A PHASE-BASED APPROACH TO RIGHTWARD MOVEMENT IN COMPARATIVES

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Abstract

In this article, I aim at providing a phase-based explanation of extraposition phenomena in attributive comparatives. Conforming to a semantic requirement, the *than*-expression is an obligatory complement of the functional Degree head. However, there is need for an adequate explanation of extraposition, which seems to be syntactically unmotivated, if it involves movement to the right. Furthermore, this rightward movement is not even obligatory in head-final constructions.

My solution makes use of the fact that comparative complements are phase-sized constituents, and the cyclic Spell-Out of these elements determines their order with respect to other elements in the construction. This may be changed by feature-driven movements in the derivation, which accounts for the lack of extraposition in head-final constructions.

1. The problem

In this paper, I provide an explanation of the – sometimes obligatory – extraposition phenomena captured in attributive comparatives by means of operations related to phase theory (cf. Chomsky 2001, 2004, 2005) and prosodic transfer mechanisms (cf. Selkirk & Kratzer 2005, Kratzer & Selkirk 2007, Göbbel to appear).

On the basis of earlier assumptions (Haider 2000, 2003), the ungrammatical sentences in (1)-(2) were filtered out by a constraint called EDGE EFFECT, according to which no syntactic object may appear on the right hand side of the modifier head in a head-initial phrase, within a pre-head adjoined modifier[1]:

(1)   *A sas   magasabban *mint a   galamb* repül.   (*Hungarian*)
        the eagle higher-ADV than the pigeon flies
        'Eagles fly higher than pigeons.'

(2)   *I saw a taller [*than John*] man.

(3)   A   sas   magasabban repül *mint a   galamb*.   (*Hungarian*)
        the eagle higher   flies than the pigeon
        'Eagles fly higher than pigeons.'

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[1] The edge effect constraint filters out not only comparative constructions, such as those in (1-2), but also constituents which are complements of a modifier head preceding the modified head in a head-initial phrase:
(i)   Peter is a proud (*of his son) man.
The PP *of his son* is the complement of proud, and it follows the head; meanwhile, *proud* is the pre-head modifier (attribute) of *man* in a naturally head-initial English NP.
The length of this paper does not enable me to account for sentences like (i) above, and that is the reason why edge effects as independent phenomena are beyond the scope of this article. Here I will focus solely on edge effects found in comparatives.

(4)   I saw a taller man [*than John*].

The *than*-constituents in italics are complements in the comparative degree expression; however, the constructions converge only if these constituents move to the right (see (3)-(4)). Such an instance of rightward movement raises several problems, if we aim at analyzing these sentences in present-day minimalist syntax, as movements to the right are syntactically unmotivated.

Besides extraposition, there is yet another problem: the extraposition presented above does not appear in languages using head-final phrases:

(5)   Er hat es [sehr viel sorgfältiger als jeder andere] analysiert. (*German*)
        he AUX that much more carefully   than anyone else   analyzed
        'He analyzed it much more carefully than anyone else.'

(6)   He has [(much more) carefully (*than anyone else)] analyzed it.

(7)   Er hat es [viel weniger oft   als ich (dachte)] geprobt.   (*German*)
        he aux that much less   often than I   thought   rehearsed
        'He rehearsed it much less often than I thought.'

(8)   He has [(much less) often (*than I (thought))] rehearsed it.

        (Haider 2003, exx. 4a-d)

As can be seen above, the lack of extraposition in German, which uses head-final VPs, APs and AdvPs[2], does not make the clauses ungrammatical, as opposed to English, in which only head-initial phrases can be found. There has not yet been any explanation given to the head-final versus head-initial distinction with respect to extraposition, which I will attempt to provide in this paper.

In Section 2, I provide an overview of the structure of comparative constructions. In Section 3, I present and discuss Haider's account on edge effects. The remaining sections will be dedicated to the solution to the problems, based on Phase Theory (Chomsky 2001, 2004, 2005) and prosodic transfer mechanisms (Selkirk & Kratzer 2005, Kratzer & Selkirk 2007, Göbbel to appear).

2. On comparative constructions

In this paper, the structural design of comparative constructions relies on the assumptions and analytic methods of Corver (1990, 1997a), Kenesei (1992), Kennedy (1997) and Lechner (1999). The head of the comparative expression is a degree head (Deg^0; Corver 1990: 34, on the basis of Abney 1987), which can host the comparative degree morpheme *–er*; it projects a DegP functional phrase, and determines whether the expression is comparative [+COMP] or absolute [-COMP]. In order to satisfy the [± COMP] feature, an AP or AdvP – being a secondary dimensional predicate – is externally merged into the specifier position of the DegP (Lechner 1999: 25). This can be seen below:

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[2] On the head-final versus head-initial distinction in German, see Haider (2002).

(9) $[_{DegP} [AP] [_{Deg'} [_{Deg} -er_{[+COMP]}]]]$

For a comparative construction to converge, the presence of two constituents is indispensable (Keenan 1987, Izvorski 1995): one of them is the already mentioned AP/AdvP, which specifies the semantic dimension of comparison (Kennedy 1997: 50ff.), while the other one is the comparative complement (typically introduced by *than*), which defines the standard value of comparison (von Stechow 1984, Kennedy 1997: 56). This is exemplified below:

(10)   John is taller than Peter.

(11) $[_{DegP} [_{AP} tall] [_{Deg'} [_{Deg} -er] [_{than\text{-}XP} than Peter]]]$

On the dimensional scale as defined by *tall*, *Peter* provides the standard value, whereas *John* specifies the reference value (Kennedy 1997: 50ff.); however, *John* stays outside the comparative DegP[3].

Nevertheless, comparative constructions do not consist of DegPs only, as several languages use periphrastic comparative adjectives; that is, the comparative forms of adjectives and adverbs are not always morphologically realized:

(12)   a. John is more elegant than Peter.

        b. Juan es más elegante   que Pedro.   (*Spanish*)
           John is more elegant   thanPeter
           'John is more elegant than Peter.'

It can also be realized that another degree expression can appear above *more/más*, as can be seen below (Bresnan 1973):

(13)   a. John is much more elegant than Peter.

        b. Juan es mucho más   elegante que Pedro.   (*Spanish*)
           John is much   more elegant thanPeter
           'John is much more elegant than Peter.'

In the light of Corver (1997a), *more* and *más* can be classified as QUANTIFIER-LIKE DEGREE ITEMS, while *much/mucho* DETERMINER-LIKE DEGREE ITEMS. The syntactic representation including them as well as the main DegP, which is based on Lechner (1999: 25), is illustrated by the tree diagram below[4]:
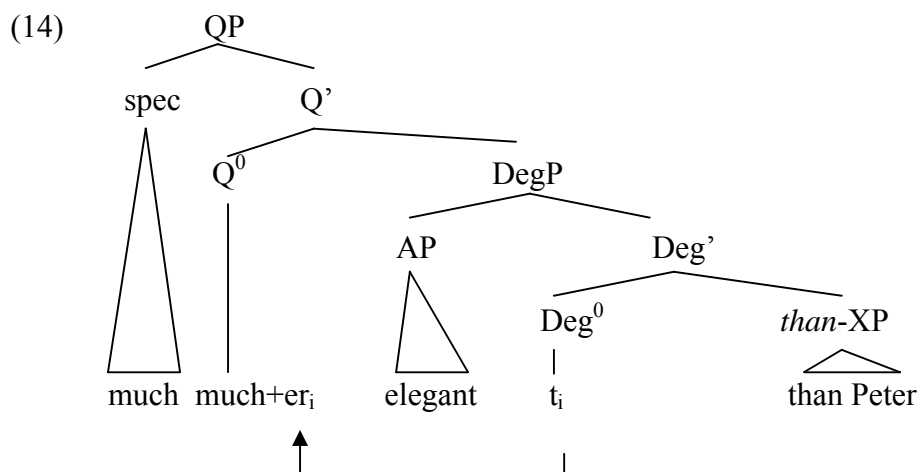
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[3] The reason for this is that the element representing the reference value has different functions in the matrix clause (e.g., it might be given a thematic role), as opposed to the comparative complement:
(i)   A man [taller than Bill] loves Mary.
A man provides the reference value of the comparison, while it is the external argument of *love*.
[4] In the original DegP-hypothesis, there was only one functional layer in the construction, in which a Deg^0 subcategorized for an AP (Abney 1987, Corver 1990). In the article introducing determiner- and quantifier-like degree items, Corver places a QP between the DegP and the AP (1997a), and generates determiner-like degree items in specDegP, and quantifier-like degree items in Q^0. The two approaches are illustrated by the representations below:
(i) $[_{DegP} Deg^0 [_{AP} A^0]$ (Abney 1987, Corver 1990)

(14)

QP diagram:

- QP
  - spec
    - much
  - Q'
    - Q^0
      - much+er$_i$
    - DegP
      - AP
        - elegant
      - Deg'
        - Deg^0
          - t$_i$
        - *than*-XP
          - than Peter

On the basis of the tree diagram, it can be seen that the functional projection projected by the quantifier-like degree item is placed on the top of the DegP; this is true of English, as it has head-initial phrases. However, German APs and AdvPs are head-final (Haider 2002: 77); that is, the order of Deg^0 and the *than*-XP is expected to be reversed, and Deg^0 should follow its complement[5]. The following questions may arise in connection with the syntactic representation in (14):

- why is the *than*-XP in the complement position of Deg^0?
- why is the AP/AdvP in the specifier position of DegP?
- why is the QP generated above DegP?

First of all, there exist constructions even in English in which the *than*-XP immediately follows the degree head:

(15)   More than ten people came.

(16)   More often than not I eat breakfast.

The presence of the element representing the standard value is obligatory[6], which makes the *than*-XP function as an argument; being a complement is much more compatible with argument roles than being optionally adjoined. In connection with thematic roles, certain languages can have bare DPs function as *than*-XPs:

(17)   Sasha siln'eye, [$_{CP}$ ch'em Petr].   (*Russian*)
        Sasha stronger   than   Peter
        'Sasha is stronger than Peter.'

(18)   Sanyi erősebb, [$_{CP}$ mint Péter].   (*Hungarian*)
        Alex   stronger   than   Peter
        'Alex is stronger than Peter.'

(ii)   [$_{DegP}$ Deg^0 [$_{QP}$ Q^0 [$_{AP}$ A^0]]]   (Corver 1997a)
The tree diagram in (14) differs from these to some extent; still, these differences will be argued for.
[5] See Section 6 for a discussion of head-final degree expressions.
[6] Even if the standard value can be recovered from the context, it is still present implicitly.

(19) Sasha siln'eye [DP Petrá].   (*Russian*)
     Sasha stronger   Peter-GEN.
     'Sasha is stronger than Peter.'

(20) Sanyi erősebb [DP Péternél].   (*Hungarian*)
     Alex   stronger   Peter-ADE
     'Alex is stronger than Peter.'

If the comparative complement is manifested by a bare DP, the standard value is marked by morphologically realized inherent case: Adessive in Hungarian, and Genitive in Russian. However, any inherent case assigner, such as the degree morpheme in comparative constructions, assigns case to a DP if and only if it theta-marks the DP (cf. Chomsky 1986: 194)[7]. Therefore, inherent case assignment can be taken as evidence in favour of comparative complements' being arguments in comparative constructions, and this status is more compatible with a complement position.

   Second, the representation in (14) shows how to account for the formation of comparative adjectives or adverbs: if the morphologically realized version appears (e.g., *easy* + *–er*), the AP is immediately followed by the comparative morpheme; if the periphrastic version is used (e.g., *more interesting*), the quantifier-like degree item *much*[8] is base-generated in Q^0, the comparative morpheme *–er* in Deg^0, and the latter moves to Q^0 via head movement and is adjoined to *much*, hence creating the form *more* via morphological fusion, while the AP remains in its original position.

   Another advantage of the analysis is that *enough*-inversion, which has been quite problematic to analyse, can be accounted for by claiming that *enough* is an ordinary degree marker base-generated in Deg^0; as a result, it always follows the AP:

(21) I like [NP [DegP big [Deg' enough]] cars].

   Third, it is quite straightforward why the QP is base-generated above the DegP, as this is the representation in which the comparative morpheme can move to Q^0; furthermore, the order of the designated elements (i.e., determiner-like degree items come first, quantifier-like degree items come second, followed by the dimensional AP/AdvP) also support (14).

   The last important factor that may have an effect on the explanation of extraposition is the category of the comparative complement. Certain languages use exclusively clausal comparative complements, in which *than* can be analysed as a complementizer (Kenesei 1992: 42ff.). If there are only a few syntactic constituents following *than*, they are remnants of comparative ellipsis and obligatory comparative deletion (cf. Bresnan 1973, 1975, 1977: 163; Pinkham 1982: 99ff.):

(22) This car is much faster than ~~d-fast it was~~/~~it was d-fast~~ yesterday.[9]

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[7] According to Katalin É. Kiss (p.c.), this theta-role in comparatives is called STANDARD (VALUE), which is assigned to the comparative complement by the degree head.

[8] This *much* is different from its determiner-like degree item counterpart (cf. Corver 1997a):

(i)   *Much* more people came to the party.   *much* in specQP (determiner-like degree item)
(ii)   Andrew is brilliant. He is so *much* so that he won several competitions last year.
                              much in Q^0 (quantifier-like degree item)

[9] This ellipsis mechanism can be found in Spanish comparative complements as well.

The following example, which is completely unmarked in certain American dialects of English, also provides evidence for the clausal nature of comparative complements:

(23)   John is taller than what Mary is[10].
        (Chomsky 1977: 87, ex. 51a)

That is, operator movement has taken place, which is typical of CPs. In line with what has been mentioned, comparative complements can be CPs or DPs; this classification will play a very important role in the explanation of extraposition.

3. Earlier approaches to edge effects

On the basis of Haider (2000: 4, 2003), the edge effect constraint can be formulated as follows:

(24)   HAIDER'S EDGE EFFECT CONSTRAINT: in a head-initial phrase, within a pre-head adjoined modifier, no syntactic object may appear on the right hand side of the modifier head [11] [12].

This supposition is also supported by the examples in (5)-(8), where problematic constructions are saved by extraposition. However, there are three problems with Haider's analysis.

First, the result of a syntactic constraint is extraposition; i.e., rightward movement (Bresnan 1973, Kennedy & Merchant 1997). However, the Minimalist Programme (Chomsky 1993, 1995, 2001, 2004, 2005) denies all such movements, as these cannot be motivated with strong features. If extraposition exists at all, it should be dealt with at PF (Koster 1978, Rochemont 1982, Zwart 1990: 2, Chomsky 2001); still,

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[10] In standard English, (23) would be unmarked if *what* were covert. The *wh*-expression functions as the comparative operator (Chomsky 1977, Kennedy and Merchant 1997), which can be overt in certain languages:
(i)   János gyorsabb mint amennyire Mari gyors.   (*Hungarian*)
       John faster   than how.much Mary fast.
       'John is faster than Mary.'
The function of this operator is to specify the measure of the standard value projected onto the dimensional scale. The difference between the two values in comparative degree expressions, as well as the degree related to the dimensional predicate (AP/AdvP) in absolute degree expressions, can be represented or modified by determiner-like degree items (e.g., *very*, *so* or *much*). As comparative operators provide the precise degree of the standard value in comparative complements, and because they are in complementary distribution with any other determiner-like degree item (or measure phrase), they are thought to be base-generated in specQP and move to the left periphery of the clausal comparative complement. That is why the following example is ungrammatical:
(ii)   * Több fiú jött, mint amennyi tíz.   (*Hungarian*)
         more boys came than how.much ten
        'More boys cam than ten.' (intended meaning)
[11] Williams (1981) suggested a similar approach by formulating the Head Final Filter. This filter was operative at s-structure, and ruled out any prenominal modifier unless its last constituent was its own head.
[12] Haider introduced the edge effect constraint to support the assumption that AdvPs are freely adjoined to modified XPs (Cf. Costa 2000, Ernst 2002, Svenonius 2002; contra Laenzingler 1993, 2000, Alexiadou 1994, 1997, Cinque 1999, 2004).

due to the order of derivational mechanisms, PF-operations are unable to obviate violations of syntactic constraints.

Second, Haider's account is purely descriptive, especially because it does not explain why there is a distinction between head-initial versus head-final constructions.

Third, Haider remains agnostic as to how to explain the sensitivity of elements commonly known to be generated in specifier positions to edge effects. For example, certain quantifiers (such as *few*, *little*, *several*, *many*) are base-generated in specifier positions, and yet they are sensitive to edge effects (see 25)[13], and the same can be stated about dimensional APs/AdvPs, which are generated in specDegP (see 26).

(25)   [NP[specNP fewer (*than last year)] people] came to the party

(26)   Paul is a [more proud (*of his wife)] man than Joseph.

This article focuses on comparative extraposition and does not intend to handle those cases of edge effects in which it is not a phase-like, but a smaller constituent that intervenes between the modifier head and the modified head. Still, the edge effect constraint should be maintained as a filter as long as a better solution to constructions like (26) emerges.

4. Phases and cyclic prosodic transfer mechanisms

In order to avoid the three problems just mentioned, I use mechanisms introduced by Phase Theory and cyclic spell-out. The definition of a phase can be formulated as follows:

(27)   PHASES: derived syntactic objects, which are transferred to the interfaces of syntax; such transfers are cyclic/compositional mappings for the phonetic and semantic interfaces. (Chomsky 2005: 9)

The importance of phases can be captured in the fact that once a phase is fully built, a syntactic derivation transfers it to the LF and PF interfaces; after being transferred, only the left periphery of the phase will be available for further syntactic operations, the rest of the phase will become opaque (PHASE IMPENETRABILITY CONDITION; Nissenbaum 2000, Chomsky 2001: 14, 2004, Svenonius 2004).

The next question is which syntactic elements, XPs can be considered phases. According to Chomsky, phases can be CPs, v*Ps and DPs (2005: 10). The highest maximal projection of the left periphery, as designed by Rizzi (1997), is equivalent to the CP here (Chomsky 2005: 10). v* is a functional head equipped with full argument structure (*ibid*). Finally, DPs may be considered phases due to their resemblance to CPs (*ibid*), which has been described in the literature (cf. Chomsky 1970, Abney 1987; further evidence for DP's clause-like behaviour can be found in Vangsnes 1999, Zamparelli 2000, Svenonius 2004 and Hiraiwa 2005).

Based on the definition of phases, it is clear that transfers occur cyclically. For example, once a phase is fully built, it is transferred to the interfaces, and when PF

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[13] According to Abney (1987: 184ff.), these quantifier phrases are base-generated in specNP. On the basis of Zamparelli (2000), there are several functional projections inside the DP; still, these quantifiers are placed in specifier positions.

receives a phase, the constituent is linearized, and the mechanisms which require the visibility of the syntactic structure are carried out (e.g., prosody, stress assignment; cf. Selkirk 1984, Chen 1990). By building phases in a bottom-up fashion, it is expected that the transfer of each phase is followed by that of another one. The means that the earlier a phase is spelt out, the later it appears in the final order of constituents at PF, and will follow the phases spelt out later[14].

Accordingly, the connection between the transfer of syntactic phases and the creation of prosodic structure (and phonological phrasing[15], which is relevant in stress assignment), as described by Kratzer and Selkirk (2007), can be conceptualized in the following way:

(28)   PROSODIC TRANSFER: the domain of a phase is equivalent to the prosodic domain of phrasal stress (Kratzer & Selkirk 2007: 11).

Alternatively, each sequence of constituents spelt out as a phase is equivalent to a separate phonological phrase, in which phrasal stress patterns are manifested. In other words, this suggests that phases are the basic units of interface transfers, linearization at PF as well as phonological phrases[16].

In most of the works on Phase Theory, a phase is either the highest maximal projection in the clause (i.e., a CP, above which nothing is generated), or it is a CP, v*P or DP generated as a complement/argument (Chomsky 2001, 2004, 2005, Svenonius 2004, etc.). For example, subject DPs generated inside the v*P phases may be considered phases on their own, but once they are moved into specTP, they cease to operate as such. The question might arise what is behind this phenomenon; that is, it may be asked what determines whether a phase-compatible constituent (CP, v*P or DP) will behave like an actual phase. In order to answer this question, it needs to be investigated how certain elements are merged or built into the construction.

As a matter of fact, two such operations exist: set merge and pair merge, and the difference between them can be deduced by looking at the definitions below:

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[14] At first sight, the assumption that syntactic structures are built in a bottom-up fashion may sound counter-intuitive to some speakers, as the direction of constituents in actual speech production might not be considered to follow this method. Nevertheless, the way Merge operations work and the direction of syntactic movements (i.e., leftward movements into higher positions) ensure that structure is built bottom-up, towards the highest maximal projection.

[15] In suprasyllabic prosodic structure – as a mapping of its syntactic counterpart – there are three levels: prosodic word, phonological phrase, and intonational phrase (Selkirk 1984: 26ff.). In this article, the domain of phrase stress is considered to be the phonological phrase, which can be further divided into major prosodic phrases (cf. Kahnemuyipour 2004, Kratzer & Selkirk 2007: 12). However, the internal structure of the phonological phrase is irrelevant for the current research.

[16] An even clearer description of the generalization can be seen if Kahnemuyipour's Highest Phrase Constraint is taken into consideration:

(i)   THE HIGHEST PHRASE CONSTRAINT OF PROSODIC TRANSFER: within the transfer domain of a phase, the highest phrase is equivalent to the highest phonological phrase in the intonational structure. (Kratzer & Selkirk 2007: 12, based on Kahnemuyipour 2004).

As a result, it can be claimed that cyclic transfer mechanisms *ab initio* determine the prosodic structure of the clause (cf. Göbbel to appear: 9). In fact, the above rules are supported by Göbbel's constraint which ensures that phonological phrase structure (i.e., the structure available for PF) is determined by syntactic phases:

(ii)   OUTPUT-OUTPUT FAITHFULNESS CONSTRAINT: every major phonological phrase deriv́ed by cyclic Spell-Out corresponds to a major phonological phrase in phonological structure.
(Göbbel to appear: 9).

(29) a. SET MERGE builds syntactic objects, where one of the elements counts as the head and the other as its argument.

    b. PAIR MERGE constructs an ordered pair of elements, where the adjunct does not saturate the argument grid of the head of the constituent it adjoins to or change its properties.

    (Matos 2007: 4; cf. Chomsky 2001, 2004)

It can clearly be seen in the definitions of set merge and pair merge that the former builds specifier, head and complement constituents into the construction when they first appear, whereas pair merge is responsible for the merge of adjuncts. This difference plays a crucial role in the derivation, as – on the basis of the order of merge operations – this is what makes it possible that adjoined elements are merged into a phase-sized maximal projection at the moment when that phase is ready to be spelt out (Chomsky 2005: 13). In other words, although phases are built cyclically, as far as the order of derivational mechanisms inside a phase are concerned, adjuncts will enter the derivation when the already built segment of the structure is waiting for Spell-Out. That is why there is no time for adjuncts to be spelt out separately, even if they are phase-compatible maximal projections. As a result, adjuncts are not considered phases with respect to transfer mechanisms. This is supported by the following example as well:

(30)   I gave the [$_{NP}$ girl [$_{CP}$ who knows Peter]] my key to the door.

It can be noticed that the relative clause CP in (30) is spelt out together with the element it is adjoined to, regardless of being a phase-compatible constituent.

       The set merge versus pair merge distinction is evidently valid with respect to external merge (EM), when the element merged into the construction is not part of the element it is merged with (cf. Chomsky 2005: 7). Naturally, external merge takes place when a given element enters the derivation for the first time, regardless of being an argument or an adjunct. On the other hand, internal merge (IM; *ibid.*) takes an element already generated in the structure and re-merges it or its copy into a different position. The question is whether it is set merge or pair merge which merges moved elements into their landing sites in internal merge operations (i.e., syntactically triggered movements). This problem can clearly be captured in the appearance and movement of subject DPs. It is assumed that once a constituent has entered into the construction by set merge, further operations that merge the same element into higher (specifier) positions deprive the moved constituent of its phase-like properties. This is the reason why subject DPs are spelt out together with the CP they are contained within and not as separate phases, which makes them similar to the relative clause in (30) in this respect. In other words, moved elements (i.e., their copies) are merged into the construction by pair merge, not set merge. The following examples show the above assumption:

(31) a. [$_{CP}$ [$_{TP}$ I$_i$ [$_{v*P}$ t$_i$ said [$_{CP}$ [$_{TP}$ they$_x$ have [$_{vP}$ t$_x$ [$_{vP}$ arrived$_y$ [$_{VP}$ t$_x$ t$_y$]]]]]]]]].

    b. [$_{Phase-4}$ I [$_{Phase-3}$ said [$_{Phase-2}$ they have [$_{Phase-1}$ arrived].

    c. *I said have they arrived.

In (31a), the subject of the subordinate clause is base-generated as the internal argument of the predicate; in order to move it out of the lowest phase, it needs to be moved to the left periphery of that phase in order to satisfy the Phase Impenetrability Condition; then it is moved into specTP. (31b) shows in which phase each element ends up during the derivation, prior to its Spell-Out. On the basis of (31c), the subject of *arrive* cannot be considered a separate phase on its own, since − in a bottom-up method − it would be spelt out prior to the transfer of Phase-2 (i.e., the subordinate CP), and hence it would follow the aspectual auxiliary, which is illicit. In sum, it can be claimed that internal merge operations are in fact pair merge operations.

5. CP-extraposition in the case of head-initial phrases

I suggest that we start the discussion on CP-extraposition in the case of head-initial phrases with the following sentence:

(32)   I met [DP a [NP [DegP taller [CP than John]] [NP person]].

During the syntactic derivation, building the construction bottom-up, phase after phase, the following phases and linearizations must be taken into consideration:

(33) a. syntax: [NP [DegP taller   [CP than John]] [NP person]   transfer of CP
         PF: than John

    b. syntax: [DP a [NP [DegP taller [CP *opaque*]] [NP person]]   transfer of DP
        PF: a taller person   than John

    c. syntax: [v*P I [VP met [DP *opaque*]]   transfer of v*P
        PF: I met   a taller person   than John

    d. syntax: [CP [TP Ii [v*P ti [VP *opaque*]]]]   transfer of CP
        PF: I   I met   a taller person   than John

    e. PF: I   I̶ met   a taller person   than John   copy-and-delete

    f. PF: I met a taller person than John   final outcome

In other words, the derivation starts with the transfer of the comparative complement CP[17], which becomes opaque (Chomsky 2001, 2004). Opacity here means that the constituent already spelt out is not available for further syntactic operations, which is in line with the Phase Impenetrability Condition; an opaque phase may have a role during the derivation of the clause after being transferred to the interfaces only if a head equipped with a strong feature higher up in the construction attracts (i) an XP in the left periphery of the phase into its specifier position, (ii) the head of the phase via head-movement, or (iii) the whole phase into its specifier position[18] for feature checking,

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[17] The comparative complement CP is a reduced clause, as everything that follows the subject has undergone ellipsis, which is typical comparative complements (cf. Lechner 1999: 97ff.).
[18] Moving phases as maximal projections that are already opaque is not an uncommon phenomenon; the only requirement is that no syntactic operation be executed inside the phase, while the it is moved as a

hence inducing overt movement and internal merge (*ibid*). The next phase is a DP, and its constituents are spelt out, with the exception of the CP *than John*, which has already been transferred. It is important to mention here that the syntactic derivation cannot order the phonological component to rank the phases already spelt-out: their order is strictly determined by transfer mechanisms.

The transfer of the DP is followed by that of the v*P, sending the elements *I met* to the interfaces. Nevertheless, the subject sits in the left periphery of the v*P, thus remaining in the active zone. After the spell-out of v*P, the subject moves to specTP in order to check the strong EPP feature of the head T. As a result, the subject appears twice at PF, after linearization. As the copy-and-delete nature of movement requires that the highest copy receives phonological interpretation, the lower copy is deleted at PF (Bobaljik 2002, Chomsky 2005: 12).

In sum, it can be claimed that the CP-extraposition phenomenon in head-initial phrases does not include syntactic rightward movement. The solution lies in the fact that the transfer mechanisms involved in the derivation of a clause may alter the final word order, inasmuch as constituents spelt out first will evidently follow those spelt out later.

6. The lack of extraposition in head-final phrases

On the basis of Haider's (2000: 4; 2003) edge effect constraint, it is expected that there is no extraposition in head-final degree expressions. In order to provide an adequate explanation for such a difference, it must be investigated what kind of syntactic differences can be detected between functionally extended head-final and head-initial APs or AdvPs.

If the only difference is that in the case of a head-initial DegP, the comparative complement follows, whereas in the case of head-final DegP, it precedes the degree head, this does not seem to modify the derivational schema outlined in the previous section. Therefore, a more restricted syntactic background is taken as the foundation of the theory. According to Kayne, the universal order of the elements in a phrase is: specifier-head-complement (1994: 35). In this respect, SOV order would also be impossible, unless the complement base-generated as a post-head constituent raises into the specifier position of a functional phrase preceding the head (*ibid*; Koster 1999: 32ff.). This sounds fully compatible with the requirement of strong feature checking.

In addition, it must also be taken into account that in certain languages using head-final VPs (e.g., Dutch or German) there is an extra functional layer on the top of the comparative degree expression, which is responsible for the agreement between the AP/AdvP and the modified element (Corver 1997b: 327ff.). In other words, there is an AgrP on the top, the existence of which can empirically be proven by the following examples:

(34) een dur–*e*   fiets   (*Dutch*)
      an expensive-INFL bike
      'an expensive bike'

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whole. For example, in German the EPP feature of T^0 can be checked by moving the vP, which is already spelt out by then, into specTP. For discussion, see Richards & Biberauer (2005) and Biberauer & Roberts (2006).

(35) Deze fiets   is duur.   (*Dutch*)
      this bicycle is expensive
      'This bicycle is expensive.'

(36) ein kostspielig–*es* Fahrrad   (*German*)
      an expensive-INFL bicycle
      'an expensive bike'

(37) Dieses Fahrrad ist kostspielig.   (*German*)
      this   bicycle is expensive
      'This bicycle is expensive.'

In (34)-(37), absolute adjectives can be seen. According to Corver (1997b: 327), the inflection morpheme *–e* in Dutch attributive DegPs is obligatory, which supports the existence of AgrP on this level; the same phenomenon can be noticed in the German examples as well. Corver also proves that this AgrP is head-final (*ibid*: 344ff.). However, in Kayne's universal order, the head-finality of the AgrP can be guaranteed only if the DegP is generated as the complement of Agr, and then moved to specAgrP:

(38) $[_{AgrP}$ $[_{DegP}$ $[_{AP}$]$[Deg^0$ CP/DP]]$_i$ Agr $t_i]$

In the representation above, the comparative complement – along with the rest of the functionally extended degree expression – is base generated as a complement in a position following the Agr head. Later, in order to derive the head-final AgrP, the whole degree expression – along with the comparative complement – is moved into the specifier position of AgrP[19].

Nevertheless, in connection with this instance of complement-to-specifier movement, it may be asked what triggers overt movement here. Strong Edge Features (EF) mentioned by Chomsky (2005) may appear as the trigger of overt movement, which are responsible for the obligatory overt agreement between the adjective and the modified head. Still, it must also be kept in mind that such features can be found on phase heads (*ibid*), and movements to other positions (e.g., specTP) can be triggered by features derivative of those found on phase heads (*ibid*)[20]. If the presence of phase heads is necessary to place strong features into the construction, the question is whether a phase-compatible maximal projection can be found on the top of the degree expression. However, even if this were the case, the phase would still not be transferred before the Spell-Out of the modified head, and it still would not follow the modified head in the final word order, as the degree expression in attributive constructions is merged into the structure by pair merge. In other words, even if a degree expression had a

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[19] This certainly does not mean that AP-NP agreement strictly co-occurs with head-finality, as there is such agreement in Spanish head-initial phrases, too (e.g., *famosas*PLUR-FEM *ciudades*PLUR-FEM 'famous cities'). However, according to Zagona (2002: 238), agreement in Spanish is sublexical, it is syntactically inert, and therefore it is invisible for syntactic processes. In this respect, it may be argued that the Spanish equivalent of the Agr head in (38) is not equipped with a strong feature, and therefore no movement could derive a head-final order.

[20] It may be problematic to determine which strong feature triggers the movement of the whole functionally extended degree expression (QP) to specAgrP exactly. Chomsky (2001, 2004) regarded EPP as a potential strong feature, which was subsequently changed to EF (2005). Still, due to the theoretical doubts cast upon these features, this question will be answered by future research.

phase-compatible XP as its highest maximal projection, it would still be transferred to the interfaces together with the modified head.

I suggest that – on the basis of the above representation – the derivation of (7) should be looked at, which is repeated below:

(39) Er hat es [viel weniger oft als ich (dachte)] geprobt.   (*German*)
he AUX that much less   often than I   thought   rehearsed
'He rehearsed it much less often than I thought.'

(40) a. syntax: [CP als ich dachte]   transfer of CP
        PF: als ich dachte

    b. syntax: [AgrP[viel weniger oft [als ich dachte]] *Agr* [viel weniger oft [*opaque*]]

        PF: als ich dachte

    c. syntax: [v*P er [es [AgrP[viel weniger oft [als ich dachte]] *Agr*
            [viel weniger oft [*opaque*]] geprobt]]   transfer of v*P
        PF: er es viel weniger oft als ich dachte viel weniger oft
            geprobt als ich dachte

    d. syntax: [CP er_i hat [v*P t_i [*opaque*]]   transfer of CP
        PF: er hat er es viel weniger oft als ich dachte viel weniger
            oft geprobt als ich dachte

    e. PF: er hat ~~er~~ es viel weniger oft als ich dachte   copy & delete
            ~~viel weniger oft~~ geprobt ~~als ich dachte~~

    f.   Er hat es viel weniger oft als ich dachte geprobt.   final outcome

It can be seen in the derivation that the comparative complement CP is transferred first. This is followed by the transfer of the next phase (v*P). After the whole degree expression – including the comparative complement CP already spelt out – undergoes movement to specAgrP[21], the CP reaches another phase level (v*P), and the syntactic derivation – together with the elements of the upper phase – transfers the CP to the phonological component again. Therefore, the second phase (v*P) includes two copies of the degree expression: the higher one in specAgrP and the lower one where it was

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[21] This movement, similarly to that of DP subjects already mentioned, is not peculiar in any way, as it is possible to spell out a constituent more than once. This is exemplified below:
(i)   [CP3 [CP2 When she asked [CP1 what he was doing]]_i [CP3 he [vP ran away t_i].
It can be seen that CP2 is generated as an adjoined modifier inside the vP, and then it is moved to the left periphery and is adjoined to CP3. However, CP1 is a complement contained within CP2. This means that CP1 must have been transferred to the interfaces earlier than CP2 due to cyclic Spell-Out. Still, after CP2 is moved leftward, a copy of CP1 is also created in the landing site of CP2. As a result, even though CP1 is a phase-compatible maximal projection in a complement position, when it is spelt out for the second time (after movement), it is transferred to the interfaces when CP2 is, and because the latter is merged into the construction by pair merge after being moved, it is spelt out together with CP3. As CP1 has two copies, the higher copy will actually be pronounced, and the other one will be deleted at PF (Bobaljik 2002, Chomsky 2005: 12).

base-generated. It must be kept in mind that it is the lower copy of the degree expression in which the comparative complement has been spelt out, whereas the higher copy of the degree expression includes a copy of the comparative complement as well. Due to the copy-and-delete nature of movement, only the higher copy of the CP will actually be pronounced, similarly to that of *viel weniger oft*. As already mentioned, the degree expression is not regarded as a phase on its own, as it is merged into the construction by pair merge, being an adjunct of the VP.

Hence, the movement of the degree expression (i.e., QP, including the comparative complement) to specAgrP provides adequate explanation for the difference between head-initial and head-final degree expressions with respect to extraposition.

7. The edge effect constraint in the light of cyclic transfer

It was suggested in section 3 that the edge effect constraint should be maintained for cases where the element intervening between the modifier head and the modified head is not as big as a phase. However, in the light of Phase Theory, certain modifications of the constraint are possible.

First of all, if edge effect violations can be obviated by extraposition induced by cyclic transfer mechanisms, which has noticeable word order results only after linearization at PF due to the order of the derivational processes, the edge effect constraint cannot be syntactic in nature; in fact, it is supposed to be operative at PF[22]. This is supported by examples in which the comparative complement consists of phonologically non-prominent elements, and they do not violate the edge effect constraint in their original position either:

(41)   More often [than not] I eat breakfast.

The comparative complement in (41) does not include overt and prominent constituents of a (reduced) clause, only the negative can be seen after the linearization of the clause.

Second, on the basis of Kayne (1994: 35), head-final phrases can be accounted for by generating the complement of the head as a post-head complement and moving it into a functional specifier position. This movement deprives the phase-like features of moved constituents, as the complement is pronounced in a position preceding its head. This explains the lack of edge effects in head-final phrases, as different phase boundaries and different stress patterns exist in them due to pair merge.

Accordingly, the constituents filtered out by the edge effect constraint are (i) phonologically prominent, (ii) they are complements of a pre-head modifier, and (iii) they can be found in the same phonological phrase as the modifier head and the modified head. By providing a phase-based approach to the extraposition in comparatives, it is explained why an extraposed comparative complement can survive,

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[22] The question which rules of prosody or metrical phonology are violated in edge effect violations cannot be answered here due to the limits imposed on the length of the present article. It is possible that the solution may be found in a model based on Liberman & Prince (1977). For example, there may be a grid clash between the complement of the modifier, which can be a phonological phrase on its own, and the modified head. It could also be interesting to investigate whether the prominence of the modifier equipped with a complement is in conflict with the weak-strong binary metrical tree, and hence the modifier would be more prominent than the modified head. Nevertheless, this is going to be answered by future research.

as it is transferred to the interfaces earlier, hence it is not part of the phonological phrase that includes the modifier head and the modified head.

Furthermore, a phase-based approach also explains why complements smaller than a phase cannot avoid the edge effect constraint. Let's examine the example below:

(42) a. *an afraid [PP of snakes] girl

b. *an afraid girl [PP of snakes]

In (42a), the PP complement of snakes is not a phase, and that is why it is in the same phonological phrase that includes the modifier head and the modified head as well, which contradicts the edge effect constraint. On the other hand, (42b) is ungrammatical because (i) there is no syntactically motivated rightward movement to take care of the PP, and (ii) the *afraid of snakes* sequence is a left-adjoined modifier inside an NP, and nothing can be extracted out of an adjunct by syntactic movement (*Condition on Extraction Domain*, Huang 1982: 505; *Adjunct Island Condition*, Johnson 2002: 1). That is why (42b) cannot be derived by syntactic operations without violating the Condition on Extraction Domain[23].

8. DP-extraposition in phrasal comparatives

It was mentioned in section 2 that certain languages can manifest the standard value of comparison with an inherently case-marked DP. As DPs can turn to be phonological phrases at PF, edge effects are expected to be detectable in such constructions as well. In fact, this prediction is borne out, as can be seen in the examples below:

(43) a. *Láttam   egy magas-abb Jánosnál férfit.   (*Hungarian*)
        see-PAST-1st-SG a   tall-er   John-ADE man-ACC
        'I saw a man taller than John.'

b. Láttam   egy magas-abb férfit   Jánosnál.   (*Hungarian*)
        see-PAST-1st-SG a   tall-er   man-ACC John-ADE
        'I saw a man taller than John.'

The DP in Adessive case (*Jánosnál* – 'than John') represents the standard value in both cases; still, in (43a) it immediately follows the degree head, which hosts the comparative marker (*–(a)bb* – '–er'), whereas in (43b) it appears at the end of the clause.

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[23] Bhatt & Pancheva (2004) propose an alternative approach to rightward movement in comparatives, in which the degree head moves out of a left-adjoined degree expression, and it moves into a position that follows the modified head; the *than*-XP enters the construction at this point via countercyclic late merger, as the complement of the degree head. However, there are many discrepancies between this analysis and present-day minimalist assumptions. First of all, it includes rightward movement, which cannot be triggered syntactically, mainly due to its direction. Second, it violates the Condition on Extraction Domain, which has been mentioned, as this instance of syntactic rightward movement extracts a constituent (i.e., the head) of a left-adjoined modifier and right-adjoins it to the construction at some level, which makes the analysis doubtful.

In accordance with Svenonius (2004), Hiraiwa (2005) and Chomsky (2005: 10), DPs are considered to be phase-compatible constituents. As *Jánosnál* is the complement of the degree head in (43a-b), there is no reason to believe why it would not act as a phase. Building the construction in a bottom-up fashion, the first phase ready for Spell-Out is this DP; therefore, it follows the rest of the elements, which belong to later cycles in the final word order.

9. Conclusion

The aim of this article was to provide an adequate explanation of rightward movement in attributive comparatives. The explanation was based on tools provided by Phase Theory as well as prosodic transfer mechanisms.

In head-initial phrases, the phase-sized comparative complement is extraposed, because it is spelt out earlier than the remaining constituents of the degree expression. As a result, the earlier a syntactic object is spelt out, the later it will be pronounced in the final word order.

In head-final phrases, the final position of the comparative complement is affected by the existence of a functional phrase (AgrP) on the top of the degree expression, and the whole degree expression (including a copy of the comparative complement) is moved into the specifier of this phrase, thus a higher copy is created. The lack of extraposition is determined by the existence of the AgrP, which is head-final inasmuch as it triggers the movement of the degree expression into its specifier.

The explanation of extraposition in phrasal comparatives is based on the same grounds as in the case clausal comparative complements, as both CPs and DPs are phase-compatible constituents.

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