Winfried Lechner, *Ellipsis in comparatives*

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1 Introduction

Lechner's (2004) book *Ellipsis in Comparatives* is a major contribution to our understanding of comparative constructions. It is essential reading for anyone interested in comparatives and ellipsis phenomena, and more generally, the syntax-semantics interface. It has been a number of years since this book appeared. But like the best movies and the best books, it feels curiously undated. The arguments continue to pack a punch and there are lots of mysteries, some solved and some not. The book is quite dense and in this review we attempt to lay out the basic proposals of this work and explore certain extensions and alternatives where we feel this would be fruitful.

It has been claimed that there are some reduction processes involved in the derivation of comparatives, which seem to take on a form specialized for comparatives (Bresnan 1973; Hankamer 1971; Pinkham 1985, among others). Lechner's overarching proposal is simply that comparatives do not involve construction-specific types of ellipsis. He fleshes out his proposal by making detailed subproposals for the phenomena grouped under the rubric of *Comparative Deletion* and *Comparative Ellipsis*. Here is a quick overview of Lechner's main ideas.

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First, it has been assumed that the underlying structure of the *than*-XP in (1) contains a non-comparative form of a gradable predicate that is the same as the overt one in the matrix clause (i.e., ⟨tall⟩ in (1a) and ⟨many musicians⟩ in (1b)), but it must be deleted under identity with the matrix one by a comparative-specific ellipsis operation dubbed Comparative Deletion (Bresnan 1973).

(1)   a.   John is taller than Bill is ⟨tall⟩.
      b.   Sam knows more musicians than Mary knows ⟨many musicians⟩.

Lechner claims that the reduction of the *than*-XP-internal gradable adjective should be analyzed as movement of the gradable adjective to the matrix clause (the *AP-Raising Hypothesis*) and hence we can dispense with the construction-specific Comparative Deletion.

Secondly, while *than* combines with a clausal constituent in (1), it can also take a phrasal DP complement, as in (2).

(2)   a.   John is taller than Bill.
      b.   Sam knows more musicians than Mary.

There has been much debate over whether *than* in phrasal comparatives underlyingly combines with a phrasal DP or a clausal constituent that appears phrasal by means of reduction operations (Hankamer 1973; Heim 1985, among others). Lechner argues that all phrasal comparatives (with some exceptions) are derived from a clausal source via reduction operations (the *PC-Hypothesis*). The PC-Hypothesis raises the question of whether it is necessary to posit a comparative-specific operation in order to derive phrasal comparatives from their clausal counterparts. It has often been assumed that a construction-specific Comparative Ellipsis is responsible for producing (2) from (1). Contrary to this view, Lechner proposes that the effects of Comparative Ellipsis should be attributed to the effects of general conjunction reduction operations, such as Gapping and Right Node Raising (the *CR-Hypothesis*).

Note that the AP-Raising Hypothesis and the CR-Hypothesis impose conflicting structural requirements on comparatives. If the *than*-XP-internal gradable predicate and the matrix one partake in a single movement dependency, then the *than*-XP should be subordinated by the matrix clause. On the other hand, the *than*-XP and the matrix clause should be analyzed as having a coordinate structure under the assumption that conjunction reduction operations can only target coordinate structures. Lechner solves this structural paradox by proposing that the *than*-XP, which is underlyingly subordinated by the matrix clause, undergoes extraposition, which produces a structure close to coordination.

With these assumptions in place, Lechner is able to cover impressive conceptual and empirical ground. The syntactic structures that he assumes are suitable for compositional semantics and engage with both the big picture and the details of Germanic syntax. While the overall account is quite persuasive, there are points where we feel that alternatives could be profitably explored. Such points will be discussed after we illustrate the above-mentioned claims in more detail.

2 Comparative deletion

2.1 Ellipsis vs. movement

Comparatives involve a comparison of two degree descriptions denoted by the *than*-XP and the matrix clause (von Stechow 1984; Heim 2000, among others). Given this, a phonologically empty gradable adjective needs to be posited within the *than*-XP in cases like (1), which contributes to producing a degree description. The necessity of postulating a covert gradable predicate is most clearly seen in subcomparatives like (3).

(3)　a.　This screen is wider than that screen is high.

　　　b.　The shelf is taller than the door is wide.

Lechner postulates for the clausal comparative in (4a) the representation in (4b), where the *than*-XP is interpreted as a degree description in the semantic component.[1]

(4)　a.　Mary is younger than Peter is.

　　　b.　[Mary is [$_{DegP}$ young [Deg^0[+comparative]
　　　　　[$_{than}$-XP than [$_{CP}$ OP$_1$ [$_{TP}$ Peter is [$_{DegP}$ ⟨young⟩ [Deg^{0}t$_1$]]]]]]]]]

Now the question is why a gradable predicate in the *than*-XP must be deleted if it is the same as the matrix one.[2] One popular approach to this issue is to adopt a comparative-specific operation Comparative Deletion, which deletes a *than*-XP-internal gradable predicate under identity with the matrix one (Bresnan 1973, 1975). However, Lechner advocates an intriguing

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[1]Some exposition is in order about the syntax and semantics of comparatives that Lechner proposes. Lechner claims that a gradable adjective and the *than*-XP occupy the specifier and the complement of Deg^0[+comparative], respectively. Deg^0[+comparative] itself does not have a realization; comparative morphology appears as a reflex of a checking relation between the head of AP and Deg^0[+comparative]. He presents evidence from binding in favor of the idea that the *than*-XP is base-generated in a structurally low position (see Section 3.3.1 of Chapter 2 in Lechner's book). While Deg^0[+comparative] has semantic content (see (28)), Lechner assumes that Deg^0 within the *than*-XP is semantically vacuous. The complement of Deg^0 within the *than*-XP is occupied by a null operator and, following Chomsky (1977), it is assumed to undergo movement to the Spec of CP. Lechner's analysis can avoid the problem of a left branch condition violation that is induced by the null operator movement under some of the previously proposed analyses. Finally, Lechner argues that the *than*-XP denotes a definite degree description, assuming that a gradable adjective denotes a relation between individuals and degrees (i.e., ⟨d,⟨e,t⟩⟩) and that *than* picks the maximal degree out of a set of degrees.

[2]One qualification is necessary here. As Chomsky (1977) discusses, if a *than*-XP-internal gradable predicate is focused, it is not deleted even if it is the same as the matrix one.

(i)　Speaker A: This desk is higher than that one is wide.
　　Speaker B: What's more, this desk is higher than that one is HIGH.
(Chomsky 1977:122)

alternative analysis, in which the two gradable predicates are related via movement.

(5)   The AP-Raising Hypothesis:
      Comparative Deletion consists in overt raising of AP from SpecDegP of the comparative complement to SpecDegP of the matrix clause.

                                                              (Lechner 2004:40)

Lechner assumes that a *than*-XP-internal gradable predicate undergoes movement to check the [+comparative] feature of the Deg^0 in the matrix clause. Lechner argues that the AP-Raising Hypothesis captures various facts that would be puzzling if the operation involved were ellipsis. First of all, the AP-Raising Hypothesis provides a straightforward account of the fact that a *than*-XP-internal gradable predicate must be covert in cases like (4). The AP-Raising Hypothesis can attribute this fact to general properties of movement. Since an application of movement is generally obligatory and, furthermore, the tail of a chain is normally unpronounced, it follows that the *than*-XP-internal gradable predicate is obligatorily covert. In contrast, the Comparative Deletion approach needs to stipulate that ellipsis, which is usually optional, is mandatory in this particular environment.

Another difference between ellipsis in general and the reduction process of a *than*-XP-internal gradable predicate lies in the locality constraint on the distance between a reduced/deleted element and its antecedent. In VP-ellipsis cases like (6a), a non-local VP (i.e., the VP headed by *read*) as well as a local VP (the VP headed by *bought*) can serve as an antecedent of the elided VP. In contrast, a non-local gradable predicate cannot be taken as an antecedent of a reduced *than*-XP-internal gradable predicate in comparatives, as in (6b).

(6)   a.   Marcus read every book I did and I bought every book Charles did ⟨bought/read⟩.
      b.   The table is wider than this rug is, but this rug is longer than the desk is ⟨d-long/*d-wide⟩.

                                                              (Lechner 2004:12)

As Lechner argues, this difference also naturally follows from the AP-Raising Hypothesis. To produce a non-local reading in comparatives, a *than*-XP-internal gradable predicate needs to move to the Spec of DegP in a different sentence, but such movement would be prohibited for locality reasons.

Lechner offers further supporting evidence, which comes from the contrast between (7) and (8). Ellipsis cannot target a small clause predicate phrase, as shown in (7). Contrary to what the Comparative Deletion approach would expect, it can be reduced within the *than*-XP, as in (8).

(7)   a.   *Vivek made Nishi angry at Melissa and Sam made Carry ⟨angry at Melissa⟩.
      b.   *I consider Betsy pretty and you consider Sam ⟨pretty⟩.

                                                              (Lechner 2004:48)

(8) a. Vivek made Nishi angrier at Melissa than Sam made Carry ⟨d-angry at Melissa⟩.

   b. I consider Betsy prettier than you consider Sam ⟨d-pretty⟩.

(Lechner 2004:49)

Since a small clause predicate phrase can undergo movement (e.g., *How pretty do you consider Betsy?*), the AP-Raising Hypothesis captures the grammaticality of (8).

Establishing that the reduction of a *than*-XP-internal gradable predicate is a result of its movement, Lechner explores properties of a movement dependency between a *than*-XP-internal gradable predicate and the matrix one. Lechner approaches this issue by capitalizing on proposals about the syntactic structure of restrictive relative clauses. It has been claimed that two different structures need to be postulated for restrictive relative clauses, namely, a raising structure and a matching structure (Bhatt 2002; Carlson 1977; Hulsey and Sauerland 2006). In the raising structure, there is only one instance of a head noun, which is base-generated within a relative clause and moves to the Spec of CP, as in (9a). In the matching structure, a head noun is also base-generated relative-clause-internally and moves to the Spec of CP, but there is another occurrence of a head noun, which is base-generated relative-clause-*externally*, and the head noun in the Spec of CP is deleted under identity with the external one, as illustrated in (9b).

(9) the picture that Mary likes

   a. Raising Structure:
      $[_{DP}$ the $[_{CP}$ [picture]$_1$ that $[_{TP}$ Mary likes [picture]$_1$]]]

   b. Matching Structure:
      $[_{DP}$ the [picture] $[_{CP}$ [~~picture~~]$_1$ that $[_{TP}$ Mary likes [picture]$_1$]]]

Extending these analyses of relative clauses to comparatives, Lechner considers two structures in (10a) and (10b). In the raising structure in (10a), a gradable predicate within the *than*-XP moves to the Spec of DegP in the matrix clause. On the other hand, in the matching structure, a gradable predicate within the *than*-XP is not directly connected to the matrix one by movement, but it only moves to the Spec of CP within the *than*-XP and it is phonologically deleted under identity with the *than*-XP-external occurrence of a gradable adjective.

(10) Mary is younger than Peter is.

   a. Raising Structure:
      ... $[_{DegP}$ [young] Deg^0[+comparative] $[_{\text{than-XP}}$ than $[_{CP}$ OP$_1$ $[_{TP}$ Peter is $[_{DegP}$ [young] Deg^0 t$_1$]]]]]

   b. Matching Structure:
      ... $[_{DegP}$ [young] Deg^0[+comparative] $[_{\text{than-XP}}$ than $[_{CP}$ [~~young~~]$_1$ $[_{TP}$ Peter is $[_{DegP}$ [young]$_1$ Deg^0]]]]]

As the AP-Raising Hypothesis in (5) indicates, Lechner argues for the raising analysis, claiming that it can be mapped onto the required meaning

more transparently than the matching structure. Given the semantics of comparatives that Lechner sets up, the complement of *than* must denote a set of degrees (see footnote 1). This is possible in the raising structure by the general compositional semantic mechanism under the assumptions that a null operator is semantically vacuous and that movement induces insertion of a λ-operator right below a moved constituent (Heim and Kratzer 1998).

(11)   [$_{than-XP}$ than [$_{CP}$ ~~OP~~ λd. [$_{TP}$ Peter is [$_{DegP}$ [young] Deg^0 d]]]]

In contrast to the raising structure, no operator movement takes place in the matching structure in (10b).[3] One possible way to derive (11) from the matching structure in (10b) that Lechner considers is to assume that the λ-operator introduced by movement of the *than*-XP-internal gradable predicate binds a degree variable added to the complement of Deg^0. However, such processes are not independently motivated and hence the matching structure should not be favored over the raising one.

   Note that a gradable adjective must be interpreted both in the matrix clause and within the *than*-XP in order for both the matrix clause and the *than*-XP to denote a degree description. To make this possible in the raising structure, Lechner assumes that movement does not have to form a chain if a moved element can be interpreted in both its original position and the moved position (*Move α without Form Chain*). This aspect of Lechner's analysis is expressed by not co-indexing the two occurrences of the gradable predicate in the raising structure in (10a).

2.2 Issues of the AP-raising hypothesis

2.2.1 Raising vs. matching

In this section, we focus on the question of whether clausal comparatives should be analyzed as involving the raising structure in (10a) and present some conceptual and empirical issues that might challenge Lechner's claim. We would like to suggest that the matching structure might be a viable analysis of the relation between a *than*-XP-internal gradable predicate and the matrix one.

   First, the interpretive requirement that a gradable predicate must be interpreted both in the *than*-XP and in the matrix clause appears to be derived more straightforwardly by the matching analysis than by the raising analysis. The matching structure involves two occurrences of gradable predicates, which are base-generated in the matrix clause and in the *than*-XP, respectively (see (10b)). In other words, the matching structure allows us not to adopt Move

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[3]As far as we can see, Lechner does not discuss explicitly the reason why operator movement cannot occur in the matching structure. We speculate that this is because the Spec of CP is occupied by the moved predicate and there is no position to which an operator can move. See Section 2.2.1 for further discussion.

α without Form Chain, which as far as we can tell is not justified independently. Moreover, the claim that the raising structure is compositionally interpreted more straightforwardly than the matching structure should be subject to close scrutiny. This argument might be undermined if we can postulate the structure in (12), in which the gradable predicate and a null operator undergo movement to some positions in the left periphery of the *than*-XP.

(12)   ... [$_{DegP}$ [young] Deg^0[+comparative] [$_{than}$-XP than [$_{XP}$ ~~[young]~~ [$_{YP}$ OP$_2$ [$_{TP}$ Peter is [$_{DegP}$ [young]$_1$ Deg^0 t$_2$]]]]]]

It is possible to produce the desired meaning from (12) by the processes that are employed to interpret the matching structure of restrictive relative clauses.

Secondly, there is also an empirical reason that may favor the matching structure over the raising one. Lechner observes that a gradable predicate in the matrix clause is interpreted within the *than*-XP even though it is—on the surface—not there. This point can be made by (13a). To rule (13a) out, one might think that the constituent *d-proud of John* is present in the underlying structure of the *than*-XP, which results in a violation of Condition C. However, if this is the case, the sentence in (13b) would be ruled out on a par with (13a), contrary to fact.

(13)   a.   *Mary is prouder of John$_i$ than he$_i$ is.

       b.   Mary is prouder of John$_i$ than he$_i$ believes that I am.

                                                          (Lechner 2004:16)

As Lechner discusses, the contrast between (13a) and (13b) shows that what is present in the underlying structure of the *than*-XP in these cases is the constituent that contains a pronominal correlate of the name *John*. Under this assumption, Condition B is violated in (13a), but it is not in (13b), as shown in (14). This kind of mismatch between an elided/reduced element and its antecedent is dubbed *Vehicle Change* by Fiengo and May (1994).

(14)   a.   *Mary is prouder of John$_i$ [than he$_i$ is ⟨d-proud of him$_i$⟩]

       b.   Mary is prouder of John$_i$ [than he$_i$ believes that I am ⟨d-proud of him$_i$⟩]

Note that Vehicle Change is a hallmark of an ellipsis operation, but not of a movement operation. Fiengo and May (1994) observe that the Vehicle Change effect can be seen in ellipsis in (15).

(15)   a.   *Mary hit John$_i$, and he$_i$ did ⟨hit him$_i$⟩, too.

       b.   Mary loves John$_i$, and he$_i$ thinks that Sally does ⟨love him$_i$⟩, too.

However, if Vehicle Change is feasible in cases involving movement, it would become less clear why A'-movement cannot obviate a violation of Condition C when a relevant name is within the complement of a moved

element, as in (16a). This fact has received a copy-theoretic explanation in which the name within a lower copy of the moved element induces a Condition C violation, as shown in (16b). However, if Vehicle Change could convert the name in the lower copy of the *wh*-phrase into its pronominal correlate, as in (16c), the sentence in (16a) would incorrectly be predicted to be grammatical.

(16)   a.   ??/*[Which argument that John$_i$ is a genius] did he$_i$ believe?

                                                                         (Fox 1999:164)

        b.   *[$_{CP}$ [which argument that John$_i$ is a genius]$_1$ did [$_{TP}$ he$_i$ believe [which argument that John$_i$ is a genius]$_1$]]

        c.   [$_{CP}$ [which argument that John$_i$ is a genius]$_1$ did [$_{TP}$ he$_i$ believe [which argument that he$_i$ is a genius]$_1$]]

Given the discussion above, the Vehicle Change effect in (13) would not be expected under the raising analysis, which does not involve any ellipsis operation, a point made by Kennedy (2002).[4] Notice that the matching structure involves an ellipsis operation that can invoke Vehicle Change.

Capitalizing on this aspect of the matching structure, Sauerland (1998) proposes an analysis of a circumvention of a Condition C violation in relative clauses like (17). In the raising structure, Condition C must be violated, as illustrated in (17a). In contrast, in the matching structure, a violation of Condition C is circumvented as a consequence of Vehicle Change, as in (17b).

(17)   the picture of John$_i$ that he$_i$ likes

        a.   Raising Structure:
              *[$_{DP}$ the [$_{CP}$ [picture of John$_i$]$_1$ that [$_{TP}$ he$_i$ likes [picture of John$_i$]$_1$]]]

        b.   Matching Structure:
              [$_{DP}$ the [picture of John$_i$] [$_{CP}$ [picture of him$_i$]₁ that [$_{TP}$ he$_i$ likes [picture of him$_i$]$_1$]]]

The claim that the matching structure is necessary to get a Vehicle Change effect receives support from the fact that if relative clauses like (17) combine with some factor that forces a raising structure (i.e., the presence of a bound pronoun in (18a) and the presence of an idiom chunk in (18b)), a Condition C violation effect emerges.

(18)   a.   *The letters by John$_i$ to her$_j$ that he$_i$ told [every girl]$_j$ to burn were published.

        b.   *The headway on Mary$_i$'s project she$_i$ had made pleased the boss.

                                                                (Sauerland 1998:71)

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[4]Note that movement does not form a chain in the raising structure of comparatives, unlike in *wh*-movement cases like (16). It is not clear to us how this difference may affect the applicability of Vehicle Change.

To sum up the discussion above, while Lechner's arguments for movement of a gradable predicate in the *than*-XP are quite convincing, it appears to remain as a topic for further investigation how a *than*-XP-internal gradable predicate is related to the matrix one.

2.2.2 Subcomparatives

Independent of the debate over whether comparatives should be analyzed as having the raising structure or the matching one, but still very relevant for the AP-Raising Hypothesis, is the proper analysis of subcomparatives like (19), about which Lechner is silent.

(19) a. This screen is wider than that screen is high.
      b. The shelf is taller than the door is wide.
      c. I threw away more books than I kept magazines.

Clearly, we cannot directly apply the AP-Raising Hypothesis to subcomparatives because the gradable predicates (or the constituents that dominate them) are lexically distinct in the *than*-XP and the matrix clause. The absence of an appropriate movement dependency in subcomparatives is supported by Kennedy's (2002) observation that a parasitic gap is licensed in clausal comparatives involving reduction of a *than*-XP-internal predicate, as in (20), but not in subcomparatives, as in (21). Note that overt movement is a prerequisite for parasitic gap licensing.

(20) a. I threw away more books than I kept without reading *e*.
      b. Jerome followed more suspects than Arthur interrogated without arresting *e*.

                                                    (Kennedy 2002:561)

(21) a. *I threw away more books than I kept magazines without reading *e*.
      b. *Jerome followed more leads than Arthur interrogated suspects without arresting *e*.

                                                    (Kennedy 2002:562)

These facts appear to suggest that there is a possibility that two lexically distinct gradable predicates can be base-generated in the *than*-XP and in the matrix clause, respectively, and the two predicates do not partake in any dependency relation, as in (22b).

(22) a. This screen is wider than that screen is high.
      b. $[_{TP}$ this screen is $[_{DegP}$ [wide] Deg^0[+comparative] $[_{than\text{-}XP}$ than $[_{CP}$ OP_1 $[_{TP}$ that screen is $[_{DegP}$ [high] Deg^0 $t_1]]]]]]$

However, the availability of this kind of derivation should somehow be restricted to subcomparatives. Otherwise, the locality effect in (6b), repeated here as (23a), cannot be captured because we would be able to assign to (23a)

the derivation in (23b), where the *than*-XP-internal gradable predicate *wide* is deleted under identity with the same predicate in the preceding sentence.

(23)   a. The table is wider than this rug is, but this rug is longer than the desk is ⟨d-long/*d-wide⟩.

        b. $[_{TP}$ this rug is $[_{DegP}$ [long] Deg^0[+comparative] $[_{\text{than-XP}}$ than $[_{CP}$ OP_1 $[_{TP}$ the desk is $[_{DegP}$ ~~[wide]~~ Deg^0 t_1]]]]]]

The generalization concerning deletion of the gradable predicate within the *than*-XP, which we get from Kennedy (2002), seems to be as follows: deletion is only possible under local identity (as in the matching structure) and if such a deletion is possible, it is obligatory. This deletion is fed by movement of the gradable predicate and this movement is only possible (and when possible, obligatory) if it leads to deletion. Local deletion is not an option with subcomparatives and so there is no movement of the gradable predicate. Island effects are nevertheless found with subcomparatives, presumably due to the movement of the degree operator. Extending Lechner's system to handle subcomparatives seems to us to be a feasible project but one where the range of reduction processes at play (e.g., *more women than men*) is likely to present challenges.

3 Phrasal comparatives

3.1 Clausal vs. phrasal sources of the *Than*-XP

In many languages that have comparative constructions, the comparative marker (e.g., *than* in English) can combine with various types of elements. For instance, the comparative marker can take a clausal complement in (24) as well as a phrasal complement in (25) in English (and German). For expository purposes, the complement of *than* in a phrasal comparative is referred to as the standard and the constituent in the matrix clause that is contrasted with the standard is called the associate. In (25a), *Bill* is the standard and *John* is the associate.

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

        b. Sam knows more musicians than Mary knows.

(25)   a. John is taller than Bill.

        b. Sam knows more musicians than Mary.

In the study of phrasal comparatives, much attention has been paid to the issue of whether phrasal comparatives like (25) are derived from their clausal counterparts in (24) by applying reduction operations or there is no hidden structure in the *than*-XP of phrasal comparatives and *than* directly combines with a phrasal constituent (Hankamer 1973; Heim 1985). Lechner presents new

interesting facts that contribute to settling this issue, some of which we will see shortly. On the basis of such facts, Lechner argues for the PC-Hypothesis in (26).[5]

(26) PC-Hypothesis:
      All PCs without explicit standards derive from a clausal source.
      (Lechner 2004:93)

To set the stage for discussing Lechner's arguments, let us first consider two possible approaches to phrasal comparatives. The first approach assumes that *than* always combines with a clausal constituent in both clausal and phrasal comparatives, but in phrasal comparatives, it comes to a constituent that looks phrasal by way of reduction operations, as in (27a). This approach is referred to as a Reduction Analysis. Under this approach, the only difference between clausal and phrasal comparatives is the size of an elided constituent in the *than*-XP. Thus, the postulation of a single lexical entry for Deg^0[+comparative] in (28) is sufficient for interpreting both kinds of comparatives.

(27) Reduction Analysis:
      a. [John is [$_{DegP}$ tall [Deg^0[+comparative]
                      [$_{than\text{-}XP}$ than [$_{CP}$ OP$_1$ [Bill ~~is tall Deg^0 t$_1$~~]]]]]]]
      b. $\exists d'[tall(d')(j) \wedge d' > max\{d|tall(d)(b)\}]$

(28) $[[Deg^0[\text{+comparative}]]] = \lambda d \lambda P_{\langle d, \langle e, t \rangle \rangle} \lambda y \exists d'[P(d')(y) \wedge d' > d]$
      (Lechner 2004:56)

However, a covert clausal structure is not a prerequisite for interpreting phrasal comparatives. Another approach, dubbed a Direct Analysis, does not posit any silent structure in the *than*-XP, as in (29a). The Direct Analysis produces the correct interpretation in (29d), which is the same as (27b), from (29a) by applying the movement operations in (29b) and (29c) and positing a lexical entry for Deg^0 given in (30), which is designated for the Direct Analysis.

(29) Direct Analysis:
      a. [John is [$_{DegP}$ tall [$_{YP}$ $Deg^0$$_{[DA]}$ [$_{than\text{-}XP}$ than [$_{DP}$ Bill]]]]]]
      b. Movement of the associate:
          [John λx. [x is [$_{DegP}$ tall [$_{YP}$ $Deg^0$$_{[DA]}$ [$_{than\text{-}XP}$ than [$_{DP}$ Bill]]]]]]

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[5]Some instances of comparatives with an explicit standard are given below.

 (i)   She ran faster than 20mph.

(ii)   He is taller than 6 feet.

It remains to be seen whether the *than*-XP also involves a clausal structure in these cases.

c. Movement of YP:
    [John [[$_{YP}$ Deg$^0_{[DA]}$ [$_{than\text{-}XP}$ than [$_{DP}$ Bill]]] λd.λx. [x is [$_{DegP}$ tall d]]]]

d. ∃d'[tall(d')(j)∧d'>max{d|tall(d)(b)}]

(30) Deg^0 in the Direct Analysis:
      [[Deg$^0_{[DA]}$]] = λxλP$_{\langle d, \langle e, t \rangle \rangle}$λy∃d'[P(d')(y)∧d'>max{d|P(d)(x)}]

We are now in a position to consider Lechner's arguments for the PC-Hypothesis. The first argument comes from binding facts. Lechner shows that the structural position of the associate has a direct effect on the binding properties of the standard. Lechner's finding can be summarized as the Binding Generalization in (31), which is taken from Bhatt and Takahashi (2007).

(31) The Binding Generalization:
      The standard is c-commanded by everything that c-commands the associate.

The Binding Generalization is motivated by facts like (32) and (33). In (32a) and (33a), the pronoun c-commands the boldfaced associate and it cannot be coreferential with the name within the standard.[6] In contrast, since the pronoun does not c-command the associate in (32b) and (33b), it can be coreferential with the relevant name.

(32) a. *More people introduced him$_i$ **to Mary** than to John$_i$'s mother.

      b. **Mary** introduced him$_i$ to more people than John$_i$'s mother.

(33) (Context: Peter, Peter's sister, and Sally are taking part in a race. People are betting on their prospects.)

      a. *More people expect him$_i$ to overtake **Sally** than Peter$_i$'s sister.
          (= *More people expect him$_i$ to overtake Sally than expect him$_i$ to overtake Peter$_i$'s sister.)

      b. (?)More people expect **Sally** to overtake him$_i$ than Peter$_i$'s sister.
          (= More people expect Sally to overtake him$_i$ than expect Peter$_i$'s sister to overtake him$_i$.)

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[6]The facts in (32) and (33) are taken from Bhatt and Takahashi (2011). Lechner provides as evidence for the generalization the sentence in (i) where the relevant pronoun occupies subject position.

(i) *He$_i$ introduced **Sally** to more friends than Peter$_i$'s sister. (Lechner 2004:214)

However, the subject appears to c-command the *than*-XP, regardless of the structural position of the associate.

(ii) ***He**$_i$ introduced Sally to more friends than Peter$_i$'s sister.

This confound is eliminated in (32) and (33).

The Binding Generalization naturally follows from the Reduction Analysis. In this approach, the standard is situated in the structural environment within the *than*-XP, which is isomorphic to that of the associate in the matrix clause, as illustrated in (34). Thus, everything that c-commands the associate is expected to c-command the standard.[7]

(34)   Reduction Analysis:

    a.   LF of (33a)
        *... than $[_{CP}$ OP$_1$ [⟨[many people Deg^0 t$_1$] expect him$_i$ to overtake⟩ Peter$_i$'s sister]]

    b.   LF of (33b)
        ... than $[_{CP}$ OP$_1$ [⟨[many people Deg^0 t$_1$] expect⟩ Peter$_i$'s sister ⟨to overtake him$_i$⟩]]

The Binding Generalization cannot be captured by the Direct Analysis because there is no reduced clause in the *than*-XP. More specifically, in both (33a) and (33b) the standard is base-generated in a position outside the c-command domain of the pronoun and it is never c-commanded by the pronoun during the course of the derivation, as shown in (35).

(35)   Direct Analysis:

    a.   LF of (33a)
        [Sally [[$_{YP}$ Deg$^0_{[DA]}$ than Peter$_i$'s sister] λd.λx. [[many people d] expect him$_i$ to overtake x]]]

    b.   LF of (33b)
        [Sally [[$_{YP}$ Deg$^0_{[DA]}$ than Peter$_i$'s sister] λd.λx. [[many people d] expect x to overtake him$_i$]]]

Lechner's binding evidence convincingly demonstrates that only the Reduction Analysis is at work in English phrasal comparatives. If the Direct Analysis were available to English, we would not observe the disjoint reference effect in (32/33a). On the basis of similar evidence, Lechner also reaches the conclusion that only the Reduction Analysis is available in German.

    Lechner offers another intriguing argument in favor of the PC-Hypothesis. He shows that phrasal comparatives obey a constraint on reduction/ellipsis, which is predicted only by the Reduction Analysis because no reduction/ellipsis takes place in the Direct Analysis. This point is established on the basis of the fact that the *than*-XP has to appear in the clause-final position in

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[7]The deletion within the *than*-clause in (34) seems to be a non-constituent deletion. Merchant (2009) provides a constituent deletion analysis for such cases.

most cases of phrasal comparatives. This is evidenced by the contrast between (36a) and (36b).

(36) a. More people bought newspapers [than books].

      b. *More people [than books] bought newspapers.

      c. More people [than bought books] bought newspapers.

(Lechner 2004:141)

Lechner argues that the Reduction Analysis offers an explanation of this restriction on the position of the *than*-XP. It is well known that the resolution of a reduced/elided constituent fails if the reduced/elided constituent is contained within its putative antecedent constituent (Bouton 1970).[8] In (36a), the reduced constituent within the *than*-XP is not included within its antecedent constituent, namely, the matrix clause, due to extraposition of the *than*-XP. This is shown in (37a). On the other hand, the *than*-XP is within the matrix clause in (36b), as in (37b), and hence the resolution of the reduced constituent does not succeed in this case. Note that the *than*-XP can appear in the clause-medial position in (36c) because no reduction/ellipsis operation takes place there.

(37) Reduction Analysis:

      a. LF of (36a)
          [[more people bought newspapers] [$_{than\text{-}XP}$ than OP$_1$ ⟨[many people t$_1$] bought⟩ books]]

      b. LF of (36b)
          *[more people [$_{than\text{-}XP}$ than OP$_1$ ⟨[many people t$_1$] bought⟩ books] bought newspapers]

Lechner takes the contrast between (36a) and (36b) to be evidence against the Direct Analysis by claiming that it cannot distinguish these two sentences because they share the same representation in (38) under this approach.

(38) Direct Analysis of (36a) and (36b):
      [newspapers [[Deg$^0{}_{[DA]}$ than books] λd.λx. [[many people d] bought x]]]

However, Bhatt and Takahashi (2007) develop a version of the Direct Analysis which is sensitive to the surface position of the *than*-XP. This version is able to capture the contrast between (36a) and (36b) thereby defusing the argument against the Direct Analysis. Further complexities remain in this domain as shown by the contrast in (39), pointed out to us by Danny Fox, which is challenging for both the Reduction Analysis and the Direct Analysis.

(39) a. I gave more people sports jackets [than raincoats].

      b. *I gave more people [than raincoats] sports jackets.

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[8]This constraint is referred to as *Embedding in Lechner's book.

     c.   I gave more people [than you did raincoats] sports jackets.

     d.   I gave more people [than you did] sports jackets.

<div align="right">(Danny Fox p.c.)</div>

Both analyses need to assume rightward movement of *sports jackets* over the *than*-clause in (39c, d). But if *sports jackets* can be rightward moved in (39c, d), then it can also be rightward moved in (39b) and the explanation of the two analyses that block (36b) are inoperative. As a result, neither analysis can explain the ungrammaticality of (39b).

    On the basis of the facts about binding and the possible positions of the *than*-XP (and others), Lechner concludes that all phrasal comparatives are derived from clausal sources. He also considers various facts that have been argued to show that the PC-hypothesis is too strong (Brame 1983; Napoli 1983, among others). For instance, the phrasal comparatives in (40a), (41a), and (42a) lack a well-formed clausal comparative counterpart, as shown in (40b), (41b), and (42b). Pointing out that these challenges arise only under the assumption that *than* must combine with a full finite clause, Lechner claims that these challenges can be taken away if we assume that *than* can take a small clause as its complement. More specifically, the small clause subject can bear an accusative case, as the standard in (40a) does. A reflexive in the small clause subject position can be bound by the matrix subject, as is analogous to (41a). Finally, the small clause analysis produces a correct interpretation of (42a).

(40)   a.   John is taller than me.

        b.   *John is taller than me am.

<div align="right">(Lechner 2004:179)</div>

        c.   John is taller [than [$_{SC}$ me $\langle$tall$\rangle$]]

(41)   a.   John couldn't possibly be taller than himself.

        b.   *John couldn't possibly be taller than himself is.

<div align="right">(Lechner 2004:180)</div>

        c.   John couldn't possibly be taller [than [$_{SC}$ himself $\langle$tall$\rangle$]]

(42)   a.   She ran faster than the world record.

        b.   *She ran faster than the world record ran.

<div align="right">(Lechner 2004:182)</div>

        c.   She ran faster [than [$_{SC}$ the world record $\langle$fast$\rangle$]]

Under the small clause approach, these facts no longer constitute a problem for the PC-Hypothesis (see Section 5 of Chapter 3 in Lechner's book for his analysis of other challenges). This line of research has been explored more recently by Pancheva (2009).

3.2 Cross-linguistic variation in the structure of phrasal comparatives

As we have seen in the last section, Lechner convincingly argues for the PC-Hypothesis. However, this proposal raises a question that he does not discuss

<div align="right"></div>

in his book. That is, why is the Direct Analysis unavailable to English? In other words, why is *than* unable to take a phrasal constituent as its complement? A solution that immediately comes to mind may be that the $\text{Deg}^0_{[DA]}$ head in (30) is just not available to natural language. Therefore, if the complement of *than* is a phrasal constituent that does not denote a degree description, the entire structure would end up being uninterpretable. However, in Bhatt and Takahashi (2011), we demonstrated that phrasal comparatives in Hindi-Urdu and Japanese must receive the Direct Analysis. We argued that the English-type binding facts are not found in Hindi-Urdu and Japanese phrasal comparatives. Moreover, we presented the fact that a quantifier within the *than*-XP exhibits distinct scopal properties between English, on the one hand, and Hindi-Urdu and Japanese, on the other. We claimed that this scopal difference would not be explained if the Reduction Analysis is at work in Hindi-Urdu and Japanese phrasal comparatives.

Together with our claim that the Direct Analysis is available at least in some languages, Lechner's PC-Hypothesis for English (and German) opens new avenues for exploring the cross-linguistic variation in the structure of the complement of *than*.

4 Reduction operations in phrasal comparatives

4.1 Specialized vs. general reduction operations

In Section 3, we discussed Lechner's claim that all phrasal comparatives without explicit standards derive from a clausal source. It follows from this claim that the phrasal comparatives in (43) are manufactured by applying not only Comparative Deletion (CD), which Lechner analyzes as movement, but an additional reduction operation, which removes *is* in (43a) and *read* in (43b) from the *than*-XP. This kind of reduction operation is often referred to as Comparative Ellipsis (CE), which deletes elements within the *than*-XP that are not made covert by Comparative Deletion/AP-Raising or by other independently motivated ellipsis operations such as VP-ellipsis.

(43)   a. John is taller than Bill $\langle_{CE}$ is$\rangle$ $\langle_{CD}$ tall$\rangle$.

        b. Mary read more books than Sam $\langle_{CE}$ read$\rangle$ $\langle_{CD}$ many books$\rangle$.

This operation is also at work in generating what Lechner calls partially reduced comparatives like (44), where the *than*-XP involves reduced elements and, at the same time, more than one standard, unlike phrasal comparatives.

(44)   a. Mary saw the movie more often on video than Bill $\langle_{CE}$ saw the movie$\rangle$ $\langle_{CD}$ often$\rangle$ in the theater.

        b. John spoke more vehemently against Mary than Tom $\langle_{CE}$ spoke$\rangle$ $\langle_{CD}$ vehemently$\rangle$ against Jane.

A question that arises here is whether it is necessary to postulate a reduction operation that is specialized for comparatives, such as Comparative Ellipsis, to derive phrasal and partially reduced comparatives.

Lechner's answer to this question is negative. He argues that the partially reduced comparatives in (44) are produced by applying Gapping, which is independently attested in coordinate structures like (45). Similarly, the phrasal comparatives in (43) are claimed to be produced as a result of the application of Stripping, which is an operation of deleting everything but one element in coordinate structures, as in (46).[9]

(45) a. Mary saw the movie on video, and Bill ⟨*Gapping* saw the movie⟩ in the theater.

  b. John spoke vehemently against Mary, and Tom ⟨*Gapping* spoke vehemently⟩ against Jane.

(46) a. John is tall, and Bill ⟨*Stripping* is tall⟩, too.

  b. Mary read many books, and Sam ⟨*Stripping* read many books⟩, too.

More generally, Lechner advocates the CR-Hypothesis in (47).

(47) CR-Hypothesis:
  All deletion in comparatives derives from Conjunction Reduction (Gapping, Right Node Raising and Across-the-Board-movement).
  (Lechner 2004:114)

His arguments for the CR-Hypothesis proceed in two steps. First, he shows that conjunction reduction operations and reduction operations that play a role in forming partially reduced comparatives are governed by the same constraints. This indicates that conjunction reduction operations are applicable to the *than*-XP. Secondly, he demonstrates that there are constraints that regulate reduction operations that produce phrasal comparatives as well as reduction operations taking place in partially reduced comparatives. This fact leads us to conclude that the CR-Hypothesis is correct. Let us now see some of Lechner's arguments that motivate this conclusion.

It has been claimed that a constituent reduced by Gapping must include the highest predicate within a conjunct (Hankamer 1979; Hudson 1976). This constraint, which Lechner refers to as *Locality*, gives an account of the contrast between (48a) and (48b).

(48) a. Some visited Millhouse and others ⟨visited⟩ Otto.

  b. *Lisa said that some visited Millhouse and Otto claimed that others ⟨visited⟩ Bart.

  (Lechner 2004:98)

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[9]Lechner takes Stripping to be a radical instance of Gapping.

As shown in (49) and (50), the Locality constraint also restricts the possibility of reduction in the *than*-XP in partially reduced comparatives, which Lechner takes to show that the reduction of a predicate in these cases is an instance of Gapping (see Section 2.2 of Chapter 3 in Lechner's book for other evidence).

(49) a. More people visited Millhouse on Monday than ⟨visited⟩ Otto on Friday.

  b. *More people said that some visited Millhouse than claimed that others ⟨visited⟩ Bart.

                                                                    (Lechner 2004:99)

(50) a. Some visited Millhouse more often than others ⟨visited⟩ Otto.

  b. *Lisa said that some visited Millhouse more often than Otto claimed that others ⟨visited⟩ Bart.

                                                                    (Lechner 2004:99)

Establishing that conjunction reduction operations and reduction operations in partially reduced comparatives are governed by the same constraints, Lechner goes one step further and presents the more remarkable fact that reduction operations in phrasal comparatives are restricted in the same way as the two kinds of reduction operations discussed above. In Gapping, a nonfinite clause boundary can be included in the gap, as in (51a), but a finite clause boundary cannot be, as in (51b). This constraint is dubbed *Boundedness*.

(51) a. Lisa promised to visit Millhouse and Sally ⟨promised [$_{CP[-finite]}$ to visit]⟩ Otto.

  b. *Lisa promised that her mother will visit Millhouse and Sally ⟨promised [$_{CP[+finite]}$ that her mother will visit]⟩ Otto.
                                                                    (Lechner 2004:100)

As expected from the facts about the Locality constraint, reduction operations in partially reduced comparatives are also subject to the Boundedness constraint, as shown by the contrasts in (52) and (53).

(52) a. More people promised to visit Millhouse on Monday than ⟨promised [$_{CP[-finite]}$ to visit]⟩ Otto on Friday.

  b. *More people promised that their friends will visit Millhouse on Monday than ⟨promised [$_{CP[+finite]}$ that their friends will visit]⟩ Otto on Friday.

                                                                    (Lechner 2004:100)

(53) a. Some promised to visit Millhouse more often than others ⟨promised [$_{CP[-finite]}$ to visit]⟩ Bart.

  b. *Some promised that their friends will visit Millhouse more often than others ⟨promised [$_{CP[+finite]}$ that their friends will visit]⟩ Bart.

(Lechner 2004:100)

More significant is the fact that the Boundedness constraint also governs reduction operations that form phrasal comparatives, as shown in (54) and (55).

(54) a. More people promised to visit Millhouse than ⟨promised [$_{CP[-finite]}$ to visit]⟩ Otto.

  b. *More people promised that their friends will visit Millhouse than ⟨promised [$_{CP[+finite]}$ that their friends will visit]⟩ Otto.

(Lechner 2004:119–120)

(55) a. Some promised to visit Millhouse more often than others ⟨promised [$_{CP[-finite]}$ to visit Millhouse]⟩.

  b. *Some promised that their friends will visit Millhouse more often than others ⟨promised [$_{CP[+finite]}$ that their friends will visit Millhouse]⟩.

(Lechner 2004:119–120)

The fact that conjunction reduction operations and reduction operations in partially reduced and phrasal comparatives are subject to the same constraints strongly shows that the CR-Hypothesis is correct. As Lechner argues, it also corroborates the PC-Hypothesis. Notice that the Direct Analysis could be an alternative way to yield phrasal comparatives. However, if the Direct Analysis is also at work, in addition to the Reduction Analysis, it would be less clear why constraints on conjunction reduction operations have an effect on the formation of phrasal comparatives because the Direct Analysis does not involve any reduction/ellipsis operation.

Before leaving this section, let us consider some cases which show that conjunction reduction operations other than Gapping also target the *than*-XP. Lechner claims that the comparative in (56) should be analyzed as involving Right Node Raising (RNR). There are two possible derivations of (56), which are illustrated in (56a) and (56b). In (56a), it is assumed that Gapping targets the clause-medial *than*-XP. On the other hand, the *than*-XP is assumed to appear in the clause-final position in (56b). In this case, Gapping only eliminates the verb *gave*; the constituent *to Sue* undergoes RNR.

(56) **He** gave more books than Bill to Sue.

  a. *[he gave more books [than Bill ⟨$_{Gapping}$ gave ⟨$_{CD}$ many books⟩ to Sue⟩] to Sue]

  b. [[he gave more books ⟨$_{RNR}$ to Sue⟩ [than Bill ⟨$_{Gapping}$ gave ⟨$_{CD}$ many books⟩⟩ ⟨$_{RNR}$ to Sue⟩]] [to Sue]]

Lechner argues that the derivation in (56a) is not a possible derivation of (56). This is so because Gapping can apply to the *than*-XP in the clause-final position, but not to the *than*-XP in a clause-medial position.

(57)   a.   ?*He gave more books [than Bill ⟨*Gapping* gave⟩ to Sue] to Mary.

       b.   He gave more books to Mary [than Bill ⟨*Gapping* gave⟩ to Sue].

(Lechner 2004:145)

Consequently, the grammaticality of (56) indicates that RNR is also needed as a tool to produce reduction effects in comparatives.

Let us next examine a case that indicates that Across-the-Board-movement is also at work in forming comparatives. Evidence comes from the interpretive fact of (58). In (58), the reduced *than*-XP-internal subject can be interpreted as a variable bound by the existential quantifier in the matrix subject. However, it cannot be understood as an existential quantifier. Thus, the comparative in (58) can be paraphrased as (58a), but not as (58b).

(58)   Somebody spent more money on reindeers than on gifts.

       a.   = Somebody$_i$ spent more money on reindeers than he$_i$ spent on gifts.

       b.   ≠ Somebody spent more money on reindeers than somebody spent on gifts.

(Lechner 2004:154)

This fact follows if we assume that the *than*-XP-internal subject must be reduced as a result of the application of Across-the-Board movement and the trace left behind by this movement must be interpreted as a variable bound by the moved element, as shown in (59).

(59)   [somebody$_1$ [[t$_1$ spent more money on reindeers] [than t$_1$ ⟨*Gapping* spent⟩ ⟨$_{CD}$ much money⟩ on gifts]]]

While space limitation prevents a more thorough discussion, capitalizing on conjunction reduction operations, Lechner explains a wide range of facts about English and German comparatives, which would be puzzling if reduction phenomena in the *than*-XP were the outcome of a specialized reduction operation.

## 5 A structural paradox of comparatives

5.1 Subordination vs. coordination

In Section 2, we have discussed the AP-Raising Hypothesis, which claims that the effects of Comparative Deletion should be analyzed as a consequence of movement of a gradable predicate from the Spec of the *than*-XP-internal DegP to the Spec of the matrix DegP. Therefore, the AP-Raising Hypothesis

imposes the structural requirement that the matrix clause must subordinate the *than*-XP because the *than*-XP-internal gradable predicate must move to a position which c-commands its original position. On the other hand, we have also discussed the CR-Hypothesis in Section 4, which claims that all reductions within the *than*-XP must be derived by applying conjunction reduction operations. As their name suggests, conjunction reduction operations can target only coordinate structures. Thus, the CR-Hypothesis demands that the matrix clause and the *than*-XP must be parsed as having a coordinate structure. Consequently, Lechner's central proposals raise an interesting structural paradox; comparatives must be analyzed as involving both a subordinate structure and a coordinate structure.

Lechner resolves this structural paradox in the following way. First, the *than*-XP is subordinated by the matrix clause in the underlying structure. If a conjunction reduction operation does not apply, as in (60), no other operation has to take place.

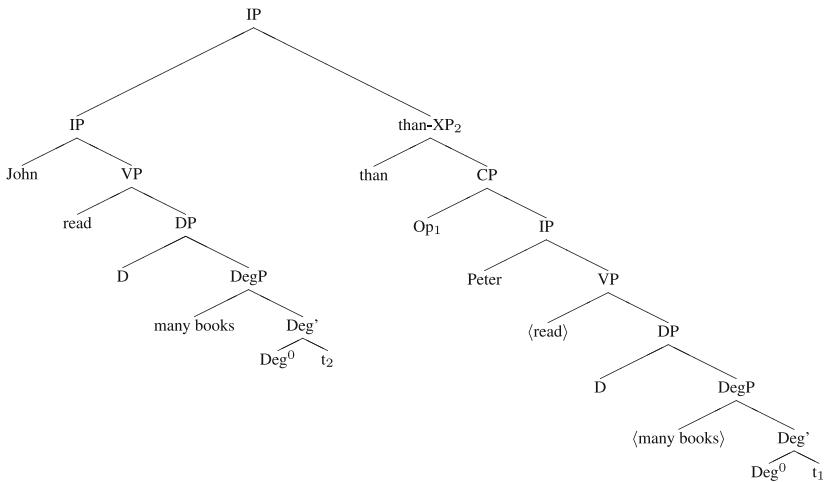(60) John read more books than Peter read.
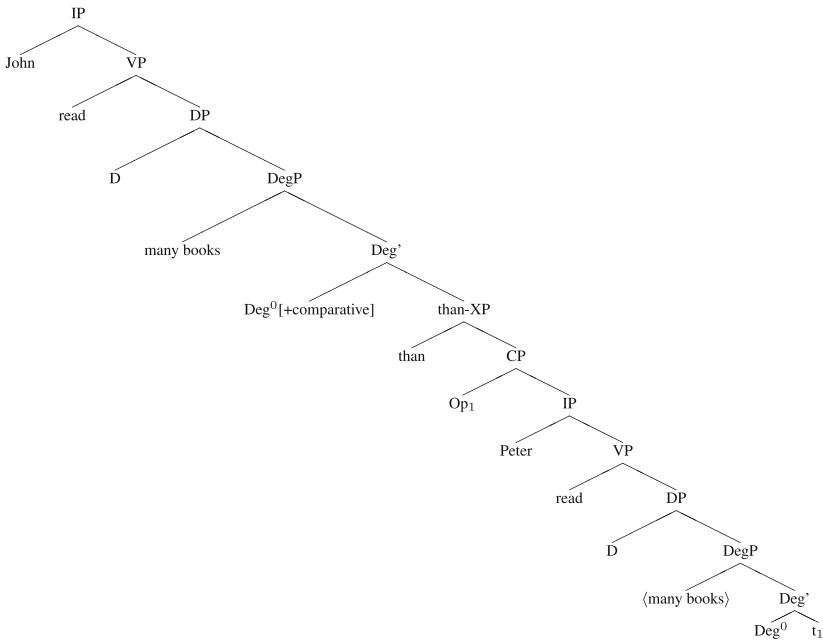
Note: the higher copy of *many books* is realized as *more books*.

However, if a conjunction reduction operation has to apply to the *than*-XP, as in (61), then the *than*-XP first undergoes extraposition and adjoins to IP, which Lechner assumes creates a kind of coordinate structure to which

conjunction reduction operations are applicable. This process, referred to as *than*-XP Raising (TR), has the *than*-XP leaving behind a simple trace of type *d*.

(61)   John read more books than Peter.

IP
- IP
  - John
  - VP
    - read
    - DP
      - D
      - DegP
        - many books
        - Deg'
          - Deg^0 t_2
- than-XP_2
  - than
  - CP
    - Op_1
    - IP
      - Peter
      - VP
        - ⟨read⟩
        - DP
          - D
          - DegP
            - ⟨many books⟩
            - Deg'
              - Deg^0 t_1

Lechner argues that the TR-analysis offers an account of the fact, which, at first sight, appears problematic to the CR-Hypothesis. It has been pointed out that a constituent reduced by Gapping and its antecedent must be embedded at the same depth in each conjunct (Hankamer 1971, 1979; Hudson 1976; Sag 1976). This constraint is called *Isomorphism*. Gapping in (62) has only the wide reading in (62a) because the narrow reading is ruled out by the Isomorphism constraint.

(62)   John wanted to write plays and Sam poems.

   a.   Wide reading:
        [John [wanted to write] plays] and [Sam ⟨wanted to write⟩ poems]

   b.   Narrow reading:
        *[John [wanted to write] plays] and [Sam ⟨wrote/writes⟩ poems]
                                                      (Lechner 2004:186)

Contrary to what would be expected under the CR-Hypothesis, an effect of the Isomorphism constraint is not observed in comparatives like (63). Both the wide reading in (63a) and the narrow reading in (63b) are available to this sentence, unlike (62).

(63)   John wants to write more plays than Sam.

   a.   Wide reading:
        John wants to write more plays than Sam wants to write.

    b. Narrow reading:
        John wants to write more plays than Sam wrote/writes.

(Lechner 2004:187)

Lechner argues that the Isomorphism constraint is in fact not violated in comparatives. The ambiguity of the interpretations in (63) arises from the ambiguity of the adjunction sites of the *than*-XP. In order to produce the wide reading, the *than*-XP adjoins to the matrix IP, as in (64a). On the other hand, the *than*-XP targets the embedded IP to generate the narrow reading, as in (64b). Notice that these two representations obey the Isomorphism constraint.[10]

(64)   a. Wide reading:
          $[_{IP}$ $[_{IP}$ John wants to write more plays t_1] [than Sam ⟨wants to write⟩$]_1$]

      b. Narrow reading:
          John wants $[_{IP}$ $[_{IP}$ PRO to write more plays t_1] [than Sam ⟨wrote/writes⟩$]_1$]

    Given the discussion above, the TR-analysis predicts that the size of a reduced constituent is determined by the height of the adjunction site of the *than*-XP. Lechner shows that this prediction is borne out on the basis of the interaction between the adjunction sites of the *than*-XP and the binding conditions. Let us first consider (65), where the narrow reading in (65a) is ungrammatical, but the wide reading in (65b) is not.

(65)   **Mary** promised him$_i$ to invite more people than John$_i$'s sister.

      a. Narrow reading:
         *Mary promised him$_i$ to invite more people than John$_i$'s sister invited.

      b. Wide reading:
         Mary promised him$_i$ to invite more people than John$_i$'s sister promised him$_i$ to invite.

(Lechner 2004:199)

The TR-analysis postulates the representations in (66a) and (66b) for the narrow reading and the wide reading of (65), respectively. However, if the *than*-XP adjoins to the embedded IP, as in (66a), the pronoun c-commands the name within the *than*-XP, which induces a Condition C violation. One might

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[10]We cannot postulate an analogous structural ambiguity for the coordinate structure in (62) because the relevant representation shown in (i) for the narrow reading is not well-formed.

(i)   John wanted [[PRO to write plays] and [Sam ⟨wrote/writes⟩ poems]]

Want cannot take a complement of the form *[Sam ⟨wrote/writes⟩ poems]*.

think that there is an alternative derivation of the narrow reading, in which the *than*-XP adjoins to the matrix IP and the reduced constituent is interpreted as *invited*, as illustrated in (66c). This derivation does not violate Condition C, but it disobeys the Isomorphism constraint. Consequently, the narrow reading is not available to (65).

(66) a. Narrow reading I (ruled out by Condition C):
          *Mary promised him$_i$ [$_{IP}$ [$_{IP}$ PRO to invite more people t$_1$] [than John$_i$'s sister ⟨invited⟩]$_1$]

   b. Wide reading:
          [$_{IP}$ [$_{IP}$ Mary promised him$_i$ to invite more people t$_1$] [than John$_i$'s sister ⟨promised him$_i$ to invite⟩]$_1$]

   c. Narrow reading II (ruled out by the Isomorphism constraint):
          *[$_{IP}$ [$_{IP}$ Mary promised him$_i$ to invite more people t$_1$] [than John$_i$'s sister ⟨invited⟩]$_1$]

If the positions of the pronoun and the constituent containing the relevant name in (65) are swapped, as in (67) and (68), the wide reading becomes unavailable.[11]

(67) **Mary** promised John$_i$'s sister to invite more people than he$_i$.

   a. Narrow reading:
          Mary promised John$_i$'s sister to invite more people than he$_i$ invited.

   b. Wide reading:
          *Mary promised John$_i$'s sister to invite more people than he$_i$ promised John$_i$'s sister to invite.

                                                          (Lechner 2004:201)

(68) Maria hat **[der Schwester von Hans$_i$]** versprochen mehr Leute
       Maria has the sister   of Hans promised more people
       einzuladen als er$_i$.
       to.invite   than he

       'Mary promised John$_i$'s sister to invite more people than he$_i$.'

   a. Narrow reading:
          Mary promised John$_i$'s sister to invite more people than he$_i$ invited.

   b. Wide reading:
          *Mary promised John$_i$'s sister to invite more people than he$_i$ promised John$_i$'s sister to invite.

                                                          (Lechner 2004:201)

The adjunction of the *than*-XP to the embedded IP requires the reduced constituent to be understood as *invited*, due to the Isomorphism constraint.

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[11]Since a nominative pronoun is not a very good standard in English phrasal comparatives, (67) is not perfect. Such a confound does not exist in (68) because a nominative pronoun is a legitimate standard in German phrasal comparatives.

Since this representation does not violate any principle, as in (69a), the narrow reading is grammatical. In contrast, if the *than*-XP adjoins to the matrix IP, as in (69b), the reduced constituent must be interpreted as the constituent that contains *John* because of the Isomorphism constraint. Consequently, Condition C is violated within the *than*-XP, which makes the wide reading unavailable.[12]

(69)   a.   Narrow reading:
           Mary promised John$_i$'s sister [$_{IP}$ [$_{IP}$ PRO to invite more people t$_1$] [than he$_i$ ⟨invited⟩]$_1$]

      b.   Wide reading:
           *[$_{IP}$ [$_{IP}$ Mary promised John$_i$'s sister to invite more people t$_1$] [than he$_i$ ⟨promised John$_i$'s sister to invite⟩]$_1$]

The same type of argument can also be made by capitalizing on Condition B. While the relevant name is embedded within a larger constituent in the *than*-XP in (65), the name itself is a standard in (70) and the narrow reading is impossible in this case. The same fact can also be obtained in German, as in (71).

(70)   **Mary** convinced us to send him$_i$ more money than John$_i$.

      a.   Narrow reading:
           *Mary convinced us to send him$_i$ more money than John$_i$ sent him$_i$.

      b.   Wide reading:
           Mary convinced us to send him$_i$ more money than John$_i$ convinced us to send him$_i$.

                                 (Lechner 2004:202)

(71)   **Maria** hat uns überredet ihm$_i$ mehr Geld   zu senden als   der Hans$_i$.
       Maria has us   convinced him more money to send   than the Hans

       'Mary convinced us to send him$_i$ more money than John$_i$.'

      a.   Narrow reading:
           *Mary convinced us to send him$_i$ more money than John$_i$ sent him$_i$.

      b.   Wide reading:
           Mary convinced us to send him$_i$ more money than John$_i$ convinced us to send him$_i$.

                                   (Lechner 2004:202)

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[12]One question that may arise here is why a violation of Condition C cannot be obviated in (67) and (68) by an application of Vehicle Change, which converts a name to its pronominal correlate.

(i)   [$_{IP}$ [$_{IP}$ Mary promised John$_i$'s sister to invite more people t$_1$] [than he$_i$ ⟨promised his$_i$ sister to invite⟩]$_1$]

The impossibility of an application of Vehicle Change appears to suggest that the constituent within the *than*-XP *promised John's sister to invite* is made covert as a consequence of a movement operation in (67) and (68). See Section 2.2.1 for more discussion about Vehicle Change.

Since there is no embedding of the name, if the *than*-XP adjoins to the embedded IP and the reduced constituent is resolved by taking the embedded VP as an antecedent, Condition B is violated, as in (72a). In contrast, if the *than*-XP adjoins to the matrix IP, Condition B is not violated, as in (72b). Therefore, only the wide reading is a grammatical interpretation of (70) and (71).

(72)   a.   Narrow reading:
            *Mary convinced us [$_{IP}$ [$_{IP}$ PRO to send him$_i$ more money t$_1$] [than
            John$_i$ ⟨sent him$_i$⟩]$_1$]
       b.   Wide reading:
            [$_{IP}$ [$_{IP}$ Mary convinced us to send him$_i$ more money t$_1$] [than John$_i$
            ⟨convinced us to send him$_i$⟩]$_1$]

The TR-analysis offers a straightforward solution to the structural paradox of comparatives (i.e., subordination vs. coordination). We have seen that it can explain the apparent discrepancy between Gapping and reduction operations in comparatives by positing multiple adjunction sites of the *than*-XP. We have also discussed the interesting interaction between attachment sites of the *than*-XP and binding conditions, which is captured by the TR-analysis.

5.2 Issues of *Than*-XP raising

5.2.1 Further issues of subordination vs. coordination

In the study of comparatives, much attention has been paid to the issue of whether comparatives should be analyzed as having a coordinate structure or a subordinate structure, or both (Moltmann 1992). Recently, Osborne (2009) has provided an interesting perspective on this debate by observing various intriguing facts. As Lechner does, Osborne also claims that comparatives should be parsed as a subordinate structure in some cases, but in other cases, they should be analyzed as involving a coordinate structure. In Obsorne's framework, the notion *functional equivalence*, which is defined in (73), plays an essential role in determining when comparatives are given a subordinate structure and when they are given a coordinate structure.

(73)   Functional Equivalent of a *Than*-Clause
       A *than*-clause is functionally equivalent to the matrix clause if the two
       could be coordinated with a standard coordinator (*and*, *or*, *but*) and
       the compared constituents across the clauses fulfill the same syntactic
       function.

(Osborne 2009:436)

Given (73), the *than*-XP in (74a) is considered to be functionally equivalent to the matrix clause because they can be coordinated, as in (74b).

(74)   a.   More people bought books [than sold them].
       b.   Many people bought books and sold them.

In contrast, the *than*-XP in (75a) is not functionally equivalent to the matrix clause because they cannot be coordinated, as in (75b).

(75) a. More people invited us [than we invited].

  b. *Many people invited us and we invited.

Capitalizing on functional equivalence, Osborne argues that comparatives must be analyzed as having a coordinate structure when the *than*-XP is functionally equivalent to the matrix clause.[13] Otherwise, they should be considered to have a subordinate structure.

  We discuss two pieces of evidence for this claim here. First, Osborne observes that the *than*-XP can appear in a clause-medial position if it is not functionally equivalent to the matrix clause both in English in (76b) and German in (77b).

(76) a. More people invited us [than we invited].

  b. More people [than we invited] invited us.

  (Osborne 2009:428)

(77) a. Warum sind mehr Leute gekommen [_than-XP als wir eingeladen
      why   are more people come   than we invited
      haben]?
      have
       'Why did more people come than we invited?'

  b. Warum sind mehr Leute [_than-XP als   wir eingeladen haben]
      why   are more people   than we invited   have
      gekommen?
      come
      'Why did more people come than we invited?'

  (Osborne 2009:433)

This fact receives a natural account if we assume that in (76) and (77), the comparative expression in the matrix clause bears a subordination relation with the *than*-XP, just like the head noun of a relative clause subordinates the relative clause. As shown in (78), a relative clause can also appear in a clause-medial position.

(78) People [who sold books] bought magazines.

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[13]Indeed, Osborne claims that comparatives involve a coordinate structure only when the *than*-XP and the matrix clause are functionally equivalent and the *than*-XP immediately follows its functional equivalent.

On the other hand, if the *than*-XP is functionally equivalent to the matrix clause, then it is degraded in a clause-medial position, as in (79b) and (80b).

(79)   a.   More people bought books [than sold them].

        b.   ??More people [than sold books] bought them.

                                                                    (Osborne 2009:428)

(80)   a.   weil   wir mehr Blumen an die Redakteure [_than-XP als an die
               because we more flowers to the editors   than to the
               Professoren] schickten
               professors   sent
               'because we sent more flowers to the editors than to the professors'

        b.   ??weil   wir mehr Blumen [_than-XP als an die Professoren],
               because we more flowers   than to the professors
               an die Redakteure schickten
               to the editors   sent
               'because we sent more flowers to the editors than to the professors'

                                                                    (Osborne 2009:434)

According to Osborne, the comparatives in (79) and (80) must be analyzed as involving a coordinate structure. Given this, the *than*-XP is degraded in a clause-medial position in (79) and (80) for the same reason that the second conjunct cannot precede the first conjunct in a coordinate structure.

(81)   a.   Many people bought books and sold them.

        b.   *Many people [and sold them] [bought books].

Note however that while *than*-XPs with functional equivalents in clause-medial positions are degraded, (81b) is ungrammatical.

   Osborne presents a further argument for the claim that comparatives should be regarded as involving a coordinate structure if the *than*-XP is functionally equivalent to the matrix clause. The *than*-XP is functionally equivalent to the matrix clause in (82a) and (83a), as evidenced by (82b) and (83b). Osborne argues that in such cases, the *than*-XP cannot intervene between its functional equivalent, as in (82c) and (83c).

(82)   a.   What did more girls order [than boys order]?

        b.   What did [girls order] and [boys order]?

        c.   *What did more girls [than boys order] order?
               (Osborne 2009:432, underlined material is the functional equivalent of the *than*-XP)

(83)   a.   weil   er öfter   Witze   erzählt [_than-XP als sie Witze
               because he more.often jokes   tells   than she jokes
               erzählt]
               tells
               'because he tells jokes more often than she tells jokes'

b. weil [er oft Witze erzählt] und [sie Witze erzählt]
 because he often jokes tells and she jokes tells
 'because he often tells jokes and she tells jokes'

c. *weil <u>er</u> öfter [_{than-XP} als sie Witze erzählt] <u>Witze</u>
 because he more.often than she jokes tells jokes
 <u>erzählt</u>
 tells
 'because he tells jokes more often than she tells jokes'
 (Osborne 2009:436, underlined material is the functional
 equivalent of the *than*-XP)

This fact also follows straightforwardly if comparatives must involve a coordinate structure when the *than*-XP is functionally equivalent to the matrix clause. The *than*-XP cannot be intraposed in (82) and (83) for the same reason that the second conjunct cannot be intraposed into the first conjunct in a coordinate structure.

Osborne's explanation gives us a partial handle on the puzzling facts in (39). In (39b), the *than*-phrase appears in a clause-medial position even though it has a functional equivalent and Osborne's system would predict degradation. However, (39b) is not merely degraded; it is fully ungrammatical. This is also the case with the core cases in (36). Hence the explanation is partial.[14]

We suggest that Osborne's facts can be explained by making reference to properties of focus licensing.[15] When the *than*-XP is functionally equivalent to the matrix clause, it contains at least one element that receives contrastive focus. For instance, the predicate *sold* gets contrastively focused in (74a), repeated here as (84a), because it is in contrast to the predicate *bought* in the matrix clause. On the other hand, there is no focused element that is contrasted with an element in the matrix clause in (76a), repeated below as (84b), in which the *than*-XP is not functionally equivalent to the matrix clause.

(84) a. More people bought books [than sold them].
 b. More people invited us [than we invited].

While a detailed exposition of a theory of focus demands more space than we can devote here, we would like to briefly sketch an effect of the focus licensing that lies behind the differences between comparatives with functional equivalence and ones without it. Roughly speaking, in order to license focus in a given constituent α, there must be an antecedent constituent that is different

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[14]We are setting aside here the case of clause-medial *than*-clauses in (39c, d). These seem to have functional equivalents just as much as (39b) and so Osborne's system would also predict these to be degraded. It is possible that (39c, d) are somewhat degraded compared to their counterparts with clause-final *than*-clauses. Nevertheless there is a sharp contrast between (39b) and (39c, d), which does not follow from Osborne's system.

[15]Grant (2010a, b) gives a parsing-based analysis of these facts, working with a proposal that certain kinds of garden paths cannot be recovered from leading to ungrammaticality. In her treatment, the ungrammatical cases are all instances of such garden paths.

from α and is semantically identical to α, modulo focused elements (Rooth 1992, 1996). The focus on *sold* in (84a) is licensed because the matrix clause can serve as an antecedent by virtue of the fact that it is semantically identical to the *than*-XP, modulo the focus marked element, as illustrated in (85).

(85)   [[more people bought books] [than d-many people sold them]]

We have seen that if the *than*-XP in (84a) is intraposed, as in (79b), repeated here as (86a), the sentence becomes degraded. In this case, there is no constituent that can count as an antecedent. Since the matrix clause contains the *than*-XP, it would never be semantically identical to the *than*-XP, as shown in (86b). An analysis along this line can be extended to the cases in (82c) and (83c).

(86)   a.   ??More people [than sold books] bought them.
        b.   [more people [than d-many people sold them] bought them]

The suggested approach also captures the fact that if the *than*-XP is not functionally equivalent to the matrix clause, it can be intraposed, as in (76b), repeated here as (87). Since the *than*-XP in (87) does not contain a focused element, this sentence is not subject to any requirement for licensing focus, unlike (86a).

(87)   More people [than we invited] invited us.

To sum up, Osborne's facts can be explained by making reference to properties of focus licensing. They may follow from the focus structures of comparatives with a functionally equivalent *than*-XP and ones without it and properties of the focus licensing. If this discussion is successful, these facts are captured in a way that is compatible with Lechner's system.

5.2.2 Extraposition of the Than-*XP and the scope of Deg⁰[+comparative]*

Than-XP Raising is invoked when a conjunction reduction operation applies within the *than*-XP, as in (88), or when the *than*-XP is extraposed, as in (89).

(88)   a.   Some visited Millhouse more often than others Otto.
        b.   [[Some visited Millhouse [$_{DegP}$ often Deg^0[+comparative] t_1]] [than others ⟨visited⟩ Otto]$_1$]

(89)   a.   John read more books last year than Bill read.
        b.   [[[John read [$_{DegP}$ many books Deg^0[+comparative] t_1]] last year] [than Bill read]$_1$]

Lechner analyzes *than*-XP Raising as rightward movement of the *than*-XP and hence it strands Deg^0[+comparative] (i.e., *-er*), as illustrated in (88b) and (89b). However, this analysis appears to raise an issue.

It has been claimed that *-er* and the *than*-XP form a constituent at LF (Hackl 2001; Heim 2000) and take scope at the same position (Bhatt and Pancheva 2004). This point can most clearly be shown by Bhatt and Pancheva's (2004) observation that extraposition of the *than*-XP has an effect on scopal

possibilities of *-er*. More specifically, they argue that the scope of *-er* is marked with the surface position of the *than*-XP. For instance, if it is ensured by the relative positions of an adjunct and the *than*-XP that the *than*-XP resides within an embedded clause, as in (90), *-er* must take scope within the embedded clause and hence it cannot take scope over the matrix predicate *required*.

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

    a.   required > fewer than that number:
        Too much productivity excludes John from getting tenure.

    b.   *fewer than that number > required:
        That number is the minimum number of papers that John needs to publish to get tenure. (i.e., Too much productivity does not exclude John from getting tenure.)

                                        (Bhatt and Pancheva 2004:26)

In contrast, if the *than*-XP is guaranteed to adjoin to the matrix clause, as in (91), *-er* must take scope over the matrix predicate.

(91)   [[John is required to publish fewer papers this year in a major journal to get tenure][than that number]].
    *required > fewer than that number; fewer than that number > required
                                       (Bhatt and Pancheva 2004:26)

If *-er* and the *than*-XP form a constituent at LF and take scope at the same position, it paves the way for handling the scopal facts in (90) and (91). Lechner's system as it stands does not give us a direct way to have the *-er* and *than*-XP form a constituent at LF. Bhatt and Pancheva (2004), inspired by Fox and Nissenbaum's (1999) Late Merge treatment of extraposition, propose a treatment of these facts where the Deg head undergoes QR subsequent to which the *than*-XP merges with it in a right peripheral position. However, Lechner assumes AP-Raising to handle Comparative Deletion and hence he cannot use Late Merger of the *than*-XP. But as we noted earlier, Lechner could just as well have used a matching analysis for Comparative Deletion without any loss of coverage. Once this is done, a Late Merge-style analysis can be constructed within Lechner's sytem.

6 Concluding remarks

In the preceding sections, we have provided an overview of Lechner's ambitious research program as embodied in this book and suggested certain alternatives to the paths taken within. We have only been able to cover the highlights, the proverbial tip of the iceberg. In addition to these, the book covers a rich domain of topics that includes but does not exhaust NP-internal syntax, prenominal versus postnominal modification, the interaction of coordination and verb movement, and extraposition.

The ideas explored in this book connect with a number of active research directions. The move away from ellipsis processes specialized to comparatives that is a major topic here is part of a wider move against construction-specific ellipsis processes pursued among others by Kyle Johnson and Jeroen van Craenenbroeck. The strong position taken by Lechner concerning the PC-Hypothesis arguing that all phrasal comparatives in English and German have clausal sources has inspired work on the crosslinguistic variation in this domain, including our own work on Hindi-Urdu and Japanese. The wider research program pursued by Beck et al. (2004, 2010) and Kennedy (2009) can also be seen as part of this stream of work. We have already noted the many open questions in this book concerning the choice of matching versus raising, subordination versus coordination, and the derivation of the extraposition/scope generalization. The reader is likely to find many more.

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