (2009: (40)) observes that $MORE_3$ can be defined in terms $MORE_2$, but not vice versa, creating the expectation that no language uses $MORE_3$ only; this seems, as Kennedy notes, to be correct.

Note that, somewhat surprisingly, PCs in which the remnant consists of a measure phrase instead of an individual term are not handled by MORE₃ but by the clausal version MORE₂, at least if measure phrases are assumed to denote sets of degrees (Schwarzschild 2005).

(76) John is taller than 5ft_{<d,t>}.

From this it follows that languages which only have access to MORE₃ should not sanction measure phrase remnants, a prediction which still needs to be tested.

Turning to a first set of empirically falsifiable consequences of the DA, the specific implementation above entails the five claims in (77):

- (77) a. In PCs, the CD-site is resolved in the semantic component.
 b. PCs do not embed categories that react to diagnostics for syntactic structure.
 c. The correlate and the remnant of attributive PCs undergo covert movement.
 d. Quantificational remnants are assigned wide scope.
 e. Nominal attributive PCs are derived by Parasitic Scope.

Corollary (77)a predicts that base-generated PCs should not display Principle C effects of the sort seen in (26)a. One is accordingly led to expect that the Greek PC (78)a should contrast with its ill-formed clausal variant (78)b. This prognosis is not confirmed, though:

- (78) a. *I Maria ine pio perifani gia ton Gianni₁ apo auton_{1, ACC}.
 the Mary is more proud of the Gianni than.phrasal he
 b. *I Maria ine pio perifani gia ton Gianni₁ ap'oti autos_{1, NOM}.
 the Mary is more proud of the Gianni than.clausal he
 'Mary is more proud of Gianni than he.'

However, as pointed out by a reviewer, the coreference pattern (78)a is still amenable to DA, given that at LF, the pronominal remnant (*auton*/'he_{ACC}') c-commands the predicate containing the name (*Gianni*), inducing a Principle C violation.

Second, BT demonstrate that the second consequence of the DA, according to which the *than*-XP does not embed unpronounced structure, is empirically supported by the absence of disjoint reference effects in PCs in Hindi and Japanese, among others. Discussion of details will be postponed to section 5.3.

Third, as Heim (1985) pointed out, covert movement of the remnant and the correlate should be subject to syntactic island constraints. That this is correct can be inferred from the observation that the degree head FEW in (79)a is unable to scope out of a relative clause. Movement of FEW together with the remnant, which is required to generate the interpretable LF-representation (79)b, incurs a strong violation of the Complex NP Constraint¹⁷:

- (79) a. *_{[DP Someone [_{CP} who could answer *fewer* questions]]} made a good impression on Bill than on Fred. [Heim 1985, 25: (39)]
 b. *_{[IP on Bill [_{FEW₃} *than on Fred*] [_{λ₂ λ₁} [_{[DP someone [_{CP} who could answer *d₂*-many questions]]}]]} made a good impressions t₁]]]

(80)a, also discussed by Heim, demonstrates that correlate raising is equally bounded by locality.

¹⁷(66) showed that remnant movement in PCs differs from remnant movement under sluicing in that - for yet undisclosed reasons - only the latter grants amnesties to island violations.

As revealed by the pertaining LF (80)b, the correlate (*the clarinet*) must not bind a trace across a complex NP barrier:

- (80) a. ?*I spent more time with [_{DP} a woman [_{CP} that played *the clarinet*]] than the lute.
 b. [*the clarinet* [[MORE₃ than the lute] [Heim 1985, 26: (52)]
 [$\lambda_2 \lambda_1$ I spent d₂-much time with [_{DP} a woman [_{CP} that played t_1] than t₂]]]]

While supplying a *prima facie* argument in support of DA, it should not go unnoticed that the paradigms above also find a natural explanation under the ellipsis analysis. This is so because Gapping in (79) and (80) removes a finite CP, in violation of the constraint (iv) of section 4.4.1 (see (36)). The pertinent underlying representations are given in (81).

- (81) a. *Someone₁ [_{CP} who could answer fewer questions] made a good impression on Bill than <[_{CP} who could answer d-many questions] made a good impression> on Fred.
 b. *I spent more time with a woman that played the clarinet than <I spent d-much time with a woman that played> the lute.

Fourth, BT observe that the DA requires quantificational remnants to leave their surface position, because MORE₃ selects for an individual term as its first argument. More precisely, the remnant needs to QR and is therefore obligatorily assigned wide scope with respect to the correlate. (82) depicts the relevant relations schematically (for examples see BT, p. 603f):

- (82) [$QP_{3<e,t>}$ [correlate [_{<e,t>} [MORE₃ than t₃] [_{<d,<e,t>}] [$\lambda_2 \lambda_1 \dots d_2$ -many....]]]]]]

BT show that effects of this requirement are visible in languages that unambiguously treat PCs as base-generated, among them Japanese and Hindi-Urdu. A further prediction, which has not been attended to in the literature, is that in these languages, NPs that resist wide scope such as bare indefinites, should not be able to function as remnants. Thus, the structure corresponding to (83) should be ill-formed in Japanese and Hindi-Urdu.¹⁸

- (83) Girls are more avid readers than boys.

Finally, the derivation of attributive PCs should reflect properties generally characteristic of Parasitic Scope constellations. Positive evidence to this effect is discussed in Lechner (2016).

The information accumulated so far lends plausibility to the idea that PCs also have a base-generated parse. Further substantiation for this claim will be presented in the following section, which summarizes the results of RA, and traces current and recent developments which lead to a partial synthesis incorporating aspects of both approaches.

5.3. Arguments for RA

Proponents of RA have recruited the following arguments in support of the claim that the degree complement of PCs is endowed with abstract syntactic representation.

- (i) The ellipsis analysis offers a natural explanation for the fact that in languages such as German, the case of the remnant matches that of the correlate (Heim 1985):

¹⁸A reviewer notes that the example is acceptable in Hindi, but that the bare nouns behave like kind names. A more complete investigation of the issue has to await another occasion.

- (84) a. Sie_{NOM} zeigte ihr_{DAT} mehr Bilder als er_{NOM}.
 she showed her more pictures than he
 ‘She showed her more pictures than he did.’
 b. Peter_{NOM} zeigte ihr_{DAT} mehr Bilder als ihm_{DAT}.
 Peter showed her more pictures than him
 ‘Peter showed more pictures to her than to him.’

This is unexpected on DA in its present form, because the representations of DA do not supply the remnant with a case assigner. While it is possible to amend this shortcoming, for example by relegating case assignment to LF after movement of the two DPs in configurations akin to (85), RA clearly offers a more concise explanation for case matching.

- (85) [correlate_{CASE- α} [MORE₃ than remnant_{CASE- α} ... [...]]]

(ii) English PCs obligatorily extrapose (Pinkham 1985: 108; but see also Bhatt and Takahashi 2007). The DA lacks the means to express this linearization and/or containment condition, which excludes (86)b:

- (86) a. More people than bought books bought newspapers. [Pinkham (1985)]
 b. *More people than books bought newspapers.
 c. More people bought newspapers than bought books.
 d. More people bought newspapers than books.

(iii) If the degree clause contains hidden structure, one is led to expect that names embedded in the remnant should not be able to corefer with pronouns that c-command the correlate, as expressed by generalization (87) (Lechner 2004; improved examples and (87) from BT):

- (87) Every node that c-commands the correlate also c-commands the remnant.

(88) documents that this prediction is confirmed for English PCs. As the LFs in (89) reveal, the pronoun c-commands the name inside the degree complement in (88)a, but not in (88)b:

- (88) a. *More people introduced *him*₃ to Sally than to *Peter*₃'s sister.
 b. More people introduced *Peter*₃ to Sally than to *his*₃ sister.
 (89) a. *More people introduced *him*₃ to Sally than <introduced *him*₃> to *Peter*₃'s sister.
 b. More people introduced *Peter*₃ to Sally than <introduced *Peter*₃> to *his*₃ sister.

By contrast, the DA assigns to both sentences representations in which the name is free. Hence, the disjoint reference effect in (88)a remains unaccounted for:

- (90) a. Sally₁ [MORE than *Peter*₃'s sister]₂ [$\lambda_2 \lambda_1$ d₂-many people introduced *him*₃ to t₁]
 b. Sally₁ [MORE than to *his*₃'s sister]₂ [$\lambda_2 \lambda_1$ d₂-many people introduced *Peter*₃ to t₁]

BT observe that not all languages react to Principle C alike. In Hindi-Urdu, for one, structures isomorphic to (88)a admit coreference (Bhatt and Takahashi 2011: (35)):

- (91) Atif-ne [*Ravi-kii*₃ behen-kii foto]-se us-ko₃ [Hindi-Urdu]
 Atif-ERG Ravi-GEN sister-GEN picture-than he-DAT
 Mohan-kii behen-kii foto zyaadaa baar dikhaa-ii.
 Mohan-GEN sister-GEN picture more times show-PERF
 ‘Atif showed Mohan’s sister’s picture to *him*₃ more times than *Ravi*₃'s sister’s picture.’

They take this to signal that English assigns PCs a clausal analysis and employs $MORE_2$, while Hindi-Urdu parametrically has access to $MORE_3$ only. This conjecture is, as BT show, supported by the systematic clustering of properties such as scope (see (82)) and the single remnant condition, illustrated for Hindi-Urdu in (92):

- (92) *Tina-ne aaj [Pim kal-se] zyaadaa kitaabe parh-ī.
 Tina_{ERG} today Pim yesterday-than] more books readPfv.FPI.
 ‘Tina read more books today than Pim yesterday.’

(iv) The ellipsis analysis generates the expectation that PCs display the same characteristics as partially reduced comparatives, i.e. constructions in which the *than*-XP either contains more than one remnant or a remnant that is not nominal. As shown by Lechner (2004; see also section 3.1.) this prediction is borne out for reduction languages such as German and English.

(v) A well-defined subclass of PCs admit tense mismatches between the matrix clause and the reconstructed degree complement (McCawley 1988; Pinkham 1985; Lechner 2004, 2016):

- (93) John will visit more friends than Sue_{NOM}.
 a. ...than Sue will visit d-many friends
 b. ...than Sue (has) visited d-many friends (atemporal reading)

The existence of atemporal readings is not expected on DA, because $MORE_3$ λ -converts an exact copy of the matrix predicate, including the temporal specification, into the *than*-XP. Specifically, DA generates the LF for (93) in (94)a, which is mapped into the meaning (94)b:

- (94) a. LF: John [[$MORE$ than Sue] [$\lambda_2 \lambda_1$ [$_{TP}$ t_1 will visit d₂-many friends]]]
 b. [[$MORE_3$] ([Sue]) ([[$\lambda_2 \lambda_1$ [$_{TP}$ t_1 will visit d₂-friends]]])] ([John]) =
 = $\lambda x. \lambda A_{\langle d, \langle e, t \rangle \rangle} \lambda y. \lambda d. A(d)(y) \subset \lambda d. A(d)(x)(Sue)$
 ([[$\lambda_2 \lambda_1$ [$_{TP}$ t_1 will visit d₂-friends]]])(John) =
 = $\lambda d. Sue \text{ will visit } d\text{-many friends} \subset \lambda d. John \text{ will visit } d\text{-many friends}$

Evidently, the mechanics of DA does not provide the means to derive mismatches in temporal specification, indicating that PCs that admit atemporal readings are derived by ellipsis.¹⁹

Taken together with the findings from 5.1, where it was concluded that arguments for base generation on closer scrutiny turn out to be equally compatible with RA, the five generalizations listed in the present section provide additional support for the existence of hidden structure in the representation of PCs. Moreover, there is also clear evidence for the competing base-generation approach. In light of these two conflicting sets of facts, a consensus has emerged that the model currently best suited to handle the full range of phenomena is synthetic, incorporating both RA and DA, subject to typological variation and possibly other parameters (Kennedy 2009).

¹⁹Interestingly, the availability of atemporal readings is syntactically restricted in similar ways as attributive nominal comparatives in German or base-generated PCs in Slavic: in atemporal PCs, the correlate has to c-command the comparative DP. See Lechner (2016) for discussion.

6. Conclusion

Unpronounced constituents in comparatives fall into three discrete classes, none of which, it was argued, requires designated syntactic or semantic mechanisms: (i) the silent degree variable created by empty operator movement; (ii) material affected by Comparative Deletion, which targets degree predicates (including the common noun in attributive comparatives) and consists, I have suggested, in a version of the raising operative known from NP-movement; and (iii) non-construction specific ellipsis operations. The present chapter has set out to demonstrate that attempts at bringing this idealization closer to reality have been successful in many respects. Naturally, a number of questions regarding ellipsis in comparatives remain under debate at the point of writing, among them (i) how to reign in the zoo of possible meanings for the degree head MORE (with important consequences for delimiting the class of PCs that are not elliptical); (ii) the inner architecture of degree predicates (affecting the analysis of how much ellipsis is tolerated in amount and degree comparatives, respectively; Lechner 2016); (iii) and numerous issues related to the scope of the degree relation (Beck 2011).²⁰

²⁰To close with a puzzle observed by Larson (1988), universals in subject position can scope over matrix clause negation in PCs but not in clausal comparatives:

- (i) Joe didn't score more than everyone.
 - a. Joe scored more than not everyone.
 - b. Joe didn't score more than anyone.
- (ii) Joe didn't score more than everyone did.
 - a. Joe scored more than not everyone.
 - b. *Joe didn't score more than anyone.

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