

Measuring Cardinalities: Evidence from Differential Comparatives in French

Introduction

In this article, we show that comparatives of cardinality (e.g. *more books*) are special: cardinality differs from other dimensions, e.g. tallness, in that it can only be measured out using strictly numerical measures. Our primary data in this paper comes from nominal comparatives in French, e.g. *plus de livres* ‘more books’ (where one compares numbers of books): certain differentials cannot straightforwardly combine with the degree head *plus*. Those are numerically quantified noun phrases (Num NP), for example *trois livres* ‘three books’, which cannot combine with the degree head in a nominal comparative the same way that measure phrases, e.g. *trois centimètres* ‘three centimeters’, combine with the degree head in adjectival comparatives.¹ We derive the inability of Num NP differentials to combine with nominal comparatives from the fact that nominal cardinality comparatives degree quantify over pure cardinalities while Num NP only gives cardinalities of NP. We also show how French circumvents the problem of combining Num NP with the degree head *plus* by resorting to a special structure, signaled by the presence of the preposition *de* before *plus*, where the differential is a verb argument (in many languages cardinality comparatives with differentials end up with a surface syntax that is quite different from their differential-less siblings (see Bhatt & Homer 2019)). In this structure, the degree quantifier lacks sortal information since it does not combine with an NP. It therefore ranges over unspecified degrees, information about which is provided by the differential phrase. French shows us that there is flexibility in the way a quantificational head (the degree quantifier *plus*) combines syntactically with its semantic arguments. Depending upon the kind of degrees this quantifier quantifies over, its semantic arguments enter different syntactic structures.

Section 1 provides the empirical background: we show that combining *plus* in a nominal comparative with a differential is subject to strict limitations: Num NP measure phrases (e.g. *trois livres*) are excluded, while ‘quantity words’, i.e. words like *beaucoup* ‘much’, which can be used as degree quantifiers or as comparative modifiers, are possible (a non-exhaustive list of quantity words in English is: *few, little, much, many*). In Section 2, we offer an explanation for the dichotomy between measure phrases and bare quantifiers. Section 3 describes the syntactic properties of the special construction, labelled ‘*de plus* differential comparative’, that French uses to in-

¹The distinction between adjectival and nominal comparatives is also known as the degree comparative/quantity comparative distinction (Gawron 1995).

roduce Num NP measure phrases in nominal comparatives; a semantic analysis is also provided. Some outstanding problems are discussed in the last section.

1 The problem: Measure phrases in nominal comparatives

Adjectival comparatives French comparative constructions are superficially similar to the better studied English comparatives. The similarity is obvious in so-called adjectival comparatives, with or without a differential ((1a) and (1b)):

- (1) *Adjectival comparatives*
- a. Without a differential:
Marie est plus grande que Jean.
Marie is more tall than Jean
'Marie is taller than Jean.'
 - b. With a differential:
Marie est trois centimètres plus grande que Jean.
Marie is three centimeters more tall than Jean.
'Marie is three cms taller than Jean.'

In French, positive adjectives never take a measure phrase; but comparative adjectives can:²

- (2) a. *trois centimètres grande
three cms tall
Intended: 'three cms tall'
- b. trois centimètres plus grande
three cms more tall
'three cms taller'

Nominal comparatives In so-called nominal comparatives without a differential, the similarity still holds (note that *plus* is followed by the preposition *de* in nominal comparatives with a degree quantified NP; more on this in Section 2.1):

- (3) Marie a lu plus de livres que Jean.
Marie has read more of books than Jean
'Marie read more books than Jean.'

²Here we do not count the measure phrases introduced post-nominally with *de*, which Schwarzschild (2005) talks about:

- (i) a. *cinq kilos lourd
five kgs heavy
b. lourd de cinq kilos
heavy of five kgs

With a differential, the situation is significantly more complex. The only differentials that can straightforwardly fit in the canonical position, i.e. right before *plus*, are differentials that consist of just a ‘quantity word’, e.g. *beaucoup* ‘much, a lot’:

- (4) Marie a lu beaucoup plus de livres que Jean.
 Marie has read much more of books than Jean
 ‘Marie read many more books than Jean.’

Similarly:

- (5) a. un peu plus de livres
 a little more of books
 lit. ‘a little more books’³
 b. infiniment plus de livres
 infinitely more of books
 ‘infinitely more books’
 c. tellement plus de livres
 so-much more of books
 lit. ‘so much more books’
 d. trois fois plus de livres
 three times more of books
 lit. ‘three times more books’

Differentials that consist of only a bare numeral are out (while they are not in English):

- (6) *Marie a lu trois plus de livres que Jean.
 Marie has read three more of books than Jean
 Intended: ‘Marie read three books more than Jean.’

Also out are differentials of the form Num NP, e.g. *trois livres* ‘three books’:

- (7) *Marie a lu trois livres plus (de livres) que Jean.
 Marie has read three books more of books than Jean
 Intended: ‘Marie read three books more than Jean.’

The way French would render what is intended in (7) involves the preposition *de* before *plus* (notated *de_{pre}*), and no noun following it:

- (8) Marie a lu trois livres *de_{pre}* plus que Jean.
 Marie has read three books of more than Jean
 ‘Marie read three books more than Jean.’

Compare with the Num-NP-more order in English (English also has a Num-more-NP order; we will discuss both orders in due course): no equivalent of *de* can intervene between the measure phrase and *more*, and, like in French, no noun can follow *more*:

- (9) Marie read three books (*of) more (*books) than John.

³*Un peu* cannot combine with count nouns (**un peu de livres*), but it can be used as a differential with a count nominal comparative.

(8) is an instance of what we will call the *de plus* differential comparative. All differentials that contain an NP (in other words, a sort denoting expression, e.g. *livres*) require the *de plus* differential comparative:

- (10) a. trois livres *(de) plus / *trois livres plus de livres
 three books of more three books more of books
 ‘three books more’
 b. plusieurs livres *(de) plus / *plusieurs livres plus de livres
 several books of more several books more of books
 ‘several books more’
 c. quelques livres *(de) plus / *quelques livres plus de livres
 some books of more some books more of books
 ‘a few books more’
 d. au moins trois livres *(de) plus / *au moins trois livres plus de
 at-the less three books of more at-the less three books more of
 livres
 books
 ‘at least three books more’

But differentials that do not contain an NP cannot enter the *de plus* differential comparative. We thus have an interesting pair: when *beaucoup* composes with an NP sort complement (11a), the presence of *de_{pre}* is mandatory, in other words, the *de plus* differential comparative is required; when it doesn’t (11b), the *de plus* differential comparative is barred:

- (11) a. beaucoup de livres *(de_{pre}) plus
 a-lot of books of more
 b. beaucoup (*de_{pre}) plus de livres [= (4)]
 a-lot of more of books

The following paradigm sums up what we have seen so far, about count nominal comparatives in French:

- (12) No differential:
 plus de livres
- (13) Differential present, and *plus* followed by an NP:
- | | | |
|----|--|------------------------------|
| a. | *trois plus de livres | *Num-plus-de-NP |
| b. | *trois livres plus de livres | *Num-NP-plus-de-NP |
| c. | *trois livres de _{pre} plus de livres | *Num-NP-de-plus-de-NP |
| d. | beaucoup plus de livres | ✓Quantity_word-plus-de-NP |
| e. | *beaucoup de _{pre} plus de livres | *Quantity_word-de-plus-de-NP |
- (14) Differential present, and *plus* not followed by an NP:
- | | | |
|----|---|------------------------------|
| a. | *trois livres plus | *Num-NP-plus |
| b. | trois livres de _{pre} plus | ✓Num-NP-de-plus |
| c. | *beaucoup de livres plus | *Quantity_word-de-NP-plus |
| d. | beaucoup de livres de _{pre} plus | ✓Quantity_word-de-NP-de-plus |

Without a differential, *plus* can combine with a degree quantified NP (through the preposition *de*), e.g. *plus de livres* (12). If *plus* is to be followed by a degree quantified NP (a ‘restrictor’), the only possible differentials are ‘quantity words’, i.e. ones that are not bare numerals and do not contain a sortal NP (13a)-(13d); *de_{pre}* is not available ((13c) and (13e)). In the absence of a degree quantified NP, *plus* can take a measure phrase as long as it is preceded by *de_{pre}* ((14a) vs. (14b) and (14c) vs. (14d)): (14b) and (14d) exemplify the *de plus* differential comparative, characterized by *de_{pre}* and no noun after *plus*. The term ‘measure phrase’ as we use it here covers Num-NP and quantity_word-de-NP phrases.

We thus have the following generalization about bare *plus* and about *de_{pre}*:

- (15) **Generalization:** In count nominal comparatives, bare *plus*, i.e. *plus* not preceded by *de_{pre}*, is possible either with a differential consisting of a quantity word, or with a following NP. *De_{pre}* is only possible with a preceding measure phrase (=a Num-NP phrase or a quantity_word-de-NP phrase) and no NP following *plus*.

This generalization is about count nominal comparatives; we will address mass nominal comparatives later (Section 4.2); in adjectival comparatives, all differentials, including measure phrases, can immediately precede *plus* (1b), in fact *de_{pre}* is impossible there:

- (16) *Marie est trois centimètres *de_{pre}* plus grande que Jean.
 Marie is three centimeters of more tall than Jean.
 Intended: ‘Marie is three cms taller than Jean.’

In the next section, we propose an explanation for the restrictions on differentials with bare *plus* in count nominal comparatives.

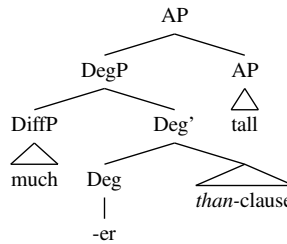
2 Bare *plus* and differentials

In order to understand the first part of the generalization in (15), we need to answer three questions: Why are bare numerals excluded with bare *plus*? Why are differentials with a sortal NP excluded? Why is the rest (e.g. *beaucoup*) possible? The three questions are taken up (not necessarily in that order) after a foray into the structure of nominal comparatives.

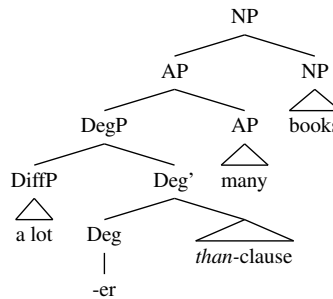
Can bare <i>plus</i> be preceded by...		
<i>trois</i>	<i>trois livres/ beaucoup de livres</i>	<i>beaucoup</i>
No	No	Yes
(13a)	(13b)	(13d)

2.1 Hidden structure

- (17) *Standard representation of an adjectival comparative in English*



(18) Standard representation of a nominal comparative in English



Following Bresnan 1973, we assume that in English, adjectival comparatives, as well as nominal comparatives with a degree quantified NP, are formed by combining *-er* with an adjective (*-er* heads a DegP projection which is adjoined to AP). In the adjectival comparative case, it is clear that there is an adjective (the case is maybe less straightforward in suppletion cases, *better*), e.g. *tall* as in *Mary is 3 cms tall-er than John*. In the nominal comparative case, the morphology is not fully transparent but the adjective is assumed to be *many/much*: *more* spells out *many-er/much-er*, as in *Mary read three many-er books than John*. The AP formed by *-er* and *many/much* is adjoined to an NP, e.g. *books*. In the adjectival comparative case, French can combine *plus*, a counterpart of *-er*, with an adjective, e.g. *grande*, as in *Marie est plus grande que Jean*, in a similar fashion to English. In the nominal comparative case, e.g. *Marie a lu plus de livres que Jean*, there is no overt adjective: the morpheme *plus* which seems to semantically play the same role as *-er*, appears to have no adjective to combine with, in apparent contravention of Bresnan's rule.

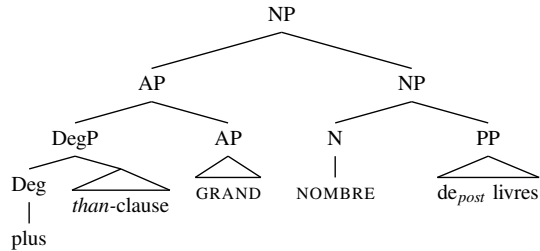
If the rule is in fact obeyed, a covert adjective has to be present in the structure. But an equivalent of the adjective *many/much*, used to form nominal comparatives in English, cannot be found in French. The closest that French has to *many/much*, *beaucoup*, is indeed an N/NP, not an adjective,⁴ unlike *many/much*.

We propose that French uses abstract formatives to construct *many/much*:

⁴*Beaucoup* is etymologically formed with the noun *coup* 'knock' modified by the adjective *beau* 'beautiful' (Carlier 2011 a.o.). It doesn't combine with an NP directly the way an adjective would: the preposition *de* is necessary, which could signal noun complementation:

- (i) a. beaucoup *(de) livres
a-lot of books
- b. beaucoup *(de) vin
a-lot of wine

- (19) *French nominal comparative:*
 UN [[_{AP} [_{DegP} plus] GRAND] [_{NP} NOMBRE de_{post} livres]]
- (20) *French nominal comparative (without a differential)*



In this structure we find a covert occurrence of the adjective *grand* ‘great’ (notated: GRAND) and a covert occurrence of the noun *nombre* ‘number’ (notated: NOMBRE). The AP formed by *plus* and GRAND is adjoined to an NP headed by NOMBRE. The presence of the adjective is in accordance with Bresnan 1973. The motivation for postulating the covert noun NOMBRE is not just semantic, it also comes from the presence of the preposition *de_{post}*, which we take to be a signal of noun complementation: we analyze the overt NP, e.g. *livres*, as the complement of the silent N NOMBRE,⁵ while in English the NP is simply comprised of the visible N. To sum up, the structure corresponding to the English *many-er books* literally says the equivalent of a *greater number of books*, which is *un plus grand nombre de livres*, with three covert elements. This is to be compared with:

- (21) *English nominal comparative:*
 [[_{AP} [_{DegP} -er] many] [_{NP} books]]

Beaucoup cannot be used as a predicate, unlike *many* or the adjective *nombreux* ‘numerous’:

- (ii) a. Les problèmes sont *beaucoup/ nombreux.
 the problems are a-lot/ numerous
 b. The problems are many.

Beaucoup cannot be modified by the adverb *infiniment* ‘infinitely’, unlike French adjectives, and unlike *many*:

- (iii) a. *infiniment beaucoup de livres
 infinitely a-lot of books
 b. infiniment grand
 infinitely great
 c. infiniment many

⁵The overt noun *number* requires the preposition *de* before its complement:

- (i) un nombre (de) livres
 a number of books

Granted, there are many usages of the preposition *de*, so our claim that it is used here to introduce a complement of a noun is by no means the only plausible hypothesis. It doesn’t seem to be required by case reasons at any rate: bare nouns can be used after certain quantifiers, e.g. *quelques livres* ‘a few books’.

2.2 Ruling out differentials with a sortal NP

- (22) *trois livres plus de livres [=(13b)]
 Analyzed as:
 UN trois livres plus GRAND NOMBRE de livres⁶

When we try to degree quantify the overt noun *nombre/number* with a measure phrase, ungrammaticality ensues, in a way parallel to (13b). This seems to set it apart from other nouns, e.g. *girl/fille*, *book/livre*, etc.

- (23) *French*:
- a. une fille trois centimètres plus grande
 a girl three cms more tall
 - b. *un nombre trois livres plus grand (de livres)
 a number three books more great of books

- (24) *English*:
- a. a three cm taller girl
 - b. a three hundred mile greater range
 - c. *a three book greater number (of books)

The adjective is not at fault by itself: the adjective *grand* can admit a measure phrase ((23a), where it means *tall*), and so can *great* (24b). Is the noun *nombre/number* at fault then? The problem is not actually tied to nominal comparatives or to the noun *nombre qua* noun. We can replicate the deviance of (23b) with an adjectival comparative predicated of the noun *nombre*.⁷

- (25) *Ce nombre (de livres) est trois livres plus grand que ce nombre (de
 this number of books is three books more great than that number of
 livres).
 books

The same deviance obtains in English:

- (26) *This number (of books) is three books greater than that number (of books).

And the deviance also obtains with the adjective *nombreux* 'numerous':

- (27) *Cette classe est trois élèves plus nombreuse que cette classe.
 this class is three students more numerous than that class
 Intended: 'There are three more students in this class than in that class.'

⁶In the underlying order we have a noun, NOMBRE, after the adjective; for reasons that we do not explore here, in the surface order (23a), the noun comes before the whole AP; (23b), with the N-AP order, is out, and so is the variant with the flipped order.

⁷In fact, the order 'un NP Num NP plus A', exemplified in (23a), (23b) and (25), is potentially ambiguous in French between an 'adjectival' structure and a 'nominal' one. In the former, the adjectival comparative is predicative and realized inside a reduced relative clause; in the latter, the comparative is attributive and extraposed to the right.

The problem with measure phrases appears to be conceptual: something about the cardinality dimension makes measure phrases unavailable. The restrictions on possible differentials described above come into play when the adjective *grand* is recruited to measure a cardinality. But the same measure phrase, *trois livres*, which cannot be used to measure out a cardinality, can be coerced to measure out a length:

- (28) Marie a une étagère trois livres plus large que Jean.
 Marie has a shelf three books more wide than Jean
 ‘Marie has a three book wider shelf than Jean.’

We will come back to the English case in §4.1 (*three books more* is an apparent counterexample). But for the time being, we focus on French.

Recall the ill-formedness of (13b):

- (29) *Marie a lu trois livres plus (de livres) que Jean.
 Marie has read three books more of books than Jean
 Intended: ‘Marie read three books more than Jean.’

With the cardinality dimension, unlike other dimensions, i.e. length, weight, volume, temperature, etc., Num-NP and quantity_word-de-NP are not acceptable differentials. We believe that a simple explanation can be given by considering the specialness of cardinality.

First, we spell out our semantics for *plus*, based on the well-behaved adjectival comparative:

- (30) Marie est trois centimètres plus grande que Jean.
 Marie is three centimeters more tall than Jean
 ‘Marie is three cms taller than Jean.’

Assume the following entry for *plus* (modeled after standard accounts of *-er*):

- (31) $\llbracket \text{plus} \rrbracket = [\lambda D_1 \langle d, t \rangle . \lambda D \langle \langle d, t \rangle, t \rangle . \lambda D_2 \langle d, t \rangle . D(\lambda d_d . D_2(d) \wedge \neg D_1(d))]$

Plus composes with three arguments. Among them are two predicates of degrees (type $\langle d, t \rangle$), or, in set-talk, two degree intervals (connected sets of degrees), one of which corresponds to the *than*-clause, and the other corresponds to the lambda abstract created by Quantifier Raising (QR). The $\langle \langle d, t \rangle, t \rangle$ argument is the differential argument:⁸ it is a predicate of predicates of degrees, or, in set-talk, and since we assume that the relevant sets are connected, a predicate of intervals. The relevant interval is made up of all the degrees that are in the set corresponding to the lambda abstract (here, the set of degrees of tallness that Marie has) and not in the set corresponding to the *than*-clause (here the set of degrees of tallness that Jean has). This interval is a gap, between two heights. A differential such as *trois centimètres* indicates the size of this height interval:

- (32) $\llbracket (30) \rrbracket = (\mathcal{M}(\llbracket \text{centimètres} \rrbracket))(\llbracket \text{trois} \rrbracket)(\lambda d_d . \text{Marie is } d\text{-tall and Jean is not } d\text{-tall})$

⁸We retain from Schwarzschild 2005 the idea that measure phrases do not denote degrees (type d); instead they denote predicates of degree gaps (type $\langle \langle d, t \rangle, t \rangle$). The $\langle \langle d, t \rangle, t \rangle$ meaning is derived by combining \mathcal{M} , a variant of a shifter introduced in Rett (2014), with the unit and then with the numeral i.e. $\mathcal{M}(\llbracket \text{unit} \rrbracket)(\llbracket \text{numeral} \rrbracket)$. See §3.2 for details.

= the size of $\{d : \text{Marie is } d\text{-tall and Jean is not } d\text{-tall}\}$ is three cms

This is in essence Schwarzschild’s (2005) analysis of measure phrases as predicates of gaps (our implementation bears some resemblance to Rett’s (2018) implementation). To make sense of the unavailability of *trois livres (plus de livres)*, we need to ask ourselves whether *trois livres* can be a cardinality measure phrase. Going back to the semantics of *plus* (31), we see that its differential looks to measure out a gap, which is an interval of degrees. Here we are dealing with an interval of degrees of cardinality: this is a requirement imposed by *nombre*. What are degrees of cardinality? Like degrees of length, they are numbers; but unlike units of measurement of length, the unit of measurement of cardinality is not expressed. Crucially a sort, e.g. *book, apple, orange*, is not a cardinality unit. While it is possible to add three cms to five feet, as long as one unit of measurement can be converted into the other (or both to a third) because they are measured along the same dimension, *viz* length, there is no conversion that could, without loss of meaning, allow one to add three apples to five oranges. In *trois livres, livres* is a sort, not a cardinality unit; if there is a cardinality unit, then it is implicit. Therefore *trois livres* or *beaucoup de livres* cannot be appropriate cardinality measure phrases. They cannot measure out a gap that is a gap between sets of numbers; another way of seeing the problem is that three books/many books cannot be added to 5.⁹

(33) *Marie a lu trois livres plus (de livres) que Jean.¹⁰ [= (13b)]

(34) $\llbracket(33)\rrbracket = (\mathcal{M}(\llbracket\text{livres}\rrbracket)(\llbracket\text{trois}\rrbracket))(\lambda d_d. \text{Marie read } d\text{-many books and Jean did not read } d\text{-many books})$
= #

The result is deviant; and the same deviance is expected to occur with all differentials with a sortal NP (e.g. **beaucoup de livres plus (de livres)*).

2.3 Ruling in quantity words as differentials

When they combine with a de-NP restrictor, quantity words like *beaucoup* function as cardinality measure phrases; but the absence of an NP restrictor makes them purely quantitative. For that reason, we can compute a meaning for (35), with some simplifying assumption about the source of evaluativity introduced by *beaucoup*:

(35) Marie a lu beaucoup plus de livres que Jean. [= (13d)]

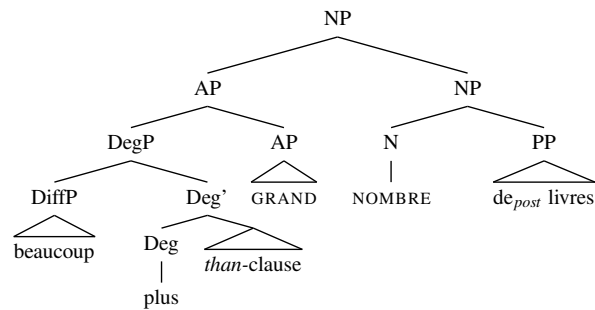
(36) $\llbracket\text{beaucoup}\rrbracket = \lambda D_{\langle d,t \rangle}. \text{the size of } D \text{ is large}$

(37) $\llbracket(35)\rrbracket = \llbracket\text{beaucoup}\rrbracket(\lambda d_d. \text{Marie read } d\text{-many books and Jean did not read } d\text{-many books})$
= the size of $\{d : \text{Marie read } d\text{-many books and Jean did not read } d\text{-many books}\}$ is large

(38) *French nominal comparative with a quantity word differential*

⁹In §3.2, we make explicit our assumptions about the meaning of *trois livres*.

¹⁰In our analysis, the anomaly of (33) is semantic; we haven’t derived a contradiction or a tautology, some of which are known to induce ungrammaticality (Gajewski 2002). We leave for future research a complete explanation of the perceived ungrammaticality of such a sentence.



2.4 Bare numerals

Bare numerals pose an interesting challenge. They are not acceptable as differentials, witness (39):

(39) *Marie a lu trois plus de livres que Jean. [= (13a)]

When cardinalities are explicitly compared, the deviance with bare numerals remains: this is shown by (40), a variant of (23b), and (41), a variant of (25):

(40) *Ceci est un nombre trois plus grand (de livres) que ça.
 this is a number three more great of books than that

(41) *Ce nombre (de livres) est trois plus grand que ce nombre (de livres).
 this number of books is three more great than that number of books

And yet, bare numerals do seem to be the right kind of object to measure out a gap between two cardinality intervals. If what we said in the previous subsection is on the right track, it seems that the source of the problem should not be conceptual, but rather syntactic. We do not have an explanation for the unacceptability of (39) through (41), but a way of looking at it might be to incriminate some constraint against free-standing numerals, an appearance of which would be in the ban on the constituency *more than Num/less than Num* for comparative numeral DPs (Arregi 2013).

Interestingly, English can say:

(42) Mary read three more books than John.

This Num-More-NP order is very rare cross-linguistically, and in fact, we cannot be absolutely certain that it is not the result of movement of the NP from Num-NP-More. Note that when cardinalities are explicitly compared, in a way parallel to (40)-(41) above, ungrammaticality ensues, which casts doubt on the Num-More-NP constituency (i.e. on the fact that the numeral is indeed a differential in (42)):

(43) *This is a three greater number (of books) than that.

(44) *This number (of books) is three greater than that number (of books).

With the intriguing exception of (42), bare numerals appear to not be suitable differentials. It stands to reason that it is the same (supposedly syntactic) constraint which applies to (39)-(41) and (43)-(44).

To sum up, in this section we've explained why bare *plus* cannot take measure phrases in nominal comparatives, because cardinality gaps cannot be measured out by measure phrases. Quantity words like *beaucoup* are suitable differentials because they are purely quantitative. Bare numerals are paradoxically ruled out: we proposed that a syntactic constraint explains this unexpected restriction. We can now turn to the *de plus* differential comparative.

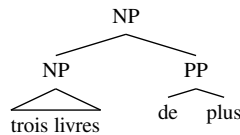
3 The *de plus* differential comparative in French

After bare *plus*, we now discuss the *de plus* differential comparative, which is mandatory in nominal comparatives with a measure phrase and banned everywhere else:

(45) trois livres *de_{pre}* plus [= (14b)]

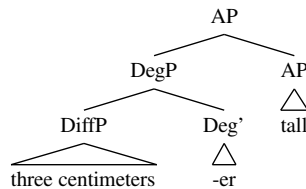
An obvious analytical challenge is the availability of a differential with a sort, given what we just explained about the cardinality dimension requiring a numerical measure; we will address the issue in §3.2 (and argue that the dimension of comparison is in fact not cardinality). Here we focus on the syntactic properties of the construction: we show that in this construction the differential is not a specifier of the Deg head but rather an argument of the verb; *de plus* is adjoined to this argument:

(46) De plus differential comparative in French

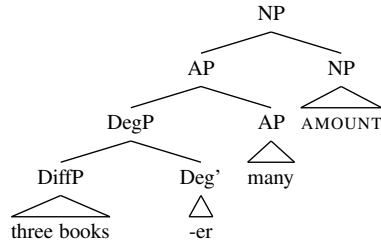


This stands in contrast to the structure of French nominal comparatives with a quantity word differential (38), which in turn conforms with standard assumptions about differential comparatives, namely that differentials sit in the specifier of the Deg head, and DegP is adjoined to an AP, e.g. *tall*, or *many* (the following trees illustrate those assumptions for English):

(47) Adjectival comparative



(48) Nominal comparative



In the *de plus* construction, the presence of the preposition *de_{pre}* is hardly compatible with the view that the measure phrase occupies the specifier of *plus*. We present a set of additional facts which suggest that the measure phrase in the French *de plus* differential comparative (*trois livres de_{pre} plus* (14b)) is a verb argument, and it is modified by a phrase containing the degree head (there simply is no degree quantified NP) as in (46).

3.1 Justifying the special constituency

3.1.1 Movement I: Quantitative *en* cliticization

The first piece of evidence for (46) comes from the quantitative *en* cliticization test: the clitic *en* can be anaphoric to an NP preceded by a numeral or certain quantifiers (e.g. *beaucoup de* ‘many’): for example in (49), *en* is anaphoric to *livres* ‘books’, an NP preceded by the numeral *cinq* ‘five’:

- (49) Jean a lu cinq livres et Marie *(en) a lu trois *t*.
 Jean has read five books and Marie of-it has read three
 ‘Jean has read five books and Marie has read three.’

The cliticization process must originate in a direct DP object. See, by contrast, how cliticization fails out of a PP adjunct:

- (50) *Jean a lu cinq heures d’affilée et Marie en a lu trois *t*.
 Jean has read five hours in-a-row and Marie of-it has read three
 Intended: ‘Jean has read for five hours on end and Marie has read for three hours.’

The cliticization test applies successfully to the *de plus* differential comparative (8)-(14b): the clitic originates in the differential DP (or what is semantically the differential) and the result is well-formed:

- (51) De plus *differential comparative*
 Jean a lu deux livres et Marie en a lu trois *t**(de_{pre}) plus que
 Jean has read two books and Marie of-it has read three of more than
 lui.
 him
 ‘Jean has read two books and Marie has read three more than him.’

This in fact, according to standard views, is a sub-extraction test (Ruwet 1972, Pollock 1998 a.o.) which is used to diagnose movement out of DPs in object position. And

it supports the view embodied in tree (46): in a sentence like (8), what is semantically a differential is in fact an argument of the verb *lire* ‘read’, specifically its direct object. In an adjectival comparative, for which we do not postulate the special constituency whereby the differential is selected by the verb, but maintain an English-like constituency, as illustrated in (47), *en*-cliticization turns out to be impossible. In (52), *en* is intended as being anaphoric to the noun *kilogrammes* ‘kilograms’:

- (52) *Adjectival comparative*
We are competing in a tug of war, and before that, there is a weigh-in; the other group weighs 5,000 kgs. . .
 *Nous en sommes deux mille t plus lourds qu’eux.
 we of-it are two thousand more heavy than-them
 Intended: ‘We are 2,000 kgs heavier than them.’
- (53) *Control showing that the noun kilogrammes can antecede en, despite being a unit of measurement (and thus, a special noun somehow):*
Same context as above. . .
 Nous en pesons deux mille t.
 we of-it weigh two thousand
 ‘We weigh 2,000 kgs.’

The discrepancy between *de plus* comparatives and adjectival comparatives w.r.t. the *en*-test is expected if our assumptions about constituency are correct. As additional confirming evidence, note that (54), a near synonym of (52) with a *de plus* differential comparative as direct object, is grammatical:

- (54) *Same context as above. . .*
 Nous en pesons deux mille t de plus qu’eux.
 we of-it weigh two thousand of more than-them
 ‘We weigh 2,000 kgs more than them.’

3.1.2 Movement II: Relativization

The NP that serves semantically as a differential in the *de plus* construction can be relativized (this process requires *wh*-movement, which is possible if the measure phrase is an object, but impossible if it is a specifier):

- (55) *De plus differential comparative*
 Les trois prières que Marie a dites t *(de_{pre}) plus que Jean étaient
 the three prayers that Marie has said.FEM.PL of more than Jean were
 en allemand.¹¹
 in German
 ‘Marie said three more prayers than Jean; those prayers were in German.’

The same relativization is impossible with an adjectival comparative, in line with our expectations: this would amount to Left-branch extraction:

(56) *Adjectival comparative*

*Les trois centimètres que Marie est *t* plus grande que Jean comptent
 the three centimeters that Marie is more tall than Jean mean
 beaucoup.
 a-lot
 Intended: ‘Marie is three centimeters taller than Jean; this difference means a lot.’

The near synonym with the transitive verb *mesurer* constructed with a nominal comparative is grammatical:

(57) *Control with a de plus differential comparative*

Les trois centimètres que Marie mesure *t**(de_{pre}) plus que Jean comptent
 the three centimeters that Marie measures of more than Jean mean
 beaucoup.
 a-lot
 ‘Marie is three centimeters taller than Jean; this difference means a lot.’

In English we cannot sub-extract in order to express the equivalent of (55):

- (58) The three prayers that Mary said more than John were in German.¹²
 Grammatical, but only under an irrelevant VP modifier reading (no sub-extraction)

This is expected if the differential in English is not a verb argument, but sits in Spec, DegP.

3.1.3 Movement III: *Wh*-sub-extraction

Wh-movement is possible in questions as well (sub-extraction out of the differential):

- (59) De quel vin Jean a-t-il bu trois bouteilles *t**(de_{pre}) plus que Marie ?
 of what wine Jean has-he drunk three bottles of more than Marie
 ‘What wine did Jean drink three more bottles of than Marie?’

Wh-sub-extraction is disallowed out of measure phrase differentials in English nominal comparatives (again this is a case of Left-branch extraction):

¹¹Interestingly, the definiteness of *les trois prières* induces the following accommodation: Jean and Marie said the same *n* prayers, and Marie said a total of *n+3* prayers. It is asserted that those prayers that Marie said but Jean didn’t were in German.

¹²The closest we can get to the French sentence is:

- (i) ?The three more prayers than John that Mary said were in German.
 Acceptable although marked; no sub-extraction; Num-More-NP order

Note that the Num-NP-More order is worse:

- (ii) *The three prayers more than John that Mary said were in German.

- (60) a. ???What wine did John drink [[three bottles of *t*] more] than Mary?
 b. What wine did John drink [three] more [bottles of *t*] than Mary?

English has two word orders for nominal comparatives, Numeral-NP-More and Numeral-More-NP. In (60), sub-extraction out of the differential is only attempted with the former order, shown in (60a); in the latter order (60b), the differential merely consists in the numeral *three*, and, for that reason, extraction is in fact done out of a right-branch NP, and is therefore allowed.

3.1.4 Agreement

In French, what appears to be a differential behaves like a DP argument with regard to agreement. We show this with a comparison bearing on amounts of mass objects, e.g. *trois litres de vin* ‘three liters of wine’. If our constituency is correct, we predict that plural agreement is triggered by the plural DP *trois litres de vin*, in subject position. If on the other hand the English-style constituency (48) is correct, then the abstract AMOUNT will trigger singular agreement. Our test is about mass objects in order to avoid a confound: with a plural count noun, we would get plural agreement under either hypothesis, i.e., whether there is no quantified NP (46), or there is one, and it is an abstract noun triggering semantic plural agreement (48). The facts support our hypothesis, as only plural agreement is possible in the cases at hand:

- (61) *Trois litres de vin de plus *a/ont été vendus aujourd’hui qu’hier.*
 three liters of wine of more has/have been sold today than-yesterday
 ‘Three liters more wine was sold today than yesterday.’

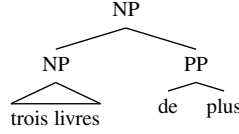
(62) is a control which indicates that the DP *trois litres de vin* in subject position triggers obligatory plural agreement; and (63) is a control without the differential, in which singular agreement is mandatory:

- (62) *Control:*
*Trois litres de vin *a/ont été vendus aujourd’hui.*
 three liters of wine has/have been sold today
 ‘Three liters of wine were sold today.’
- (63) *Control:*
*Plus de vin a/*ont été vendu aujourd’hui qu’hier.*
 more of wine has/have been sold today than-yesterday
 ‘More wine was sold today than yesterday.’

Another order is possible, with the phrase *de vin* following *plus*, but the agreement remains plural in that order; in fact, we believe that this second order results, not from a different construal of the degree head, but from the extraposition of *de vin*.¹³

- (64) *Trois litres de plus de vin *a/ont été vendus aujourd’hui qu’hier.*

¹³Spanish is similar to French in that, in nominal comparatives, only the Numeral-NP-More order is available with count nouns. Importantly, Spanish can show us something that French can’t, because it has bare NPs, unlike French (where a plural/mass indefinite NP is formed with an NP preceded by *de* combined with a definite article, i.e. *des NP, du NP*):



3.2 Analysis of the *de plus* differential comparative in French

Because measure phrase differentials in the *de plus* construction are verb arguments, it is tempting to analogize them to the differential verbal comparatives in Mandarin discussed by Li (2015) (*bǐ* comparative construction).

- (70) Marie a lu trois livres de plus que Jean.
 Marie has read three books of more than Jean
 ‘Marie read three more books than Jean.’

For a sentence like (70), an account along the lines of Li 2015 would involve a relation between three objects of type $\langle e, t \rangle$, namely the *than*-clause, the abstract formed by QRing the direct object *trois livres de plus que Jean* and leaving behind a trace of type e , and the differential. On this degreeless view, the *than*-clause denotes the set of books read by Jean and the predicate formed by QR denotes the set of books read by Marie. Between the two sets of books, we can establish a one-to-one mapping; once this is done, there is a remainder, namely three members of the set of books read by Marie, that are not covered by the mapping: this is the denotation of the differential.¹⁵ We proposed such an account in Bhatt and Homer to appear. However we now think that it cannot be right, because there are some major differences between French and Mandarin.

Mandarin does not have straightforward counterparts of attributive comparatives, e.g. *a longer paper than ...*, *more books than ...*, so there is no direct counterpart of (3) and (12). Moreover we can get the usual scopal effects of Deg movement in French which have been shown to be unavailable in Mandarin (see Erlewine 2018 who argues that Mandarin lacks degree abstraction altogether):

- (71) Marie veut lire trois livres de_{pre} plus que Jean.
 Marie wants read three books of more than Jean
 ‘Marie wants to read three books more than Jean.’
 ‘more \gg want’ reading is available

¹⁵An entry for the degree head in the *de plus* differential comparative, along the lines of Li 2015 adapted for French, would be (assuming that *de* is semantically transparent):

(i) $\llbracket \text{plus}_{\text{nomdiff}} \rrbracket = \lambda P_{\langle e, t \rangle} . \lambda Q_{\langle e, t \rangle} . \lambda R_{\langle e, t \rangle} . \exists f_{\langle e, e \rangle} [f: \{x: P(x) = 1\} \mapsto \{x: R(x) = 1\} \text{ is one-to-one} \wedge f \text{ preserves the taxonomic level introduced by } Q \wedge Q(\text{Max}(\{x: R(x) = 1\} \setminus \text{Range}(f)))]$

This says that there is a one-to-one function f from the set of things that Jean read to the set of things that Marie read, such that the domain and codomain of f are sets of books (as required by the differential *trois livres*), and the difference of the range of f and the set of things read by Marie is a set whose maximum — a plural individual — has the property of being three books, i.e. the property denoted by the differential.

In order to be true, (71) does not require that there be particular books that Marie wants to read; it also does not require that she has a desire to outperform Jean. It can be true if the number of books that Marie wants to read exceeds the number of books that Jean wants to read by three. This ‘more \gg want’ reading is derived by degree abstracting across the attitude *vouloir*. Li’s treatment would leave an individual trace and that would not give us the intended reading.

For these reasons, Li’s degreeless treatment of differential verbal comparatives with homomorphism cannot be ported to French. A degree-based account of the French differential comparatives is in order, which preserves the fact that the differential has the syntactic status of a direct object. The syntactic relations and the semantic dependencies seem to come apart; moreover *plus* isn’t directly degree quantifying anything.

- (72) Marie a lu [[trois livres] [de [plus que Jean]]].
 Marie has read three books of more than Jean

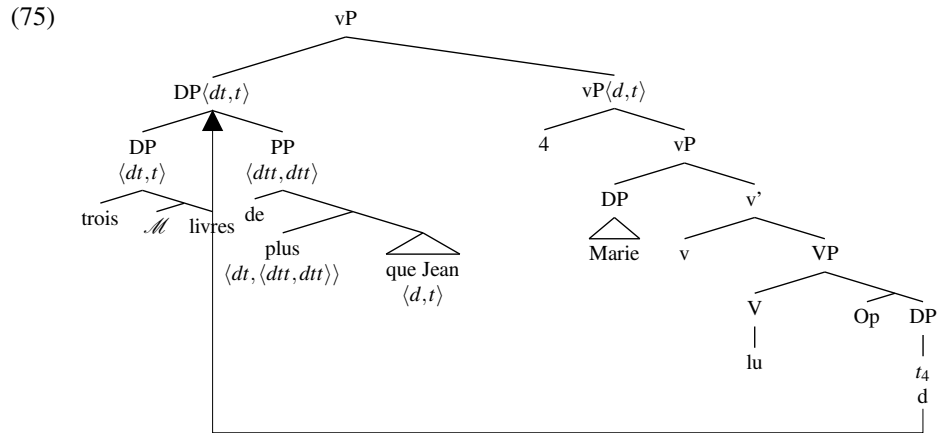
Crucially, we make two stipulations: (i) there is no hidden structure after *de plus*, i.e. no silent adjective and noun, unlike in (19), and (ii) leaving *plus* without a following (hidden) AP is only possible with *de_{pre}*. In (72), *plus* combines with the following arguments (the entry is the same as in (31) for there is only one *plus* morpheme, but it can enter two syntactic structures): (i) the standard phrase; we assume that it is clausal underlyingly, having undergone ellipsis; it is of type $\langle d, t \rangle$ i.e. it is a degree predicate; (ii) the differential phrase, which we assume to be a predicate of sets of degrees ($\langle \langle d, t \rangle, t \rangle$); and (iii) another degree predicate which is created after QR of the entire direct object ($\langle d, t \rangle$). In this configuration, *de_{pre}* plays no semantic role:

$$(73) \llbracket \text{plus} \rrbracket = [\lambda D_1 \langle d, t \rangle. \lambda D \langle \langle d, t \rangle, t \rangle. \lambda D_2 \langle d, t \rangle. D(\lambda d_d. D_2(d) \wedge \neg D_1(d))] \quad [= (31)]$$

We see that Deg movement can take place (witness the scopal interaction with an attitude, (71)). This movement needs to take place because in our system, the object DP has the semantics of a degree quantifier and quantificational elements in object position must move. But this movement is not enough to allow composition to proceed. What we are moving is a degree quantifier which leaves behind a degree trace. A verb like *lire* ‘read’ cannot combine with a degree; it needs an individual. For this purpose, we need a ‘degree-to-stuff’ convertor. There is precedence for convertors between the degree and the individual domain. Grosu and Landman (1998) have a degree-to-stuff convertor while Rett (2014) argues that for a convertor from stuff to degrees.¹⁶

- (74) [[trois livres] [de [plus que Jean]]] λd Marie a lu degree-to-stuff(d)
plus: $\langle dt, \langle dt, dt \rangle \rangle$;
que Jean...: $\langle d, t \rangle$;
trois M livres: $\langle dt, t \rangle$;
 λd Marie a lu degree-to-stuff(d): $\langle d, t \rangle$;
trois livres de plus que Jean: $\langle dt, t \rangle$

¹⁶The output of our degree-to-stuff convertor is a quantificational object and hence must itself be moved. But for simplicity, we do not show this movement in our semantic derivation.



We assume that the degree-to-stuff convertor Op yields the following output:

- (76) Main clause: $\lambda d. \exists x[\text{read}'(\text{marie},x) \wedge \mu(x) = d]$
 (we will abbreviate this as: $\lambda d. \text{MARIE}(d)$)

The measure function μ is a free variable. We assume that conditions on ellipsis resolution ensure that the comparative clause receives a similar interpretation; in particular, it uses the same measure function μ .

- (77) Comparative (*que*) clause: $\lambda d. \exists x[\text{read}'(\text{jean},x) \wedge \mu(x) = d]$
 (we will abbreviate this as: $\lambda d. \text{JEAN}(d)$)

We adopt Schwarzschild's treatment of measure phrases as predicates of gaps; in the comparative this is the gap between the degrees in the main clause and the degrees in the comparative clause. In the case at hand, we have the following gap:

- (78) $\lambda d. [\text{MARIE}(d) \wedge \neg \text{JEAN}(d)]$

This set is quite underspecified as it stands — it is the set of degrees such that Marie read objects with that degree and Jean didn't. But we don't know what μ is so we don't know what the dimension along which the objects that are read are being compared. It could be length, weight, literary significance, or as we will see number. The information about this μ is provided by the differential. In the case at hand, since the differential is *three books*, μ will have to be a function that maps objects to a degree scale on the *book* dimension. We can call this μ_{book} .¹⁷

We assume that *3 books* is a measure phrase, not very different from more canonical measure phrases like *4 centimeters* and *5 kilograms*. *4 centimeters* is the measure

¹⁷ The measure phrase can be any noun phrase that can represent a point on a scale. For example, it can be something like '3 kilos'. In that case, μ will be a function that maps stuff to a scale of weight. The one restriction we have identified is that the measure phrase cannot be a bare numeral. We believe this is so because a numeral by itself does not give us a dimension. There is no straightforward way to map stuff to a numerical scale while there is a way to map stuff to a scale of weight, length, books or socks. All of these mappings will impose restrictions of the kind of stuff we are dealing with but are reasonable given such restrictions. The problem with numerals on their own is that absent sortal information, there is no sensible way to count stuff.

assigned by a length measure function (call it μ_{length}) to an object whose length is 4 centimeters, which ‘has 4 centimeters’ in it. In exactly the same way, *3 books* is the measure assigned by a measure function (call it μ_{book}) to a plural object which consists of 3 books. How are the degree *3 books* (type $\langle\langle d, t \rangle, t\rangle$) and the quantificational *3 books* (type $\langle\langle e, t \rangle, t\rangle$) related? We propose that they share the same core but that the derivation of degree *3 books* involves a variant of Rett’s $M\text{-OP}_d$ operator, which we call \mathcal{M} :

$$(79) \text{ Quantificational ‘3 books’} \\ \lambda P. \exists x[P(x) \wedge \text{book}'(x) \wedge \#(x) = 3]$$

$$(80) \text{ Degree ‘3 books’} \\ \mathcal{M}(\llbracket \text{books} \rrbracket)(\llbracket 3 \rrbracket) = \\ \lambda D_{\langle d, t \rangle}. M(D) = 3_{\text{book}}$$

\mathcal{M} is defined as follows:

$$(81) \mathcal{M} \rightarrow \lambda P. \lambda n. \lambda D_{\langle d, t \rangle}. M(D) = n_P \\ \text{(Following Rett (2014):256, } M(D) \text{ will return the size of the gap; } n_P \text{ is the point} \\ \text{on the } P\text{-scale that corresponds to } n.)$$

The semantic composition goes as follows, using the entry for *plus* in (73):

$$(82) \llbracket \text{plus} \rrbracket(\lambda d. \text{JEAN}(d))(\mathcal{M}(\llbracket \text{books} \rrbracket)(\llbracket 3 \rrbracket))(\lambda d. \text{MARIE}(d)) = \\ (\mathcal{M}(\llbracket \text{books} \rrbracket)(\llbracket 3 \rrbracket))(\lambda d. \text{MARIE}(d) \wedge \neg \text{JEAN}(d)) = \\ [M(\lambda d. \text{MARIE}(d) \wedge \neg \text{JEAN}(d)) = 3_{\text{book}}] = \\ \text{True iff the difference between what Marie read measured by } \mu_{\text{book}} \text{ and what} \\ \text{Jean read measured by } \mu_{\text{book}} \text{ equals } 3_{\text{book}} \text{ on the } \textit{book} \text{ scale.}$$

Because (by our second stipulation) there is no hidden adjective or noun in the *de_{pre}* structure, there is no dimension for comparison provided by an adjective (e.g. *tall*), or an adjective plus a noun (as in *grand nombre*). Therefore we have to assume that *plus* quantifies over *unspecified* degrees. We start with an unspecified measure function μ which receives its value from the differential phrase.

The stipulation that leaving *plus* without a following (hidden) AP is only possible with *de_{pre}* ensures that we don’t incorrectly rule in **trois livres plus* (14a): since we have a single lexical entry for *plus*, the only semantic difference between bare *plus* and the *de plus* differential comparative comes from the presence vs. absence of an AP (hence of a dimension of comparison). The bare *plus* involves a silent *grand nombre* and hence can only range over numbers; differentials like *trois livres* range over book degrees and are not possible.

3.3 Quantity words

Lastly, we note that quantity words can be used as arguments:¹⁸

¹⁸When they are used as an individual argument, quantity words undergo some movement, as is visible in example (83): *beaucoup* surfaces to the left of the past participle. In a simple present sentence (with no

- (83) Il a beaucoup appris/ lu.
 he has much learned/ read
 'He learned/read a lot.'

Although *beaucoup* can saturate a verb argument, it cannot, by itself, take part in the *de plus* construction:

- (84) *Marie lit beaucoup de plus que Jean.¹⁹
 Marie reads much of more than Jean
 Intended: 'Marie reads much more than Jean.'

In light of the foregoing discussion, this is surprising. *Beaucoup* has the appropriate $\langle\langle d, t \rangle, t\rangle$ type (see (36) on p. 10) to compose with *plus* in the frame shown in (75). We want to submit that the absence of a sortal is what makes *beaucoup de plus* unacceptable, for *beaucoup de NP de plus* is perfect:

- (85) Marie lit beaucoup de livres de plus que Jean.
 Marie reads much of books of more than Jean
 'Marie reads many more books than Jean.'

Without sortal information, the underspecification remains unresolved. Why this is a problem is not clear to us at the moment, but it seems to be a problem indeed.

4 Open questions

4.1 English

We have already mentioned the cross-linguistically rare construction that English has, that is the Num-More-NP order (§2.4). Here we point out another challenge. English seems to have a counterpart to the ungrammatical **trois livres plus* (we stipulate that only *de_{pre}* permits *plus* without a following AP):

- (86) three books more

We explained that, if the dimension of comparison is cardinality, a differential with a sortal NP causes a semantic anomaly (§2.2). We actually replicated the same anomaly

past participle), *beaucoup* surfaces to the right of the main verb (main verbs are higher than past participles in French, see Pollock 1989):

- (i) Il apprend/ lit beaucoup.
 he learns/ reads much
 'He learns/reads a lot.'

¹⁹The way French can render what is intended in (84) is with bare *plus*:

- (i) Marie lit beaucoup plus que Jean.
 Marie reads much more than Jean
 'Marie reads much more than Jean.'

Since we stipulate that only in the *de plus* construction can there be no AP after *plus*, there has to be a hidden AP in (i), e.g. *grand nombre de choses* 'great number of things'.

in English (26)). And it can be further demonstrated by the ungrammaticality of the following:

(87) *three books more books

If we analyze (86) as in (88), with a cardinality degree function, *many*, and a covert *books*, we incorrectly expect the same anomaly to occur:

(88) three books many-er BOOKS

But we don't have to postulate this underlying structure: we could instead suppose that English too can have a structure with no gradable predicate (no AP after *-er*), the way we did for the *de plus* differential comparative (with the unspecified degree analysis developed in §3.2):

(89) a. trois livres de plus
b. three books much-er (with a dummy *much*)

Under this view, English still differs from French in that English doesn't use a preposition before *more*; and unlike French, the differential is not a verb argument, but sits on a left branch (hence the extraction and agreement facts in §3.1.3 and §3.1.4).

A further point worth noting here is that while **three books more books* and **three books more written material* are ungrammatical, measure phrases based on units of measurement (as opposed to sortals) are acceptable as differentials: *three centimeters more books* and *two kilos more socks*. Of course if the differential is a measure phrase based on a unit of measurement, then the comparative is an amount comparative even if it is based on a count noun. This generalization extends to amount comparatives which also do not permit measure phrases based on sortals (**two books more wine*) but permit measure phrases based on units as differentials (*two liters more wine*). This is not a syntactic restriction — if a sortal NP is interpreted as a unit, then it can function as a differential for both mass and cardinality comparatives (*two bottles more wine*, *two bottles more books*). Finally it is worth noting that this restriction does not extend to AP comparatives which freely allow for measure phrases based on sortals, albeit with coercion (*two books taller*).

4.2 Mass comparatives in French

Surprisingly, the presence of a name of unit in a mass nominal comparative is incompatible with bare *plus*:

(90) *Marie a bu trois centilitres (d'eau) plus d'eau que Jean.
Marie has drunk three centiliters of-water more of-water than Jean
Intended: 'Marie drank three centiliters of water more than Jean.'

The *de plus* differential comparative is available:

(91) Marie a bu trois centilitres d'eau de_{pre} plus que Jean.
Marie has drunk three centiliters of-water of more than Jean
'Marie drank three centiliters of water more than Jean.'

This pattern is surprising, because if we analyze *plus d'eau* in a parallel way to *plus de livres* (19), we should postulate a silent occurrence of *quantité* 'amount':

(92) UNE [[_{AP} plus GRANDE] [_{NP} QUANTITÉ de_{post} eau]]

It seems plausible that degrees of quantity are not just numbers, but numbers with an amount unit, i.e. a unit of volume or weight. Therefore we cannot straightforwardly explain why *trois centilitres* is not an appropriate measure phrase. And yet, when we use an overt paraphrase, we again observe a degradation:

- (93) a. ??une quantité trois centilitres plus grande d'eau
 an amount three centiliters more great of-water
 b. ??une quantité trois kilos plus grande de riz
 an amount three kgs more great of rice
 c. une quantité trois kilos plus lourde de riz
 an amount three kgs more heavy of rice

Going from amount to weight causes a significant improvement ((93b) vs. (93c); the latter is perfect).

We also see that the presence of a sort forces the *de plus* differential comparative:

- (94) Marie a bu beaucoup d'eau *(de_{pre}) plus que Jean.
 Marie has drunk much of-water of more than Jean
 'Marie drank much more water than Jean.'
 (95) Marie a bu beaucoup (*de_{pre}) plus d'eau que Jean.
 Marie has drunk much of more of-water than Jean
 'Marie drank much more water than Jean.'

The facts with *beaucoup* (94)-(95) are intriguing. It might be that we are not analyzing the hidden elements correctly, or again that at some relevant conceptual level, *amount* and *number* do not differ significantly. The generalization for French does seem to be that nominal comparatives in French do not ever allow for measure phrase differentials irrespective of whether they are mass or cardinality comparatives.

Conclusion

An important distinction that has emerged in this paper is between cases where the degree head does not combine with a nominal restrictor and cases where it does. In cases where there is a nominal restrictor, both English and French block NP differentials with a sortal (e.g. *[three books] more books, *[trois livres] plus de livres). Our explanation is that in the presence of an NP restrictor the degree quantification is only over numbers and a differential like *three books/trois livres* denotes book degrees and not numbers.

We also proposed a semantics for the *trois livres de plus* construction in French, which we analyzed as lacking an NP restrictor. This we suggest allows for underspecified degrees in the syntax; this underspecification is resolved through the differential. We assigned essentially the same semantics to the English *three books more*. The link

between the presence of a nominal restrictor and the inability to take count NP differentials is, we believe, significant. A structure with a count NP differential and a nominal restrictor ends up with unusable semantics; it does not deliver the meaning of a cardinality comparison with a differential. We believe that this is why the expression of nominal comparatives with count differentials crosslinguistically utilizes non-canonical structures. The next step is to study other languages from the angle of measure phrases in nominal comparatives, in search for a confirmation of our claims and for (possibly) different alternative strategies. Some preliminary research (Bhatt and Homer 2018) shows that in Hindi-Urdu comparatives the differential functions like an argument and the comparative directly modifies the predicate (while in French the differential functions like an argument and the comparative is a modifier of the differential).

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