

On Why Only Some Spatial Prefixes Can Denote Degree

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Abstract

The goal of this article is to contribute to the discussion of what the primitives of meaning are, and how morphemes with a basic meaning can extend their denotation to more abstract readings. The discussion takes as an example the case of Spanish spatial prefixes that can denote degrees. Indo-European languages frequently use prefixes whose basic meaning is spatial (over-run) as degree modifiers (over-estimate). Using data from Spanish, I argue that degree prefixes restrict the scale of the base, setting a boundary and picking values above or below that boundary. This leads me to treat prefixes that denote both place and degree as equivalent to vectorial prepositions: prefixes can only be used to express degree if they can introduce a boundary and a directionality; this is reflected in two further readings associated to these prefixes: the bound domain reading and the hierarchical reading. Finally, I discuss the special case of entre-, whose lack of vectorial semantics correlates with more marked properties in its degree use.

Keywords: *prefixation, degree, place, preposition, word meaning.*

1 The problem

The goal of this article is to address the question of what the real primitives of morpheme semantics are through the lens of the case of the relation between spatial semantics and degree semantics in the prefixation system of Spanish. While the phenomenon itself has been frequently noted in the literature (see below), to the best of my knowledge it has not been approached from the perspective of which elements of spatial meaning are required to trigger the degree reading. I argue that space and degree share some abstract notions of meaning, specifically boundaries and extensions, and as such spatial prefixes that encode both notions may be used as degree prefixes, all things being equal. The conclusions do not grant that this is the only way to encode degree semantics in a prefix, neither is it the goal of this article: we restrict our goals to showing one possible way of doing so, which I argue takes place in Spanish, and possibly extends to other Indo-European languages.

In several Indo-European languages, some prefixes whose core meaning is locative are also used as degree prefixes with verbs and qualifying adjectives (see, among others, Kornfeld 2008, Rett 2008, Hamawand 2011a, 2011b; Kagan 2013; Tolskaya 2014, 2018). This is, for instance, the case of the prefix *sobre-* in Spanish (1), *over-* in English (2), *sous-* in French (3) and *pre-* in Slovak (4). In each one of these examples, the first one shows the locative use of the prefix; the second shows the degree reading with a verb, and the third illustrates the degree reading with an adjective.

- (1) a. sobre-volar
over-fly
'to fly over a location'

- b. sobre-calentar
over-heat
'to heat too much'
 - c. sobre-lleño
over-full
'too full, brimming'
- (2)
 - a. over-run
 - b. over-estimate
 - c. over-confident
- (3)
 - a. sous-tendre
under-lie
'to under-lie'
 - b. sous-payer
under-pay
'to underpay'
 - c. sous-oxygéné
under-oxygenated
'with not enough oxygen'
- (4)
 - a. pre-letiet'
over-fly
'to fly over a location'
 - b. pre-jedat' (sa)
over-eat (oneself)
'to eat too much'
 - c. pre-pracovaný
over-elaborate
'to elaborate something above what is convenient'

As becomes clear from these examples, it is frequent in Indo-European languages that some locative prefixes are used to express degree. The locative prefixes that most frequently do this are those that express positions in a vertical axis (up and down) and those that denote crossing a boundary (like *out-* in *out-smart* or *extra-* in *extra-sweet*; see §2.2 below for more details). In what follows, I focus on the case of Spanish.

Within these languages, there is a general semantic relation between specific spatial prefixes and degree. This triggers the question of which properties a spatial prefix must have in order to allow also degree readings –on the assumption, which I follow here, that space is a more basic conceptual domain than degree, and if one is derived from the other it is degree that re-uses the pieces of space–. What information should a prefix like *over-* encode, in contrast to (for instance) a prefix like *in-*, so that only the first can be used to denote a particular degree? A plausible initial way of viewing this is to adopt a metaphor-based view where humans conceptualise levels of intensity in a vertical axis (see for instance a *higher {temperature / price}* vs. a *lower {temperature / price}*). However, this explanation does not automatically explain why prefixes indicating 'crossing a boundary', like *out-* and *extra-*, also allow these readings, as boundaries are not necessarily oriented in a vertical axis. For this reason, in this article I adopt a different approach which I think is ultimately compatible with a cognitive view, but which I base on the semantic ingredients that these prefixes lexicalise as locative elements.

The approach I adopt is one where formal features are required to express the computational aspects of meaning which determine how one affix combines with bases. Specifically, I employ features that have originally been proposed in vectorial semantics for at least some prepositions. This approach argues that the meaning of some locative prepositions is not simply to identify a particular location, but to define an extended space around an object. That space is defined by abstract vectors that originate in the relevant area of that object, and project into space, with a particular direction and length.

This article is structured as follows. In the next section, I discuss the structure of verbs and adjectives with a degree prefix, to identify which properties must be accounted for in an analysis. This includes a more detailed presentation of the prefixes that adopt these readings in Spanish. In §3, I show that these prefixes systematically have, in addition to the locative and degree readings, two more interpretations, which I call the 'domain' one and the 'hierarchical' one. In §4, I show that the existence of these readings is possible because, contra other locative prefixes, the ones that can be used as degree elements contain a notion of boundary and a notion of orientation. In §5, I conclude the paper.

2 Where we need to get: degree prefixes with verbs and adjectives

In this section, I describe in some detail the degree reading of the prefix and how that reading combines with the verb semantics. I start presenting a brief description of the prefixes that can produce degree readings with verbs and adjectives in Spanish (§2.1); in §2.2 I present a more detailed description of the prefixes in the group that have a basic spatial meaning. The (obvious) generalisation is that only bases that have a degree component allow for this degree reading; in §2.3 I present my assumptions about the semantic properties of a base that allows degree modification. In §2.4 I argue that the prefix does not satisfy the degree argument of the base, but is used to restrict the scale to values that are contextually below or above a particular threshold, which only in some cases coincides with the standard value of the base.

2.1 *Starting assumptions*

I assume that degree prefixes are those which, in combination with a base, provide some additional information about the scalar specification of a property or eventuality denoted by the base. This definition takes as granted two ideas, which I make explicit here: first, the definition assumes that degrees must operate over scales (Bartsch & Vennemann 1972, Kamp 1975, Cresswell 1976, van Benthem 1982, Hoepelman 1983, von Stechow 1984, Bierwisch 1989, Klein 1991, Schwarzschild 2008), understood as sets of ordered values within a particular dimension. Second, the definition assumes that, for a base to take a degree prefix, it must be associated to a scale.

As an illustrative example, consider the case of *caro* 'expensive' > *ultra-caro* 'extremely expensive'. I assume that *caro* 'expensive' denotes a scalar property: there are different degrees of being expensive (or cheap), which we can easily translate into numerical quantities. I furthermore assume that *ultra-*, in the degree reading, operates somehow over this scale (see below for details), picking up only the values within the scale that are considered extremely high within the context.

If the base is not scalar without the prefix, the degree prefix cannot make it scalar—that is, the prefix cannot coerce a degree reading on a base that is not interpreted as gradable—. From

español ‘Spanish’ we can get the degree reading in *ultra-español* ‘extremely Spanish’ because, next to the non-gradable nationality reading, *español* allows gradable readings (*Hoy estás muy español* ‘Today you are very Spanish’), and this is the reading that the degree prefix combines with. From an adjective *metálico* ‘metallic’ – which, to the best of my knowledge, does not have a scalar reading in Spanish – we cannot get a degree reading of *ultra-metálico* in the strict sense of ‘extremely metallic’ (although speaker creativity may assign other plausible interpretations).

From this perspective, degree prefixation falls within what DiSciullo (1997) labels an ‘adverbial prefix’, in the sense that the prefix modifies some property that pre-existed on the base, instead of altering the information that the base contains. Specifically, I argue that a degree prefix modifies a degree variable that the base introduces independently of the prefix.

As already noted, I focus on the case of Spanish. Degree prefixes in Spanish differ with respect to three properties: (i) the type of degree they denote, below or above a particular value; (ii) whether they can combine, in the degree reading, with both verbs and adjectives or only with one of them and (iii) whether they have a locative use, or are specialised in a degree reading.

With respect to the first question, prefixes can be divided in two categories. The series in (5) denotes values that are above a standard –they denote high degree or excess–.

- (5) *archi-* (*conocido* ‘known’ > *archi-conocido* ‘very well known’), *extra-* (*plano* ‘flat’ > *extra-plano* ‘extra-flat’), *hiper-* (*ventilar* ‘to ventilate’ > *hiper-ventilar* ‘hyper-ventilate’), *re-* (*peinar* ‘to comb (hair)’ > *re-peinar* ‘to comb too much’), *recontra-* (*difícil* ‘difficult’ > *recontra-difícil* ‘extremely difficult’), *requete-* (*guapo* ‘handsome’ > *requete-guapo* ‘extremely handsome’), *sobre-* (*abundar* ‘to abound’ > *sobre-abundar* ‘over-abound, to be in an excessive quantity’), *super-* (*poblar* ‘populate’ > *super-poblar* ‘super-populate, populate in an excessive quantity’), *ultra-* (*moderno* ‘modern’ > *ultra-moderno* ‘extremely modern’).

The series in (6) denotes values below a standard –either low degree or insufficient degree–. I do not include here *medio* ‘half’, as in *medio recordar* ‘to half remember’ because it is controversial whether this should be considered a prefix or rather the adjective *medio* ‘half’ used in compounding structures.

- (6) *entre-* (*abrir* ‘to open’ > *entre-abrir* ‘open half way, to open incompletely’), *hipo-* (*tensión* ‘blood pressure’ > *hipo-tensión* ‘low blood pressure’), *infra-* (*utilizar* ‘to use’ > *infra-utilizar* ‘under-use, to use too little’), *semi-* (*enterrar* ‘to bury’ > *semi-enterrar* ‘to half bury, to bury incompletely’), *sub-* (*desarrollar* ‘develop’ > *sub-desarrollar* ‘under-develop’)

With respect to their bases, some of them can combine both with adjectives and verbs (7). However, other prefixes only allow the degree reading with verbs (8) or with adjectives (9).

- (7) *entre-* (*entre-cerrar* ‘close halfway’ ~ *entre-claro* ‘half bright’), *hiper-* (*hiper-desarrollar* ‘to over-develop, to develop too much’ ~ *hiper-sensible* ‘hyper-sensitive’), *re-* (*re-peinar* ‘to comb too much one’s hair’ ~ *re-duro* ‘very hard’), *super-* (*super-dotar* ‘to give too much’ ~ *super-listo* ‘extremely clever’), *ultra-* (*ultra-congelar* ‘to freeze to an extreme degree’ ~ *ultra-fino* ‘extremely thin’)

- (8) infra- (*infra-valorar* ‘under-estimate’), sobre- (*sobre-alimentar* ‘to feed too much’), sub- (*sub-estimar* ‘under-estimate’)
- (9) archi- (*archi-famoso* ‘archi-famous, extremely famous’), extra- (*extra-ligero* ‘extremely light’), hipo- (*hipo-tenso* ‘with low blood pressure’), recontra- (*recontra-feo* ‘extremely ugly’), requete- (*requete-alto* ‘extremely tall’)

Note that I propose locating *infra-* in the category of prefixes that only allow degree readings with verbs, despite the existence of forms like *infra-humano* ‘under-human’ and *sub-normal* ‘sub-normal’; I will get back to why I do not consider this a real degree reading in §3.

Finally, all degree prefixes that can combine with verbs have an additional place reading where they denote different types of spatial orientation. Among the prefixes that only combine with adjectives, *extra-* does have a place reading, but not *archi-*, *recontra-* and *requete-*. In a situation that has been reported for other languages, Spanish uses for degree prefixes denoting the vertical dimension of UP and DOWN: up for *hiper-* (*hiper-índice* ‘hyper-index’), *sobre-* (*arco* ‘arc’ > *sobre-arco* ‘arc above a door’) and *super-* (*estrato* ‘stratum’ > *super-estrato* ‘super-stratum’) and down for *infra-* (*infra-scrito* ‘written below’) and *sub-* (*sub-urbano* ‘underground’). Other prefixes imply OUTSIDE / BEYOND, that is, crossing a boundary, in particular *extra-*, meaning ‘outside’ (*extra-terrestre* ‘extraterrestrial’) and *ultra-*, meaning ‘beyond’ (*ultra-mar* ‘beyond the sea, at the other side of the sea’). Finally, the spatial readings of *semi-* and *entre-* refer to locations that are crucially delimited: *entre-* locates something within the space delimited by two objects, like the preposition *entre* ‘between’ (*planta* ‘floor’ > *entre-planta* ‘space between two floors’), and *semi-* defines a portion of roughly half of the spatial extension of an entity (*círculo* ‘circle’ > *semi-círculo* ‘semi-circle, half a circle’).

2.2 Spanish spatial-degree prefixes

The focus of this article is in the conditions that a spatial prefix must meet in order to be used as a degree prefix, so from now on I focus only on the prefixes in (10), which meet this description:

- (10) entre-, extra-, hiper-, hipo-, infra-, re-, sobre-, sub-, super-, ultra-

The status of these prefixes is, however, not the same in terms of productivity. By far, the most productive ones are *extra-*, *hiper-*, *re-*, *super-* and *ultra-*, especially with adjectives. In addition to the more established forms that can be found in dictionaries (11, see also Fábregas 2023), these prefixes are used in plenty of occasional neologisms, especially with adjectives, and always to denote extreme degrees. (12) offers a few cases taken from the Web / Dialects subcorpus in Corpus del Español. This corpus contains two billion words from written spontaneous speech (chats, online comments, social networks) of all Spanish varieties.

- (11) a. extra-limitarse ‘out-limit, to exceed oneself’, extra-fino ‘extra-thin’, extra-plano ‘extra-flat’...
- b. hiper-calórico ‘hyper-caloric’, hiper-crítico ‘hyper-critical’, hiper-tensión ‘hyper-tension’, hiper-sensible ‘hyper-sensitive’...
- c. re-buscar ‘to search too much’, re-cargar ‘to charge something too much’, re-concentrar ‘to concentrate something too much’, re-limpiar ‘to clean something too much’, re-pintar ‘to paint something too much’...

- d. super-poblar ‘to over-populate’, super-abundar ‘to abound too much’...
- e. ultra-nacionalista ‘extremely nationalistic’, ultra-violento ‘ultra-violent’...
- (12) a. extra-peligroso ‘extra dangerous’, extra-pesado ‘extra heavy’, extra-agradable ‘extra nice’, extra-limpio ‘extra clean’ ...
- b. hiper-capitalista ‘hyper-capitalist’, hiper-cómodo ‘hyper-confortable’, hiper-obeso ‘hyper-obese’, hiper-secreto ‘hyper-secret’...
- c. re-viejo ‘very old’, re-orgullosa ‘very proud’, re-celoso ‘very jealous’, re-sofisticado ‘very sophisticated’...
- d. super-sencillo ‘super-simple’, super-hermoso ‘super-pretty’, super-personal ‘very personal’, super-dulce ‘super-sweet’...
- e. ultra-delgado ‘extremely thin’, ultra-feliz ‘extremely happy’, ultra-largo ‘ultra-long’, ultra-exigente ‘ultra-demanding’...

There are, literally, thousands of coinages documented in this corpus for each one of the prefixes. The prefix *sobre-* is not productive with adjectives (in the degree reading), but it is with verbs. (13) shows some examples from the same corpus:

- (13) sobre-estresar ‘to over-stress’, sobre-fermentar ‘to ferment too much’, sobre-explicar ‘to explain too much’, sobre-condimentar ‘to condiment too much’, sobre-complicar ‘to complicate too much’, sobre-vacunar ‘to vaccinate too much’...

In general, degree prefixes oriented in a negative direction are less productive, particularly with adjectives. The prefixes *sub-* and *infra-* are quite productive with verbs or participles derived from them. The following examples are taken from the same corpus.

- (14) a. sub-diseñado ‘imperfectly designed’, sub-medicado ‘medicated too little’, sub-exponer ‘to show something too little’, sub-actuar ‘to act too little’...
- b. infra-informado ‘little informed’, infra-producido ‘produced too little’, infra-diagnosticar ‘to diagnose less than required’, infra-representar ‘to represent something less than required’...

Judging from the facts found in the Web / Dialects subcorpus, the two less productive prefixes are *hipo-* and *entre-*. In the case of *hipo-*, the neologisms I could document in the corpus are almost always of scientific registers, none of them in common use, and the forms are restricted to nominal bases and adjectives morphologically related to them (*hipo-termal* ‘hypo-thermal’); the only exception is *hipo-suficiencia* ‘hypo-sufficiency, less than sufficiency’.

The degree use of *entre-* is clearly not productive, and judging from the dictionary it has never been productive. I have not been able to find any neologism in the corpus, and the only clear cases of degree readings that I identify in dictionaries are those in (15).

- (15) a. entre-abrir ‘between-open, to open partially’, entre-cerrar ‘between-close, to close partially’, entre-morir ‘between-die, to agonise, to be close to death’, entre-oír ‘between-hear, to hear partially’, entre-parecerse ‘between-appear, to appear partially’, entre-untar ‘between-spread, to spread the bread incompletely’, entre-ver ‘between-see, to see partially’
- b. entre-ancho ‘between-broad, neither broad nor narrow’, entre-claro ‘between-clear, almost of a light colour’, entre-cano ‘between-grey, with hair almost

grey’, *entre-largo* ‘between-long, that is longer than broad’, *entre-ordinario* ‘between-ordinary, almost ordinary’, *entre-oscuro* ‘between-dark, almost dark’

The list is almost exhaustive: I have taken out, for different reasons, the verb *entre-cavar* ‘between-dig, to remove the upper part of the soil to plant something’, and the adjectives *entre-doble* ‘between-double’ and *entre-fino* ‘between-thin’. In the first case, a gloss ‘to dig incompletely’ does not satisfy the description of the verb, which does not mean to dig small holes but to treat the land in a way that the crust is removed: the verb has a good deal of lexicalisation, and it is not clear that a spatial gloss is not more appropriate (‘to dig the crust between the soil and the outside’, for instance). In the case of the adjectives, I show that they are not degree readings in §3.1.

In addition to how restricted the list is, if we compare with the other prefixes, and to the absence of neologisms, the evidence suggest that most of the words in (15) are actually not in use in contemporary Spanish: in (15a) I could only document in different corpora (CREA, CORDE, Corpus del español) the verbs *entre-abrir*, *entre-cerrar*, *entre-oír* and *entre-ver*. In (15b), *entre-cano* and *entre-claro* are well-documented. The rest are either not documented or documented only in the historical corpus CORDE, and that with only a handful of tokens: *entre-largo* is documented less than one dozen times; there is one instance of *entre-ancho*, another of *entre-ordinario* and another one of *entre-oscuro*.

2.3 The properties of the verb: degree components

Above, I have assumed that degree prefixes must combine with bases that have scales associated to it. In this section I am more precise about the nature of this scalar notion. I assume that the presence of a scale, as a set of ordered values, is what determines whether a predicate has a degree argument. The presence of the degree argument makes a predicate ‘gradable’, which more technically means that the verb is a vague predicate and the truth value of a proposition that contains it cannot be determined until the degree argument is satisfied. Let me illustrate this first with the obvious example of the adjective *caro* ‘expensive’.

- (16) *caro*
 ‘expensive’

Being cheap or expensive depends on the price of something. Price can easily be constructed as a set of ordered values – 1 euro, 1.10 euros, 1.20 euros, and so on–. Being cheap means costing a quantity that, in context, is considered low and, conversely, being expensive implies having a high price.

What counts as a low or a high price depends on context, and the type of object that has that price: a cheap price for a diamond is probably expensive for a kilo of apples. This also means that, out of context, one cannot evaluate if *Este libro es caro* ‘This book is expensive’ is true or false: to determine if something is expensive, the specific price value in the scale has to be determined, and it also has to be determined if that price is considered high in that context. I follow Cresswell (1976), von Stechow (1984) and Heim (1985), among others, in the claim that being associated to a scale is formally represented as having a degree argument, represented as *d*. Thus, a gradable adjective like *caro* does not only have a nominal argument, the entity that is expensive, but also a degree argument.

$$(17) \quad [[\text{caro}]] = \lambda e \lambda d [\text{caro}'(e, d)]$$

Unless both arguments are satisfied, the predicate does not have a truth value. For the degree argument this means fixing the degree value. As we have seen, fixing that value generally implies determining to what extent the price is above or below what contextually is considered enough to say that something is expensive. That value is called the standard value. The standard value is contextually defined: talking about a softcover book of around 300 pages, we could fix that standard value of what counts as expensive at 25 euros, for instance, depending of all kinds of contextual information –the cost of living, your own economic resources, etc.–. Once the standard value is fixed, we consider it true that the book is expensive if it costs 25 euros or more.

Formally, fixing the value implies satisfying the degree argument. This can be done with a specific value (*[three meters] tall*), or, more frequently, via existential closure of the degree variable as any scalar value equal or above this standard value (Bartsch & Vennemann 1972, Krifka 1989, Kennedy 1999). This is represented in (18), which corresponds to the denotation of the positive degree of an adjective used in *This book is expensive*.

$$(18) \quad [[\text{caro}^{\text{pos}}]] = \lambda e \exists d [\text{caro}'(e, d) \ \& \ d \geq d^{\text{standard}}]$$

Once the degree argument has been satisfied, other expressions are not able to close it again. This is parallel to nominal arguments: if the subject of the predicate ‘expensive’ is satisfied by the nominal *este libro* ‘this book’, as in (19), no other nominal is able to satisfy that argument variable again (20).

- (19) a. $\lambda e \exists d [\text{caro}'(e, d) \ \& \ d \geq d^{\text{standard}}]$ (this book)
 b. $\exists d [\text{caro}'(\text{this book}, d) \ \& \ d \geq d^{\text{standard}}]$

- (20) **[Este libro] [este volumen] es caro.*
 this book this volume is expensive

Similarly, once the degree variable is satisfied, no other expression is able to satisfy it. This is what explains that, interpreted as independent modifiers of the same predicate, two different degree adverbs cannot both close the degree variable, as in (21c).

- (21) a. too expensive
 b. very expensive
 c. *very too expensive

What is possible, of course, is that one degree adverb modifies the other, further restricting the scale. For instance, (22) is possible in the reading where *too* closes the degree variable, and *a bit* modifies ‘too’, not the degree variable: the reading is not, then, that the book is a bit expensive, but that the book is excessively expensive. The second modifier, *a bit* restricts the degree of excess denoted by *too*, so that the reading is that the book is only slightly excessive in price.

(22) [a bit [too]] expensive

With all these things presented, let us now examine a less obvious case of degree argument involving verbs, where it is not so common to accept the existence of degree arguments.

(23) alimentar
 'to feed'

Intuitively, it is easy to see that 'to feed' is associated to degree, because the same vagueness in context as with *expensive* is verified here. Imagine I have a pet elephant, and I only feed him one (normal size) tuna sandwich per day. We know that is not enough food for this type of animal, and consequently someone could tell me that I am not feeding my elephant even if I am giving some food to it. What counts as enough is context dependent: if my pet is a spider, the same amount of food would allow me to say, truthfully, that I am feeding my pet. In other words: feeding is not 'to give food', but 'to give enough food', where 'enough' depends on context.

As in adjectives, having a degree argument or not has formal consequences. Bosque & Masullo (1998) note that quantity adverbs like *mucho* 'much', *un poco* 'a little', *suficiente* 'enough' or *bastante* 'quite' adopt different readings, which reflect the meaning components of the verb they modify. As they do not incorporate any lexical information specifying whether the quantity they talk about is time, space, frequency, etc., the way we interpret these adverbs depends on the meaning of the verb we combine it with. For instance, in (24a), the reading is temporal extension, 'for a long time', and in (24b) the reading is spatial extension, a long way'.

(24) a. dormir mucho
 to.sleep much
 'to sleep for a long time'
 b. desplazar mucho
 displace much
 'to displace something a long way'

Other verbs get degree readings with the same adverbs: they talk about the value of some state, property or event, as in (25): the eventuality happens or is made with more or less intensity, to a higher or lower degree.

(25) desear mucho
 want much
 'to want to a high degree'

It can be shown that the same value reading is possible with a verb like 'alimentar':

(26) alimentar mucho
 feed much
 'to feed to a high degree'

In parallel to the case of adjectives, a verb like *alimentar* (and all those that allow degree readings of quantity adverbs) has a degree argument, in addition to the usual eventuality argument (Davidson 1967, Parsons 1990) and the event participant arguments.

$$(27) \quad [[\text{alimentar}]] = \lambda e \lambda y \lambda x \lambda d [\text{alimentar}'(e, x, y, d)]$$

This basically means that ‘feed’ describes the event where an entity *x* gives to an entity *y* what counts as enough nourishment. An equivalent of the positive degree of the adjective emerges when the degree argument is existentially bound, setting ‘enough’ in the context: that means that *x* feeds *y* when *x* gives *y* at least as much nourishment as, within the context, is considered standard.

$$(28) \quad \lambda e \lambda y \lambda x \exists d [\text{alimentar}'(e, x, y, d) \ \& \ d \geq d^{\text{standard}}]$$

The quantity adverbs can also close the degree variable too little in (29) means that the nourishment is below what counts contextually as enough:

- (29) a. Juan alimenta poco a su gato.
 Juan feeds little DOM his cat
 ‘Juan feeds his cat too little’
 b. $\lambda e \exists d [\text{alimentar}'(e, \text{Juan}, \text{his cat}, d) \ \& \ d < d^{\text{standard}}]$

2.4 The prefix as a restrictor of the scale

In this section I argue that the degree prefix does not satisfy the degree argument but introduces a restriction on the scale. The effect of the restriction is that only some scalar values are considered.

First, it is important to note that the degree prefix can co-occur with the degree adverb, as in the following naturally occurring examples (30), for adjectives, and (31), for verbs:

- (30) a. Reloj Dogma Prima antiguo, **muy extra-plano**, chapado en oro. [E-bay, 2022]
 ‘Vintage Dogma Prima watch, very ultra-thin, gold-plated.’
 b. el sabor ligeramente avellanado y achocolatado es **demasiado super-mega-[r]rico** y distinto. [Instagram, May 2021]
 ‘the slightly hazelnutty and chocolatey flavor is just way super-mega-delicious and different.’
 c. La gente es **muy sub-normal**. [Twitter, 11th May 2025]
 ‘People are very dumb [=sub-normal].’
- (31) a. Necesito saber cuando debería comer [mi cachorro] o tengo la sensación de que lo voy a **sobre-alimentar mucho**. [Reddit, April 2025]
 ‘I need to know when I should feed [my puppy] or I feel like I’m going to end up overfeeding him a lot.’
 b. Acá Frances McDormand también **sobre-actúa un poco** su falso papel de mujer indignada [Perfil.com, 3rd of February 2018]
 ‘Here Frances McDormand also overacts a bit in her fake role as an outraged woman.’

- c. Al final, si **se sobrecalienta lo suficiente**, se te va a joder el motor [Reddit]
'In the end, if it overheats enough, your engine's gonna get messed up.'

If the prefix satisfied the degree argument, we would expect the quantity adverb not to be able to further specify the degree, in the same way that two degree adverbs cannot both satisfy the degree argument of an adjective (remember (21c)). I therefore propose that, when used as degree prefixes, these morphemes are functions of type $\langle d, d \rangle$, that is, semantic functions that take degrees and return other degrees, without saturating it. Technically, this means that they do not introduce existential closure of the degree value.

The degree prefix restricts the set of values that are considered for that predicate. To see what this means, let us examine the following predicate:

- (32) sobre-alimentar un poco
over-feed a bit
'to overfeed a bit'

What this means is that the nourishment provided is a bit above what is considered normal or reasonable; first, *sobre-* ‘over-‘ restricts the set of values associated to ‘feed’ to only those values that are above what is considered reasonable (not above what is enough), and then the quantity adverb *un poco* ‘a bit’ picks from the restricted set of values those that are in the lower range. Incidentally, note that the interpretation is perfectly in line with the general assumptions about the timing of prefixation: the prefix combines with the verb before the quantifier that binds degree is introduced in the structure. This is what compositionally triggers a reading where first the prefix restricts the available range of scalar values, and then the adverb picks these values from the restricted scale.

A visual representation could help grasp these concepts. Imagine that (33) represents the set of ordered values associated to 'feed':

- (33) ...-----...

Adding *sobre-* introduces a boundary internal to the set of values: the value, whichever it is in context, that is considered reasonable. It furthermore introduces a direction: the scale is restricted to those values strictly above that 'reasonable value'.

- (34) ...-----]-----...
 d^{reasonable}
sobre-

Then, un poco 'a bit' picks the lower values within the new restricted scale defined by *sobre*-*'over'*. I represent those values with '(' and ')'.

- (35) ...-----(-(-----)]_d^{reasonable}-----...
sobre- un poco

Technically, this means that *sobre-* is a modifier of degrees (not a degree argument) stating that the degree values are restricted to only those value above a reasonable value. ‘Reasonable’

introduces intensional semantic notions that require reference to worlds; see Gast, Putnam & Jóhannsdóttir (2025) on Icelandic *of-* for an analysis where the intensional semantics of this type of prefix is unpacked. I gloss here over this issue, which is orthogonal to our purposes, and treat 'reasonable' as atomic.

$$(36) \quad [[\text{sobre}]] = \lambda P \lambda d [P(d) \ \& \ d > d^{\text{reasonable}}]$$

Crucially, *sobre-* does not introduce existential closure and does not supply a specific value that satisfies the degree argument. Then, when combined with the verb (or the adjective), it restricts the degree of that predicate to only the range of values above what is considered reasonable, but keeps the argument open.

$$(37) \quad [[\text{sobre-alimentar}]] = \lambda e \lambda x \lambda y \lambda d [\text{feed}'(e, x, y, d) \ \& \ d > d^{\text{reasonable}}]$$

Different degree prefixes introduce different types of restrictions on the scale. For instance, *infra-* or *sub-* introduce a restriction to only the values that are below what is considered enough:

$$(38) \quad [[\text{infra-}]] = \lambda P \lambda d [P(d) \ \& \ d < d^{\text{reasonable}}]$$

There are two properties of the analysis I have presented about the degree prefixes that are crucial in explaining why only some locative prepositions can denote degree (see also Caha, De Clercq & Vanden Wyngaerd 2024 for a proposal along the same lines for the comparative). The first is that the restriction of the scale crucially involves setting a boundary, which can be a normalcy value. The second is that the prefix also orients the boundary with respect to the portion of the scale: higher or smaller values, which should be taken as the directionality of the restricted scale from the boundary. This explains that *un poco* 'a little' picks opposite sets of values when combined with a verb with *sobre-* or *infra-*: with *sobre-*, it picks the lowest values of the restricted scale ('it is only a bit excessive'), and with *infra-* it picks the highest values ('it is only a bit below what is normal').

- (39) a. *sobre-alimentar un poco*
 over-feed a bit
 'to feed slightly excessively'
 b. *infra-valorar un poco*
 under-value a bit
 'to value slightly below what is reasonable'

3 How to get there: other non-locative readings of degree prefixes

In the previous section, I have highlighted that the degree prefix restricts the scale of the base. In order to do so, the prefix must be able to define a boundary and a directionality. In this section, I show that the prefixes that denote degree tend to allow two other readings which I argue intermediate between the locative and the degree reading. These readings show that the prefixes, independently, can also define boundaries and directionalities, even in the absence of a scale that makes them denote degree. These readings are, respectively, the domain reading

(§3.1) and the hierarchical reading (§3.2), which have in common that they are neither spatial –strictly speaking– nor degree, as they often emerge with non-gradable bases.

3.1 Bounded domain readings

Consider the usual interpretation of the adjective in (40):

- (40) *extra-ordinario*
 extra-ordinary
 ‘extraordinary’

In a degree reading, this should mean ‘very ordinary’. However, the common interpretation is the one equivalent to ‘out of the ordinary’, that is, ‘not included among what is considered ordinary’.

Even though the gloss ‘out of the ordinary’ invites to taking the prefix as denoting space, it is clear that in a strict sense this is not a spatial use of the prefix: in essence, *ordinario* does not define an entity that can be located in a spatial dimension. It does, on the other hand, define a metaphorical space, which corresponds to the domain of things that we can consider ‘ordinary’, so this interpretation can be seen as conceptually closer to the locative interpretation than to the degree reading.

I call this reading the bound domain reading: the presence of the prefix forces a reading where the base adjective is not taken to mean a quality or a property, as is generally the case, but rather a conceptual domain. The prefix delimits the extension of the domain, and in the case of *extra-*, locates its subject outside the boundaries of that domain. The following cases with *extra-* are also instances of this reading.

- (41) a. (*aventura*) *extra-marital*
 affair *extra-marital*
 ‘extra-marital affair’
 b. (*acuerdo*) *extra-judicial*
 settlement *extra-judicial*
 ‘out-of-court settlement’

In (41a), the prefix defines the domain of entities, events and properties that can be considered ‘related to marriage’, and locates the affair outside the boundaries of that domain; similarly, (41b) defines a domain of judicial entities, and places the settlement outside that domain: the settlement was reached without the intervention of legal procedures. Clearly, the reading is not spatial because it does not necessarily mean that the settlement happened outside the courthouses (physically outside them).

The bound domain reading is normally interpreted with a classifying function: the subject of predication is classified in subtypes according to the relation with that domain. In (41a), the affair is classified as one that happens outside the marriage; in (41b), the agreement is classified as not having a judicial nature. This is the reason why the reading is so typical with relational adjectives as bases: these adjectives do not denote properties, but types of entities.

The prefix *intra-* also has instances of this bound domain reading, where the subject is located within the confines of the domain defined by the base.

- (42) a. (*violencia*) *intra-familiar*
 (violence) *intra-familiar*
 ‘in-family violence, domestic violence’

- b. (conflicto) intra-musulmán
 conflict intra-muslim
 ‘conflict within Islam’

Prefixes that denote up and down relations also allow these readings: in the following list, what the words have in common is that the base should be taken as a bound domain somehow associated to the base, and the prefix locates an object above or below that domain.

- (43) a. super-sónico
 super-sonic
 ‘above the domain of things perceptible by hearing’
- b. sub-atómico
 sub-atomic
 ‘below the domain of atomic entities’
- c. sub-celular
 sub-cellular
 ‘below the domain of cells’
- d. infra-rojo
 infra-red
 ‘below the domain of the red colour’

The prefix *entre-*, as mentioned above, seems to be unproductive because of the absence of neologisms in the Web / Dialects subcorpus examined. Despite that, I believe that the following two adjectives are instances of the bound domain reading with *entre-*.

- (44) *entre-doble* ‘between-double; speaking of fabric, fabric which is in an intermediate class between double and thin’, *entre-fino* ‘between-thin; of a class intermediate between coarse and fine’

My reason to propose that this is an instance of a bound domain reading is that in this use the adjectives do not literally describe the properties of the subject, but actually presuppose some kind of taxonomy of very specific entities and locate the subject within one of the classes. *Entre-doble*, as the gloss shows, is only used for fabric, and denotes the intermediate class between fabric that has a double layer, therefore thicker, and that which is thin. In this use, the adjective is not itself gradable because it denotes a closed class.

As for *entre-fino*, it is only broadly documented when it talks specifically about types of salt or wool:

- (45) Mediante la Disposición 2447/2019, publicada en el Boletín Oficial, el organismo prohíbe la “sal fina, sal gruesa, sal industrial y sal entrefina” de la marca Sal-Teñito. ‘Through disposition 2447/2019, published through the Official Gazette, the agency prohibits “fine salt, coarse salt, industrial salt, and medium-fine salt” of the brand Sal-Teñito’.

[*Contexto* (Argentina), 20th of March 2019; from NOW, Corpus del Español]

As the example (45) shows, the adjective is used to classify types of salt within a taxonomy, rather than to describe the dimensions of the salt.

To conclude this subsection, I take the bound domain reading to provide evidence that these prefixes, even outside the degree interpretation, have the capacity to define boundaries on their bases, which induces a domain reading. Given the proximity of this interpretation to the spatial one, I think it is fair to consider it a more basic reading than the degree one.

3.2 Hierarchical readings

In the bound domain interpretations, there is no notion of hierarchical distribution: when we say that something is *super-sonic*, we are not locating it in a position that controls or has authority over things that are sonic, and when we say that something is *sub-atomic*, we do not say that subatomic entities are somehow subordinate to atomic entities; we just distinguish domains, and classify entities with respect to those domains.

In contrast, what I call the hierarchical reading additionally orders the domains defined according to importance, quality or capacity of influence over other entities. The domain interpretation is still present, but in addition the prefix treats those domains as 'levels' which are ordered with respect to each other. Consider, as an example, (46):

- (46) sobre-humano
 super-human
 'super-human'

In contrast, the degree reading –which the Spanish word does not allow, but the English translation does– would be 'very human' (as when it is claimed that someone is too human, that is, carries to an extreme human-like properties), where whichever properties define humanity appear to a high degree. What I call the hierarchical reading is the more usual interpretation where the subject of the adjective is located at a level that is above that of humans: the adjective denotes a superior level where entities that are better than humans are located (say, Superman). Note that this implies, first, to define a domain of human entities –as in the bound domain reading– and then to treat domains as ordered levels, with a level above humans –in contrast to the bound domain reading–.

This hierarchical reading, as far as I can see, only emerges with prefixes that denote up and down, quite likely due to the cognitive tendency to conceptualise quality and hierarchy in a vertical and not horizontal level. Next to cases interpreted as levels of quality (*infra-ser* 'sub-being', *super-hombre* 'über-mensch'), the hierarchy is often interpreted as taxonomies of entities, interpreting that the lower categories are divisions of higher categories that include them. The following examples have adjectives or nouns as bases.

- (47) a. sub-categoría
 sub-category
 'subcategory'
 b. infra-provincial
 infra-provincial
 'related to subdivisions within a province'
 c. super-clase
 super-class
 'super-class'
 d. hiper-texto

hyper-text

‘structured text which includes other texts, links, and images’

The reading is also obtained with verbal bases, as in the following examples.

- (48) a. sub-dividir
sub-divide
‘to divide into subgroups’
b. sub-delegar
sub-delegate
‘to delegate responsibilities on a subordinate’
c. sub-arrendar
sub-let
‘to sub-let’

Finally, another typical interpretation of the hierarchical reading is when the hierarchy is associated to notions of control and subservience to others, higher in rank. This reading appears also with all types of bases:

- (49) a. sub-ordinar
sub-ordinate
‘to place under the control of something else’
b. super-visar
super-vise
‘to supervise’
c. super-ordinar
super-ordinate
‘to place in a position of control over other entities’
d. sub-sirviente
sub-servient
‘subservient’
e. sub-delegado
under-delegate
‘deputy delegate’
f. super-intendente
super-intendent
‘super-intendent’

Let us summarise what we have seen so far: the place prefixes that can be used as degree prefixes, beyond expressing particular spatial notions, are generally characterised by having at least one of the following two readings: a bound domain reading, which I have argued is related to their capacity to define a boundary, and a hierarchical reading, which I have related to a notion of directionality that imposes an ordering between the domains defined. Both notions, as we have seen, are required in their degree use.

4 Getting there: Locations, boundaries and orientations

We have seen that spatial prefixes may have degree readings when they are able to define a boundary that restricts the scale of the base, and a directionality. The ability to define boundaries and directionalities can be independently identified in other non-degree and non-spatial readings of these prefixes, which I have described as the bound domain and the hierarchical readings.

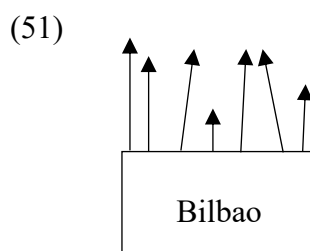
In this section, I connect these observations with independent work about the semantics of spatial prepositions, and from there make a preliminary proposal about which semantic and formal ingredients a prefix must have in order to allow a degree reading.

4.1 *Spatial prepositions*

My starting point is the semantics of spatial prepositions. Spatial prepositions are generally treated as relational elements that associate two entities through a topological relation in space; saying that *The book is on the table* ultimately implies relating the book and the table saying that the book is in a non-trivial relation with the space defined by the table, specifically it is located on the surface of the table. However, in some cases the topological, region-based relation is insufficient to characterise the spatial relation. Zwarts (1997, 2017) and Zwarts & Winter (2000) propose that, in order to describe the semantics of some other spatial prepositions a vectorial analysis is necessary. In order to see why, let us consider the following example:

- (50) El avión está sobre Bilbao.
 the plane is over Bilbao
 ‘The plane is above Bilbao’

Clearly, the space occupied by the plane cannot be properly described as part of the space occupied by the city Bilbao: the topological relation is necessary, but in addition to it, one needs to propose that the plane is in a certain vectorial space that has its origin in the entity ‘Bilbao’. The vectorial space is the (extended) region defined by vectors with length, orientation and directionality. In the case of *sobre* ‘over’, the space defined corresponds to the region defined by vectors that project upwards from ‘Bilbao’ (51):



The plane is above Bilbao is true only if the plane is in the region defined by these vectors; otherwise it is false. The preposition used picks from the set of vectors only those that have the length and orientation.

Vectors must have an origin, which is what I identify as the boundary of the object that defines where the vector starts. In addition to this, vectors must have some extension: otherwise

they cannot be defined as vectors, which are characterised by having the following three properties which a region does not automatically possess:

- a) length, which is the measure of the extension
- b) directionality, which refers to the position of the space surrounding the object that the vector points towards.
- c) orientation; by default, the orientation of a vector is from the object and into the space that surrounds the object. Depending on the position of the boundary, that direction from the object may be interpreted as downwards, upwards or other values.

Evidence that a preposition is not just topological, but vectorial, comes from the possibility to combine it with measure phrases –which determine the length of the vector– and orientation modifiers (Svenonius 2010). Note that prepositions and adverbs like *sobre* ‘above, over’, *bajo* ‘below, under’ and *fuera* ‘outside’ are vectorial at least in the sense of allowing these measure phrases (52):

- (52)
- a. dos metros sobre el suelo
two meters above the ground
‘two meters above the ground’
 - b. dos metros bajo el mar
two meters under the sea
‘two meters below the sea’
 - c. La pelota golpeó dos centímetros fuera del campo.
the ball hit two centimeters outside of the field
‘The ball hit two centimeters outside the field’

In contrast, and as predicted by the theory, the topological prepositions do not license these modifiers, because their semantics does not entail defining an extended vectorial space. As can be seen, *entre-* falls into this class (53c).

- (53)
- a. *dos metros a la casa
two meters at / to the house
 - b. *dos metros en la casa
two meters in the house
 - c. *dos metros entre la casa y el patio
two meters between the house and the yard
 - d. *dos metros junto a la casa
two meters next to the house
 - e. *dos metros ante la casa
two meters before the house
 - f. *dos metros tras la casa
two meters behind the house

The following examples illustrate the combination of orientation modifiers with the projecting prepositions:

- (54) a. La estrella Alioth está localizada diagonalmente sobre Phecda.
the star Alioth is located diagonally above Phecda
‘The star Alioth is located diagonally above Phecda’
b. La estrella Phecda está localizada diagonalmente bajo Alioth.
the star Phecda is located diagonally below Alioth
‘The star Phecda is located diagonally below Alioth’

Admittedly, the orientation modifiers are more restricted than the ones measuring the vector; for instance, the notions of 'outside' or 'past-a-point' do not license them, because being outside the space of an entity does not entail any location with respect to that entity.

4.2 *Spatial prefixes*

I propose that spatial prefixes can also be divided following the same criteria, in spatial topological prefixes and vectorial prefixes. I remain neutral with respect to whether the prefixes, at least in cases of phonological identity, are literally the prepositions used in different types of structures; in some cases, like *entre-* and *sobre-* (in Spanish) or *over-* and *under-* (in English), this seems to be the simpler option, but in cases where there is no identity (eg., Spanish *sub-* and *bajo* 'under') it is not obvious to conclude whether the preposition is a version of the prefix, the prefix is a version of the preposition or they are independent elements which happen to denote (roughly) the same spacial notion.

I furthermore propose that the vectorial semantics in a locative prefix is reflected in its capacity to have degree readings, intermediated in most cases by the capacity to define bound domain and hierarchical readings. In what follows I explain how.

We have seen that the degree reading requires defining a bound that restricts the scale, and a directionality. These are two ingredients that prepositions which have a vectorial semantics include. The directionality follows obviously from the notion of vector: going back to the plane above Bilbao example, the preposition picks only those vectors that go in an upwards direction. Vectors that go eastward or westward are irrelevant for this preposition, like the vectors that project downwards to Bilbao. In contrast, *El terremoto se originó dos kilómetros bajo Bilbao* 'The earthquake originated two kilometers below Bilbao' picks only the vectors that are projected downwards.

It is less obvious that the vectorial semantics also requires defining a boundary, but this can also be shown in examples where objects have the appropriate configuration. Consider the example in (55):

- (55) El dron está seis metros sobre el Empire State Building.
the drone is six meters above the Empire State Building
‘The drone is six meters above the Empire State Building’

The Empire State Building is a 102 story high building, with a height of 381 meters. In order to evaluate if (55) is true, the six meters must be counted from the upper boundary of the structure that corresponds to the building, which means that the drone must be at 387 meters above the ground. Irrespective of the location of the speaker, counting the six meters from the second floor or ground level does not capture the intuitive truth conditions of (55).

Thus, spatial prepositions with a vectorial semantics both define boundaries of an object, and a directionality from them. My claim is that spatial prefixes that have these semantic

ingredients are the only ones able to produce degree readings, because being a degree prefix requires delimiting a scale to only the values higher or lower than the new boundary set. Hence, prefixes like *a-*, *en-*, *tras-*, *ante-* (56), relating to non-vectorial prepositions, systematically lack a degree reading.

- (56)
- | | | | |
|----|---------------|---|-----------------------------|
| a. | claro 'clear' | > | a-clar-a-r 'to clear' |
| b. | cárcel 'jail' | > | en-carcel-a-r 'to imprison' |
| c. | tienda 'shop' | > | tras-tienda 'back shop' |
| d. | brazo 'arm' | > | ante-brazo 'fore-arm' |

More specifically, I propose that spatial prefixes that can have degree readings are associated to boundaries and orientations. In formal terms, *sobre-* is represented as containing [Bound], and also [Orientation], which is furthermore specified as 'upwards', which I represent as '↑'; 'downwards' can be represented as ↓, and 'outside', as ←. The same goes, with differences in orientation, for the other prefixes: the conceptual differences between *super-*, *sobre-*, *ultra-*, *extra-*, which speakers sometimes perceive as denoting different (high) quantities, may be related to the length of the vector, but for the time being I remain neutral with respect to this.

- (57)
- | | | |
|----|-----------------|------------|
| a. | sobre- 'over-' | [Bound, ↑] |
| b. | infra- 'infra-' | [Bound, ↓] |
| c. | extra- 'extra-' | [Bound, ←] |

I also remain neutral with the nature of these features, whether they are purely semantic or syntactic in nature, and how they are internally organised—I believe that at this stage of research it is more crucial to focus on the empirical facts and understand them than using these data to argue for or against any theory—. The approach is compatible with Lexicalism, if one assumes that these features are defined in the lexicon and are not projected as syntactic heads, but also with Distributed Morphology, if one proposes that the features are bundled in heads that are spelled out by the appropriate exponents, and Nanosyntax, if the bundles are treated as syntactic constituents obtained by combination of each separate feature into a structure that can be lexicalised by the prefix.

To summarise, my proposal is that spatial prefixes should be divided in a way parallel to spatial prepositions, with only some of them having a vectorial semantics. This vectorial semantics involves, at least, defining a boundary and defining the directionality of the relevant vectors that project from that boundary. Used as prefixes, the vectorial semantics allows for bound domain readings –via [Bound]–, hierarchical readings –when the directionality can be interpreted as levels of quality, taxonomical relations or control– and degree readings.

If the theory that I have just presented is at least on the right track, the focus now moves to the prefix *entre-*, which is exceptional in the class. Just like the other degree prefixes we have focused on, this prefix has spatial readings, but unlike them, it does not have a vectorial semantics, as we have seen.

To finish the analysis, then, in the following section I discuss the case of *entre-*. I argue there that, indeed, it lacks a vectorial semantics, even though it does presuppose –rather than introduce– boundaries; this is the reason why the degree reading with this prefix has special properties that single it out from the rest of the class.

4.3 *The curious case of entre-*

Within the proposal that I am making here, *entre-* stands out because as a preposition it does not have the expected behaviour of a projective spatial location, as we have seen above. In what follows, I argue that this result is compatible with the general proposal: *entre-* defines an extension that is bounded in two points, defined by the two elements that it introduces, and as such it satisfies the requisites that the degree reading imposes on the spatial configuration. The non-projective nature of the prefix, moreover, reflects on some specificities of the readings that it triggers.

Intuitively, what makes *entre-* not vectorial is that it denotes a location in the intermediate space defined by two entities. These entities, however, are not specified by the prefix, so the notion of space can be turned into time or degree. In (58), I present an example of the spatial reading, and in (59) two examples of the temporal reading; the rest of spatial prefixes that can take degree readings lack this temporal reading.

- (58) a. *entre-cejo*
 between-eye.brow
 ‘space between the eyebrows’
 b. *entre-abrir*
 between-open
 ‘to open partially’
- (59) a. *entre-guerra*
 between-war
 ‘period between two wars’
 b. *entre-tiempo*
 between-weather
 ‘period between two seasons or periods of time’

It seems that the prefix clearly requires boundaries, although in this case the boundaries must be provided by the base, and the prefix seems unable to provide those boundaries itself. This may explain why bound domain readings are not documented. I propose that the degree reading of the prefix should be as follows (60): the prefix presupposes the existence of a maximal and a minimal degree, and locates the degree variable in the interval defined by these two values:

$$(60) \quad [[\text{entre-}]] = \lambda d \lambda P \exists d^{\max} \exists d^{\min} [P(d) \ \& \ d^{\min} < d < d^{\max}]$$

This means that the bases of *entre-* in the degree reading must be interpretable as scales where there is a maximal and a minimal value (see Kennedy & McNally 2005). Intuitively, this is clearly the case in the verbal bases with which it combines: *abrir* ‘to open’, for instance, denotes a change that has a minimal degree (the door is closed) and a maximal one (the door is fully open). That the verb has a degree variable can be independently shown by the combination with degree adverbs (61a); that the scale is bound in a maximal value can be seen by the possibility to combine the verb with the adverb *completamente* ‘completely’ (61b), that verbs like *alimentar* ‘to feed’ reject (61c).

- (61) a. Juan abre mucho la boca al comer.
 Juan opens much the mouth at-the eat
 ‘Juan opens the mouth a lot when eating’
 b. Abre completamente la boca.
 open completely the mouth
 ‘Open your mouth completely’
 c. #Alimenta completamente a tu gato.
 feed completely your cat

‘To feed’ rejects a maximal degree because there is a minimal value associated to feeding (not feeding), but there is no upper limit to how much food one can in principle give to a living entity –the consequences of doing so are a different story–.

When the prefix *entre-* combines with the verb, as in (62), the interval of scalar values is restricted to only those intermediate between the maximal and the minimal value: the door is not closed, but it is not fully open either.

$$(62) \quad [[\text{entre-abrir}]] = \lambda e \lambda x \lambda y \lambda d \exists d^{\max} \exists d^{\min} [\text{abrir}'(e, x, y, d) \ \& \ d^{\min} < d < d^{\max}]$$

Less intuitively, *ver* ‘see’ and *oír* ‘hear’ also fall within this description: they allow a degree variable.

- (63) a. En la foto se ve poco a Juan.
 in the photo SE sees little at Juan
 ‘In this photo, Juan is not seen much’
 b. Se te oye mucho en la grabación.
 SE you hears much in the recording
 ‘You are heard a lot in the recording’

They are perception verbs, which means that they denote eventualities where one obtains sensorial evidence of the existence of something; in them, the maximal degree is interpreted as full perception, while the minimal degree can be interpreted as not perceiving something. When the prefix combines with the verb, we again obtain the reading where something is not invisible, but has not been fully perceived.

$$(64) \quad [[\text{entre-ver}]] = \lambda e \lambda x \lambda y \lambda d \exists d^{\max} \exists d^{\min} [\text{ver}'(e, x, y, d) \ \& \ d^{\min} < d < d^{\max}]$$

This explains that, with verbs, the prefix *entre-* is typically associated to a reading of incomplete action (Bosque 2023) where the event has been started –thus moving away from the minimal degree– but has not been carried to its completion – this not reaching the maximal value–.

With adjectival bases, the same basic principles hold: the base must be interpretable as associated to a scale with a maximal and a minimal value, and the prefix locates the range of values between the two boundaries. This is clearly the case of *cano* ‘with grey hair’, which allows *completamente*.

- (65) Mi abuelo tiene el pelo completamente cano.
 my grandfather has the hair completely grey
 ‘My grandfather has completely grey hair’

The minimal degree being ‘not grey at all’ and the maximal degree being ‘completely grey’, (66) correctly denotes that the hair is in some intermediate value between grey and not grey. In parallel to the incomplete action cases with a verbal base, we could talk here of an incomplete property.

- (66) $[[\text{entre-cano}]] = \lambda d \exists d^{\max} \exists d^{\min} [\text{cano}' (\text{My grandfather's hair}, d) \ \& \ d^{\min} < d < d^{\max}]$

From this perspective, it is significant that the only colour terms that are documented in combination with degree *entre-* are *claro* ‘bright, light’ and *oscuro* ‘dark’. These are the only adjectives in the series that can be easily interpreted as the opposite poles of a closed scale: the minimal value of brightness is the maximal value of darkness, and vice versa. The two adjectives are logically synonyms, although speakers clearly choose as base the adjective denoting the maximal value that they consider to be closest to the actual degree: *entre-oscuro* ‘between-dark’ emphasises that the colour is not dark, but approaches it, and *entre-claro* ‘between-bright’ does the opposite.

In contrast, an adjective like ‘red’ would not be able to combine with the prefix: the prefix presupposes that there should be a maximal value for red, and also a minimal one, but what would be the minimal value? Green? Blue? Pink? White? Colourless? Hence, (67) fails because the presupposition that the prefix introduces cannot be met by the base.

- (67) $[[\text{entre-rojo}]] = \lambda x \lambda d \exists d^{\max} \exists d^{\min} [\text{rojo}' (x, d) \ \& \ d^{\min} < d < d^{\max}]$

In contrast, other adjectives that do not define themselves closed scales can satisfy this presupposition, with appropriate semantic accommodation. Take for instance *entre-ancho* ‘between-broad’, which means ‘neither broad nor narrow’. The adjective does not itself have a maximal degree, as (68) shows:

- (68) #El camino es completamente ancho.
 the road is completely broad
 Intended: ‘The road is completely broad’

However, our world knowledge allows us to accommodate the presupposition that we must place the interval between a maximal and a minimal degree. We know that breadth can be associated to numerical quantities, and we know that the breadth of a road must fall within an interval of values to be used. We can take the minimal value presupposed by the prefix as the lower end of that interval, and the maximal as the higher end, so that, in practice, (69) would mean that the road is ‘of unremarkable breadth’, neither narrow nor broad.

- (69) $[[\text{entre-ancho}]] = \lambda d \exists d^{\max} \exists d^{\min} [\text{ancho}' (\text{the road}, d) \ \& \ d^{\min} < d < d^{\max}]$

Ultimately, then, the prefix *entre-* is different from the class. Calling it a degree prefix is possible because its denotation modifies the degree argument, like the others. However, in this case, there is no single orientation: the degree has to be higher than the minimal value and

lower than the maximal value. This triggers a special reading that the other degree prefixes cannot have: the action was carried out incompletely, or the property is possessed in an incomplete way.

5 Conclusions

In this article I have made a proposal about the conditions that allow a spatial prefix to be used as a degree prefix. I have argued that prefixes with a vectorial semantics are those best equipped to become degree prefixes, because their vectorial semantics presupposes the existence of a boundary and an extension, which is required by their directionality. When applied to the scale of the base, these ingredients make it possible to restrict the range of values of a scale projected by the adjective or verb. Within the class, I have also addressed the behaviour of *entre-*, which lacks a vectorial semantics due to the fact that its orientation with respect to each one of the two elements that delimit its location is variable, so that an increase in the distance from one of them results in a decrease in the distance from the other. I have argued that, still, the prefix encodes both boundaries and extensions, and that the specificities related to how its boundaries are defined is what explains the different degree reading that it triggers, relating to incompleteness rather than to low values in the scale, *per se*.

Going back to how I started the article, I want to emphasise that the study has been confined to Spanish, and has made a proposal about how this language treats the relation between spatial and degree readings. In principle, the proposal can be extended to other Indo-European languages, like those mentioned in §1 above. Its success crucially depends on the following predictions, which presuppose that the language contains prefixes that are both spatial and degree-denoting:

a) The prefixes involved should contain boundaries and extensions, which should manifest in the existence of domain and hierarchical readings. That failing, the behaviour of those prefixes should be similar to *entre-*, where there is no directionality involved.

b) The degree reading should be confined to bases that independently project scales, given that the analysis is built on the proposal that the prefix provides highly abstract meaning notions that become degree-like only within the context of scalar semantics. The prefix itself does not encode degree.

c) Prepositions with a vectorial semantics should exhibit degree readings, at least in some cases.

I have not addressed two issues that would be necessary, in my opinion, to have a complete characterisation. I have noted that degree prefixes have different productivity with verbs and adjectives, with some cases where the prefix can only obtain a degree reading with one of these bases. In the account I have proposed this property is not accounted for, given that I am proposing one single degree argument. One possible option, that I leave for future exploration, is to develop an account where the degree argument of verbs and adjectives has semantic, and perhaps also structural, differences.

I have not said anything, either, about those prefixes that denote degree but never double as spatial prefixes. Initially, one would expect that their semantics is not radically different from the one described here, and that raises the question of why they are not used as spatial elements too. This connects with the general question of how the spatial-degree prefixes keep

their boundary and directionality but change the type of entity they modify, from regions of space to scales: prefixes specialised in degree could be those that only modify degrees and reject space. Accounting for this difference, as far as I can see, requires one of the following two approaches, whose exploration I also leave for future research: to decompose the features associated to the prefix, and define the semantics individually for each feature, rather than for the whole morpheme, so that only some can contain space, and only some can contain degree, or alternatively to treat the degree prefixes without spatial uses as suppletive forms of spatial prefixes.

Given these limitations, I have tried to restrict the presentation to a neutral enough framework where I have avoided making claims about the broader theories about word formation or meaning composition that may be supported by the claims. I believe that identifying the primitives of meaning –which has been the main issue discussed here– should be a precondition for any further elaboration. However, if the analysis proposed here is on the right track, and to the extent that it is, the proposal that I have made here is directly compatible with the following general approaches to word formation:

a) From a semantic perspective, the approach is straightforwardly compatible with theories where there is a division between structural aspects of meaning –which are highly abstract– and conceptual aspects of meaning: the relation between space and degree can be viewed as made possible by abstract general notions like boundary, orientation and extension, which applied to a spatial dimension produce a different interpretation than when applied to other cognitive domains, such as classes of entities and degree, depending mainly on the semantic properties of the morphological base, which contributes its root. Both aspects of meaning have to be ultimately integrated within the interpretation of what the word means, and how that meaning is distributed across morphemes, and the integration is what determines whether speakers feel the need for creating a new word or can extend the meaning of the word to other domains.

b) From a word formation perspective, the approach is generally compatible with those where morphemes –more generally, morphological formatives– must encode abstract notions, and rules of semantic compositionality must apply to them. More speculatively, the analysis favours approaches where lexical entries contain richly specified feature sets which determine rigid structural semantics, with underspecification being confined to the conceptual aspects of meaning, such as the cognitive domain where the abstract features must be interpreted.

Despite these limitations, I hope that this article has managed to present a reasonable approach to how the notions of space and degree can be connected in the domain of prefixation.

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