Building up Complex Temporal Constructions*

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1. Introduction: lexical, functional and complex prepositions

In recent years there has been increased interest on the internal structure of some prepositional ‘particles’, in particular those ‘particles’ that express spatial relations. Earlier studies1 used to distinguish between functional prepositions, as a ‘to’, de ‘of’, en

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1 Traditional grammarians characterized the particles according to different criteria than those used to describe lexical categories such as nouns, verbs and adjectives. The classification of ‘particles’ (from the Latin diminutive PARTICULA(M)) was established on the basis of the optionality of its complement. According to this criterion, prepositions are transitive and adverbs are intransitive. A further classification was proposed according to the categorial status of the complement: prepositions introduce a DP complement, whereas conjunctions take a sentential complement. These criteria, however, which establish that a ‘particle’ has to be classified not inherently but in a relative way, namely according to the syntactic configurations in which it occurs, lead sometimes to paradoxical results. In fact, for instance, después(Sp.)/dopo(It.) ‘after’ should be analysed as an adverb when used ‘intransitively’, (i.a); as a preposition, when a DP complement appears, (i.b), and as a conjunction, when a sentential complement

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‘in’, por ‘for’,… in Spanish, or a, di, da, in, per, … in Italian, and lexical prepositions, as debajo ‘under’, encima ‘above’, arriba ‘above’,… in Spanish, or sopra, sotto,… in Italian. Both in Italian and Spanish the former ones are generally unstressed, semantically “light” and obligatorily require a complement; on the other hand, the second ones have a stressed syllable, are semantically “heavy” and can display an intransitive structure, as (1) and (2) show:\(^2\)

(1)  a. Se escondió bajo *(la cama).
    ‘He hid under *(the bed)’
   
   b. Se escondió debajo (de la cama).
    ‘He hid de under (the bed)’

realizes, (i.e), despite the fact that this ‘particle’ display the same semantic interpretation in all these syntactic configurations:

(i)  a. Llegó después *(Spanish) / Arrivò dopo *(Italian) (Adverb)
    ‘He arrived after’
   
   b. Llegó después de la comida *(Spanish) / Arrivò dopo pranzo *(Italian) (Preposition)
    ‘He arrived after lunch’
   
   c. Llegó después de que comíamos *(Spanish) / Arrivò dopo che avevamo pranzato *(Italian) (Conjunction)
    ‘He arrived after we had lunch’

The criteria just mentioned have been challenged by several linguists belonging to different theoretical frameworks, such as Jespersen (1924), Jackendoff (1973), Ruwet (1982), among many others.

\(^2\). Campos (1991) argues that in Spanish locative particles allow preposition stranding. Nevertheless, some of the examples he provides are very marginal for native speakers. In Italian, as noted by Cinque (2008, p.2), quoting Rizzi (1988)), some complex locative contructions admit prepositon stranding, as in: A chi era seduto sopra? ‘Who were you sitting on?’. We will not deal with this property because temporal particles never admit preposition stranding either in Spanish or in Italian, as the following examples show:

(i)  a. *De qué/quien llegaron antes/ después? *(Spanish
    ‘Of what/whom (they) arrived before/after?’
   
   b. *(Di) che cosa/chi arrivarono prima? - *(Di) che cosa/chi arrivarono dopo? *(Italian
    ‘Of what/whom (they) arrived before/after?’
(2) a. Si è nascosto in *(camera).
    ‘He hid at (his bedroom)’
b. Si è nascosto sotto (il letto).
    ‘He hid under (the bed)’

In this paper we will focus on the syntactic behavior and the interpretive properties of the ‘particles’ antes/ despúés (Spanish) and prima/ dopo (Italian) “before/ after” which introduce complex temporal constructions.

In general, these ‘particles’ display similar properties to their spatial counterparts. Nevertheless antes/prima “before” and después/dopo “after” differ from encima/sopra ‘above’, debajo/sotto ‘under’, etc. because of the syntactic and interpretive nature of their complements, their behavior as lexical comparatives and the obligatory correlations that the constructions they head must establish with the temporal structure of the sentence in which they appear.

In what follow we will investigate these peculiar properties with the aim to offer an analysis for the internal structure of complex temporal constructions. Our analysis adopts the general cartographic hypothesis (cf. Cinque, 1994, 1999) in mapping different functional projections, each of them associated with distinct grammatical categories –features and/or heads– and extends to the complex temporal constructions the basic idea developed in Svenonius (2006, 2007) and in Cinque (2008) for prepositional phrases expressing spatial relations.

In this way, we propose that all the constructions in (3) and (4):

(3) a. Llegó (dos días) antes/despúés.
    ‘S/he arrived (two days) before/after’
b. Llegó (dos días) antes/despúés del atentado.
    ‘S/he arrived (two days) before/after the terrorist attack’

3. As many authors pointed out, there should exist a certain methonimical relationship between the notions of time and the notion of space. It is probably for this reason that antes/prima and después/dopo may also express spatial relations, as (i) shows:

(i) a. Dos calles después del semáforo, hay que girar a la izquierda.
    Spanish
b. Due vie dopo il semaforo, devi girare a sinistra.
    Italian

Lit. ‘Two streets after the traffic-lights it is necessary/you must to turn right’
c. Llegó (dos días) antes/después (de) que ocurriera el atentado/ de ocurrir el atentado.
   ‘S/he arrived (two days) before/after the terrorist attack took\textsubscript{Subj,Past} place/ the terrorist attack took\textsubscript{Inf} Place

(4) a. Arrivò (due giorni) prima/dopo. \textit{Italian}
   ‘S/he arrived (two days) before/after’

b. Arrivò (due giorni) prima dell’attentato/dopo l’attentato.
   ‘S/he arrived (two days) before of the terrorist attack’/after the terrorist attack’

c. Arrivò (due giorni) prima che avesse luogo l’attentato/dopo che ebbe luogo l’attentato.
   ‘S/he arrived (two days) before the terrorist attack took\textsubscript{Subj,Past} place/ after the terrorist attack took\textsubscript{Ind,Past} place’

where, as we can observe, temporal ‘particles’ are used ‘intransitively’, (3a) and (4a), or can take either nominal complements, (3b) and (4b), or sentential complements, (3c) and (4c), –i.e. they may occur apparently in different syntactic configurations– are the spell-out of different portions of the same syntactic configuration, as we will argue in the following sections.

2. The main properties of complex temporal particles

Despite the different theoretical frameworks adopted, some authors, such as Alarcos (1973), Marácz (1984), Plann (1986), Larson (1985), Bartra and Suñer (1992) and Bresnan (1994), agree on the fact that these particles are very close to nominal expressions. The arguments they provide in order to justify this hypothesis are briefly summarized below:

\footnote{In Italian, unlike Spanish, (3c), a lexical subject cannot appear in simple infinitive clauses. This asymmetry is due to parametric differences between the two languages which do not affect our topic, as the following example shows:}

(i) L’attentato fu sventato due giorni prima di aver luogo.
   \textit{Lit.} ‘[The terrorist attack] was foiled two days before of \( \Theta \) take\textsubscript{Inf} place.’
a) In Spanish and Italian, complex temporal (and spatial) prepositions are allowed in syntactic contexts where a DP complement is expected (see Alarcos (1973) and Plann (1986)), unlike “real” adverbials or simple prepositions. In this respect, compare the data in (5) and (6) below:

(5) a. Las costumbres de antes/ Desde después de la guerra/ La clase de antes/
    Guárdalo para despuésSpanish
b. Le abitudini di prima/ Da dopo la guerra/ La lezione di prima/ Conservalo per dopo
    Lit. ‘The traditions of before’/ ‘From after the war’/ ‘The lecture of before’/
    ‘Keep it for after’

(6) a. *Las costumbres de anteriormente/recientemente/ *Desde posteriormente/ *La clase de anteriormente/ *Guárdalo para posteriormenteSpanish
b. *Le abitudini di anteriormente/recentemente/ *Da posteriormente (del)la guerra/ *La lezione di anteriormente/ *Conservalo per posteriormenteItalian

Lit. ‘*The traditions of recently’/ ‘*From recently the war’/ ‘*The lecture of subsequently’/ ‘*Keep it for subsequently’

b) Functional temporal prepositions may assign Case directly to their complement, (7), while temporal complex prepositions cannot; they must be followed by a functional preposition in order to do so, (8):

(7) a. a las ocho\(^5\)Spanish
    alle ottoItalian
    Lit. ‘At the eight’

b. en eneroSpanish
    a/in gennaioItalian
    ‘on January’

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\(^5\) In section 4, adopting Kayne’s (2005a) and (2005b) hypothesis about silent heads, we will tentatively propose a more complex internal structure for cases such as those in (7a).
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(8) a. antes *(de) las ocho  
    \textit{Spanish}  
    prima *(del)le otto  
    \textit{Italian}  
    \textit{Lit. ‘before *of the eight’}  

b. después *(de) la cena  
    \textit{Spanish}  
    \textit{Lit. ‘after *of the dinner’}  

As the examples in (8) illustrate, in Spanish the functional preposition is \textit{de}, the same particle which is used to express genitive case in nominal constructions. Marácz (1984), Plann (1986) and Bresnan (1994) argued that complex prepositions are some kind of defective nominals because they introduce genitive complements.\textsuperscript{6}

Across Romance languages, however, there is a microparametrical variation with respect to the realization or omission of this functional preposition. In standard Spanish, for instance, it always appears whenever a complement occurs, (8). The same situation holds for Portuguese:

(9) a. antes/depois \textbf{do} atentado/ \textbf{de} mim  
    \textit{Portuguese}  

b. antes/depois \textbf{de} ocorrer o atentado  

c. antes/depois \textbf{de} que ocorresse o atentado

In Catalan the same preposition, \textit{de}, always appears except for inflected sentences:

(10) a. abans/després \textbf{de} l’atemptat/ \textbf{de} mi  
    \textit{Catalan}  

b. abans/després \textbf{de} passar l’atemptat  

c. abans/després \textbf{(*de)} que passés l’atemptat

\textsuperscript{6} The distinction between two types of prepositions was noticed long time ago by Antonio de Nebrija (1492, cap. XV), the first Spanish grammarian. According to him, in Spanish there are prepositions that require genitive, such as \textit{cerca} ‘near/close’; \textit{antes} ‘before’; \textit{delante} ‘in front of’; \textit{dentro} ‘inside’ (locative)’in’ (temporal), etc., and prepositions that introduce accusative complements, such as \textit{contra} ‘against’; \textit{hasta}, ‘until’ (temporal)/”to” (locative); \textit{entre} ‘between/among’ (locative), etc. Nebrija also pointed out that some of the prepositions of the first group might also be used without the genitive marker. This alternation goes on holding in contemporary Spanish (and Catalan) and nowadays a large microparametric variation within dialects and registers can be found: \textit{encima de la mesa/ col. encima la mesa} (Spanish) ‘on the table’; \textit{darrera de la casa/ (dar)rera la casa} (Catalan) ‘behind the house’. We refer the reader to Bartra and Suñer (1992) for more details about this topic.
French and Italian, on the other hand, display a more complex paradigm. In French the preposition *de* only appears in simple infinitival sentences preceded by *avant*:

(11) a. avant/après l’attentat/moi.  \(French\)  
    b. avant *(de*) manger/ après *(d’)* avoir mangé.  
    c. avant/après que l’attentat eut lieu  

In Italian, with *prima* the preposition *di* always shows up, except for tensed sentences:

(12) a. prima dell’attentato / *di* me  \(Italian\)  
    b. prima *di* mangiare/aver mangiato  
    c. prima (*di*) che l’attentato abbia/avesse avuto luogo  

On the other hand, *dopo* never admits the preposition *di* with exception of free personal pronouns:

(13) a. dopo l’attentato / *di* me\(^7\) \(Italian\)  
    b. dopo aver mangiato  
    c. dopo che l’attentato ha avuto luogo

Finally, Romanian behaves like Italian: *de* appears after *inainte* ‘before’, (14), and never can follow *dupa* ‘after’, (15), but, unlike Italian, *de* can never precede a free personal pronoun, (14):\(^8\)

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\(^7\) Rizzi (1988:523) notes that in Italian the preposition *di* does not obligatorily follow *dopo* in the case in which the complement is a free personal pronoun, (i.a), and that the same preposition can never appear when the free personal pronoun is modified, (i.b):

(i) a. Dopo (di) lui non c’è nessuno.  ‘After (of) him there is nobody’  
    b. Gianni viene dopo (*di*) noi tutti.  ‘G. comes after (*of) us all’

We agree with Rizzi’s judgements, but we also think that the optionality of *di* with free personal pronouns (cf. (13a) and (i.a)) is restricted to some particular cases.

\(^8\) In Romanian, unlike the other Romance languages, the sentence introduced by *dupa* ‘after’ cannot appear in infinitive:
(14) a. inainte de atentat/ (*de) mine  
    b. inainte de a se intampla atentatul  
    c. inainte (*de) sa se intample atentatul

(15) a. dupa atentat/mine  
    b. dupa ce s-a intamplat atentatul

The two following synoptical diagrams illustrate what happens in the Romance languages just mentioned regarding the presence (✓) vs. absence (*) of the functional preposition following the two temporal particles whose behavior we are studying:

(16) **Before** | DP | Personal Pronoun | Tensed sentence | Infinitival sentence
--- | --- | --- | --- | ---
Spanish | ✓ | ✓ | ✓ | ✓
Catalan | ✓ | ✓ | * | ✓
Portuguese | ✓ | ✓ | ✓ | ✓
French | * | * | * | ✓
Italian | ✓ | ✓ | * | ✓
Romanian | ✓ | * | * | ✓

(17) **After** | DP | Personal Pronoun | Inflected sentence | Infinitival sentence
--- | --- | --- | --- | ---
Spanish | ✓ | ✓ | ✓ | ✓
Catalan | ✓ | ✓ | * | ✓
Portuguese | ✓ | ✓ | ✓ | ✓
French | * | * | * | *
Italian | * | ✓ | * | *
Romanian | * | * | * | ---

Despite these variations, in this paper we propose that in complex temporal constructions headed by *antes/prima* and *después/dopo* the preposition *de/di* is always

(i) *A sosit (cu dua zile) dupa ce a se intampla (atentatul).  
   ‘(S/he) arrived (two days) after (the terrorist attack) takeInf place’
projected even though in some cases it is phonologically unrealized.\(^9\) We also propose that this preposition –pronounced or unpronounced– is a Case marker that dominates the eventive nominal expression and that expresses the complement-relationship between this expression and a silent TIME that selects it, as we will discuss in section 3.3.\(^{10}\)

c) as Plann (1986) pointed out for locative particles, a related question to this last property is that in Spanish this ‘particles’ can combine with postposed possessives, detrás mío ‘Lit. behind mine’, delante tuyo ‘Lit. in front of yours’, etc.\(^{11}\) These constructions are not allowed by prescriptive grammar, but they are extremely frequent in colloquial speech, and in Catalan they belong to the standard language, darrera meu, davant teu.\(^{12}\)

d) Larson (1985) pointed out another interesting property of this construction. While complex prepositions can be modified by certain adverbs with a focalizing function,

\(^{9}\) See the crosslinguistic data provided by Cinque (2008) and the references mentioned there for locative complex prepositions.

\(^{10}\) In this paper we will not deal with why this preposition can be either unpronounced or phonologically realized. Romance languages may differ in the way of assigning Case to sentential or nominal complements and perhaps the categorial origin of the particle in each language plays a crucial role in this choice.

\(^{11}\) See Terzi (2008: §3) for an explanation of these data with locative particles. Postposed possessives with temporal particles are much more restricted, but we can find some examples in very colloquial speech:

(i) a. Leo Dan, que cantó antes mío…

\textit{Lit.} ‘Leo Dan, who sung before mine}\textsubscript{Masc. Sing.}

b. Habló con Madelman y Unai (…) que pinchan después mío.

\textit{Lit.} ‘S/he talked to Madelman and Unai (…) that play after mine}\textsubscript{Masc. Sing.} \textit{(Google: 08-06-2008)}

\(^{12}\) Furthermore, in Spanish the possessive can display gender agreement with an antecedent or a human referent related to the speech act: detrás mía}\textsubscript{Nom.Sing.}. This possibility, however, belongs to a very colloquial register.
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such as *exactamente, justo o mismo* ‘exactly’, (18); other adverbs, such as *–mente* adverbs, cannot, (19):

(18) a. *exactamente/justo* antes/después del atentado
   *esattamente/giusto/proprio* prima di/dopo l’attentato
   ‘exactly after/ before the terrorist attack’
   b. *antes/ después mismo* del atentado
   *Lit.* ‘before/ after exactly of the terrorist attack’

(19) a. *exactamente/??* justo recientemente
   *esattamente/??* giusto/ proprio recentemente
   ‘exactly recently’
   b. *recientemente mismo
   *Lit.* ‘recently exactly’

e) Larson (1985) also shows that temporal and locative complex prepositions differ from other particles because they can appear in subject position of pseudo-clefts.

(20) a. *Lo vi antes/ después/ recientemente.*
   ‘I saw him before/ after/ recently’
   b. *Antes/ después/ *recientemente* fue cuando lo vi.
   ‘Before/ after/ *recently’ was when I saw him’

According to Bosque (1990:200), this last property does not necessarily imply that *antes, después* and other particles that share similar properties are nominal categories, but it implies that they do designate specific individual entities (“individuals” in the logical sense). This is the reason why they can appear in identificative constructions such as those in (21):

(21) a. *[Una hora después de la cena] es un buen momento para fumarse un cigarro.*
   *Spanish*

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13 In Italian a similar construction, with the focalizing adverb between *after* and the *of-complement* is not possible, given that such adverbs must always appear in the higher position, (18a). We will come back to them in section 4.
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[Un’ora dopo la cena] è un buon momento per fumarsi un sigaro.  
‘One hour after dinner is a good moment for smoking a cigar’

b. [ Ø Después de la cena] es un buen momento para fumarse un cigarro.  
[Ø Dopo la cena] è un buon momento per fumarsi un sigaro.  
‘After the dinner is a good moment for smoking a cigar’

c. [Una hora después Ø] es un buen momento para fumarse un cigarro.  
[Un’ora dopo Ø] è un buon momento per fumarsi un sigaro.  
‘One hour after is a good moment for smoking a cigar’

d. [ Ø Después Ø] es un buen momento para fumarse un cigarro.  
[Ø Dopo Ø] è un buon momento per fumarsi un sigaro.  
‘After is a good moment for smoking a cigar’

According to these data, Bosque proposes to designate these particles as ‘identificative adverbs’ because places, moments or instants can be analysed as individuals; in other words, they can denote definite entities that are equivalent to physical objects or to more abstract notions that have been reified, but they are not referential expressions.

Den Dikken (2003) and Svenonius (2004), among others, argue that locative prepositions are lexical elements displaying a functional architecture as verbs and nouns do. In spite of the fact that they disagree in formal details, both authors propose, on the one hand, that the lexical value of locative particles is obtained by an unpronounced nominal PLACE modified by the locative particle\footnote{For a similar proposal, see also Bresnan (1994), Kayne (2005a, 2005b) and Terzi (2008).} and, on the other, that the functional architecture is motivated by means of a locative abstract preposition that selects an abstract noun PLACE as its complement.

We will propose that temporal expressions headed by antes/prima o después/dopo display a similar but more complex structure. The nominal properties mentioned above naturally derive from the presence of an unpronounced noun TIME. We will also propose that the syntactic configuration is selected by an abstract preposition AT that contributes to provide the temporal expression with the designation of a punctual position in the temporal axis.

In the following section, we will argue how the different portions of this functional and lexical structure are built up in order to account for the syntactic and discourse properties of our complex temporal constructions.
3. The computational process

3.1. The basic calculation

In the examples (3) and (4) the temporal constructions refer to an unambiguous point in time. Nevertheless, this temporal point is not expressed directly, and it has to be calculated by the hearer through a computational process.

For the sake of simplicity, let’s consider the following examples. Suppose that we are referring to the Madrid’s terrorist attack, which took place on Thursday, 11 March 2004. This information has to be known by both the speaker and the hearer; so they both can unambiguously fix this point on the temporal axis, and in (3b) and (4b) this temporal point (time) is inferred from the time in which took place the event denoted by the nominal expression el atentado/ l’attentato ‘the terrorist attack’, which we will call the base from now on. The quantified nominal expression dos días/due giorni ‘two days’ expresses an amount of temporal units that corresponds to the temporal interval which separates the base from the resulting point in time. Therefore, the quantified nominal expression performs the function of expressing a temporal difference that must be linked with the temporal value of the base; it’s for this reason that we dub it differential. Finally, antes/prima ‘before’ and después/dopo ‘after’ provide the orientation along the temporal axis, backwards or forwards respectively. The result of this computational process, namely the final temporal point, corresponds then to a variable whose value is the result of an algebraic operation of subtraction (antes/prima ‘before’) or addition (después/dopo ‘after’) of temporal points along the temporal axis, giving, in this way, Tuesday, March 9th 2004, or Saturday, March 13th 2004, respectively:

(22) a. Dos días después del atentado
   ‘The temporal interval (dos días) that I add to the time of the terrorist attack (Thursday 03-11-2004) gives as a result Saturday 03-13-2004’
   or
   ‘The time of the terrorist attack (Thursday 03-11-2004) + the temporal interval (dos días) = Saturday 03-13-2004’

b. Dos días antes del atentado
   ‘The temporal interval (dos días) that I subtract to the time of the terrorist attack (Thursday 03-11-2004) gives as a result Saturday 03-09-2004’
   or
   ‘The time of the terrorist attack (Thursday 03-11-2004) - the temporal interval (dos días) = Tuesday 03-09-2004’
The computational process paraphrased in (22) is also corroborated by what Bertinetto (1982) suggests as for the temporal value of our temporal constructions. Bertinetto, in fact, proposes that the temporal expressions introduced by antes/prima ‘before’ and después/dopo ‘after’ behave like punctual temporal localizations. In fact, agreeing with the compositional semantics, we can observe that these temporal expressions refer to a precise moment in the time, as the following contrasts show:

(23) a. La obra empezó/terminó a las diez/ media hora antes/después de lo previsto/ *dos horas.  
L’opera iniziò/terminò alle dieci/ mezz’ora prima/dopo del previsto/ *due ore.  
‘The dramatic work began/ended at ten o’clock/ half an hour before/after than expected/ *two hours’

b. La obra duró dos horas/ *a las diez/ *media hora antes/después de lo previsto.  
L’opera durò due ore/ *alle dieci/ *mezz’ora prima/dopo del previsto/.  
‘The dramatic work lasted two hours/ *at ten o’clock/ *half an hour before/after than expected’

In (23a) the temporal expressions with antes/prima and después/dopo can appear modifying the verbs empezar ‘to begin’ and terminar ‘to last’, which are telic; on the other hand, the same expressions are incompatible with verbs such as durar ‘to last’, for expressing an activity, (23b).

The reference point \( (r) \) of these temporal expressions \( (l \) (point of localization)) can either coincide with the reference point \( R \) of the temporal structure of the verb, as happens when the temporal expressions are introduced by antes/prima, (24a), or cannot, when they are introduced by después/dopo, (24b):\(^{15}\)

(24) a. Lo había encontrado diez días antes de Pascua.  
Lo avevo incontrato dieci giorni prima di Pasqua.  

‘I had met him ten days before Easter’

\(^{15}\) See García Fernández (2000: 294).
b. Lo había encontrado diez días después de Pascua.  
   Spanish
Lo avevo incontrato dieci giorni dopo Pasqua.  
   Italian
-----E----R----S-----
   r l
   ‘I had met him ten days after Easter’

From a semantic perspective, the properties that characterize antes/prima are more complex than those of después/dopo. In fact, according to García Fernández (2000), while antes/prima ‘before’ with temporal interpretation can introduce factual, non-factual and counterfactual predicates, as (25) shows:

(25) a. Apagó la calefacción antes de salir.
   Spense il riscaldamento prima di uscire.  
   factual
   ‘He turned off the heating before going out’

b. Dejó la reunión antes de que hubiera discusiones.
   Lasciò la riunione prima che ci fossero discussioni.  
   non-factual
   ‘He lefted the meeting before there were quarrels’

c. Dejó la reunión antes de insultar a nadie.
   Lasciò la riunione prima di insultare qualcuno.  
   counterfactual
   Lit: ‘He lefted the meeting before insulting no one (Sp.)/someone (It.)’

después/dopo ‘after’ may only introduce factual predicates: the event expressed by its complement behaves like an ‘ended up’ event:

(26) *Dejó la reunión después de insultar a nadie.  
    *Lasciò la riunione dopo non insultare nessuno.  
    Italian
    Lit: ‘He leaved the meeting after insulting no one/someone’

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16 In the Spanish example of (26) the presence of the infinitive in simple form combined with nadie ‘no one’ forces the counterfactual interpretation of the construction. In Italian, on the other hand, given that the infinitive in simple form cannot be used in such constructions, the same interpretation is obtained by the sole presence of the infinitive in simple form. Compare the Italian construction in (26) with (i), where the obligatory infinitive in past form gives rise to the factual interpretation:

(i) Lasciò la riunione dopo non aver insultato nessuno.
   Lit: ‘He leaved the meeting after not having insulted no one’
Despite these differences in interpretation, to which we suggest that it is possible to ascribe some of the variations in syntactic behavior between *antes/prima* and *deshúes/dopo*, we propose that both of them establish the same basic relation with both their base and their differential.

In order to syntactically formalize this basic relation, i.e. the algebraic operation that links the base (*el atentado/l’attentato*, in (22)) with the differential (*dos días/due giorni*, in (22)) we extend to our analysis what Kayne (1994:12) proposed to account for the coordinating constructions. The author suggests for phrases such as *John and Mary, three and eight*, etc., an antisymmetric representation, assuming that the nuclear element *and*, in Con⁰ of ConPr, behaves like an additive operator.17

Therefore, we propose that the starting point of the computational process subsumed by our complex temporal constructions (cf. (22)) can be represented in the following way:

\[
(27) \quad \text{ConP} \\
\quad \text{XP} \quad \text{Con’} \\
\quad \text{Con⁰} \quad \text{YP} \\
\quad [+/-]
\]

As (27) shows, a diadic connective operator, call it Con, enters syntax in Con⁰ projecting a Con(nective) Phrase. Con, provided with either the additive feature (+) or the subtractive feature (–), relates the constituent YP with the constituent XP in an antisymmetric fashion.

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17. The same basic hypothesis has been adopted by Brucart (2008:6) for constructions such as (i) with the additive más ‘more’ in Spanish:

(i) a. *Tus libros más los míos formarán una gran biblioteca.* (más as a symmetric additive)  
   Brucart (2008, (3))  
   *Lit.* ‘Your books more the mines will constitute a big library’

b. *La reparación duró una semana más de las dos previstas.* (más as an antisymmetric additive)  
   *Lit.* ‘The repairing lasted one week more of the two expected’

c. *Lee más libros que novelas.* (más as a comparative)  
   *Lit.* ‘(He) reads more books than novels’
In building up the internal structure of our temporal constructions, we propose that both *después/dopo* ‘after’ and *antes/prima* ‘before’ perform also the function of diadic operators, with an additive value, in the first case, and a subtractive value, in the second case.\(^{18}\) Evidence for this hypothesis is provided by the synonymity of the following pairs in Spanish:

\[(28)\]  
\[a. \text{ Llegó dos días más pronto del atentado} = \]
\[\text{Lit. (s)he arrived two days more soon of the terrorist attack’} \]

\[\text{Llegó dos días antes del atentado} \]

\[b. \text{ Llegó dos días más tarde del atentado} = \]
\[\text{Lit. (s)he arrived two days more late of the terrorist attack’} \]

\[\text{Llegó dos días después del atentado} \]

These cases allow us to suggest that *antes/prima* and *después/dopo* should be analysed as lexical comparatives,\(^{19}\) and therefore endowed with the subtractive feature and the additive feature respectively. We also propose that the subtractive feature and the additive feature are interpretable in *antes/prima* and *después/dopo.* In this way, from a configurational point of view, *antes/prima* and *después/dopo* enter syntax in the nuclear position Con\(^{\circ}\), triggering the subtractive or additive value of the projection Con\(^{\circ}\).\(^{20}\) Furthermore, still concerning the structure in (27), we propose that XP and YP coincide with the positions in which the base and the differential enter syntax, as arguments of Con\(^{\circ}\). This hypothesis allows us to account for the fact that both of them must share a

\(^{18}\) The computational operation involving the additive operator and that involving the subtractive operator should be considered the same, even though, from the algebraic point of view, the addition and the subtraction can show different properties.

\(^{19}\) The hypothesis of *antes/prima* and *después/dopo* as lexical comparatives has been proposed by several authors. See Meyer-Lübke (1974) among others.

\(^{20}\) An alternative hypothesis is to suggest that an abstract subtractive/additive operator, OP\(_{\circ}\), enters syntax in the nuclear position Con\(^{\circ}\), and that this operator later incorporates to *antes/prima* or *después/dopo* that enter syntax in an immediately higher functional head (see section 4). Nevertheless, in this paper we will not investigate this alternative proposal.
temporal information, even though in different ways –i.e. the differential denotes a number of temporal units; while the base a concrete temporal unit–. Furthermore, the same hypothesis allows us to account for the fact that the two arguments that are added together or subtracted have to be ‘semantically’ coherent, namely, they must belong to the same temporal type (span), as the contrasts in (29) show: 21

(29) a. Se fue una hora antes de √ la medianoche. 
 √ su llegada. 
* Navidad.  
Se ne andò un’ora prima di √ mezzanotte.  
√ il suo arrivo.  
* Natale.  

Lit. ‘(He) left one hour before √ the midnight/ √ his arrival/ *Christmas  
b. Se fue dos días después de √ Navidad. 
√ su llegada.  
* la medianoche.  
Se ne andò due giorni dopo √ Natale.  
√ il suo arrivo. 22  
* la mezzanotte.  

Lit. ‘(He) left two days after √ Christmas/ √ his arrival/ *the midnight

In addition, differently from what happens in constructions with a coordinating conjunction, we propose that the two arguments XP and YP in (27) do not establish a symmetric relationship; in fact, these two terms of Con° cannot be commutable (six and/plus five = five and/plus six). These two arguments, instead, establish an asymmetric relationship, which has to be ascribed to some other information provided by antes/prima and después/dopo, i.e. a vectorial information, as we will argue in section 4. Evidence for this asymmetric relationship is also provided by the insertion, along the numeration, of a phonologically realized or unpronounced genitive Case

21. We refer the reader to the Unit mismatch constraint proposed by Giorgi and Pianesi (2003: 108) for a formalisation of this property.

22. The eventive nominals su llegada/il suo arrivo ‘his arrival’ can combine with both types of differentials – una hora/un’ora and dos días/due giorni – because they can refer to different time spans.
marker introducing a spelt-out portion of one of the two arguments (cf. section 2, (8)-(17)).

A further question relating to the structure in (27) is: which positions respectively do the base and the differential occupy in this structural configuration?

Concerning this, we propose that the base enter syntax in the SpecConP, while the differential in the complement position, as (30) shows.\(^\text{23}\)

\[
(30) \quad \text{ConP} \\
\quad \text{base} \quad \text{Con’} \\
\quad \text{Con}^0 \quad \text{differential} \\
\quad [-/+] \\
\quad \text{antes/después}
\]

This proposal, which considers the base as the external argument of the additive/subtractive \textit{Con}, is suitable with the role of less prominent argument that the base takes from the point of view of the informative assembly of the construction itself (cf. Zubizarreta’s (1998:71) \textit{Nuclear Stress Rule Revised}). In addition, these positions for the base and the differential are also empirically motivated, as we will see in section 3.2 and 3.3.

### 3.2. Properties of the differential

The differential, which is an unavoidable term for the algebraic calculation subsumed by our complex temporal structure (cf. (22)), provides the temporal interval that the hearer has to add or subtract from the temporal value of the base. This term syntactically corresponds to a QP that denotes a measure, and its nucleus, \textit{Q}, can be phonologically realized or unpronounced.\(^\text{24}\) So, we can have the following cases:

\(^{23}\) See Brucart (2008) for a similar proposal in his analysis of the comparative \textit{más} ‘more’.

\(^{24}\) Other properties that can be measured, such as temperature, volume and length, among others, may be expressed by means of a measure QP. In these cases, the measure unit has to be semantically coherent with the relevant magnitude. In fact, there are measure units for longitudinal, surface or volume dimensions –meter, square meter and cubic meter, respectively–, for weight –kilo, pound, etc.–, for
a) Q° can hosts a cardinal or an existential quantifier selecting a noun that denotes a portion of time –un día/un giorno ‘one day’; varios meses/diversi mesi ‘several months’; pocos años/pochi anni ‘few years’; cinque minutes/cinque minuti ‘five minutes’).

b) The quantifier can also appear alone –mucho antes/molto prima ‘more before’; poco después/poco dopo ‘a few after; bastante antes/abbastanza prima ‘enough before’; demasiado después/troppo dopo ‘too much after’). For these cases, we propose that the temporal unit corresponds to phonologically unrealized noun denoting a portion of time, i.e. a vague contiguous set of points in time, which is the complement of the quantifier itself: [Qp mucho/molto [DPNP [\text{N Portion of time}]]].

c) The differential can also be phonologically unexpressed, (31). In these cases, its interpretation is equivalent to an undetermined segment of time.

\[
\begin{align*}
\text{a. [Qp Segment of time] antes/ después del atentado} & \quad \text{\textit{Spanish}} \\
\text{b. [Qp Segment of time] prima dell’attentato/ dopo l’attentato} & \quad \text{\textit{Italian}} \\
& \quad \text{‘[Qp Segment of time] before/ after the terrorist attack’} \\
& \quad \text{= an undetermined segment of time before/ after the terrorist attack’}
\end{align*}
\]

d) The differential may also show up as a bare plural denoting a portion of time. A singular noun with the same denotation is always excluded, as the contrast in (32) show:

\[
\begin{align*}
\text{a. años después/ *año después} & \quad \text{\textit{Spanish}} \\
\text{anni dopo/ *anno dopo} & \quad \text{\textit{Italian}} \\
& \quad \text{‘years after/ *year after’} \\
\text{b. días antes/ *día antes} & \quad \text{\textit{Spanish}} \\
\text{giorni prima/*giorno prima} & \quad \text{\textit{Italian}} \\
& \quad \text{‘days before/ *day before’}
\end{align*}
\]

pressure –atmosphere– and for other properties through which an object can be measured (cf. Rizzi (1988), Bosque (1997) and Sánchez López (1999) and (2006)).

\[25\] For a similar proposal in the domain of verb phrases, see Bosque and Masullo (1996).

\[26\] The noun tiempo/tempo ‘time’ appears in singular form when it perform the function of the differential:

\[
\begin{align*}
\text{i. tiempo antes / *tiempos antes} & \quad \text{tiempo después / *tiempos después} & \quad \text{\textit{Spanish}} \\
\text{b. tempo prima / *tempi prima} & \quad \text{tempo dopo / *tempi dopo} & \quad \text{\textit{Italian}} \\
& \quad \text{‘time before/after/ *times before/after’}
\end{align*}
\]
For cases like these, we suggest that the bare plural appears in the domain of a silent quantifier, \([\text{QP} \, \emptyset \, [\text{DP} \, e \, [\text{años/anni}]]]\), which provides the bare plural itself with the quantitative/cardinal interpretation it needs in our constructions. In fact, as some authors argued, (cf. Longobardi (1990) and Laka (1996), among others), bare plurals do not display a quantitative/cardinal interpretation.

e) Finally, the differential may appear as a lexicalized quantitative expression such as: *una eternidad/un’eternità ‘one eternity’, un siglo/un secolo ‘one century’* in their metaphorical or figurative use.

The relevant contexts where a measure QP may appear are described by Bosque (1997) and Sánchez López (2006). The authors argue that they are selected by certain prepositions or verbs. Nevertheless, they also can appear as specifiers of comparative adjectives and ‘adverbs’, such as *antes/prima and después/dopo*. If our hypothesis concerning the intrinsic value of *antes/prima and después/dopo* (cf. (27)) is on the right track –namely that they are provided with interpretable subtractive/ additive features–, we expect, according to Bosque (1997) and Sánchez López (2006), that there is only one structural position that can host measure QPs. They have to be selected as internal arguments by a nucleus such as P, V and Con. As we will see later, the differences between P and V, on the one hand, and Con, on the other, are due to the functional structure associated to comparative elements. Only when The QP is selected by Con can move to a higher position for the reasons we will suggest in section 4.

### 3.2.1. Measure QPs selected by prepositions

Some lexical prepositions, such as *durante/per ‘during/for’, dentro de/tra ‘in’, etc.*, select a measure QP:

---

We propose that this property depends on the fact that the intrinsic interpretive value of *tiempo/tempo ‘time’* subsumes an indefinite number of each of the nouns denoting a portion of time; *tiempo/tempo ‘time’* can be composed of an indefinite number of moments, minutes, days, weeks, years, etc. Notice, furthermore, that in our temporal constructions its presence as differential prevents the phonologically realized of the base:

(ii) a. *Tiempo antes del atentado* (Spanish)  
     *Tempo prima dell’attentato* (Italian)

b. *Años/Días antes del atentado* (Spanish)  
     *Anni/giorni prima dell’attentato* (Italian)
(33) a. No se hablaron durante años
   Non si sono parlati per anni
   ‘They didn’t talk to each others for years’
   
b. Llovió durante cuarenta días y cuarenta noches
   È piovuto per quaranta giorni e quaranta notti
   ‘It rained during forty days and forty nights’

(34) a. Se espera un cambio de tiempo dentro de dos días
   Ci si aspetta un cambiamento del tempo tra due giorni
   ‘A change of weather is expected in two days’
   
b. Llegará dentro de una semana
   Arriverà tra una settimana
   ‘He will arrive in one week’

The interpretation of measure QPs depends on the lexical value of the preposition. In (33) the temporal preposition durante/per ‘during/ for’ selects a measure QP that expresses a span of time. In these cases, no computational process is involved because the speaker provides the hearer with the exact amount of units of time that the process denoted by the predicate will last or will take place. On the other hand, in (34) the PP dentro de dos días/tra due giorni ‘in two days’ indicates a quantity of contiguous points in time that must to be summed up to the temporal point coinciding with the Speech Time of the sentence.\(^{27}\) The temporal point coinciding with the Speech Time corresponds to the point in time from which the vector starts and that the preposition dentro de/tra\(^ {28}\) ‘in’ orientates to the future.\(^ {29}\) Therefore, in cases like these, dentro de

\(^{27}\) See Smith’s (1981) and Hinrichs (1986) classification where this temporal preposition is analysed as ‘deictic’.

\(^{28}\) We don’t consider he locative interpretation that dentro de/tra can also have because it is irrelevant for our argumentation.

\(^{29}\) The temporal mismatch shown in (i) can be easily explained by the orientation to the future that dentro de/tra inherently possesses:

(i) *Llegó dentro de dos días

*Arrivò tra due giorni

*PAST TENSE FUTURE ORIENTATION

‘He arrived in two days’
dos días/tra due giorni is similar, from an interpretive point of view, to dos días después:

(35) Hoy es jueves día 11. Llegará dentro de dos días. Es decir, el sábado día 13 (11 + 2 días = sábado 13)
Oggi è giovedì 11. Arriverà tra due giorni. Vale a dire, sabato 13 (11+2 giorni=sabato 13)
‘Today is Thursday, 11th. (He) will come in two days. Namely, Saturday 13th (11+2 days= Saturday 13th)’

Functional prepositions such as en (Spanish)/in (Italian) ‘for/ in’, among others, may introduce measure QPs that denote spans (36a) or points (36b) in the temporal axis:

(36) a. No hizo nada en dos días  
    ?In due giorni non ha fatto nulla  
    ‘S/he has done anything during/ for two days’  
    Spanish   Italian

b. Estará aquí en dos días  
    Sarà qui in due giorni  
    ‘S/he will be here in two days’  
    Spanish   Italian

The span or punctual interpretation of the PP is obtained compositionally by the P, the aspektual value of the predicate and the Speech Time. In (36a), the QP dos días/due giorni ‘two days’ measures the temporal length of the process denoted by the predicate; whereas in (36b) the QP has a punctual interpretation that corresponds to the final point in the temporal axis. This unambiguous point in time has to be calculated by adding dos días/due giorni to the temporal point coinciding with the Speech Time, which represents the starting point in the temporal axis.

Correlative constructions that include two prepositions, such those in (37), are very close to temporal constructions headed by antes or después.\(^\text{30}\) One of the two

\(^{30}\) Other correlative constructions such (i) include two prepositions. The first one indicates the starting point in the temporal axis; while the second one, the final point:

(i) a. Estará con nosotros de Navidad a Año Nuevo/*siete días  
    Spanish
    b. Starà con noi da Natale ad/fino all’Anno Nuovo/*sette giorni  
    Italian
    ‘He will be with us from Christmas to New Year (*seven days)
prepositions introduces a measure QP *dos días/due giorni*; while the second one precedes the base *el atentado/l’attentato*:

(37) A dos días del atentado  
A due giorni dall’attentato  
*Lit.* ‘At two days from the terrorist attack’

In Spanish, (37) is parallel, from an interpretive point of view, to ‘two days before the terrorist attack’. It refers to a precise temporal point that has to be calculated by a subtractive operation. The corresponding Italian construction in (37) is, on the other hand, ambiguous: it can means either ‘two days before the terrorist attack’ or ‘two days after the terrorist attack’, depending on the context.\(^{31,32}\)

The whole construction conveys a span interpretation and no measure QP is allowed, because it has to be inferred by calculating the amount of temporal units included between the starting point in time and the final point in time.

\(^{31}\) In this respect, compare the following Italian sentences:

(i) a. A due giorni dall’arrivo del presidente non si sa ancora in quale hotel scenderà.  
‘Two days before the president’s arrival, no one knows yet at which hotel he will stay’

b. A due giorni dal disastro non si conosce ancora il numero delle vittime.  
‘Two days after the disaster, the total amount of victims is still unknown’

\(^{32}\) Data taken from CREA (*Corpus de Referencia del Español Actual*) show that a 25 per cent of Spanish native speakers interpret (37) as “two days after the terrorist attack”. The only explanation we can suggest for this is that the preposition *a* has for these speakers a weak vectorial content that leaves open the direction in which the temporal axis is orientated, as we propose for the corresponding Italian construction (cf. section 4). In Spanish, the expression *a los dos días del atentado* with a definite article preceeding the QP *dos días*, has only one possible reading, namely ‘two days after the terrorist attack’. In this case, the only computational operation available is the addition. We haven’t found any parallel examples in other Romance languages. The way in which the segment *two days* is interpreted as a differential besides the presence of a definite article, still remains unexplained.
3.2.2. Measure QPs selected by verbs

Measure QPs may also be selected by some verbs such as *durar/durare* ‘to last’, *prolongarse/prolungarsi* ‘to continue/persist’, *alargarse/allungarsi* ‘to lengthen’, *dilatarse/dilatarsi* ‘to lengthen’, *extendese/estendersi* ‘to extend’, *adelantarse/anticipar(si)* ‘to put forward’, *prorrogarse/prorogarsi* ‘to extend’, and *atrasarse/ritardare* ‘to delay’, among others. This QP can sometimes be omitted: *El concierto duró/Il concerto durò* ‘the concert lasted’. According to its interpretation, that we can paraphrase as: ‘the concert lasted an undetermined (long) segment of time’. We propose that in cases like these a QP selected by the verb enters syntax but it does not realize phonologically. Some atelic verbs denoting activities may also be combined with a QP that measures the length in time (i.e. the duration in time) of the activity itself: *dormir pocas horas/dormire poche ore* ‘to sleep few hours’, *vivir cien años/vivere cent’anni* ‘to live one hundred years’, *caminar cinco días seguidos/camminare cinque giorni di seguito* ‘to walk five days straight’, *estudiar cinco años/studiare cinque anni* ‘to study for five years’, *esperar diez minutos/aspettare dieci minuti* ‘to wait ten minutes’, etc. In all these cases the measure QP is interpreted as a span of time and, therefore, no computational operation is required. In contrast, the Spanish impersonal verb *hacer* conveying a temporal meaning, (38) requires a calculation in order to deduce the corresponding precise point in time to which the construction refers:

(38) Hace dos días/ tres horas/ poco/ mucho

*Lit.:* Does two days/ three hours/ few/ a lot

‘two days/ three hours/ a few time/ a lot of time ago’

The precise point in the temporal axis is calculated subtracting the differential *two days* from the point indicated by the Speech Time, which represents the initial point of the vectorial extension (i.e. the base). The verb *hace* orientates this temporal axis to the past.


3.3.3. Measure QPs selected by Con

Both in Spanish and Italian, measure QPs can appear modifying some comparative adjectives and adverbs, as (39) shows:

(39) a. diez años más joven/ viejo
    dieci anni più giovane/ vecchio
    \textit{Lit. ‘ten years more young/old’}

\textsuperscript{33} In Spanish, the functional preposition \textit{tras} conveys both locative and temporal meaning (cf. (i)). Notice that the second interpretation is synonymous with our complex temporal particle \textit{después} (cf. (ib)).

(i) a. La puerta se cerró tras él/ Todos van tras la recompensa
    ‘The door closed behind him/ They are all after the reward’

b. tras los incidentes de ayer/ tras esta aplastante derrota = después de los incidentes de ayer/ después de esta aplastante derrota
    ‘after yesterday’s incidents/ after this crushing defeat’

However \textit{tras}, unlike \textit{después}, behaves as a functional preposition: it obligatorily requires a complement and does not allow the presence of a Case marker. Furthermore, \textit{tras} cannot co-occur with a differential. All these properties are illustrated in (ii).

(ii) a. tras *(el atentado)/ después (del atentado)
    ‘after the terrorist attack’

b. tras (*de) el atentado/ después (*de) el atentado

c. *dos días tras/ dos días después
    ‘two days after’

The intransitive adverb \textit{atrás} (from: prep \textit{a} + prep \textit{tras}) may also express locative and temporal meanings as its basic form \textit{tras}. \textit{Atrás}, unlike \textit{tras}, may appear with a differential. In its temporal meaning \textit{atrás} is synonymous with our temporal complex construction \textit{antes}.

(iii) a. dos calles atrás
    ‘two streets backwards’

b. dos años atrás/ antes
    ‘two years ago’

\textbf{Locative interpretation}

\textbf{Temporal interpretation}

We will go deeper into the similarities between \textit{tras/ atrás} and \textit{antes/ después} in future researchs.
b. diez años menos joven/ viejo  
    dieci anni meno giovane/ vecchio  
    Lit. ‘ten years less young/old’  

In Spanish, measure QPs can also appear modifying lexical comparatives, such as the adjectives major/minor ‘older’/‘younger’, and, both in Spanish and Italian, the temporal “adverbs” antes/prima and después/dopo.

(40) a. diez años menor/ mayor  
    Lit. ‘ten years younger/older’  

b. dos días antes/ después  
    due giorni prima/ dopo  
    ‘two days before/ after’

As we have suggested in section 3.1. (cf. (27)), lexical comparatives are inherently endowed with a feature, Con (+/-), that licenses a measure QP as internal argument. It is for this reason, then, that constructions such as (41) are ungrammatical, because pleonastic:

(41) a. *diez años más menor/ más mayor\footnote{34}  
    Lit. ‘ten years more younger/ more older’  

b. *dos días más antes/ más después  
    *due giorni più prima/ più dopo  
    ‘*two days more before/ more after’

Measure QPs in comparative contexts differ from QPs selected by prepositions and verbs in three main properties: first of all, they are optional, as the contrasts in (42)

\footnote{34}{In Spanish examples such as those in (41a) can easily be found in CREA database, mainly in oral discourse. We argue that in cases like these the speaker applies the regular rule to obtain comparative adjectives, even though the adjective is inherently comparative. Instead, pleonastic constructions are much more restricted in cases with temporal ‘adverbs’, (41b).}
show; furthermore, they can appear preceding Con°, (43); and finally, their base is external to the construction in which the selecting category appears.35

(42) a. dentro de *(dos días)  
   tra *(due giorni)  
   ‘in two days’  
   b. hace *(dos días)  
   *(due giorni) fa  
   ‘two days ago’  
   c. (dos días) después  
   (due giorni) después  
   ‘(two days) after’

(43) a. dentro de dos días  vs.  *dos días dentro  
   tra due giorni  vs.  *due giorni tra  
   ‘in two days’  
   b. hace dos días  vs.  *dos días hace36  
   c. dos días después  vs.  #después de dos días37

At this point, the following question arise:
Why may the measure QP move higher crossing the nucleus in comparative constructions, whereas it has to be merged in its basic position when the selecting nucleus is a P or a V?
To account for this difference, we will focus on the cases presented in (43a) and (43c). Both the preposition dentro de/tra ‘in’ and the temporal particle después/dopo ‘after’

---

35. This last property will be discussed in section 4.

36. In Italian and English, in the corresponding constructions the differential appears preposed: due giorni fa and two days ago. In Contemporary Spanish, however, the same relative order is still available in semi-frozen constructions such as un año a (Lit.: ‘one year have 3pers sing ‘one year ago’). In addition, as Keniston (1937: 426) and Kany (1970: 262-4) noted, some American-Spanish varieties adopted this Old Spanish semi-frozen structure until XVIII century. These data seem to suggest that in some languages the differential may undergo a grammaticalisation process in order to move up to a higher position. We will go into this topic in further research.

37. The contrast between examples in (43b) will be explained later on in the same section.
select the measure QP *dos días/due giorni* ‘two days’ as internal argument, but only the latter is inherently endowed with some features that are able to project a functional architecture upwards.\(^{38}\)

In addition, we propose that measurement nouns, such as *día/giorno* ‘day’, *mes/mese*, ‘month’, *año/anno* ‘year’, *minuto/minuto* ‘minute’, etc., which appear as complements of Q in the measure QPs, have some special interpretive properties that allow them to raise upwards in the structure if there is an available position that can host them (cf. sections 3.1. and 4).

Bosque (1997) pointed out that nouns such as *día, mes*, and *año* are interpretive ambiguous. They can refer either to an entity, as in cases such as (44), or to a measure unit, as in (45). According to the author, when the noun *día*, for example, is used as a measure unit, (45), it lacks the semantic extension that characterizes common nouns and, therefore, it cannot be modified by restrictive complements or modifiers, in sharp contrast with those contexts in which the same noun is used as an entity, (44).

(44) a. Juan llegó un día de enero/ lluvioso

   Gianni arrivò un giorno di gennaio/ piovoso

   *Lit. ‘John arrived a day of January/ a rainy day’*

b. Aplazamos la fiesta para un día de enero/ lluvioso

   Posticipammo la festa ad un giorno di gennaio/ piovoso

   *Lit. ‘We postponed the party to one day of January/ one rainy day’*

(45) a. Tardó un día (*de enero/ *lluvioso)

   *Ci mise un giorno (*di gennaio/ *piovoso)

   ‘S/he lasted one day (*of January/ *one rainy day)’

b. dentro de un día (*de enero/ *lluvioso)

   tra un giorno (*di gennaio/ *piovoso)

   ‘in one day (*of January/ *one rainy day)’

This generalization holds also for the differential in our complex temporal constructions. In fact, as (46) and (47) show, restrictive complements or modifiers are

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\(^{38}\) The properties of these higher functional categories will be presented in section 4.
allowed only when the QP dos días/due giorni appears antes/prima and después/dopo.\textsuperscript{39,40}

(46) a. *dos días de lluvia después  
    *due giorni di pioggia dopo  
    \textit{Lit. `two days of rain after’}  
    
    b. *dos días agotadores después  
    *due giorni estenuanti dopo  
    \textit{Lit. `two days exhausting after’}  
    
    c. *dos días fríos después  
    *due giorni freddi dopo\textsuperscript{41}  
    \textit{Lit. `two days cold after’}  

\textsuperscript{39} However, the noun which forms part of the differential can be modified by preposed evaluative adjectives, as we can observe in (i):

(i) a. dos inolvidables días antes  
    `due indimenticabili giorni prima  
    \textit{Lit. `two unforgettable days before’}  
    
    b. tres agotadoras semanas después  
    `tre estenuanti settimane dopo  
    \textit{Lit. `three exhausting days after’}  

We suggest that these cases should not be considered counterexamples to our generalization, because they don’t restrict the semantic value of the noun. See Bosque and Picallo (1997) for more details about the behavior and interpretation of evaluative adjectives preceding and following the head N.

\textsuperscript{40} A different proposal for nouns such as day, week, year, etc., is suggested by Cinque (2006). The author, observing what happens in numeral classifier languages, which lack a classifier in these nouns, argues that they are numeral classifiers, and extends this analysis also to the traditional ‘non numeral classifier languages’, as Italian and English.

\textsuperscript{41} Relational adjectives, such as academic, festive, etc., have restrictive value. Nevertheless, they can appear preceding the noun of our differentials:

(i ) a. Un año académico después  
    Un anno accademico dopo  
    \textit{Lit. `a year academic after’}  
    
    b. dos días festivos después  
    *due giorni festivi dopo  
    \textit{Lit. `two days holiday after’}
(47) a. después de dos días de lluvia
    dopò due giorni di pioggia
    Lit. ‘after two days of rain’

b. después de dos días agotadores
    dopò due giorni estenuanti
    Lit. ‘after two days exhausting’

c. después de dos días fríos
    dopò due giorni freddi
    Lit. ‘after two days cold’

Some speakers consider después de dos días/dopò due giorni and dos días después/due giorni dopo synonymous. Nevertheless, there is a slight difference between the two constructions we present in (48):

(48) a. Después de dos días, el pescado huele mal.
    Dopo due giorni, il pesce manda cattivo odore.
    Lit. ‘After of/Ø two days, the fish smells badly’

b. Dos días después, el pescado huele mal.
    Due giorni dopo, il pesce manda cattivo odore.
    Lit. ‘Two days after, the fish smells badly’

As we can observe, in (48a) the speaker refers to a point in time. This point in time is inferred by the base después de [haber pasado] dos días/dopò [essere passati] due giorni (cf. (57)-(58)).

In (48b), on the other hand, the expression de dos días/dopò due giorni corresponds to the differential, while the base is unpronounced. It is for this reason that the sentence is odd if uttered out-of-the-blue fashion (cf. section 3.3.).

According to Bosque (1997), we propose that these cases are not counterexamples to our generalization because in these contexts the noun plus the adjective give rise to a new and different unit of measure.

42 Notice that in (48a) the point in time, which corresponds to the base, may also be expressed by additional information, (cf. (47)):

(i) a. Después de dos días fuera del congelador, el pescado huele mal.
    Dopo due giorni fuori dal congelatore, il pesce manda cattivo odore.
    Lit. ‘After two days out of the freezer, the fish smells badly’
Furthermore, in sentences such as (48b) the preposed QP *dos días/due giorni* may co-
occurs with a postposed QP, as (49) shows:

(49) **Dos días después de dos días de juerga, aún me doliá la cabeza.**

Span**ish**

**Due giorni dopo due giorni di festeggiamenti, mi faceva ancora male la testa.**

Ita**lian**

*Lit. ‘Two days after two days of celebrations my head still aches’*

In cases like these, the QP, *dos días de juerga/due giorni di festeggiamenti* ‘two days of
celebration’, is interpreted as the base of the computational process. In fact, this QP
refers to an entity, and, therefore, it is discourse linked. On the other hand, the QP *dos
días/due giorni* ‘two days’ refers to a measure unit, and, for this reason, it cannot be
associated to a concrete temporal segment in the real world.

According to these syntactic and interpretive behaviours, we propose that a QP with
measure value can be selected as internal argument by the following categories: P, V
and Con; and it can move up if the two following main conditions are fulfilled:

a) Its nominal complement is endowed with some interpretive features (i.e. it
cannot refer to an entity)

b) there is a higher landing site available in the functional architecture that the
selecting category projects.

The first condition is satisfied by the measure QP complement of Ps and Vs, but the
second one isn’t. For this reason it cannot move up.

Furthermore, some diachronic data from Old Italian, (50), and Old Spanish, (51),
provide additional evidence that supports our hypothesis, namely that in our temporal
constructions the differential enters syntax in the complement position of *antes/prim**a*
and *después/dopo*. In fact, in previous stages of the two Romance languages the
differential could also appear following the base:

(50) a. “Aristarco dice lui essere stato *dopo l’ emigrazione ionica cento anni*, regnante
Echestrato,…” [OVI (Opera del Vocabolario Italiano): *Boccaccio,
Esposizioni*, 1373-74 [c. IV (i), par. 110 | page 197]]

*Lit. ‘…after the emigration Ionic one hundred years…’*

b. “Ripuòsò Giovanni in Gierusalem ed in Giudea *dopo la morte di Cristo XL
anni,…*” [OVI (Opera del Vocabolario Italiano):Legg. sacre
Mgl.II.IV.56, 1373 (fior.) [Legg. di S. Giovanni | page 26]]

*Lit. ‘…after the death of Christ sixty years…’*
(51) a. “…después de cercado quatro meses, entraron la villa”
   [CORDE: Lope García de Salazar, *Istoria de las
   bienandanzas e fortunas* 1471 – 1476]
   Lit. ‘…after laying siege four months,…’

   b. “…y después de tomada Troya *ciento y ochenta años.*”
   [CORDE: Juan de Mena, *Homero romanizado*, 1442]
   Lit. ‘…and after conquered Troy one hundred and eighty years.’

In this way, the diagram we proposed in (30) can be represented as (52):

(52) \[ \text{ConP} \]
    \[ \text{base} \quad \text{Con’} \]
    \[ \text{Con}^\circ \]
    \[ \text{QP} \]
    \[ \text{antes/después} \quad \text{dos días/due giorni} \]

3.3. Properties of the base

As we have presented in section 1, the base of our complex temporal constructions that occupies the specifier position of ConP, (30), can appear phonologically realized either as a sentence or as a nominal expression, as the examples in (3b-c) and (4b-c), repeated below in (53) and (54), show:

(53) a. Llegó (dos días) antes/después (de) que ocurriera el atentado/
    de ocurrir el atentado. \[ \text{Spanish} \]
    ‘S/he arrived (two days) before/after the terrorist attack took_{Subj.Past place} the
    terrorist attack take_{inf. place}

   b. Llegó (dos días) antes/después del atentado.
    ‘S/he arrived (two days) before/after the terrorist attack’

(54) a. Arrivò (due giorni) prima che avesse luogo l’attentato/dopo che ebbe luogo
    l’attentato. \[ \text{Italian} \]
    ‘S/he arrived (two days) before the terrorist attack took_{Subj.Past place} after the
    terrorist attack took_{ind.Past place}

   b. Arrivò (due giorni) prima dell’attentato/dopo l’attentato.
    ‘S/he arrived (two days) before of the terrorist attack/after the terrorist attack’
Observing these data, we can generalise that the expression corresponding to the base, i.e. *que ocurriera el atentado, de ocurrir el atentado* / *che avesse luogo l’attentato, ebbe luogo l’attentato* and *el atentado/l’attentato*, has to express, or has to be associated with a point in the temporal axis. In fact, only in the case in which the base is endowed with such a property, which should be considered the basic information, it is possible to begin the computational process described in (22).

According to this observation, in those cases in which the base is a sentence, the mentioned property can be satisfied by the fact that, as a sentence expresses an event, this event can be associated with a temporal point.

On the other hand, when the base is a nominal expression, it may correspond either to nominals that denote an event, as in (53b)-(54b) and (55):

(55) a. Se fue antes/después de su llegada.  
    la muerte del abuelo.  
    lectura del periódico.

b. Se ne andò prima di/dopo il suo arrivo.  
    la morte del nonno.  
    la lettura del giornale.

‘He left before/after her arrival/his grandfather’s death/the newspaper’s reading’

or to nominals that express a temporal unit or a temporal segment, as (56) shows:

(56) a. Llegó antes/después de Navidad.  
    enero.  
    el lunes.  
    las cinco.  
    el tres de mayo.

b. Arrivò prima di/dopo Natale.  
    gennaio43  
    lunedì.  
    le cinque.  
    il tre maggio.

‘He arrived before/after Christmas/January/monday/five o’clock/may the 3th’

43 ‘Temporal’ nouns such as *Navidad/Natale ‘Christmas’* and *enero/gennaio ‘January’* do not admit the definite article because they behave like proper names.
Nevertheless, in the domain of nominal expressions there exist cases in which the base is neither a nominal that denotes an event nor a ‘temporal’ nominal:

(57) a. Le gusta una copa de coñac antes del puro.  
    Gli piace un bicchiere di cognac prima del sigaro.  
    ‘He likes a glass of brandy before the cigar’  
b. Juan entregó el documento después de María.  
    Gianni consegnò il documento dopo Maria.  
    ‘John handed in the document after Mary’  
c. Se cansó de la novela después de las primeras páginas.  
    Si stancò del romanzo dopo le prime pagine.  
    ‘He grew weary of the novel after the first pages’

Cases like these should not be considered counterexamples to the requirement we have just proposed. In fact, despite the nominals el puro/il sigaro, María and las primeras páginas/le prime pagine designate an object, we can easily infer that also in these cases the bases are able to express an eventive information. According to Bosque’s (1990, 1999:265) proposal, we suggest that in (57) the respective bases correspond to a more complex structure, namely a sentential structure where the verb and/or the predicate though unpronounced are syntactically and interpretatively present:

(58) a. …antes de (fumar) el puro  
    …prima di (fumare) il sigaro  
    Lit.‘… before of (smoking) the cigar’  
b. …después de (entregarlo) Maria  
    …dopo (averlo consegnato) Maria  
    Lit.‘…after of (handing in) Mary’  
c. …después de (leer) las primeras páginas  
    …dopo (averlo letto) le prime pagine  
    Lit.‘…after of (reading) the first pages’

44. As Bosque (1990) suggests, in cases like (57): “se sobreentiende […] un verbo que se asocia léxicamente con el sustantivo, y que denota la entrada en acción o en funcionamiento del objeto que se designa, o bien alguna actividad en la que es participante habitual” (p.52).
This possibility is attributable to the fact that the content of the verb and/or the predicate can be recovered through pragmatic or syntactic processes. The requirement that the base has to denote an event in order to express a temporal point can also account for the fact that, when the base corresponds to a sentence or to a nominal denoting an event, these expressions cannot appear in the domain of a negation. The negation, in fact, preventing the event denoted by the verb or by the nominal from taking place, also prevents the base from corresponding to a point in the temporal axis, as the ungrammaticality of (59) and (60) show.45

(59) a. *Apagó la calefacción antes de no salir.  
   *Spense il riscaldamento prima di non uscire.  
   Lit. ‘He turned off the heating before of not to go out’

b. *Cerró la puerta después de no llegar.  
   *Chiuse la porta dopo non essere arrivato.  
   Lit. ‘He closed the door after of/Ø not arrive/not been arrived’

(60) a. *Apagó la calefacción antes de la no salida.  
   *Spense il riscaldamento prima della non uscita.  
   Lit. ‘He turned off the heating before of his not going out’

b. *Cerró la puerta después de la no llegada.  
   *Chiuse la porta dopo il non arrivo.  
   Lit. ‘He closed the door after of/Ø his not arrival’

Nevertheless, there exist cases in which a non-expletive negation can appear in such domains, as the grammaticality of (61) shows:

(61) a. Antes/después de no ser aceptado en la Universidad  
   Prima di/dopo non essere accettato all’Università  
   Lit. ‘Before/after not to be accepted at the University’

b. Antes/después de la no caída del gobierno  
   Prima di/dopo la non caduta del governo  
   Lit. ‘Before/after the not fall of the Government’

45 For cases like these, see Bertinetto (1982) and García Fernández (2000).
For constructions like these, we suggest that, despite the presence of the negation, the respective bases are able, in any case, to express an event and therefore a point in the temporal axis. Their interpretation, in fact, can be paraphrased as: “a concrete event corresponding to the fact that the event denoted by the predicate/eventive nominal, and that one expected to have been taken place, did not take place”.\(^{46}\)

In those cases in which the base is represented by a nominal expression, expressing this nominal an event or a ‘temporal’ unit is not the unique requirement that it has to satisfy. In order to indicate or to be associated with a concrete point in the temporal axis, the nominal expression followed by *antes/prima* and, in particular, by *después/dopo* must also receive a ‘specific’ or referential interpretation. This requirement allows the whole complex temporal expression to work as a punctual localization in the temporal axis, as Bertinetto (1982) proposes (cf. section 3.1). Furthermore, the same requirement allows us to account for a series of empirical data such as the following:

a) the eventive nominal expression when preceded by *después/dopo* cannot be modified by the intensional adjective *posible/possibile* ‘possible’:\(^{47}\)

\[(62)\] a. *Llegó/Ha llegado/Llegaba después del posible atentado. \hspace{1cm} \textit{Spanish} \hspace{1cm} *Arrivò/ E’ arrivato/ Arrivava dopo il possibile attentato.\(^{48}\) \hspace{1cm} \textit{Italian} \hspace{1cm} \textit{Lit. ‘He arrived/ has arrived/ arrived\(_{imp}\) after (of) the possible terrorist attack’} \]

\(^{46}\) This interpretation can depend on the co-occurrence of different properties: the type of the eventive nominals, the tense of the main verb, etc. that we will not explore in this paper.

\(^{47}\) It seems that, among all the intensional adjectives, only *posible/possibile* ‘possible’ is able to cancel the ‘factuality’, and the deictic referentiality, of the eventive nominal expression followed by *después/dopo*, namely the base. In fact, other intensional adjectives, such as *probable/probabile* ‘probable’ and *presunto/presunto* ‘alleged’, can appear in the same contexts:

\[(i)\] Llegó después del probable/presunto atentado. \hspace{1cm} \textit{Spanish} \hspace{1cm} Arrivò dopo il probabile/presunto attentato. \hspace{1cm} \textit{Italian} \hspace{1cm} \textit{Lit. ‘He arrived after (of) the probable/alleged terrorist attack’} \]

As for the grammaticality of (i), we suggest that in both cases the modified nominals are able to indicate a concrete temporal point because *probable atentado/probabile attentato* and *presunto atentado/presunto attentato* are interpreted as “the tragic event that probably was a terrorist attack” and “the tragic event that presumably was a terrorist attack” respectively.

\(^{48}\) When the the verb is in the future, the adjective *posible/possibile* can modify the eventive nominal expressing the base:

\[(i)\] *Llegará después del posible atentado. \hspace{1cm} \textit{Spanish} \]
b. *Fue a dormir después de la posible llegada de su hija. Spanish
*Se ne andò a dormire dopo il possibile arrivo di sua figlia. Italian
Lit. ‘He went to sleep after (of) the possible arrival of his daughter’
c. *Se cansò de la novela después de las posibles primeras páginas. Spanish
*Si stancò del romanzo dopo le possibili prime pagine.49 Italian
Lit. ‘He got tired of the novel after the possible first pages’

b) when the main verb appears in past form, the eventive nominal expression preceded by antes/prima and después/dopo cannot have an existential interpretation:

(63) a. Llegó/Ha llegado/Llegaba antes/despúes de una fiesta. Spanish
Arrivò/È arrivato/Arrivava prima di/dopo una festa. Italian
Lit. ‘He arrived/ has arrived/arrived\textsuperscript{impf} before/after (of) a party’
b. *Llegó/Ha llegado/Llegaba antes/despúes de una fiesta cualquiera. Spanish
*Arrivò/È arrivato/Arrivava prima di/dopo una festa qualsiasi. Italian
Lit. ‘He arrived/ has arrived/arrived\textsuperscript{impf} before/after (of) a any party’
c. Llegó/Ha llegado/Llegaba antes/despúes de una (determinada) fiesta (determinada). Spanish
Arrivò/È arrivato/Arrivava prima di/dopo una (determinata) festa (determinata). Italian
Lit. ‘He arrived/ has arrived/arrived\textsuperscript{impf} before/after (of) a certain party’
d. Llegó/Ha llegado/Llegaba antes/despúes de una de las fiestas. Spanish
Arrivò/È arrivato/Arrivava prima di/dopo una delle feste. Italian
Lit. ‘He arrived/ has arrived/arrived\textsuperscript{impf} before/after (of) one of the parties’

Comparing the sentences in (63), we can observe that the indefinite nominal expression una fiesta/una festa in (63a) can only receive either a wide scope interpretation, (63c), or a D-Linking interpretation, (63d), as the ungrammaticality of (63b) shows.50

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49 With antes/prima the sentences in (61a-b) improve, probably due to the lexical and grammatical aspect of the verbs and the counterfactual value that antes/prima can have (cf. section 3.1).
c) finally, the eventive nominal expression preceded by *antes/prima* and *después/dopo* can never appear as a bare plural:

(64) a. Engordó después de *(los) embarazos.  
    Si ingrassò dopo *(le) gravidanze.  
    *Lit. ‘She got fat after (of) *(the) pregnancies’*

b. Enmudeció después de *(los) hechos.  
    Si ammutolì dopo *(i) fatti.  
    *Lit. ‘He fell silent after (of) *(the) events’*

c. Se durmió después de *(los) anuncios.  
    Si addormentò dopo *(i) consigli per gli acquisti.  
    *Lit. ‘He fell asleep after (of) *(the) TV advertisements’*

In fact, bare plurals behave like existential nominal expressions (cf. Longobardi (1994) and Brugè and Brugger (1996) among others).51

As we have seen in section 1 (cf. (3a) and (4a)), *antes/prima* and *después/dopo* do not necessarily require that the base is phonologically expressed:

(65) Llegó/Ha llegado/Llegará (dos días) antes/despúes.  
    Arrivò/È arrivato/Arriverà (due giorni) prima/dopo.  
    ‘S/he arrived/Has arrived/Will arrived (two days) before/after’

50. Notice that this requirement has not to be met in those cases in which the indefinite nominal is bound by overt adverbal quantifiers such as *siempre/sempre* ‘always’, which provide the whole sentence with a quantificational generic interpretation (cf. Heim (1982) and Diesing (1992), as (i) shows:

(i) Siempre hay alboroto después de un atentado.  
    C’è sempre confusione dopo un attentato.  
    *Lit. ‘Always there is confusion after a terrorist attack’*

51. Cases like *después de meses/años/siglos* (Spanish) or *dopo mesi/anni/secoli* (Italian) lit.’after (of) months/years/centuries’ should not be considered as counterexamples to the requirement we propose. In fact, as we have suggested in section 3.2., in these constructions the bare plurals, dominated by an empty quantifier, correspond to the differential and not to the base.
In the literature these constructions are known as ‘anaphoric temporal locutions’, given that, in order to be interpreted, they require a temporal/eventive antecedent in the sentence or in the previous discourse with which corefer (cf. García Fernández (2000 cap.11), Pavón (2003:307-309), Giorgi and Pianesi (2003), among others). This property accounts for the fact that, from an interpretive point of view, sentences like (65) are odd if uttered out-of-the-blue, while sentences like (66) and (67) are felicitous because the ‘anaphoric locution’ can build its reference sentence-externally and from the temporal phrase previously introduced in the discourse, respectively:

(66) a. Juan llegó el 15 de abril y Pablo llegó (dos días) antes/después. Spanish
Gianni arrivò il 15 aprile e Paolo arrivò (due giorni) prima/dopo. Italian
‘John arrived on April 15th and Paul arrived (two days) after/ before’

(67) A: Pablo llegó el 15 de abril. Paolo arrivò il 15 aprile.
‘Paul arrived on April 15th,
B: No. Llegó (dos días) antes/después. No. Arrivò (due giorni) prima/dopo.
‘Oh no. He arrived (two days) after/ before’

The oddness of (65), compared with the felicity of (66) and (67), suggests that also in cases like (65) the base is necessary, at least from the interpretive point of view: if the context does not provide a suitable antecedent that is able to indicate a concrete point in time, the computational process involved in our complex temporal constructions cannot take place.

In this way, and according to Giorgi and Pianesi’s (2003) analysis, among others, we propose that the additive/subtractive Operator always projects the base, i.e. its argument

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52. ‘Anaphoric temporal locutions’ are opposed to ‘indexical temporal locutions’, namely to expressions such as Monday, yesterday, on September 25th, on/ at Christmas, etc.

53. Giorgi and Pianesi (2003), to which we refer the reader, suggest that in Italian anaphoric locutions such as il giorno prima/dopo ‘the day after/ before’ are anaphoric phrases that contain a phonetically unpronounced temporal variable, e.g. il giorno prima/dopo x ‘the day before/after x’ and, studying the distribution of these expressions both in matrix and in embedded contexts, propose an analysis that formally describe how the variable can take its reference. As for matrix contexts, the authors argue that the temporal variable can corefer with the Reference Time (R) of the temporal structure (cf. Reichenbach (1947)). However, this possibility is ruled by a series of conditions, and, among them, those cases in
in SpecConP (cf. (30)), given that it represents the starting point for the computational process itself, as we have said before; in those cases in which this argument is not phonologically expressed, (65), the value of the unpronounced base is determined by its anaphoric linking with a temporal or an eventive referential referent previously introduced in the relevant context.\footnote{For a formal proposal through which the base is coindexed with a temporal or an eventive referential referent previously introduced in the relevant context, we refer the reader to Higginbotham (1985, 1987) and Zwarts (1992), among others.}

So far we have argued that the base must indicate a concrete and definite point in time; this indication allows the computational process required by our temporal constructions to take place. We have also seen that the base may be phonologically expressed as eventive nominals, ‘temporal’ nominals and sentences. As for all these linguistic expressions, however, it seems hard to state that they are inherently endowed with some features that allow them to hold the function the base requires. In fact, as we can see in (68), these expressions can also appear in constructions in which they must not be associated with a point in time, but expressing an argument of the main verb:

\begin{quote}
\begin{enumerate}
\item[(68)] a. *El atentado* no hizo víctimas. \hfill \textit{Spanish}
\hline
\item[(68)] b. *L’attentato* non ha fatto vittime. \hfill \textit{Italian}
\hline
\item[(68)] c. *Todos temían que ocurriera el atentado.* \hfill \textit{Spanish}
\hline
\item[(68)] d. *Tutti temevano che avesse luogo l’attentato.* \hfill \textit{Italian}
\hline
\item[(68)] e. *Muchos odian la Navidad/el domingo/el 15 de abril.* \hfill \textit{Spanish}
\hline
\item[(68)] f. *Molti odiano il Natale/la domenica/il 15 aprile.* \hfill \textit{Italian}
\end{enumerate}
\end{quote}

\textit{Lit.} ‘The terrorist attack didn’t make victims’

which the Reference Time coincides with the Speech Time (S), given that the temporal variable can never refer to the Speech Time. In this way, they account for the oddness of sentences in present perfect, such as: \#Gianni è partito il giorno prima/dopo ‘G. left the day before/after’, where S=R. Nevertheless, we can observe that the oddness we can find in sentences in present perfect, is the same that involve sentences in past perfect and in future tense, (65), even though, in both cases, S does not coincides with R, according to Reichenbach’s (1947:297) temporal representation. In this paper we don’t tackle this topic.
These behaviors suggest that these expressions, in order to meet the requirements the base needs, should be part of a more complex syntactic structure that can correspond to the following paraphrasis: *the time of the terrorist attack/the time the terrorist attack took place* (cf. (22)).

We propose, then, extending Kayne’s (2005a, 2005b) analysis to our temporal constructions, that those linguistic expressions that display the function of the base are actually complements of an non-pronounced head TIME, as (69) shows:

(69)  

\[
\begin{array}{c}
\text{DP}_{\text{Time}} \\
\text{D'}_{\text{Time}} \\
\text{TIME} \\
\text{KP} \\
\text{K} \\
\text{K'} \\
\text{DP/CP} \\
\text{de} \quad \text{el atentado/que ocurriera el atentado} \\
\text{di/} \quad \text{Ø} \quad \text{l’attentato/che avesse luogo l’attentato}
\end{array}
\]

The DP *el atentado/l’attentato* and the CP *que ocurriera el atentado/che avesse luogo l’attentato* are selected by the head TIME, which is able to refer to a specific temporal point, and are in a possessor relation to it.  

We propose that the referential interpretation that the base must express is obtained by inheritance from the referential interpretation of the DP.

The functional preposition *de/di* ‘of’, on the other hand, represents the lexical manifestation of the possessor relation between the head TIME and the DP/CP. In Romance languages, furthermore, it must, can or cannot appear phonologically realized depending both on the nature of the subtractive or additive operator and on the formal properties of the complement of the head TIME. In section 2 we have seen that in

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55. The complex internal structure we propose for the base could also justify the fact that in Spanish the base cannot be pronominalized by a clitic pronoun, differently from what may happen in locative contexts. Compare, in this respect, the contrasts between (i) and (ii):

(i) Llegó antes/después de él.  
*Le llegó antes/después.*  
*Lit.* (He) arrived before/after of him  
*Lit.* *Him*\text{clit} (he) arrived before/after

(ii) Corría detrás de él.  
*Le corria detrás.*  
*Lit.* (He) run\text{imp} after of him  
*Lit.* *Him*\text{clit} (he) run\text{imp} after
Spanish the presence of *de* is always obligatory with *antes* ‘before’ and *después* ‘after’. In Italian, on the other hand, only *prima* ‘before’ requires the presence of *di* introducing the complement of TIME; the only case in which *di* cannot appear is when the complement is an inflected sentence; cf. *prima* Ω che avesse luogo l’attentato ‘before the terrorist attack took place’ vs. *prima* Ω di aver luogo ‘before (it) to take place’. This behavior, however, is the same we can observe whenever a sentential complement is selected by a noun: *L’idea che lo farà* ‘the idea that he will do it’ vs. *L’idea di farlo* ‘the idea to do it’. Instead, as for the case with *dopo* ‘after’, we have seen that the complement of TIME cannot be introduced by *di*, except for the case in which the complement itself is a personal pronoun: *dopo di me* ‘after of me’. This piece of empirical evidence allows us to propose the presence of an empty functional preposition in the other cases where the constituent headed by TIME is the subject of the additive operator (cf. section 2 and (69)).

In fact, according to Cinque (1999), when the Case feature is not grammatically marked, it does not follow that it is inoperative either in the construction with *dopo* in Italian or in those languages where it is never phonologically realized.

According to this proposal, and referring to the data in (53) and (54), the diagram in (30) can be explicitly represented as (70):

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56. We have no interesting proposal to account for the fact that in Italian, when the complex temporal construction is headed by *dopo* ‘after’, the functional preposition *di* can appear only when the base corresponds to a personal pronoun. Therefore, we leave the question open here.

57. Also Svenonius (2006:2), in his analysis of prepositional phrases expressing spatial relations, such as *(ten inches) under the desk*, proposes, for their internal structure, the projection of a Case head, *Κ*, that dominates the DP *the desk* and that can also be empty.
This structural representation shows the agreement between the base and the differential, as far as the temporal information is concerned, and can also account for the semantic coherence that must hold between the two constituents.

Finally, data such those in (65) are accounted for by assuming that the projected complement of the head TIME is phonologically unexpressed but interpretative present.

4. More about the internal structure

4.1. The vectorial extension

As we have suggested in the preceding sections, antes/prima and después/dopo of our complex temporal constructions, in addition to lexically express a subtractive information and an additive information respectively, also perform the function of mapping from a point in the temporal axis to another point in the same temporal axis; the second concrete temporal point is oriented in time with respect the first one. This function, which is made clear by the property of selecting a DP_{\text{Time}}, expressing a concrete temporal point, and a QP, expressing measure in time, suggest us that our categories have vectorial properties, as Svenonius (2006, 2007)\(^5\) proposes for the prepositional phrases expressing temporal relations.

\(^5\) Cf. also Zwarts and Winter (2000).
A vector is a quantity that consists of a point of application, a size and a direction. In the temporal constructions with *antes/prima* and *después/dopo* the point of application is represented by the base, which, as we argued in sections 3.1 and 3.3, indicates a concrete and precise point in time; the differential represents the vectorial size; and the direction is provided by both *antes/prima*, backwards in the temporal axis, and *después/dopo*, forwards in the temporal axis.

Adopting a cartographic approach (Cinque 2004), and in the spirit of Svenonius (2006, 2007), we propose that the vectorial properties of our constructions imply a richer syntactic structure than (70). In other words, we suggest that *antes/prima* and *después/dopo* should be considered as complex grammatical categories, the morphological reflections of a series of features: the application point of the vectorial extension, its direction and its size, besides the subtractive or additive value we have just commented on.

According to this proposal, the first step in the fine-grained articulation of their internal structure is to identify, along the temporal axis, the application point of the vectorial extension, i.e. the starting point of the computational process. We suggest that the application point is expressed by a feature, that we call *Appl*, whose semantic contribution is to specify the precise point in the temporal axis from where the vector extends. *Appl* enters syntax as an interpretable but unvalued feature, to be assigned some value in the course of the derivation.\(^5^9\) What is uninterpretable is the overt morphological reflection of this feature, i.e. *antes/prima* or *después/dopo*. In this way the application point feature, acting as a probe, triggers the syntactic movement of *antes/prima* and *después/dopo* to *Appl*\(^0\), as (71) shows:\(^6^0\)

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\(^{5^9}\) We adopt the general proposal on silent heads suggested by Sigurdsson and Maling (2008).

\(^{6^0}\) As we have suggested in fn.20, an alternative hypothesis is that the abstract subtractive/additive operator, *Con*, moves to *Appl*\(^0\). The resulting incorporation of these two features makes it possible for *antes/prima* or *después/dopo* to enter syntax. We do not discuss the preference of one of the two hypotheses over the other. If we adopt the *Principle of Compositionality* proposed by Kayne (2005a), which states that: “UG imposes a maximum of one interpretable syntactic feature per lexical or functional item” (p.15), we can suggest, as proposed in the previous sections, that the interpretable feature that *antes/prima* and *después/dopo* are endowed with the subtractive feature and the additive feature respectively, for their behavior as lexical comparatives. This justifies their insertion in the structure in *Con*\(^0\), rather than in *Appl*\(^0\).
At this point, the constituent \textit{TIME del atentado/TIME \text{"O} l’attentato}, subject of \textit{Con}, needs to be associated with the \textit{Appl} feature, given that it expresses the precise point in time from where the vector develops its trajectory along the temporal axis.

In order to meet this requirement, we propose that \textit{Appl} enters a matching (Agree) relation with the \textit{DP\textsubscript{Time}}, valuing it as \textit{DP\textsubscript{Time+Appl}} and attracting it into its vicinity, namely the Specifier position created by the expansion of \textit{Appl\textsuperscript{o}}, as (72) shows:

\begin{itemize}
  \item \textbf{DP\textsubscript{Time+Appl} is merged in this structural position.}
  \item As a second step, another interpretable but unvalued feature enters the computation. We call it Time Orientation, i.e. \textit{TO\textsubscript{r}}. The semantic contribution of this feature is to indicate the direction of the vectorial extension with respect to the application point in time. As we have argued in section 3.1, the Time Orientation will move either backwards in the temporal axis (\textit{antes/prima}) or forwards in the temporal axis (\textit{después/dopo}), according to the subtractive/additive value that \textit{antes/prima} and \textit{después/dopo} inherently own.
\end{itemize}
Also TOr, like in the preceding step, triggers the syntactic movement of *antes/prima* and *después/dopo* to TOr°, and will expand its phrase, i.e. TOrP, as (73) shows:

(73)

![Diagram of syntactic movement](image)

*Antes/prima* will be the morphological reflection of the vectorial mapping when *TOr* chooses the backwards in time direction; while *después/dopo* will morphologically reflect the vectorial mapping when *TOr* chooses the forward in time direction.

As a last step, a third interpretable but unvalued feature emerges in the computation of our temporal constructions. We will call this feature *Measure*. The *Measure* feature enters syntax in a Meas° position expanding the MeasP projection. Its semantic contribution is to specify, along one or another of the two possible directions, how time, or how many points in time, is/are projected from a precise temporal point in the temporal axis (the application point); in other words, *Measure* helps expressing the size of the vectorial extension up to another point in time. *Measure*, then, acting as a probe, triggers the syntactic movement of *antes/prima* or *después/dopo* to Meas°. Afterwards, the same feature enters a matching (Agree) relation with the QP *dos días/due giorni*, complement of Con. Through such relation, the QP will be attracted to the Specifier position of MeasP and will be valued as QP+Meas°.
The complex temporal constructions we are studying can be modified by the temporal adverb *inmediatamente/inmediatamente* “immediately”. This adverb always precedes *antes/prima* or *después/dopo* and allows a compatible differential to phonologically realize.\(^{61}\) When that occurs, the adverb always follows the differential, as the contrasts in (75) and (76) show:

(75) a. …algunos segudos *inmediatamente* antes del accidente…
    …alcuni secondi *immediatamente* prima dell’incidente…
    *Lit. ‘some seconds immediately before the accident’*

b. *inmediatamente* algunos segundos antes del accidente
    *immediatamente* alcuni secondi prima dell’incidente
    *‘some seconds immediately before the accident’*

c. *algunos segundos antes inmediatamente* del accidente
    *alcuni secondi prima immediatamente* dell’incidente
    *‘some seconds immediately before the accident’*

(76) a. …dos segundos *inmediatamente* después del arranque…
    …due secondi *immediatamente* dopo l’accensione…
    *Lit. ‘two seconds immediately after the ignition’*

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\(^{61}\) With “compatible differential” we intend that the temporal noun of the QP expresses with preference few points or a little segment in time, as, for example, *seconds, minutes, moments* and *days* do.
b. *inmediatamente dos segundos después del arranque  
*immediatamente due secondi dopo l’accensione 
\[\text{Spanish} \quad \text{Italian}\]
c. *dos segundos después inmediatamente del arranque  
*due secondi dopo immediatamente l’accensione 
\[\text{Spanish} \quad \text{Italian}\]

From an interpretive point of view, the adverb *inmediatamente/immediatamente seems to be strictly related to the initial point of the vectorial extension. For this reason, we tentatively suggest that it is merged in an adjunct position to ApplP in the structure in (74).\(^6\)

We also propose that this adjunct position to ApplP is the position in which in Spanish is merged the focalizing adverb *mismo ‘just/precisely’, which, as the following data show, always appears between *antes/despúes and the base: \(^6\)

(77)  
\[\text{a. antes mismo de echarse un par de tragos} \]
\[\text{Lit. ‘before just/precisely of drink}\_\text{inf a couple of sips’}\]
\[\text{b. despúes mismo de las elecciones}\]
\[\text{Lit. ‘after just/precisely of the elections’}\]

4.2. The higher unpronounced \textit{TIME}

There are reasons, however, to believe that considering (74) to be the complete structure of the complex temporal constructions with *antes/prima and *después/dopo is not sufficient. In fact, as we have discussed in section 2, these constructions, like locative

\[\text{6}^2\] Nevertheless, this proposal entails to say that the movement of *antes/prima and *después/dopo to Meas\(^o\) cannot be carried out in Syntax, as the relative order in (75a) and (76a) shows. At the moment, we don’t have any interesting suggestion to formally describe why *inmediatamente/immediatamente prevents the syntactic movement of *antes/prima and *después/dopo to Meas\(^o\); so we leave the question open here.

\[\text{6}^3\] Notice that the semantic value that *mismo provides our temporal constructions with is almost equivalent to the semantic value provided by *inmediatamente. Evidence in favour with our proposal is that they cannot co-occur:

(i)  
\[\text{a. *Inmediatamente antes mismo de echarse un par de tragos}\]
\[\text{b. *Inmediatamente después mismo de las elecciones}\]
constructions, are provided with nominal properties. The resemblance of our constructions to nominals leads us to propose that the vectorial structure in (74) should be considered as the modifier of a noun that is non-pronounced. We call it TIME, and we propose that it is selected by a (referential) DP with an unpronounced head D, as (78) shows.\(^6\)

\[(78) \quad [\text{DP} \quad \text{TIME} [\text{MeasP} \text{ dos días antes/después \text{ TIME del atentado}}]]
\]

\[ [\text{DP} \quad \text{TIME} [\text{MeasP} \text{ due giorni prima/dopo \text{ TIME di/Ø \text{ l’attentato}}]]]
\]

This unpronounced head TIME denotes the final concrete point in time that corresponds to the vectorial extension, namely the resulting point in time obtained by calculating an application point (in time), a direction (backwards or forwards in time) and a size (in time).

We also propose that the relation that MeasP establishes with the head TIME is a phrasal restrictive modifier relation, namely a relation similar to a reduced restrictive relative clause; in other words, a relation that can be paraphrased as: *The TIME which corresponds to [MeasP dos días antes/después \text{ TIME del atentado}].*\(^6\)

Finally, again according to Cinque (2008) and the references quoted there, we propose that also in complex temporal constructions with *antes/prima* and *después/dopo* the DP headed by TIME is selected by a phonologically unrealized stative preposition AT.

The structure that emerges from our proposal is, then, the following:

\[(79) \quad [\text{PP}_{\text{st}} \text{ AT} \quad [\text{DP} \quad \text{TIME} [\text{MeasP} \text{ dos días antes/después \text{ TIME del atentado}}]]]
\]

\[ [\text{PP}_{\text{st}} \text{ AT} \quad [\text{DP} \quad \text{TIME} [\text{MeasP} \text{ due giorni prima/dopo \text{ TIME di/Ø \text{ l’attentato}}]]]]
\]

\(^6\) For a similar analysis, see Bresnan (1994). See also Cinque (2008), Noonan (2005) and Terzi (2008), among others, who propose a non-pronounced PLACE with the same function for prepositional phrases expressing spatial relations. Cinque (2008:fn.5) also shows that in certain languages, such as Ainu (Japan) and Tairora (Papuan), the head noun PLACE is actually pronounced. In this respect, see the examples and references quoted there.

\(^6\) We do not adopt Bresnan’s (1994) analysis, which states that locative and temporal constructions are complements of a unpronounced nominal, but we extend to our temporal constructions the proposal suggested by Cinque (2008) and others for locative constructions.

\(^6\) ‘Identificative’ adverbs (cf. Kovacci, 1999:777-778) such as *justo, justamente, exactamente* (Spanish)/*esattamente, precisamente* (Italian) ‘exactly/precisely’ are merged, in the structure in (79) in a position
Both in Contemporary Spanish and in Contemporary Italian this stative preposition never appears pronounced. Nevertheless, both in Old Spanish and Old Italian, we can observe the following data:

(80) **Old Spanish**

a. En este día, que fué **a dos días de septiembre**, en el comienzo de la noche…

*(G. Fernández de Oviedo Refundición de la Crónica del Halconero, 1535-1557)*

*Lit.* ‘In this day, which was **at** two days of septembre (= on September the 2<sup>nd</sup>), in the beginning of the night…’

b. …luego **a dos días después que se asentó**, el nuestro Maestre, (…) mandó como notable guerrero (…) a don Pedro de Luna,

*(Anónimo, Crónica de Don Álvaro de Luna)*

*Lit.* ‘…then **at** two days after that he settled, our Master, (…) charged as notable warrior (…) don Pedro de Luna,…’

(81) **Old Italian**

a. L’avuta a’ **due di dicembre** in fino a lunidi a’ **nove di di dicembre**…

*(Doc. Sen., 1277-1282)*

*Lit.* ‘He had it **at** 2 of December (= on December the 2<sup>nd</sup>) until monday **at** 9 days of december (= December the 9<sup>th</sup>)…’

b. **A di XXV d’agosto** giunse in Padova il chonte di Gholitia…

*(Anonimo [1350], Gesta Florentinorum (ed. Santini), p.144)*

*Lit.* ‘**At** days XXV of August (= On August 25) arrived at Padua the earl of Gholitia…’

higher than the position occupied by the unpronounced stative preposition **at**, (i). In fact, this type of adverbs always proceed a punctual temporal prepositional phrase, (ii):

(i) a. *Justo/justamente/exactamente* [PP[Dia] AT [DP TIME [MAdP dos días antes/ después TIME del atentado]]]  

     **Spanish**


     **Italian**

(ii) a. *Justo/justamente/exactamente a las cinco de la tarde*  

     ’Exactly at five in the evening’

     *A las cinco justo/justamente/exactamente de la tarde*  

     **Spanish**

b. *Esattamente/precisamente alle cinque di sera*  

     ’Exactly at five in the evening’

     *Alle cinque esattamente/precisamente di sera*  

     **Italian**
What these data suggest is that in previous stages of the two Romance languages a stative preposition, i.e. \( a \), was used to precede, or select, a temporal phrase indicating a definite point in the temporal axis:

(82) a. \([\text{PPstat } a \ [\text{DP TIME [DP dos dias de septiembre]]}\) (cf. (80a))

\( b. \ [\text{PPstat } a \ [\text{DP TIME [DP due di dicembre]]}\)\(^{67}\) (cf. (81a))

Furthermore, as the case in (80b) in Spanish clearly shows, the same preposition could also precede the temporal complex constructions we are dealing with:

(83) \([\text{PPstat } a \ [\text{DP TIME [MeasP dos días después TIME Ø que se asentó]]}\) (cf. (80b))

Therefore, we propose that all these data can be considered as diachronic evidence for the structural hypothesis we suggested in (79).\(^{68}\)

Furthermore, we tentatively propose that in Contemporary Spanish and in Contemporary Italian it is possible to find a residue of this old pronounced stative preposition \( a \) in those cases in which a punctual temporal phrase is expressed by a numeral referring to hours, as in (84).\(^{69}\)

(84) a. \( \text{A las cinco de la tarde} \) \( \text{Spanish} \)

\([\text{PPstat A [DP TIME [DP las cinco de la tarde]]}]\)

‘At five in the evening’

\( b. \text{Alle otto di mattina} \) \( \text{Italian} \)

\([\text{PPstat A [DP TIME [DP le otto di mattina]]}]\)

‘At eight in the morning’

---

\(^{67}\) We don’t investigate the internal structure of \( \text{dos días de septiembre/due di dicembre} \) because it is beyond the scope of the current work. We only suggest that these phrases, that we call DPs, do not provide vectorial information.

\(^{68}\) Nevertheless, we cannot justify the reasons why, both in Spanish and in Italian, the following change: \([\text{PStat } a]\) > \([\text{PStat AT}]\) occurred in the course of their respective grammatical evolution.

\(^{69}\) See footnote 64 for the position that ‘identificative’ adverbs occupy with respect these temporal constructions.
Finally, according to what we have already pointed out, we also suggest that the preposition *a* which appears in those complex temporal constructions such as *A dos días del atentado/A due giorni dall’attentato* ‘At two days from the terrorist attack’ (cf. section 3.2) corresponds to the pronounced residual version of the phonologically unrealized AT we find in (79), as the following analysis shows:

(85) a. \[PP_{stat} A \[DP \text{ TIME } [\text{MeasP } dos \text{ días } \text{de } \text{TIME } \emptyset \text{ el } \text{atentado}]]\]

b. \[PP_{stat} A \[DP \text{ TIME } [\text{MeasP } due \text{ giorni } \text{da } \text{TIME } \emptyset \text{ l’attentato}]]\]

In cases like these, the morphological reflection of the vectorial extension is represented by *de/da* respectively.\(^70\)

5. Conclusion

In this paper we have studied the syntactic behavior and the interpretive properties of the complex temporal constructed with *antes/prima* and *después/dopo* in Spanish and Italian.

We have argued that these complex temporal contructions involve a computational process whose result corresponds to a referential point in the temporal axis. In order to reach this result, we have proposed that *antes/prima* and *después/dopo* are the morphological reflectio of a series of features. The first one, which is interpretable in *antes/prima* and *después/dopo* is the subtractive and additive feature respectively (*Con [-/+]*), given that these elements behave like lexical comparatives. For this reason, they select two arguments that we have called *differential* and *base*. The differential is realized as a measure QP and corresponds to the internal argument of *antes/prima* and

\(^70\) We are aware that this hypothesis needs a deeper investigation. Nevertheless, notice that the preposition *de* of the Spanish version, (85a), does not corresponds to the Case marker *de*, though homophonous to it, but expresses a vectorial extension in time, as the preposition *da* in Italian does, (85b). However, the orientation in the temporal axis of the vectorial extension is not specified, i.e. it is unmarked, with respect to the application point. It is for this reason that the constructions in (85) are ambiguous; as argued in section 3.1., their temporal meaning can correspond both to *dos días antes del atentado/due giorni prima dell’attentato* and to *dos días después del atentado/due giorni dopo l’attentato*. Probably this ambiguity depends on the fact that *de/da* are not provided neither with an additive nor with a subtractive information.
después/dopo; while the base is realized as a referential DP

\text{Time}\ and corresponds to their external argument. The base-DP

\text{Time}\ contains an unpronounced TIME that selects an eventive nominal or a sentence in a possessor relation with this non-pronounced head. Furthermore, \textit{antes/prima} and \textit{después/dopo} are also the morphological reflections of the features Application point (\textit{Appl}), Time oriented (\textit{TOr}) and Measure (\textit{Meas}), given that they have also vectorial properties. These features enter syntax as interpretable but unvalued features building up, in this way, the internal structure of our complex temporal constructions. \textit{Antes/prima} or \textit{después/dopo} move first, to \textit{Appl}$^{\circ}$, then to \textit{TOr}$^{\circ}$ and finally \textit{Meas}$^{\circ}$ in order to value the unvalued features hosted in these heads. During the numeration, \textit{Appl} enters a matching relation with the DP\n
\text{Time}\ — i.e. the base— which is attracted to SpecAppIP to be valued as DP\n
\text{Time}+\text{Appl}. Similarly, \textit{Meas} enters a matching relation with the measure QP — i.e. the differential— which is attracted to SpecMeasP to be valued as QP+$\text{Meas}$. Finally, we have argued that MeasP, which defines the domain of the vectorial extension of \textit{antes/prima} and \textit{después/dopo}, corresponds to a (phrasal) restrictive modifier of an unpronounced head TIME which is selected by a referential DP. This DP, in turn, is dominated by a non-pronounced stative preposition AT.

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