The syntax and semantics of Spanish comparatives

Luis Miguel Toquero-Pérez
University of Southern California

1   Introduction

The purpose of this paper is to provide a uniform theory of Spanish comparative sentences. Spanish comparatives can be introduced by either a complementizer *que* ('that') or a preposition *de* ('of'). Recent analysis such as Mendia (2019) argued that this uniformity is not possible, and have proposed a theory which entails some lexical ambiguity in the comparative morpheme *más* ('more'). I will review their arguments and provide evidence that these analyses make some empirically undesirable predictions. Contrarty to these theories, I present evidence to support an analysis that assumes a single lexical entry for *más* as a generalized quantifier over degrees.

In Section 2 I present the basic data regarding comparative sentences in Spanish. The section finishes with the syntactic and semantic requirements necessary for the constructions and poses some questions that will be answered throughout the paper. The next section (Section 3) is a summary of Mendia's (2019) proposal outlining the challenges it faces: extraposition, ellipsis resolution and constituency. Once these have been established, Section 4 will be concerned with my theory of comparatives. Section 5 will come back to extraposition and its interaction with scope that on the surface seems problematic but that a closer examination shows the opposite. And Section 6 is the conclusion.

2   Phrasal and clausal comparatives: syntactic and semantic requirements

Spanish has the property of expressing comparison with two different syntactic structures: comparison introduced by *que* 'that' (1a), and by *de* 'of' (1b):

(1) a. Pedro ha leído más poemas **que** María
         Pedro has read more poems   that María

         'Pedro has read more poems than María.'
     b. Pedro ha leído más poemas **de** lo   que dijo María
         Pedro has read more poems   of CL.NEUT. what said María

         'Pedro has read more poems than what María said.'

As indicated by the examples, the different morphemes that introduce the standard of comparison suggest what the syntactic status of the standard is: *que* comparatives are introduced by a complementizer, while *de* comparatives are introduced by a preposition. The former take CP-like complements, while the latter take DP-like elements. In fact, following some literature on the issue (Price 1990), this can

be tested by looking at three different diagnostics: the size of the standard, the (im)possibility of ellipsis, and the (im)possibility to combine with free relatives.

If more than one element is allowed inside the standard of comparison, then it must be clausal (2a). Phrasal comparatives do not allow more than one syntactic object (2b):

(2) a. Tu   padre compró más   revistas   esta semana que tu   madre la
       your father bought more magazines this week   that your mother the
       semana pasada
       week   last
       'Your father bought more magazines this week than your mother (did) last week.'

    b. *Esta semana tu   padre compró más   revistas   de dos la semana
       this   week   your father bought more magazines of two the last
       pasada
       week
       Int.:'This week your father bought more magazines than two last week'

Besides, CP-like elements should be able to undergo some sort of ellipsis (Reglero 2007, Brucart 2003) (3),as opposed to DP-like elements (4).

(3) a. Juan dio más abrazos a María que Julián dio   a Cooper
       Juan gave more hugs   to María that Julián gave to Cooper
       'Juan hugged María more than Julián hugged Cooper'
    b. Juan dio más abrazos a María que Julián a Cooper
    c. Juan dio más abrazos a María que Julián

(4) Juan dio   más abrazos de lo   que Cooper *{dice}
    Juan gave more hugs   of CL.NEUT. what Cooper says
    'Juan gave more hugs than what Cooper says'

The fact that ellipsis is not permitted inside free relatives maps onto the existing body of literature that argues for a DP analysis of free relatives. In fact, unlike *de* comparatives, *que* comparatives cannot introduce a free relative; they may introduce a headless relative clause instead (5) (see Donati 1997, Cecchetto & Donati 2010).

(5) Juan dio más abrazos que {*lo   que dice Cooper/ los
    Juan gave more hugs   that CL.NEUT. what says Cooper/ DET.PL.MASC.
    que dice Cooper}
    that says Cooper
    'Juan gave more hugs than what Cooper says/ the ones Cooper says'

That said, there is a syntactic constraint in Spanish comparatives: *que* only introduces clausal complements; *de* only combines with DP-like complements.

A closer look at their semantics reveals that what is being compared is also distinct. Although they both make reference to dgrees, *que* compares "individuals" while *de* compares "degrees" or "measurable amounts". One way to test for this intuition, as proposed by Mendia (2019), is to use the demonstrative pronoun *eso* 'that', which can either refer to an individual or a degree.[1]

(6)   Context: The shirt is older than ten years

La   camisa es más   vieja {de/ *que} eso$_d$
The shirt   is more old   of   that   that

'The shirt is older than that'

(7)   Context: I have an old tee and an older shirt. Pointing at the tee

La camisa es más   vieja {*de/ que} eso$_e$
the shirt   is more old   of   that that

'The shirt is older than that'

(6) is comparing "degrees" (i.e. the age of the shirt is a measurable quantity); (7) is comparing "individuals" (i.e. the shirt and the tee). Based on this argument, and following Mendia (2019), I am assuming that, on top of the syntactic constraint, there is a semantic requirement:

(8)   Semantic Requirement on comparatives
      a. *que* takes an argument of type <dt>.
      b. *de* takes an argument of type *d*

The question that these two assumptions raise is whether a uniform analysis of the two types of comparatives is possible considering that the standards of comparison they introduce belong to different semantic types. One available answer is the one provided by Mendia (2019) who argues that such uniformity is not possible. Nevertheless, as I show below, there are some problems with his analysis which makes us rethink the issue. Contrary to Mendia, I propose that uniformity is actually a possible, desired and more parsimonious alternative; and it can be achieved by making the following two claims:

(9)   a. The comparative morpheme *más* takes two arguments of type <dt>.
      b. The preposition *de* is not semantically vacuous.

These are not brute force stipulations: (9a) provides a uniform treatment of all comparatives and has been argued for by Heim (2001) and Bhatt & Pancheva (2004); (9b) enables it and is reasonable because expressions should not be semantically vacuous.

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[1]The subscript *d* will be used to indicate that the demonstrative is denoting a degree; the subscript *e* will be used to indicate an individual.

3   Mendia's (2019) non-uniform analysis

Mendia (2019) makes use of a degree-semantics analysis that places the distinction between phrasal and clausal comparatives not in the standard morphemes themselves but in the comparative marker *más*, as shown in (10) and (11):

(10) $[\![m\acute{a}s_{clausal}]\!] = \lambda P_{<dt>}.\ \lambda Q_{<dt>}.\ [MAX(Q) > MAX(P)]$

(11) $[\![m\acute{a}s_{degrees}]\!] = \lambda R_{<d,et>}.\ \lambda d_d.\lambda x_e.\ MAX(\lambda d'.R(d')(x)) > d$

Following Heim (2001), Mendia (2019) adopts the 'classical analysis' for clausal comparatives that assumes a structure in which the standard is generated as a complement of the comparative marker *más*. This is illustrated in (21). *más* is the head of its own projection, a DegP sitting in the specifier of an XP whose head serves as restrictor. According to the entry in (10), the comparative marker $[\![m\acute{a}s_{clausal}]\!]$ is a generalized quantifier over degrees of type <dt, <dt, t> > that takes two arguments: [que + CP] of type <dt> and λd.TP, also of type <dt>. The second argument is originated via movement of the DegP: QR to a node of type *t*. The motivation for the QR analysis follows from extraposition (12) and scopal interactions with modals (13):

(12)   Extraposition
    a.   Los zapatos son más   caros   [que en las rebajas] en las tiendas
        the shoes   are more expensive that in the stores   in the stores
        ahora
        now
        'the shoes are more expensive than during sales in the stores now'
    b.   Los zapatos son más   caros   en las tiendas ahora [que en las
        the shoes   are more expensive in the stores   now   that in the
        rebajas]
        sales
        'The shoes are more expensive in the sotres now than during sales'

(13)   Scopal interactions with modals
    a.   Pedro tiene que saltar   menos alto que Juan
        Pedro has   that to-jump less   high that Juan
        'Pedro has to jump less than Juan'
    b.   Modal > less: 'The requirement is that Pedro must jump less high than Juan'
    c.   Less > modal: 'The minimal height required for Pedro's jump is lower than Juan's jump' (no upper bound limit)

On the contrary, the morpheme *más* in phrasal comparatives as indicated by the lexical entry in (11) is not a generalized quantifier over degrees. A direct consequence of $[\![m\acute{a}s_{degrees}]\!]$ not being a quantifier is that it has to be interpreted in-situ. It takes three arguments in the following order: a gradable predicate, a degree, and an individual. This semantics has several consequences on the syntactic structure of phrasal comparatives given that the order in which elements combine at LF has

to match the surface syntactic order. This means *más* heads the DegP and takes the gradable predicate as a complement, whereas the standard morpheme is adjoined to the maximal projection.

This predicts that extraposition should not be expected. Although Mendia (2019) claims that this prediction is borne out, he does not consider the full paradigm here. It is true that extraposition when the standard is a numeral is not allowed (14). But other DP-like elements can appear in the standard and allow extraposition (15): inflected D head + NP; and, neuter D head + adjective; and free relatives:

(14) *Los zapatos están más baratos en la   tienda ahora [de \$ 100]
the shoes   are   more cheap in the store now   of \$ 100

'The shoes are cheaper in the store now than \$ 100'

(15) Los zapatos están más baratos en la   tienda ahora {de lo   normal/
the shoes   are   more cheap in the store now   of the.NEUT. normal/
de la   cuenta/ de lo   que costaban   antes}
of the.FEM.SG. count/ of CL.NEUT. what cost.IMPF.3PL. before

'The shoes are cheaper in the store now than{what's normal/ their usual price/ what they were before}

So there is a generalization with respect to comparatives introduced by PPs that Mendia's analysis is unable to capture:

(16) Clausal extraposition of a phrasal comparative is allowed unless the complement introduced by the preposition is a bare numeral.

A second challenge is the incompatibility with the Ellipsis-Scope generalization (Williams 1977, Bhatt & Pancheva 2004):

(17) The scope of a DegP containing elided material must contain the antecedent of the ellipsis.

But if there is no QR, how how would we explain ellipsis resolution in the free relative clause?[2]

(18) Pedro quiere ser   más alto de lo   que pensamos   {que
Pedro wants to-be more tall of CL.NEUT. what think.PRES.1PL. that
quiere ser   d-alto/   ser   d-altos}
wants to-be d-tall.SG.MASC./ to-be d-tall.PL.MASC.

Pedro wants to be taller than what we all believe {he wants /to be}'

A third challenge is related with constituency, if *más* and the NP "books" are a constituent, (19a) is unexpected: *más* should be followed by the NP, never by the prepositional phrase. This example suggests that *más* takes the phrasal standard as a complement in the syntax and as its first argument in the semantics:

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[2]Curly barckets indicate in the example potential elided material.

(19) a. Compré   [más de dos] libros
boughtPERF.1SG. more of two books

'I bought more than two books'

b. Compré   más libros [de dos]
boughtPERF.1SG. more books of two

'I bought more books than two'

Besides, if this is the case, (19b) shows that some sort of local extraposition must have taken place.
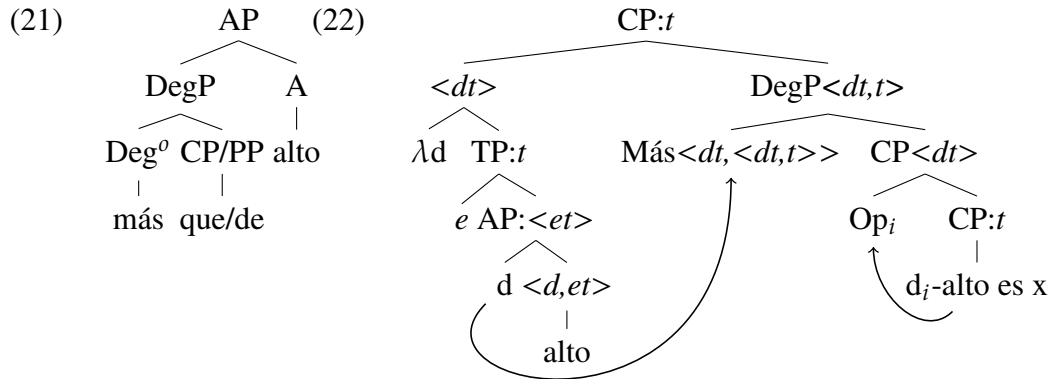
Given that I have identified some challenges with Mendia's (2019) theory of comparaitives, I propose an alternative theory in Section 4 which provides a uniform treatment of both phrasal and clausal comparatives in Spanish.

4 A uniform theory of *que/de* comparatives

Before I present the nitty gritty details of the proposal, I should mention that I am adopting the 'classical analysis' of comparatives à la Heim (2001) and Bhatt & Pancheva (2004). This analysis assumes the following structure for the comparative as illustrated by (21), treating *más* as a generalized quantifier over degrees of type <dt, <dt,t».[3] In other words, there is only one lexical entry for the morpheme which is the one in (10) repeated in (20).

(20) $[\![más]\!] = \lambda P_{<dt>}. \, \lambda Q_{<dt>}. \, [MAX(Q) > MAX(P)]$

As already mentioned when describing (10), $[\![más]\!]$ takes two set-of-degrees arguments. A tree is provided to illustrate the sentence in (7). Extraposition has been included in this tree but will not be included in subsequent derivations for ease of exposition.

(21)   AP   (22)

DegP   A

Deg^o CP/PP alto

más que/de

CP:*t*

<dt>   DegP<dt,t>

λd   TP:*t*   Más<dt,<dt,t>>   CP<dt>

e AP:<et>   Op$_i$ CP:*t*

d <d,et>   d$_i$-alto es x

alto

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[3]This is a simplified version of the comparative structure for the purposes of illustration. See Embick (2007) for an extended version. In Embick's (2007) extended version the DegP is introduced as the specifier of *a*P.

However, although this lexical entry for $[\![m\acute{a}s]\!]$ appropriately computes the meaning for clausal comparatives given that the CP is of type <dt>, it would fail to compose with phrasal comparatives if, as I assumed, they are of type d. This can be solved if we assume that the preposition *de* is not semantically vacuous. Instead it will take the standard of type d as its argument and return an element of the appropriate type to combine with the comparative morpheme. The lexical entry for the preposition is given in (23):

(23) Lexical entry for *de*
      $[\![de]\!] = \lambda\text{d'}_{<d>}.\lambda\text{d}_{<d>}.[d' \geq d]$
      the set of degrees smaller than or equal to d' '

The lexical entry for the preposition de in (23) denotes a function from degrees d to sets of degrees <dt>.[4] An example of semantic composition is provided in (24) for the sentence in (6). Analogous to (22), the comparative morpheme is generated in the specifier of the AP. It then undergoes QR for type mismatch to a node of type t. After QR, the PP introducing the standard of comparison is late merged into the structure. Semantic composition takes place appropriately given that the PP provides a suitable argument for the comparative morpheme.

(24)
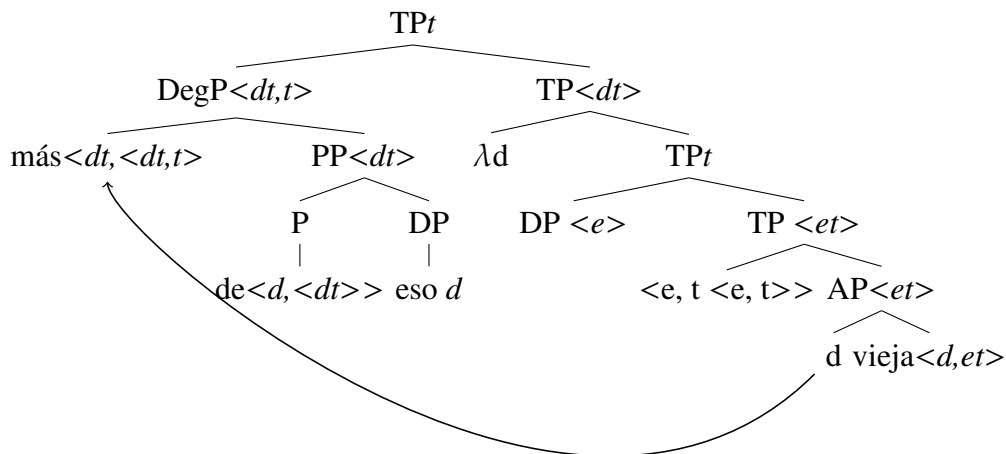
That said, the proposal here makes the right predictions with respect to the constituency problem mentioned in Section 3: the gradable predicate or DP element and the comparative morpheme never form a constituent. The gradable predicate/DP projects its own XP and the DegP is merged in the specifier position of

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[4]One may wonder now whether by giving *de* a lexical entry to return a type <dt> argument we have pushed the ambiguity problem into a different domain. This is a legitimate concern to have. However, this is not a problem if one thinks of *de* as a polymorphic typeshifter defined as a type $< \sigma < \sigma t>$ where σ could be of any possible type (Charlow 2019). Thus, if σ is of type d, now we have $< d < dt>$. Thank you very much to Deniz Rudin for pointing this out to me.

that XP just like what happens with clausal comparatives. As a result, the standard of comparison is merged as the complement of *más*. The semantic derivation of (19a) is given in (26). One must note that since we are not dealing with a gradable predicate, we need to introduce a Measure Function (Mendia 2019) that will take the NP into a gradable predicate:

(25) $[\![Measure]\!] = \lambda P_{<e,t>}.\ \lambda d_d.\lambda x_e[P(x) \wedge |x| \geq d]$

(26) LF: $[_{TP_3} [_{DegP}$más $[_{PP}$de dos$]]_{DegP} [_{TP_2} \lambda d [_{TP_1}$ Pedro $[_T$ compró $[_{DP_2}$ d $[_{DP_1}$ (meas) libros$]]]]]]$

    a. $[\![DP1]\!] = \lambda d.\exists x[\text{book}(x) \wedge |x| \geq d]$
    b. $[\![DP2]\!] = \exists x[\text{book}(x) \wedge |x| \geq d]$
    c. $[\![TP1]\!] = \exists x[\text{book}(x) \wedge \text{buy}(y,x) \wedge |x| \geq d]$
    d. $[\![PP]\!] = \lambda d.\ two \geq d$
    e. $[\![DegP]\!] = \lambda Q_{<dt>}.\ [\text{MAX}(Q) > \text{MAX}(\lambda d.\ two \geq d)]$
    f. $[\![TP3]\!] = \exists x[\text{MAX}(\lambda d.[(\text{book}(x) \wedge \text{buy}(y,x)) \wedge |x| \geq d]) > \text{MAX}(\lambda d.\ two \geq d)]$
    g. Meaning = "There is a plurality of books s.t Pedro bought them, and the cardinality of that plurality exceeds 2". In other words, there is a number of books that Pedro bought and that number is bigger than two.

I have shown that the constituency challenge can be repaired. Let's move on now to see how the ellipsis site within the free relative is licensed. In free relatives, there is movement of the *wh*-operator to the left periphery of CP which causes a relabelling of the whole clause which now becomes a DP (Donati 1997). In Spanish, both [lo *Op*] and [*Cuanto*] are quantity relative pronouns whose denotation is provided in (27):

(27) $[\![[Cuanto\ /lo\ que]]\!] = \lambda P_{<dt>}.\text{MAX}[\lambda d.P(d)]$

According to (27), the type of the relative pronoun is <dt, <dt> > just like *más*. therefore, it must move to a node of type *t* to resolve type mismatch leaving a trace of type *d* in situ, and creating a λd as a result of this movement that it will take as its argument. This is shown in (28) and the LF composition is shown in (29).

(28)
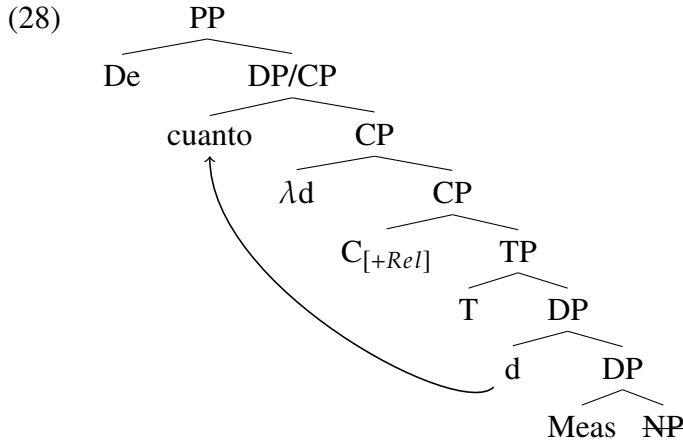
(29) LF: [$_{PP}$ de [$_{DP/CP}$ cuanto [$_{CP_1}$ λd [$_{TP}$Pedro compro [$_{DP}$ d Meas ~~caramelos~~]]]]]

'than how-much Pedro bought ~~candy~~'

  a. $[\![DP]\!] = \lambda d.\exists x[\text{candy}(x) \wedge |x| \geq d]$
  b. $[\![TP]\!] = \exists x[(\text{candy}(x) \wedge \text{buy}(p,x)) \wedge |x| \geq d]$
  c. $[\![CP1]\!] = \lambda d.\exists x[(\text{candy}(x) \wedge \text{buy }(p,x)) \wedge |x| \geq d]$
  d. $[\![DP/CP]\!] = [\lambda d.\exists x[\text{MAX}(\text{candy}(x) \wedge \text{buy }(p,x)) \wedge |x| \geq d]]$
  e. $[\![PP]\!] = \lambda d.[\exists x[\text{MAX}(\text{candy}(x) \wedge \text{buy }(p,x)) \wedge |x| \geq d']] \geq d$

The type of the $[\![DP/CP]\!]$ in (29d) is d (i.e. a degree). But this cannot combine with $[\![más]\!]$ in (20) because $[\![más]\!]$ requires a set of degrees <dt>. The preposition *de* lifts the type of its argument: a function from degrees to sets of degrees. (29e) then composes with $[\![más]\!]$ in (20)

That said, we can now go back to (18) which is ambiguous between two possible interpretations. These are obtained by making QR available to two different positions in the structure: narrow ellipsis by QRing to the non-finite TP, and wide ellipsis by QRing to the matrix TP above *querer*. The two possibilities are shown in (30) and (4).

For (30), given that QR has taken place to the embedded TP above PRO, the ellipsis site has been resolved by copying that TP into the free relative. What is more, this entails that PRO is no longer coindexed with Pedro in the matrix clause but with the subject *nosotros* 'we' in the standard of comparison. Note that coindexation with Pedro is in fact impossible.

(30)
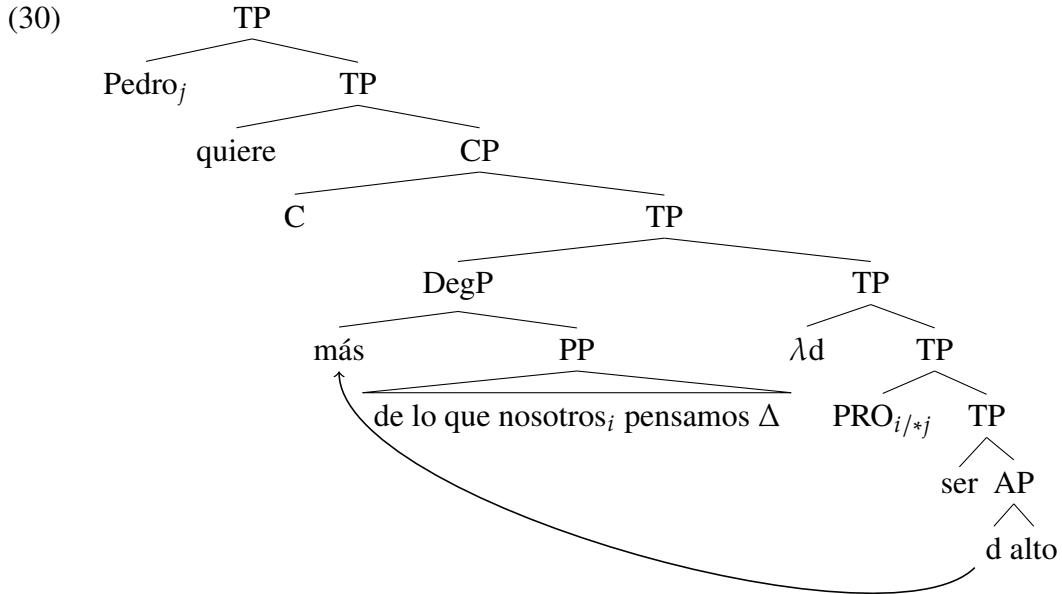
On the contrary, in (4), QR of the DegP to the matrix TP renders a different result: the antecedent of the ellipsis is now the whole clause "Pedro wants to be d-tall"; thus the ellipsis site is repaired with such an antecedent. Given that the closest controller for PRO is *Pedro*, coindexation is allowed.
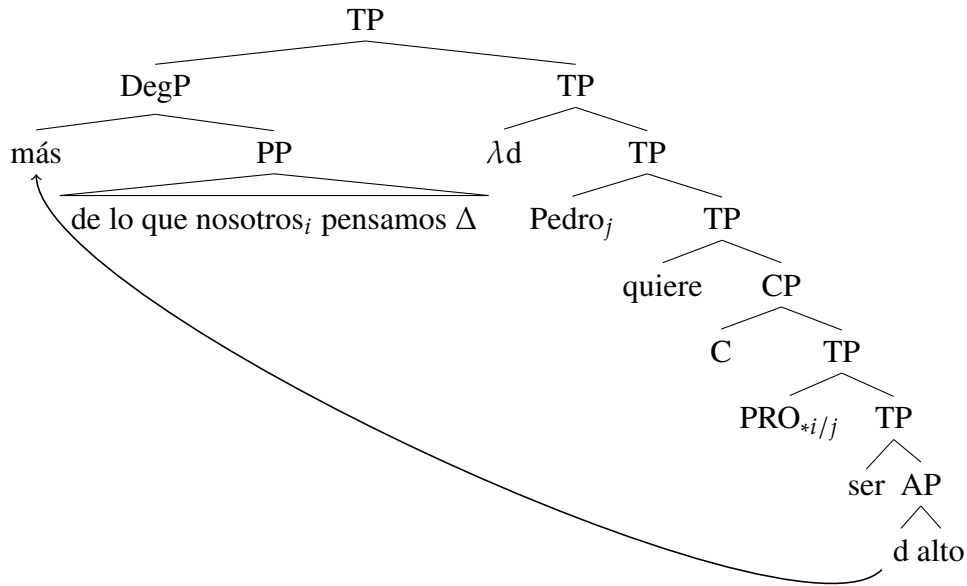
These data points entail that the Ellipsis-Scope generalization in (17) is satisfied considering that the DegP must contain the antecedent of the ellipsis in its scope. In addition, assuming this structure and semantics for comparatives gives us extraposition facts of free relatives in the standard of comparison.

5 The extraposition generalization and scope

In Section 2, I presented a generalization in (16) regarding extraposition of phrasal comparatives. The generalization is given in (31) again for convenience:

(31) Clausal extraposition of a phrasal comparative is allowed unless the complement introduced by the preposition is a bare numeral.

As I have shown there is indeed clausal extraposition of phrasal comparatives with free relatives and non-numeral DPs. We should then expect scopal interactions with intensional operators. Mendia (2019) claims that this is not the case, at least for free relatives. I would like to say the opposite. In cases like (32) and (33) it is possible to get the inverse scope interpretation with no "upper limit":

(32) Pedro tiene que saltar   menos alto de lo   que saltó   Juan
      Pedro has   that to-jump less   high of CL.NEUT. what jumped.3SG Juan
      'Pedro has to jump less high than what Juan did'
      a. Modal > less ✓
      b. Less > modal: 'The minimal height required for Pedro's jump is lower than Juan's jump' (there is no upper bound limit: he can jump less or more)

(33) Pedro tiene que saltar   menos alto de lo   normal
     Pedro has   that to-jump less   high of CL.NEUT. normal

'Pedro has to jump less than what's normal'

a. Modal > less ✓

b. Less > modal: 'The minimal height required for Pedro's jump is lower than what is considered normal for him' (there is no upper bound limit: he can jump less but he can also jump more)

The sentences with the inverse scope reading become available in the following contexts:

(34) Contexts for the inverse scope reading of (32) and (33):

a. Pedro and Juan are competing in the Olympics. Pedro is many points ahead of Juan, so it possible that he will win anyway; thus, the minimal height required for Pedro's jump to win is lower than Juan's jump but he can always jump higher.

b. Pedro is competing in the Olympics. His average jump height is 2.5 meters. He is ahead of his competitors, and so a jump below his average height would make him win. But he can also jump higher than that.

The question is now how do we explain the lack of clausal extraposition of phrasal comparatives with a numeral. Although potentially problematic, these cases can be dealt with if one assumes that there are DP-internal scope positions (Heim & Kratzer 1998: sec. 8.5; Bhatt & Pancheva 2004). Thus, then it is also possible to merge the degree clause more locally within the DP after DP-internal QR of the degree head (35). These would make sense because in these cases where no ellipsis needs to be resolved, there is no need for the degree operator to QR that high. It is constrained by Scope Economy (Fox 2000).[5]

(35)   Pedro compró [$_{DP}$ [t$_{mas}$ libros] [$_{DP}$ más [$_{PP}$ de dos]]]

6 Conclusion

In this paper I have argued for a uniform analysis of comparatives in Spanish despite the fact that two possible strategies are possible. Treating ⟦más⟧ as a generalized quantifier over degrees is not only empirically appropriate, but also conceptually desired; and it follows from the fact that items such as *de* must have a lexical entry in the semantics: it denotes a function from degrees to sets of degrees. A uniform analysis of comparatives follows proposals like Wellwood (2019) that provide a single lexical entry for the comparative morpheme. In fact, as Alexis Wellwood (p.c.) notes an analysis like Mendia (2019), also proposed by Kennedy (1999) before him, entails an ambiguity of sorts for *more/más*, itself unsupported in the morphosyntactic evidence across languages.

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[5]Providing an explanation for why sentences like (33) are not constrained by Scope Economy and pattern like free relatives is beyond the scope of this paper. But impressionistically, there is some sort of anaphoric material in these DPs that needs to be licensed. It is perhaps via QR that the anaphoric content is provided.

Acknowledgments

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