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Word formation at the morpho-semantics interface: the case of prefixed verbs in Spanish*

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Abstract: This paper provides a compositional semantics of prefixed verbs in Spanish, such as ***a-****lisar* 'to straigthen' and ***a-****cartonar* 'to stiffen', and ***en-****crespar* 'to curl' and ***en-****carcelar* 'to jail' (where the base predicates can be gradable, e.g., *liso* 'straight' and *crespo* 'curly', or non-gradable, e.g., *cartón* 'cardboard' and *cárcel* 'jail'). I propose that verbs with *a-* convey change of state and are uniformly analyzed in terms of scalar change where the theme increases in the extent to which a property applies to it. For verbs with *en-*, I propose an analysis that builds on spatial relations such that the same morphological means apply in two different domains, i.e., entities and scales/degrees, to derive different types of verbs of change (i.e., change of location and change of state). My proposal provides an account of why using different morphological means (*a-* and *en-*) may yield similar but also different verbal meanings, in addition to providing an account of why gradable and non-gradable bases can combine with the same morphological means yielding relevant semantic differences. Differences in telicity are linked to the mereological structure of the base predicates' denotations. More broadly, this paper examines prefixed verbs in Spanish as a case study that touches on polysemy, scalar change, spatial relations, and systematic meaning differences in word formation.

Keywords: change of state, property, space, aspect, telicity, Spanish

1 Introduction

This paper discusses morphologically derived Spanish verbs of change involving prefixation, namely, the prefixes *a-* and *en-*, and proposes a compositional semantics for them. Prefixation with these elements constitutes one of the most productive means in the language to derive these types of verbs (Serrano-Dolader 1999). The ultimate goals of this paper are (i) to provide a principled account of the cross-linguistic observation that various types of verbs of change may be formed by means of the same morpho-syntactic material, and (ii) to make explicit why different morphological means may yield verbal meanings that are truth-conditionally equivalent through different routes To this end, I examine a particular case that has been studied extensively from a descriptive and a syntactic point of view, but only limitedly from a semantic point of view.

Prefixed verbs with *a-* and *en-* can be formed from gradable and non-gradable base predicates.[1] With gradable bases, verbs with *a-* and *en-* derive change-of-state verbs, specifically, verbs that convey that

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[1]This paper follows Martínez Vera (2016, 2019) in assuming that prefixed verbs may combine with gradable and non-gradable bases regardless of the lexical category of the base. Thus, in addition to adjectives and nouns, it is also possible to derive prefixed verbs with numerals (***a-****unar* 'to join', with the numeral base *uno* 'one'), adverbs (***a-****lejar* 'to move away', with the adverb *lejos* 'far'), reflexives (***en-****simismar* 'to go into one's shell', with the reflexive *sí mismo* 'oneself'), etc. The bases *uno* 'one' and *sí mismo* 'oneself' are non-gradable; the base *lejos* 'far' is gradable.

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the theme increases in the extent to which a property applies to it in an event (Dowty 1979). Relevant examples appear in (1), with the predicates ***a-****lisar* 'to straighten' and ***en-****crespar* 'to curl'; the bases are *liso* 'straight' and *crespo* 'curly'.[2,3,4]

(1) a. La chica / el aparato **a-**lisó su cabello.
the girl the device **a-**straight.PST her hair
'The girl/the device straightened her hair.'
b. La chica / el aparato **en-**crespó su cabello.
the girl the device **en-**curl.PST her hair
'The girl/the device curled her hair.'

Turning to cases with non-gradable bases, verbs with *a-* convey the meaning of change of state for the theme (Gibert Sotelo & Pujol Payet 2015; Martínez Vera 2016). (2) means that the theme goes bad by turning sour. The base is *vinagre* 'vinegar'.

(2) El mal clima **a-**vinagró el vino.
the bad weather **a-**vinegar.PST the wine
'The bad weather soured the wine.'

Verbs with *en-* convey the meanings of (broadly construed) change of location and change of state (Gumiel et al. 1999; Gibert Sotelo & Pujol Payet 2015; Martínez Vera 2016, 2019). For example, (3), where the verb's base is *lodo* 'mud', means that the theme gets mud on it.

(3) El niño **en-**lodó a su papá.
the boy **en-**mud.PST his dad
'The boy covered his dad in mud.'

Further, there are minimal pairs with the prefixes, both with gradable and non-gradable bases. Consider first gradable bases. (4) is a case with the gradable base *tibio* 'warm'; there is no apparent semantic difference regardless of the prefix. (5) illustrate cases with the base *derecho*, which means 'legitimate, appropriate' or 'straight', with each meaning being targeted by a different prefix.

(4) El calor del ambiente **a-**tibió / **en-**tibió el jugo.
the heat of.the environment **a-**warm.PST **en-**warm.PST the juice
'The heat warmed the juice.'

(5) a. El cocinero **a-**derezó la ensalada.
the cook **a-**appropriate.PST the salad
'The cook dressed the salad (i.e., made the salad appropriate by dressing it).'
b. El carpintero **en-**derezó la madera.
the cook **en-**straight.PST the wood
'The carpenter straightened the piece of wood.'

As for non-gradable bases, consider (6), where the verb's base is *vinagre* 'vinegar'—the verbs in (2) and (6) constitute a minimal pair. (6) means that the theme and vinegar are in contact, e.g., that the theme is put in vinegar, or that vinegar is put on/in the theme.

(6) El cocinero **en-**vinagró el pavo.
the cook **en-**vinegar.PST the turkey

[2]Verbs are glossed separating the prefix and the base. The following abbreviations are used in the glosses: PST = preterite; PROG = progressive; PRT = participle.

[3]I focus on the eventive interpretations of these verbs. See Gawron (2005), Deo et al. (2013) and Fábregas (2015, 2023) for discussion of extent interpretations in verbal predicates.

[4]The external argument is set aside. See Gibert Sotelo & Pujol Payet (2015), Martínez Vera (2016) and Fábregas (2023).

'The cook put the turkey in vinegar/put vinegar on/in the turkey.'

I propose that all verbs with *a-* are analyzed in terms of scalar change where the theme increases in the extent to which a property applies to it (Hay et al. 1999; Beavers 2011; Martínez Vera 2021b). As for verbs with *en-*, these are understood in terms of an anchoring (spatial) relation (Galton & Hood 2005) where the theme (figure) is located with respect to the base predicate (ground) in an event (Vasardani et al. 2017). Anchoring can be understood literally, which yields change-of-location interpretations, or by extension (Gärdenfors 1996), which yields change-of-state interpretations.

I further discuss telicity. Key here is the mereological structure of the base predicate's denotation (as integrated in the prefixed verbs) in connection to contextual sensitivity (Kearns 2007; Fleischhauer 2013; McNally 2017; Martínez Vera 2021b). Thus, if the prefixed verbs combine with a gradable base, scale structure is decisive in determining whether the predicate is telic or atelic by default: if the verb's base includes a scale with a maximal degree, the predicate is typically telic, and atelic otherwise. Further, if the prefixed verb combines with a quantized non-gradable base, the predicate will be telic by default; no preference is attested in prefixed verbs with a cumulative non-gradable base.

The paper is organized as follows. Section 2 discusses prefixed verbs taking gradable bases: I show that they entail scalar change, that the prefixes may combine with gradable bases of any scale type, and that prefixed verbs with gradable bases may give rise to cases of synonymy or polysemy. Section 3 addresses prefixed verbs taking non-gradable bases: I show that verbs with *a-* uniformly convey scalar change, whereas verbs with with *en-* convey change-of-location or change-of-state meanings. Section 4 introduces my proposal. Section 5 addresses telicity. Section 6 is the conclusion. An appendix includes a sample of prefixed verbs.

2 Verbs with gradable bases

This section discusses prefixed verbs taking gradable bases. These are predicates that convey change of state, specifically, that the theme undergoes change such that it increases in the extent to which the property meaning tied to the predicate applies to it (Dowty 1979; Abusch 1986; Hay et al. 1999; Winter 2006; Kennedy & Levin 2008; Pedersen 2015). Consider, in addition to (1), the examples in (7), with the verbs ***a-****grandar* 'to enlarge' and ***en-****gordar* 'to fatten'; the bases are *grande* 'large' and *gordo* 'fat'. The sentences convey the meaning that the theme increases in size/fatness (7), just as it increases in straightness/curliness in (1).

(7) a. Los obreros **a-**grandaron el camino.
the workers **a-**large.PST the road
'The workers enlarged the road.'

b. El granjero **en-**gordó al cerdo.
the farmer **en-**fat.PST to.the pig
'The farmer fattened the pig.'

Below I discuss two issues. First, I characterize the kind of change involved in these verbs by making use of common tests for scalar verbs (section 2.1). I then turn to more detailed discussion of the gradable predicates that appear in prefixed verbs, which challenges previous claims about restrictions in the distribution of gradable predicates in the cases under consideration. Specifically, I show that there are no such restrictions in that gradable bases of all scale types may appear in prefixed verbs (section 2.2). I further link the discussion to the consideration of cases where the same base surfaces in verbs with both prefixes (section 2.3), and of cases where similar bases surface with one prefix but not the other (section 2.4).

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2.1 Change of state

This section argues that prefixed verbs with gradable predicates convey change of state. Then it turns to the kind of change involved, namely, whether these verbs may convey positive or comparative interpretations. Finally, it shows that these verbs may be compatible with differential measure phrases, which is taken to suggest that change of state is to be understood in scalar terms.

With regard to conveying change of state, I apply Beavers's (2011) entailment test for verbs denoting change, which targets an observable change in the theme (see also Shibatani 1976).[5] The test involves the follow-up *but nothing is different about X* after a sentence where something is predicated of theme *X*, e.g., *Mary straightened the rod, #but nothing is different about it*, where the theme increases in straightness as a result of participating in the event. As (8) shows, change of state is entailed for the theme; I translate the test to Spanish as *pero no hay nada diferente en X*. In (8), the theme, *her hair*, increases in straightness (8a) and curliness (8b) as a result of participating in the event.[6]

(8) a. El aparato **a-**lisó su cabello, #pero no hay nada diferente en el cabello.
the device **a-**straight.PST her hair but no there.is nothing different in the hair
'The device straightened her hair, but nothing is different about it.'

b. El aparato **en-**crespó su cabello, #pero no hay nada diferente en el cabello.
the device **en-**curl.PST her hair but no there.is nothing different in the hair
'The device curled her hair, but nothing is different about it.'

To be more precise about the kind of change that these verbs convey, I apply a test that targets whether the theme must end up in the positive extension of the base in the verb (Tenny 1994; see also Kearns 2007; Kennedy & Levin 2008; see Beavers 2011 for discussion of limitations) , e.g., whether an example such as *Mary straightened the rod* entails that the theme ends up straight. If this is not the case (i.e., if a positive interpretation is not entailed), then what is entailed is merely a comparative interpretation, i.e., that the theme need only end up straighter. The test involves the follow-up *but X didn't end up P* after a sentence where a verb whose base contributes predicate *P* applies to theme *X*. For instance, in *Mary straightened the rod, but the rod didn't end up straight* it suffices that the theme ends up straighter (although there may be a slight preference for the theme to end up fully straight; see Kennedy & Levin 2008). I translate the test to Spanish as *pero X no terminó P*. As (9) shows, the follow-ups are felicitous, which supports that a comparative interpretation where the theme increases in straightness (9a) or curliness (9b) is entailed (see section 5 for discussion of cases where there may be a slight preference for a positive interpretation).

(9) a. El aparato **a-**lisó su cabello, pero el cabello no terminó liso.
the device **a-**straight.PST her hair but the hair no ended.up straight
'The device straightened her hair, but the hair didn't end up straight.'

b. El aparato **en-**crespó su cabello, pero el cabello no terminó crespo.
the device **en-**curl.PST her hair but the hair no ended.up curly
'The device curled her hair, but the hair didn't end up curly.'

The third test I discuss concerns the incorporation of differential measure phrases (von Stechow 1984) in sentences with prefixed verbs. While this test has a more limited scope in that not all verbs may combine with such phrases, it is relevant in that it shows whether the change that takes place is measurable. If so,

[5] See Martínez Vera (2016) for further evidence concerning the application of the test *Lo que le pasó a X es* 'What happened to *X* is' (for theme *X*) (Cruse 1973). Martínez Vera (2016) argues that this test only yields grammatical results if the theme undergoes change (see Martínez Vera 2022 for further discussion of verbal predicates and change in Spanish).

[6] Some speakers may accept examples as those in (8) in the presence of an animate subject, e.g., *la chica* 'the girl'. This is tied to the acceptance of failed attempt interpretations, which are captured under the Agent Control Hypothesis (Demirdache & Martin 2015), which proposes that animate subjects may be compatible with this kind of interpretations, namely, that the intended culmination is not reached in the event.

then the change of state that is entailed is to be understood in terms of units that can be measured, e.g., scales/degrees (Kennedy & Levin 2008). In (10), the expressions providing a measurement make explicit how much the theme has changed as a result of participating in the event. The measure expression provides a comparative measurement with no indication as to whether the theme ends up in the positive extension of the relevant predicate (see Martínez Vera 2021a for further discussion).

(10) a. Los obreros **a-**largaron el camino 2 metros.
the workers **a-**long.PST the path 2 meters
'The workers lengthened the path by 2 meters.'
b. El granjero **en-**gordó al cerdo 200 gramos.
the farmer **en-**fat.PST to.the pig 200 grams
'The farmer fattened the pig by 200 grams.'

The discussion thus suggests that prefixed verbs taking gradable bases entail comparative change for the theme which is to be understood in scalar terms.

2.2 Scale types of gradable bases in prefixed verbs

This section shows that gradable bases of all scale types, i.e., open, partially closed, closed (Kennedy & McNally 2005; Burnett 2014), can surface in prefixed verbs (Fábregas 2023). To illustrate, consider the pair of adjectives *full* and *empty*, which is associated with a closed scale in that there are endpoints corresponding to complete fullness or emptiness. For *full*, the base includes both endpoints, with an orientation towards complete fullness; the opposite occurs with *empty*. Other gradable predicates may lack such endpoints, e.g., *long*, or include only one of them, e.g., absolute straightness for *straight* or *curly*.[7] The relevance of the claim that there are no restrictions with regard to scale types lies in that Martínez Vera (2016, 2019) has claimed that prefixed verbs do not take bases with closed scales, and claims that only verbs with *a-* are compatible with bases with a partially closed scale where change towards the endpoint takes place. This is empirically inaccurate.

Thus, examples of prefixed verbs with bases where there are no absolute endpoints are ***a-****delgazar* 'to thin' (with base *delgado* 'thin'), ***a-****largar* 'to lengthen' (with base *largo* 'long'), ***a-****cortar* 'to shorten' (with base *corto* 'short'), ***en-****flacar* 'to thin' (with base *flaco* 'thin'), ***en-****gordar* 'to fatten' (with base *gordo* 'fat'). Examples with only one endpoint are ***a-****lisar* 'to straighten' (with base *liso* 'straight'), ***a-****planar* 'to flatten' (with base *plano* 'flat'), ***en-****crespar* 'to curl' (with base *crespo* 'curly'), ***en-****suciar* 'to dirty' (with base *sucio* 'dirty'), ***en-****derezar* 'to straighten' (with base *derecho* 'straight'), etc. An example with both endpoints is ***em-****borrachar* 'to get drunk' (with base *borracho* 'drunk'; the endpoints of the scale are sober and drunk). As for verbs with absolute endpoints in cases with *a-*, I have not found any, but there does not seem to be a restriction in the grammar, since participial forms such as ***a-****borrachado* 'drunk' (with base *borracho* 'drunk') are possible.

2.3 Same gradable bases surfacing with *a-* and *en-* verbs

This section turns to the discussion of cases where the same base appears in verbs with both prefixes. In line with the discussion in section 2.2, there are no apparent semantic restrictions with regard to the gradable bases that appear in prefixed verbs. Nonetheless, different aspects of the base may be highlighted in the presence of each prefix.

[7] Kennedy & McNally (2005) distinguish different kinds of gradable predicates based on the adjunction of adverbials, such as *completely*. When it is possible to adjoin them, the predicate involves an absolute endpoint on the end of the gradable base that is targeted. For instance, when considering the pair formed by *straight* and *curly*, which can share the same property dimension, but point towards different ends, adjoining *completely* is possible with the former but not with the latter, e.g., *The hair is completely straight* is fine, but *The hair is completely curly* is somewhat degraded.

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These cases are of two types. First, there are verbs that convey the same meaning. Examples are ***a-****tibiar* and ***en-****tibiar* 'to warm' (the base is *tibio* 'warm'), ***a-****mustiar* and ***en-****mustiar* 'to become wilted' (the base is *mustio* 'wilted'), or ***a-****bobar* and ***em-****bobar* 'to make stupid' (the base is *bobo* 'stupid') (Real Academia de la Lengua Española 2001); see section 2.4 for further discussion of verbs with the base *bobo* 'stupid'. To exemplify, consider (11) (=(4)). The theme changes in that it becomes warmer as a result of participating in the event.

(11) El calor del ambiente **a-**tibió / **en-**tibió el jugo.
the heat of.the environment **a-**warm.PST **en-**warm.PST the juice
'The heat warmed the juice.'

Second, there is a case where the (apparently) same base surfaces in verbs with both prefixes, but their meaning is not identical. The pair is ***a-****derezar* 'to dress' and ***en-****derezar* 'to straighten'; the base is *derecho*, which conveys the meaning 'legitimate, appropriate' or 'straight' (Real Academia de la Lengua Española 2001). Examples appear in (12) (=(5)). These verbs pick different aspects of the meaning of the base (as pointed out to me by Antonio Fábregas). In (12a), the theme becomes closer to a desirable or appropriate state (e.g., the salad is dressed appropriately). In (12b), the theme becomes straighter. This pair shows that different aspects of a polysemous base can be picked up on by different prefixes.

(12) a. El cocinero **a-**derezó la ensalada.
the cook **a-**appropriate.PST the salad
'The cook dressed the salad (i.e., made the salad appropriate by dressing it).'
b. El carpintero **en-**derezó la madera.
the cook **en-**straight.PST the wood
'The carpenter straightened the piece of wood.'

2.4 Similar gradable bases surfacing with *a-* or *en-*

This section briefly turns to cases where different bases that describe extremely similar properties surface in verbs with different prefixes. In general, prefixed verbs appear to simply divide between them for reasons that do not have to be semantic.

Relevant examples are ***a-****tontar* 'to stun', and ***a-****bobar* or ***em-****bobar* 'to make stupid' (the bases are *tonto* 'silly' and *bobo* 'stupid'); or ***a-****delgazar* and ***en-****flacar* 'to thin' (the bases are *delgado* and *flaco* 'thin'). Relevant examples appear below, where in all cases the theme changes by increasing in the extent to which the relevant property applies to it. As expected, the verbs build on the meaning of the bases and may highlight particular aspects. Thus, example (13a) indicates that the theme was stunned, which is a possibility tied to *tonto* 'silly'; (13b) highlights that the theme was amazed, which is a possibility tied to *bobo* 'stupid'. The cases in (14) are identical (or nearly so) in that they convey the meaning that the theme thinned.

(13) a. Las luces **a-**tontaron a la audiencia.
the lights **a-**silly.PST the audience
'The lights stunned the audience.'
b. Las luces **a-**bobaron / **em-**bobaron a la audiencia.
the lights **a-**stupid.PST **em-**stupid.PST the audience
'The lights amazed the audience.'

(14) La persona **a-**delgazó / **en-**flacó 50 kilos.
the person **a-**thin.PST **en-**thin.PST 50 kilos
'The person lost 50 kilos.'

In summary, I have shown that prefixed verbs with gradable bases convey a transition for the theme in

which it increases in the extent to which a property meaning as tied to the base in the verb applies to it. In contrast to previous claims, prefixed verbs take any kind of gradable base—there are no apparent semantic restrictions in this regard. Examples were provided of gradable bases tied to different scale types, the same gradable base surfacing with both prefixes and different gradable bases describing similar properties that appear with different prefixes.

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3 Verbs with non-gradable bases

This section discusses prefixed verbs taking non-gradable bases. Section 3.1 concentrates on verbs with *a-*; I propose that these convey change of state, which is to be understood in scalar terms, i.e., all verbs with *a-* are to be analyzed uniformly. Section 3.2 discusses verbs with *en-*; I propose that these are to be analyzed in terms of change of location, with change-of-state interpretations arising as a result of extension of the core spatial meaning.

3.1 Verbs with *a-*

Verbs with *a-* have been characterized as conveying change of state (Schroten 1997; Serrano-Dolader 1999; Gibert Sotelo & Pujol Payet 2015; Martínez Vera 2016). The verbs in (15) (=(2)) are ***a-****vinagrar* 'to sour', with the base *vinagre* 'vinegar' (15a), and ***a-****cartonar* 'to stiffen', with the base *cartón* 'cardboard' (15b). The examples convey the meaning that the theme becomes like the base, i.e., sour (15a) or stiff (15b). Additional verbs are ***a-****caramelar* 'to make caramel-like' (with base *caramelo* 'caramel'), ***a-****filar* 'to sharpen' (with base *filo* 'sharp edge'), ***a-****humar* 'to (fill with) smoke' (with base *humo* 'smoke'), etc. (see Serrano-Dolader 1999; Gibert Sotelo & Pujol Payet 2015; see the appendix for more examples).

(15) a. El mal clima **a-**vinagró el vino.
the bad weather **a-**vinegar.PST the wine
'The bad weather soured the wine.'
b. El vino **a-**cartonó el pantalón.
the wine **a-**cardboard.PST the pants
'The wine stiffened the pants.'

I argue that change of state is to be understood as scalar change, as maintained in section 2 for verbs taking gradable bases—in this sense, the non-gradable base facilitates a gradable property when the prefixed verb is derived. My claim is thus that all verbs with *a-* are to be analyzed uniformly. In support of this, below I apply the tests in section 2.2 to cases with non-gradable bases. To set the ground, recall Beavers's (2011) entailment test with the follow-up *but nothing is different about X* after a sentence where something is predicated of theme *X*. Applying this test in (16) shows that, in line with previous literature, change of state is entailed for the theme. Noticeable changes for the theme in (16) are present, e.g., a foul smell in the wine (16a) or a changed texture in the pants (16b).

(16) a. El mal clima **a-**vinagró el vino, #pero no hay nada diferente en el vino.
the bad weather **a-**vinegar.PST the wine but no there.is nothing different in the wine
'The bad weather soured the wine, but nothing is different about it.'
b. El vino **a-**cartonó el pantalón, #pero no hay nada diferente en el pantalón.
the wine **a-**cardboard.PST the pants but no there.is nothing different in the pants
'The wine stiffened the pants, but nothing is different about them.'

Key here is to show that it suffices that the comparative interpretation in the cases under discussion is entailed. I show below that this is in fact the case. Recall the entailment test targeting whether the theme

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ends up in the positive extension of the property indicated by the base (Tenny 1994); the test involves the follow-up *but X didn't end up P* (for theme *X* and predicate *P*). The immediate issue that arises with this test is that the base predicates cannot be used as complements of the verb in the follow-up (e.g., **pero el vino terminó vinagre* 'but the wine ended up vinegar'). To address this, the examples make the property meaning tied to the base predicate explicit. The predicates chosen for the examples are based on the definitions in the Diccionario de la Real Academia de la Lengua Española (2001); I use *agrio* 'sour' (17a) and *tieso* 'stiff' (17b) to capture these property meanings. Crucially, a comparative interpretation is always possible. Thus, while the theme may have soured completely in (17a), it is possible to e.g., say that it is still sweet (so that it has only soured a little bit). Similarly, while the theme may have stiffened completely in (17b), it is possible to, e.g., say that they have not lost their flexibility (so that they have only stiffened a little bit).

(17) a. El mal clima **a-**vinagró el vino, pero el vino no terminó agrio.
the bad weather **a-**vinegar.PST the wine but the wine no ended.up sour
'The bad weather soured the wine, but the wine didn't end up sour.'

b. El vino **a-**cartonó el pantanlón, pero el pantanlón no terminó tieso.
the wine **a-**cardboard.PST the pants but the pants no ended.up stiff
'The wine stiffened the pants, but the pants didn't end up stiff.'

Finally, I turn to the possibility of including measure phrases in verbs with *a-* taking non-gradable bases. (18) provides an example where the extent of unification is targeted by a measure expression; usual intensifiers like *a lot* and *a bit*, which are more natural in this case, are also included. The verb is ***a-****unar* 'to unify' (the base is *uno* 'one'). The reason to attempt the inclusion of a measure phrase lies in that intensifiers need not be analyzed in scalar terms even in degree languages (Beltrama & Bochnak 2015). To target the measure expression in (18), suppose that the team has not worked as a unit a year ago. To address this issue, the coach sets tangible benchmarks on a scale of seven, with each benchmark entailing the previous one. After a year of hard work, the team has progressed tremendously, hitting five benchmarks. Someone who watched the team's performance a year ago, and hasn't seen them perform until a year after, but is aware of the benchmark system of the coach, is impressed and utters (18) (specifically, the option with a measure phrase).

(18) El equipo **a-**unó sus esfuerzos mucho / un poco / 5 niveles (más que hace un año).
the team **a-**one.PST their efforts a lot a bit 5 levels more than ago a year
'The team unified efforts a lot/a bit/5 levels (more than a year ago).'

What this means more generally, I propose, is that verbs with *a-* taking gradable and non-gradable bases should be analyzed in a unified manner, namely, that these verbs convey scalar change, regardless of whether the base is gradable or non-gradable.[8]

3.2 Verbs with *en-*

The literature indicates that there are two types of verbs with *en-*: verbs that convey change of location and verbs that convey change of state. The former constitute the most common case for verbs with *en-* (Gibert Sotelo & Pujol Payet 2015; Martínez Vera 2016, 2019).

Verbs indicating change of location are compatible with locatio, i.e., to put x in y (for theme x and base y), and locatum, i.e., to put y in/on x (for theme x and base y), interpretations (Mateu 2002, 2021; Gibert Sotelo & Pujol Payet 2015; Martínez Vera 2016, 2019). I illustrate these with the verbs ***en-****vinagrar* 'to put (in) vinegar' ((19a) repeats (6)), ***en-****jaular* 'to cage', with base *jaula* 'cage', and

[8] Fábregas (2023) argues that instrumental verbs with *a-*, e.g., ***a-****cuchillar* 'to knife' (with base *cuchillo* 'knife') display a different syntax when compared to verbs with *a-* conveying change of state as in the discussion in the main text, which may also involve semantic differences. I set aside these cases in the present discussion.

en-*sillar* ‘to saddle’, with base *silla* ‘saddle’. (19a) is compatible with (at least) the following interpretations: the turkey is put in vinegar (locatio), or vinegar is poured on or inside the turkey (locatum)—the interpretation is thus quite flexible. The contrast between (15a) and (19a) is interesting in that these verbs that constitute a minimal pair differ in their meaning—the only difference is the prefix. The verb with *en-* conveys the meaning of change of location; change of state is not an option. This contrasts with the verb with *a-*, which only conveys the meaning of change of state. This kind of contrast suggests that a separate analysis for verbs with *a-* and *en-* should be pursued. (19b) is characterized in terms of change of location: the theme ends up caged. (19c) illustrates a locatum case: the theme ends up saddled. Additional verbs with *en-* conveying locatio and locatum meanings are ***em****-betunar* ‘to polish’ (with base *betún* ‘shoe polish’), ***em****-botellar* ‘to bottle’ (with base *botella* ‘bottle’), ***en-****cadenar* ‘to chain’ (with base *cadena* ‘chain’), ***en-****carcelar* ‘to jail’ (with base *cárcel* ‘jail’), etc. (see Serrano-Dolader 1999; Gibert Sotelo & Pujol Payet 2015; see the appendix for more examples).

(19) a. El cocinero **en-**vinagró el pavo.
the cook **en-**vinegar.PST the turkey
‘The cook put the turkey in vinegar/put vinegar on/in the turkey.’
b. El jardinero **en-**jauló al pájaro.
the gardener **en-**cage.PST the bird
‘The gardener caged the bird.’
c. El jinete **en-**silló el caballo.
the horseman **en-**saddle.PST the horse
‘The horseman saddled the horse.’

It is worth noting that these verbs, while conveying change of location, need not entail displacement for the theme: in the presence of a locatio interpretation, the theme would be displaced; in the presence of a locatum interpretation, the theme would not be displaced. To test for this, I use Beavers’s (2011) test *but X is not somewhere else* (for theme *X*), as in, e.g., *Sue went to the store, #but she is not somewhere else*; this test targets displacement for the theme specifically. (20) illustrates that the test can be applied felicitously to the examples. I translate the test as *pero X no cambió de lugar* ‘but *X* didn’t change location’. The examples are compatible with scenarios where the theme stays put and the ground is brought to the theme, e.g., a cage is brought to where the bird is (20a) or a saddle is brought to where the horse is (20b), i.e., displacement for the theme need not be entailed. Applying this test thus suggests that verbs with *en-* convey flexible change-of-location interpretations.

(20) a. El jardinero **en-**jauló al pájaro, pero el pájaro no cambió de lugar.
the gardener **en-**cage.PST the bird but the bird no change of place
‘The gardener caged the bird, but the bird didn’t change location.’
b. El jinete **en-**silló el caballo, pero el caballo no cambió de lugar.
the cook **en-**saddle.PST the horse but the horse no change of place
‘The horseman saddled the horse, but the horse didn’t change location.’

The example in (21) turns to a case conveying change of state. The verb is ***en-****rollar* ‘to roll’, with base *rollo* ‘roll’. (21) conveys the meaning that the theme adopts the shape of a roll—adopting the shape of a roll is the most salient meaning of this verb (Real Academia de la Lengua Española 2001), which falls under change of location. Other verbs conveying change of state are ***en-****furiar* ‘to make someone furious’ (with base *furia* ‘rage’), ***em-****pantanar* ‘to make swamp-like, to bog down’ (with base *pantano* ‘swamp’), ***en-****roscar* ‘to give the shape of a thread’ (with base *rosca* ‘thread’).

(21) El niño **en-**rolló el papel.
the boy **en-**roll.PST the paper
‘The boy rolled the paper.’

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Examples like (21) entail change of state, as shown in (22a), where the test targeting change is applied. Importantly, scalar change is not entailed. Thus, a comparative interpretation does not arise, as shown in (22b). It is infelicitous to apply the test targeting whether the theme ends up in the positive extension of the property indicated by the base. Thus, it is infelicitous to utter such an example if the theme does not end up in the shape of a roll. Further, it does not seem possible to construct examples to which a measure phrase can be added; adding intensifiers is possible in that it is sensitive to the part structure of the theme, i.e., a lot or a little of the them is rolled, as shown in (22c).

(22) a. El niño **en-**rolló el papel, #pero no hay nada diferente en el papel.
the boy **en-**roll.PST the paper but no there.is nothing different in the paper
'The boy rolled the paper, but nothing is different about it.'
b. El niño **en-**rolló el papel, #pero el papel no terminó con la forma de un rollo.
the boy **en-**roll.PST the paper but the paper no ended.up with the shape of a roll
'The boy rolled the paper, but the paper didn't end up with the shape of roll.'
c. El niño **en-**rolló el papel mucho / un poco.
the boy **en-**roll.PST the paper a lot a bit
'The boy rolled the paper a lot/a bit.'

In what follows, I propose a unified account for verbs with *en-*. Building on Martínez Vera's (2019) analysis of these verbs, I propose a broad change-of-location meaning that can capture the most common cases, i.e., verbs involving change of location. I further argue that verbs with gradable bases and verbs with non-gradable bases conveying change of state arise as a result of an extension of the spatial meaning (Gärdenfors 1996). Such an analysis will make explicit why verbs with *a-* and *en-* appear to be indistinguishable when considering gradable bases, but differ more substantially when considering non-gradable bases.

4 Proposal

This section provides a compositional account of prefixed verbs. Section 4.1 introduces my theoretical setup. Section 4.2 discusses verbs with *a-*. Section 4.3 addresses verbs with *en-*.

4.1 Theoretical setup

My approach builds on Beavers's (2011) analysis of verbal predicates and Martínez Vera's (2021b) cross-linguistic analysis of verbs of change of state in degree languages. Following Beavers (2011: 351), my starting point is that entities fall into (at least) three domains:

(23) a. $U_P =$ the set of objects/entities.
b. $U_E =$ the set of events.
c. $U_H =$ the set of connected, directed scales.

Entities in each domain are mereologically complex, such that for any $x, x' \in U_X$:

(24) a. x' may be a proper subpart of x ($x' <_X x$), or a subpart or equal to x ($x' \leq_X x$).
b. $x \oplus_X x'$ is the sum (or join) of x and x'.
c. x is atomic iff for all $x' \leq_X x, x = x'$.

A scale is a mereologically complex argument $h \in U_H$ of gradable bases, which integrates a property or dimension, e.g., height (Kennedy & McNally 2005). They are integrated into the verbal predicate of change compositionally. Scales h have the following properties:

(25) a. Degrees on h are atomic parts of h.

b. Subscales of h are non-atomic parts of h.
c. There is a precedence relation $\ll_H$ such that for any non-overlapping $h', h'' <_H h$, either $h' \ll_H h''$ or $h'' \ll_H h'$ (i.e., h is linearly ordered).

Scales may include minimal and maximal degrees (Kennedy & McNally 2005). Following standard practice, degrees are represented with d (i.e., atomic parts of scales h). Thus, for any h:

(26) a. The minimal degree in h, min_h, is defined as the degree $d <_H h$ such that no $d' <_H h$ is such that $d' \ll_H d$.
b. The maximal degree in h, max_h, is defined as the degree $d <_H h$ such that no $d' <_H h$ is such that $d \ll_H d'$.

Following Kennedy & McNally (2005), the assumptions in (26) are tied to the proposal that the scale associated with a gradable predicate can have (i) no minimal or maximal degree, i.e., open scales, such as *narrow* or *wide*; (ii) either a minimal or a maximal degree, i.e., partially closed scales, such as *clean* vs. *dirty* or *curly* vs. *straight*; or (iii) both a minimal and a maximal degree, i.e., closed scales, such as *empty* or *full*.

To account for prefixed verbs, I propose a Figure/Ground Relation (FGR) in (27). To provide a general characterization covering different possibilities with regard to the meaning of different prefixed verbs, the definition in (27) remains somewhat underspecific with regard to what exactly it means to establish a relation between an object or a scale and the theme in an event or to apply an object or a scale to a theme in an event; the specifics are discussed in the following sections. The FGR is a relation between the theme argument (the figure), an object or a scale (the ground), and an event that holds iff the theme participates in the event such that the object or the scale establishes a relation with it. The object or scale, which is mapped to the event, is contributed by the base predicate's denotation. In plain words, the FGR captures that the base predicate of a prefixed verb establishes a relation with its theme as a result of the latter participating in the event the verb describes—intuitively, the theme increases in degree along a scale in an event for verbs with *a-*, and the theme is located with respect to the object ground in an event for verbs with *en-*.

(27) *Figure/Ground Relation (FGR)*
θ is a Figure/Ground Relation (FGR) between theme x, ground y (where $y \in U_P$ or $y \in U_H$), and event e, represented as $\theta(x, y, e)$, which holds iff y establishes a relation with x as x participates in e.

Following Beavers (2011) and Martínez Vera (2021b), I assume source and goal relations, defined in (28). These specify what part of the ground (i.e., what part of an object or what part of a scale) is to be considered at the beginning and end of the event a predicate of change describes—the theme relates to these parts via the FGR in (27), which specifies that the theme and the ground establish a relation in the event. Finally, I assume that the initial and final parts of the event are distinct (Martínez Vera 2021b).

(28) a. *Source relation σ*
Source relation σ is a relation between parts x, x' and event e, represented as $\sigma(x, x', e)$, which holds iff $x \leq_X x'$ corresponds to the initial part of e, where $X = P$ or $X = H$.
b. *Goal relation γ*
Goal relation γ is a relation between parts x, x' and event e, represented as $\gamma(x, x', e)$, which holds iff $x \leq_X x'$ corresponds to the final part of e, where $X = P$ or $X = H$.

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4.2 Verbs with *a-*

4.2.1 Verbs with gradable bases

This section provides an analysis for the cases with *a-* in section 2, where the theme increases in the extent to which the relevant property applies to it:

(29) La chica / el aparato **a-**lisó su cabello.
the girl the device **a-**straight.PST her hair
'The girl/the device straightened her hair.'

I assume the syntactic structure in (30) for the VP in (29).[9,10]

(30) [[a- liso] su cabello]]

In line with Faller (2000) and Martínez Vera (2021b), I propose that gradable predicates are functions from scale parts to truth values; they integrate a property or dimension—h is used for variables for parts of scales. For instance, *liso* 'straight' denotes a function that takes scale parts h as argument and yields true iff h is a scale part of the scale of straightness (31)—see below for discussion of contextual variable assignment g.

(31) $[\![\text{liso}]\!]^g = \lambda h[h \leq_H straightness]$

The denotation of the prefix *a-* appears in (32). I propose that it takes gradable predicate P (a predicate of scales), theme x and event e and denotes an FGR, represented as $\mathcal{R}$, in the domain of scales, i.e., it relates x, scale part h to which gradable predicate P has applied and event e such that h establishes a relation with x in e. In line with Anderson & Morzycki (2015) and Zhang (2020), I assume that change of state verbs, verbs with *a-* here, instantiate a case where relating h with x means that x increases in degrees $d <_H h$ as x participates in e. Following Kennedy & Levin (2008), h in the denotation of verbs denoting scalar change is derived from the relevant gradable predicate, i.e., h is a scale part in the denotation of the gradable predicate. h is always bottom-closed (Pedersen 2015), which is instantiated as the degree in the subscale that is specified in the source relation, i.e., the degree that corresponds to the beginning of the event. Following Beavers (2011) and Pedersen (2015), I assume that the value of such a degree is determined contextually or it equals the lexical minimum of the scale (if one exists). Similarly, there is a degree in the subscale corresponding to the end of the event (Beavers 2011), which I assume is distinct from the degree corresponding to the beginning of the event (Martínez Vera 2021b). Following Martínez Vera (2021b), the latter degree could be either the lexical maximum (if present) or a specific value determined contextually. To provide an explicit formalization for setting the values of these degrees, I propose that the prefix introduces free variables represented with indices $i \neq j$, which are assigned a value by contextual variable assignment g such that $g(i) \neq g(j)$ are included in subscale h to which the gradable predicate in the prefixed verb applies (Martínez Vera 2021b). (32) introduces the denotation of the prefix *a-*. In plain words, (32) says that x increases in degrees in h (a scale part characterized by P's property or dimension; see (31)) as a result of participating in e.

(32) *Lexical entry of* a-
a. $[\![\text{a-}_{i,j}]\!]^g = \lambda P_{ht}\lambda x\lambda e\exists h[P(h) \wedge \mathcal{R}(x,h,e) \wedge \sigma(g(i),h,e) \wedge \gamma(g(j),h,e)]$

[9] See Mateu (2002), Martínez Vera (2016) and Fábregas (2023) for detailed syntactic structures where, e.g., a V head combines with the prefix prior to combining with the base predicate and the theme. I set aside this step and provide denotations for the prefixes that will yield the relevant verbs (i.e., I provide denotations for what the syntactic literature would identify as a complex prefix + V head).

[10] The discussion does not include the consideration of degree morphemes, which follows Beavers (2011). See Martínez Vera (2021b) for discussion of degree morphemes within Beavers's (2011) setup.

b. $[\![\text{a-}_{i,j}]\!]^g$ is true of individual x, property of scales P_{ht} and event e iff there is subscale h to which P applies, and $\mathcal{R}(x,h,e)$, $\sigma(g(i),h,e)$ and $\gamma(g(j),h,e)$ hold, which is the case iff x participates in e such that it changes from holding $g(i) <_H h$ of P at the beginning of e to holding $g(j) <_H h$ of P at the end of e.

(33) indicates how contextual assignment of values to the indices in the denotation in (32) works (see section 4.3.3 for discussion of applying (33) in verbs with *en-* taking gradable bases). A comparative interpretation characterizing incremental change (Hay et al. 1999), as discussed in section 2.1, follows from this proposal.

(33) *Variable assignment in U_H*
For any α subject to variable assignment g to free variables of indices $i \neq j \in \mathbb{N}$ (for i, j that are mapped to objects of type h by g) introduced by lexical item *a-*$_{i,j}$ or *en-*$_{i,j}$, and scale h to which gradable predicate P has applied such that $g(i) \neq g(j) <_H h$:
a. $g(i) = d$, where (i) $d = min_h$ (if present), or (ii) d is contextual.
b. $g(j) = d'$, where (i) $d' = max_h$ (if present), or (ii) d' is some unspecified degree, or (iii) d' has a specific value determined contextually.

The denotation of ***a-lisar*** 'to straighten' in (30) is captured in (34). (34) conveys that the theme increases in straightness as a result of participating in an event.

(34) a. $[\![\text{[a-}_{i,j}\text{ liso]}]\!]^g = \lambda x \lambda e \exists h[h \leq_H straightness \wedge \mathcal{R}(x,h,e) \wedge \sigma(g(i),h,e) \wedge \gamma(g(j),h,e)]$
b. $[\![\text{[a-}_{i,j}\text{ liso]}]\!]^g$ is true of individual x and event e iff there is scale $h \leq_H straightness$, and $\mathcal{R}(x,h,e)$, $\sigma(g(i),h,e)$ and $\gamma(g(j),h,e)$ hold, which is the case iff x participates in e such that it changes from holding $g(i) <_H h \leq_H straightness$ at the beginning of e to holding $g(j) <_H h \leq_H straightness$ at the end of e.

The denotation of the VP in (29), which has the syntactic structure in (30), appears in (35). This example conveys that the hair increases in straightness as a result of participating in an event—the specific values of the indices are calculated based on (33).

(35) $[\![(30)]\!]^g = \lambda e \exists h[h \leq_H straightness \wedge \mathcal{R}(her\ hair,h,e) \wedge \sigma(g(i),h,e) \wedge \gamma(g(j),h,e)]$

My proposal accounts for the properties of prefixed verbs with *a-* discussed in section 2.1. It makes explicit that incremental change for the theme along a property scale is entailed, and further gives the necessary elements to account for the possibility of adjoining differential measure expressions. As Sawada & Grano (2011) indicate, the key component in the case of the latter is the presence of a bottom-closed scale, which is the case here.

4.2.2 Verbs with non-gradable bases

This section concentrates on verbs with non-gradable bases derived with *a-* discussed in section 3.1. As indicated, I propose a unified account for verbs with *a-* with both gradable and non-gradable bases. Here I extend the analysis in 4.2.1 to these cases. Recall example (2), where the theme sours.

(36) El mal clima **a-**vinagró el vino.
the bad weather **a-**vinegar.PST the wine
'The bad weather soured the wine.'

The syntactic structure of the VP in (36) appears in (37).

(37) [[a- vinagre] el vino]

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A base predicate such a *vinagre* 'vinegar' is non-gradable. I assume that non-gradable predicates denote functions from entities to truth values (Heim & Kratzer 1998). For instance, *vinagre* 'vinegar' denotes a function that takes object parts x and yields true iff x is an object part of vinegar.

(38) $[\![\text{vinagre}]\!]^g = \lambda x[x \leq_P vinegar]$

Calculating the truth conditions of verbs like ***a-vinagrar*** 'to sour' in (37) faces the issue that the base is non-gradable, i.e., it denotes a predicate of entities and not a predicate of scales, which is what the prefix takes. To address this, I propose the coercion rule (Pustejovsky 1995) in (39), which type-shifts the non-gradable predicate into a gradable one (Partee 1986), as a last resort. This kind of process is not uncommon more generally. A usual case is non-gradable predicates being modified by numerals or measure phrases, e.g., expressions such as *five guests* (Cresswell 1976; Morzycki 2015; Rett 2018). The present discussion extends type-shifts of this kind to verbal derivational morphology. Further, non-gradable predicates have been argued to be associated with a set of dimensions, e.g., *smoker* is associated with frequency-of-smoking, enthusiasm-for-smoking, etc. (Morzycki 2012: 193), thus paving the way to characterize the meaning of the derived gradable predicate. The coercion rule in (39) captures that a non-gradable predicate becomes gradable by means of dimension function δ (Morzycki 2012) in a configuration such as (37), where the dimension of measurement of the predicate is a member of the non-gradable predicate's set of dimensions. Following Martin & Piñón (2020) (see also Kamp & Partee 1986; McCready & Ogata 2007), I assume that the set of dimensions is formed by stereotypical features of the non-gradable base, i.e., it is grounded in facts or conventional aspects of individuals of which the predicate is true (they exhibit those facts or conventional aspects). Thus, δ shifts a non-gradable predicate to a gradable one assigning a dimension corresponding to a steoreotypical feature of the things the non-gradable predicate is true of.

(39) *Coercion Rule (CR)*
If predicate P_{et} appears in configuration [α P] such that α requires a predicate P_{ht}, thus creating a type mismatch, dimension function δ shifts P_{et} to P_{ht}, where the dimension associated with P_{ht} corresponds to a stereotypical feature of the things P_{et} is true of.

A potential issue is whether rule (39) overgeneralizes. Consider a form such as, e.g., ***a-botellar***, with the base *botella* 'bottle'. While this verb is not included in the dictionary (Real Academia de la Lengua Española 2001), it does trigger results when looking for it on the web: I found the participle ***a-botellado***, as in *vainas* ***a-botelladas*** 'bottlenecked amunition', which suggests that such a form yields a possible word in the language. The rule in (39) accommodates cases like this.[11]

To calculate the truth conditions of ***a-vinagrar*** 'to sour' in (37) rule (39) applies. $[\![\text{vinagre}]\!]^g_{et}$ shifts into $[\![\text{vinagre}]\!]^g_{ht}$; the dimension of the derived predicate is sourness (Real Academia de la Lengua Española 2001), i.e., the relevant stereotypical feature here. The denotation of *vinagre* once rule (39) applies appears in (40).

(40) $[\![\text{vinagre}]\!]^g = \lambda h[h \leq_H sourness]$ (by CR (39))

[11] Rule (39) appears to apply beyond prefixed verbs. A similar process would take place in the comparative, where non-gradable predicates behave as gradable. Examples with non-gradable *hombre* 'man' and *televisor* 'TV' appear below. These sentences convey that an object has more of the relevant properties of a man or a TV than the standard of comparison. This actually reinforces an interesting parallelism in that, as Kennedy & Levin (2008) point out, explicit comparatives and incremental verbs of change seem to share a common semantic core, which they capture in terms of (differential) measurements.

(i) a. Juan es más hombre que Pedro.
Juan is more man than Pedro
'Juan is more of a man than Pedro.'
b. Este Sony es más televisor que ese Hisense.
this Sony is more TV than that Hisense
'This Sony is more of a TV than that Hisense.'

The denotation of ***a-vinagrar*** 'to sour' appears in (41). (41) conveys that the theme increases in sourness as a result of participating in an event.

(41) a. $[\![$ [a-$_{i,j}$ vinagre] $]\!]^g = \lambda x \lambda e \exists h[h \leq_H sourness \wedge \mathcal{R}(x, h, e) \wedge \sigma(g(i), h, e) \wedge \gamma(g(j), h, e)]$

b. $[\![$ [a-$_{i,j}$ vinagre] $]\!]^g$ is true of individual x and event e iff there is scale $h \leq_H sourness$, and $\mathcal{R}(x, h, e)$, $\sigma(g(i), h, e)$ and $\gamma(g(j), h, e)$ hold, which is the case iff x participates in e such that it changes from holding $g(i) <_H h \leq_H sourness$ at the beginning of e to holding $g(j) <_H h \leq_H sourness$ at the end of e.

The denotation of the VP in (36), which has the syntactic structure in (37), appears in (42). This example conveys that the turkey increases in sourness as a result of participating in an event—the specific values of the indices are calculated based on (33).

(42) $[\![(37)]\!]^g = \lambda e \exists h[h \leq_H sourness \wedge \mathcal{R}(the\,wine, h, e) \wedge \sigma(g(i), h, e) \wedge \gamma(g(j), h, e)]$

The discussion has thus made explicit that verbs with *a-* taking gradable and non-gradable bases are analyzed uniformly. Non-gradable bases shift to become gradable, and verbs with these bases entail incremental change for the theme along a property scale.

4.3 Verbs with *en-*

4.3.1 Change of location

In this section, I propose that the core meaning of verbs with *en-* relies on a spatial relation. Recall example (6), where the theme may get vinegar on it, in it or may be put in vinegar.

(43) El cocinero **en-**vinagró el pavo.
the cook **en-**vinegar.PST the turkey
'The cook put the turkey in vinegar/put vinegar on/in the turkey.'

I assume the syntactic structure in (44) for the VP in (43).

(44) [[en- vinagre] el pavo]

I assume a three-dimensional Euclidean space V over the positive real numbers whose center is 0 (Zwarts & Winter 2000); each coordinate is a point. I further assume that objects have location loc. $loc(x)$ for entity x corresponds to x's eigenspace, i.e., x's location or region (in space). $loc(x)$ is interpreted as region function R that takes x as input and gives as output x's location (Wunderlich 1991; see also Nam 1995). The region of entities is closed, and has an interior and a boundary. Regions are assumed to be convex (Zwarts & Winter 2000). Consider a case such as *The ball is inside the bowl*; technically, in such a case the regions of the ball and the bowl would be disjoint, since the bowl's interior is empty; however, the bowl is actually conceived as convex, i.e., the region of the ball is understood as included in the region of the bowl. Further, I follow Mador-Haim & Winter (2015: 443) in assuming that the location of a property consists of the union of the location of the entities in its denotation, which they capture under the Property-Eigenspace Hypothesis (PEH). These authors propose an account for cases such as *Mario is far from a gas station*, which allow for a pseudo-universal interpretation, where Mario, an entity with a location, is far from every gas station, which involves a property whose location is understood in terms of the location of the entities in its denotation. Following these authors, the PEH is defined in (45)—their definition is adapted to a mereological setup.

(45) *Property-Eigenspace Hypothesis (PEH)*
The eigenspace of property P_{et} corresponds to the sum of the eigenspaces of entities x in P's

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extension, i.e., $loc(P) = \bigoplus_{x \leq_P P} loc(x)$

To capture the flexibility in spatial meanings in verbs with *en-*, I extend Vasardani et al.'s (2017) account of the preposition *at* in English, which is based on anchoring relations (Galton & Hood 2005). I propose relation $\mathcal{L}$, which relates theme x, entity part y to which non-gradable predicate P has applied and event e such that x is located with respect to y as a result of participating in e. 'Being located' is how applying entity part y to x in the FGR (27) is understood in this case. Thus, x transitions in e (i) from being disjoint from y's location, or (ii) (partially) overlapping/abutting (crucially, not being within) the location of some part of y at the beginning of e to (i) being located within the location of some part of y, (ii) to having the location of some part of y falling within its location, or (iii) abutting some part of y's location at the end of e. I assume that these possibilities are always available, but specific verbs may be pragmatically narrowed down to yield likely interpretations. Further, as in the case of verbs with *a-*, where degree values are assigned contextually (33), I propose that the value of the parts whose locations are related to x's location at the beginning and end of e is determined via a contextual variable assignment. The prefix *en-* introduces free variables represented with indices $i \neq j$, which are assigned a value by contextual variable assignment g such that $g(i)$, $g(j)$ are in the domain of entity part y to which the non-gradable predicate in the prefix's denotation applies. The denotation of *en-* appears in (46). (47) indicates how contextual assignment of values to the indices in the denotation in (46) works.

(46) *Lexical entry of* en-

a. $[\![\text{en-}_{i,j}]\!]^g = \lambda P_{et} \lambda x \lambda e \exists y [P(y) \wedge \mathcal{L}(x, y, e) \wedge \sigma(g(i), y, e) \wedge \gamma(g(j), y, e)]$

b. $[\![\text{en-}_{i,j}]\!]^g$ is true of individual x, predicate of objects P_{et} and event e iff there is object y to which P has applied, and $\mathcal{L}(x, y, e)$, $\sigma(g(i), y, e)$ and $\gamma(g(j), y, e)$ hold, which is the case iff x participates in e such that it changes in that $loc(x)$ is located with respect to $loc(g(i))$ at the beginning of e (i.e., $loc(x)$ is outside of $loc(g(i))$ or $loc(x)$ (partially) overlaps/abuts $loc(g(i))$ at the beginning of e), and $loc(x)$ is located with respect to $loc(g(j))$ at the end of e (i.e., $loc(x)$ is within $loc(g(j))$, $loc(g(j))$ falls within $loc(x)$ or $loc(x)$ abuts $loc(g(j))$ at the end of e).

(47) *Variable assignment in* U_P

For any α subject to variable assignment g to free variables of indices $i \neq j \in \mathbb{N}$ (for i, j that are mapped to objects of type e by g) introduced by lexical item *en-*$_{i,j}$ and entity part y to which non-gradable predicate P has applied such that $g(i), g(j) \leq_P y$:

a. $g(i) = z$, where z is contextual.

b. $g(j) = z'$, where (i) z' has a specific value determined contextually, or (ii) z' is some unspecified entity part.

The denotation of ***en-****vinagrar* 'to put (in) vinegar' appears in (48). (48) conveys that the theme is put in vinegar or vinegar is poured on or inside the theme.

(48) a. $[\![[\text{ en-}_{i,j} \text{ vinagre }]]\!]^g = \lambda x \lambda e \exists y [y \leq vinegar \wedge \mathcal{L}(x, y, e) \wedge \sigma(g(i), y, e) \wedge \gamma(g(j), y, e)]$

b. $[\![[\text{ en-}_{i,j} \text{ vinagre }]]\!]^g$ is true of individual x and event e iff there is object $y \leq vinegar$, and $\mathcal{L}(x, y, e)$, $\sigma(g(i), y, e)$ and $\gamma(g(j), y, e)$ hold, which is the case iff x participates in e such that it changes in that $loc(x)$ is located with respect to $loc(g(i))$ at the beginning of e (i.e., $loc(x)$ is outside of $loc(g(i))$ or $loc(x)$ (partially) overlaps/abuts $loc(g(i))$ at the beginning of e), and $loc(x)$ is located with respect to $loc(g(j))$ at the end of e (i.e., $loc(x)$ is within $loc(g(j))$, $loc(g(j))$ falls within $loc(x)$ or $loc(x)$ abuts $loc(g(j))$ at the end of e).

The denotation of the VP in (43), which has the syntactic structure in (44), appears below. This example conveys that the turkey is put in vinegar, or that vinegar is poured on or inside the turkey. (49) captures

that change of location takes place, in contrast to the case in (42), where the verb with *a-* with the same base denotes an increase in sourness.

(49) $[\![(37)]\!]^g = \lambda e \exists y[y \leq vinegar \wedge \mathcal{L}(the\,turkey, y, e) \wedge \sigma(g(i), y, e) \wedge \gamma(g(j), y, e)]$

My account of verbs with *en-* makes it explicit that they are compatible with different interpretations. This flexibility means that change of location for the theme may or may not take place, depending on the interpretation of the case under consideration, as discussed in section 3.2.

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4.3.2 Change of state with non-gradable bases

This section turns to cases of verbs with *en-* taking non-gradable bases that convey change of state. Recall example (21), repeated below; the theme transitions by adopting the shape of a roll.

(50) El niño **en-**rolló el papel.
the boy **en-**roll.PST the paper
'The boy rolled the paper.'

The syntactic structure of the VP in (50) appears in (51).

(51) [[en- rollo] el papel]

To account for the fact that cases like (51) convey that the theme takes the shape of what the base denotes (instead of change of location), I propose that the meaning of (51) arises due to an extension of the spatial meaning of the verb to a property meaning, which is tied to the base predicate, so that the theme is located with respect to it. Based on Gärdenfors (1996), I propose that, in the calculation of the truth conditions of the relevant prefixed verb, the location of the predicate is calculated as usual (i.e., in terms of the PEH (45)), but there is a transfer from a first-order space, where entities are located in actual space (see section 4.3.1), to a second-order space, a property space, where the entities in the denotation of the base predicate are characterized in terms of a dimension—the theme is then located with respect to a relevant part of the predicate in this order. As Gärdenfors points out, this extension is quite natural and is typical of expressions with spatial meanings, as long as the spatial structure of the participating elements is preserved in different orders, which is what I propose here. In (52), I define an extension rule, which will also be applied to verbs with *en-* with gradable bases in section 4.3.3.

(52) *Extension Rule (ER)*
Let α be a linguistic expression that denotes a first-order spatial relation $\mathcal{A}$ between figure x and ground y in event e, where $P(y)$ for P a predicate of entities or a predicate of scales, such that x is located with respect to y in e. $\mathcal{A}$ is extensible to second-order spatial relation $\mathcal{A}_\epsilon$ iff x and y have a structure that can be located in first-order space in e such that these structures are preserved in second-order space (in e), where P is understood in terms of a property meaning, i.e., a dimension (e.g., shape, fatness).

The denotation of ***en-****rollar* 'to roll' appears in (53). Rule (52) applies, which means that the parts of the entity under consideration are roll-shaped entities that belong to a second-order space—the value of the indices is resolved based on (47). This is a case where the semantics provides several possibilities, as specified with the different available options in the denotation below, but the actual interpretation is pragmatically resolved in terms of the theme becoming roll-shaped.

(53) a. $[\![$[en-$_{i,j}$ rollo]$]\!]^g = \lambda x \lambda e \exists y[y \leq roll\,shape \wedge \mathcal{L}_\epsilon(x, y, e) \wedge \sigma(g(i), y, e) \wedge \gamma(g(j), y, e)]$ (by ER (52))

b. $[\![$[en-$_{i,j}$ rollo]$]\!]^g$ is true of individual x and event e iff there is object $y \leq roll\,shape$, and

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$\mathcal{L}_\epsilon(x, y, e)$, $\sigma(g(i), y, e)$ and $\gamma(g(j), y, e)$ hold, which is the case iff x participates in e such that it changes in that $loc(x)$ is located with respect to $loc(g(i))$ at the beginning of e (i.e., $loc(x)$ is outside of $loc(g(i))$ or $loc(x)$ (partially) overlaps/abuts $loc(g(i))$ at the beginning of e), and $loc(x)$ is located with respect to $loc(g(j))$ at the end of e (i.e., $loc(x)$ is within $loc(g(j))$, $loc(g(j))$ falls within $loc(x)$ or $loc(x)$ abuts $loc(g(j))$ at the end of e).

The denotation of the VP in (50), which has the syntactic structure in (51), appears in (54). (54) conveys that the theme adopts the shape of a roll.

(54) $[\![(51)]\!]^g = \lambda e \exists y[y \leq roll\ shape \wedge \mathcal{L}_\epsilon(the\ paper, y, e) \wedge \sigma(g(i), y, e) \wedge \gamma(g(j), y, e)]$

My proposal accounts for the fact that change is entailed for the theme in verbs with *en-* conveying change of state—in (54), the theme must adopt the shape of a roll. A key issue here is that my proposal captures that these verbs do not convey scalar change (e.g., it is not possible to adjoin measure phrases), which follows from the mereological structure of the base's denotation (a partial, not a linear, order)—this contrasts with verbs with *a-*, where scalar change is conveyed. Consider the contrast in (55):

(55) a. El vino **a-**cartonó este panatalón más que ese panatalón.
the wine **a-**cardboard.PST this pants more than that pants
'The wine stiffened these pants more than those pants.'

b. Mara **en-**rolló este papel más que ese papel.
Mara **en-**roll.PST this paper more than that paper
'Mara rolled this paper more than that paper.'

In (55), both prefixed verbs convey change of state; a comparison between two themes is established. For (55a), assume that the same amount of wine was poured on the same part of each pair of pants. This example conveys that the first pants end up stiffer than the second pants (i.e., a comparative interpretation); an interpretation where, e.g., the same degree of stiffness is present in both cases but the area covered by the wine for the first pair of pants is greater is not ruled out either. For (55b), suppose that there are two A4-sized pieces of paper. This example conveys that more of the first paper ends up roll-shaped than the second one, e.g., all of the first paper ends up roll-shaped, while only half of the second paper ends up roll-shaped (the other half remains flat). Here what parts of the theme are involved is key: the parts that change become roll-shaped, which contrasts with the parts that remain unchanged. Crucially, an interpretation in which the first paper is more of a prototypical roll when compared to the second paper is not available.

4.3.3 Change of state with gradable bases

This section turns to verbs with *en-* taking gradable bases. Consider (7b), repeated below. The theme increases in the extent to which a property meaning (e.g., fatness) applies to it.

(56) El granjero **en-**gordó al cerdo.
the farmer **en-**fat.PST to.the pig
'The farmer fattened the pig.'

The syntactic structure of the VP in (56) appears below.

(57) [[en- gordo] al cerdo]

As indicated, the extension rule (52) applies. As Gärdenfors (1996) indicates, linear orders, in particular, time, are dependent on spatial dimensions (see also Herskovits 1986). Under this view, a sentence such as *They met at 5 o'clock* indicates a point on a travel trajectory, which is locatable in first-order space. I extend this to verbs with gradable predicates, which are associated with scales (i.e., linear orders). As in

the case of time, scales (as tied to gradable predicates) can be located in space in that their structure can be mapped onto space when combined with an expression denoting a first-order spatial relation, such as *en-*. Due to the presence of property meanings (dimensions), the first-order spatial relation is extended to a second-order relation, and the theme can thus be located with respect to a scale.

The prefix *en-* can thus combine with both gradable and non-gradable predicates in a property space, yielding a change-of-state interpretation, by applying the extension rule (52). (58) shows the result of applying extension rule (52) to the prefix's denotation (46). While the denotation is kept general, abuttal of the theme's location and scale parts is the only possibility when the prefix takes a predicate of scales (since scales are linear orders). Further, if *en-* applies in the domain of scales by application of the extension rule (52), variable assignment g applies as in (33) (where objects of type h are manipulated). This contrasts with the case where the extension rule does not apply (46); variable assignment g applies as in (47) (where objects of type e are manipulated).

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(58) *Lexical entry of* en- *by application of ER (52)*

a. $[\![\text{en-}_{i,j}]\!]^g = \lambda P_{\tau t}\lambda x\lambda e\exists y_\tau[P(y) \wedge \mathcal{L}_\epsilon(x,y,e) \wedge \sigma(g(i),y,e) \wedge \gamma(g(j),y,e)]$, where $\tau = e$ or $\tau = h$.

b. $[\![\text{en-}_{i,j}]\!]^g$ is true of individual x, predicate $P_{\tau t}$ (where $\tau = e$ or $\tau = h$) and event e iff there is object y_τ to which P has applied, and $\mathcal{L}_\epsilon(x,y,e)$, $\sigma(g(i),y,e)$ and $\gamma(g(j),y,e)$ hold, which is the case iff x participates in e such that it changes in that $loc(x)$ is located with respect to $loc(g(i))$ at the beginning of e (i.e., $loc(x)$ is outside of $loc(g(i))$ or $loc(x)$ (partially) overlaps/abuts $loc(g(i))$ at the beginning of e), and $loc(x)$ is located with respect to $loc(g(j))$ at the end of e (i.e., $loc(x)$ is within $loc(g(j))$, $loc(g(j))$ falls within $loc(x)$ or $loc(x)$ abuts $loc(g(j))$ at the end of e).

The denotation of ***en-****gordar* 'to fatten' in (30) appears in (59). (59) conveys that the theme increases in fatness as a result of participating in an event.

(59) a. $[\![[\text{ en-}_{i,j}\text{ gordo }]]\!]^g = \lambda x\lambda e\exists h[h \leq_H fatness \wedge \mathcal{L}_\epsilon(x,h,e) \wedge \sigma(g(i),h,e) \wedge \gamma(g(j),h,e)]$

b. $[\![[\text{ en-}_{i,j}\text{ gordo }]]\!]^g$ is true of individual x and event e iff there is scale $h \leq_H fatness$, and $\mathcal{L}_\epsilon(x,h,e)$, $\sigma(g(i),h,e)$ and $\gamma(g(j),h,e)$ hold, which is the case iff x participates in e such that it changes in that $loc(x)$ abuts $loc(g(i))$ at the beginning of e (where $g(i) <_H y \leq_H P$) and $loc(x)$ abuts $loc(g(j))$ at the end of e (where $g(j) <_H y \leq_H P$).

The denotation of the VP in (56), which has the syntactic structure in (57), appears in (60). This example conveys that the pig increases in fatness as a result of participating in an event—the specific values of the indices are calculated based on (33), as indicated above. To capture this increase, a scale is located in second-order space, i.e., a property space (Gärdenfors 1996).

(60) $[\![(57)]\!]^g = \lambda e\exists h[h \leq_H fatness \wedge \mathcal{L}_\epsilon(the\,pig,h,e) \wedge \sigma(g(i),h,e) \wedge \gamma(g(j),h,e)]$

The truth conditions of cases such as (56) in (60), with *en-*, convey the same meaning as the ones discussed in 4.2.1 for verbs with *a-*, which is why prefixed verbs taking gradable bases display the same properties regardless of the prefix (i.e., change is scalar, measure expressions can be adjoined). Thus, the meaning of scalar change is arrived at via different routes: for verbs with *a-* scale parts are integrated from the beginning, whereas for verbs with *en-* scale parts may be integrated by extension—first-order space is extended to second-order space (a property space).

4.4 Summary

By means of the study of Spanish prefixed verbs, the discussion has provided a principled account of the cross-linguistic observation that various types of verbs of change may be formed by means of the

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same morpho-syntactic material. This has become apparent in the analysis of verbs with *en-*, where three types of verbs of change have been accounted for. These verbs convey, first and foremost, change of location. A flexible approach was adopted, so that locatio and locatum interpretations are available but are pragmatically narrowed down. These are cases where the base is non-gradable. Verbs with *en-* may also convey change of state by extension, i.e., first-order space is extended to a second-order space (a property space). I identified two different cases. With non-gradable bases, change of state relies on entity parts applying to the theme as it participates in an event. With gradable bases, in contrast, change of state is understood as scalar change; scale parts apply to the theme as it participates in an event. The key difference between these two types of change-of-state verbs lies in the mereological structure of the base's denotation: in the former it is a partial order, whereas in the latter it is a linear order.

Further, the discussion has provided a principled account of why different morphological means may yield verbal meanings that are truth-conditionally equivalent through different routes. This is the case when considering prefixed verbs with *a-* and prefixed verbs with *en-* taking gradable bases. For verbs with *a-*, I proposed an account where all verbs convey incremental change where scale parts apply to the theme as it participates in an event. This is the case for both gradable and non-gradable bases; in the case of the latter I proposed a coercion rule to shift non-gradable bases into gradable. Verbs with *en-* taking gradable bases convey the same (scalar) meaning, but this meaning is derived via a spatial route. Extension to a property space is required, so that the theme may be located with respect to the relevant scale's location. On the surface, these prefixed verbs, with both *a-* and *en-*, are truth-conditionally equivalent, but they get there via different routes.

A final note concerns a potential link between my proposal, and issues pertaining to differences in how many attested verbs there are in each case. Most attested verbs with *en-* taking non-gradable bases denote change of location (Serrano-Dolader 1999); few attested verbs denote change of state. This may be captured in my proposal by assuming that cases where the extension rule (52) applies constitute a marked option, which is tied to the proposal that change-of-state interpretations are derived.[12] A further extension of this view would be to suggest that it may also become (somewhat) unsurprising that attested verbs with *en-* taking gradable bases are less numerous when compared to attested verbs with *a-* taking them (and perhaps potentially other strategies in the language), as noted by Serrano-Dolader (1999).

5 Telicity

This section addresses telicity in expressions with prefixed verbs. In line with previous literature, I show that the mereological structure associated with the entities or scales denoted by the base predicates in prefixed verbs is key in connection to determining whether the relevant predicates are telic. I make a novel observation concerning the role of quantization and atomicity for verbs with *en-* in this regard.

Following Beavers (2011) (see also Tenny 1994; Krifka 1998; Rothstein 2004), I assume the definition of telicity in (61):

(61) *Telicity*
A predicate ϕ is telic iff for any event ϕ describes, ϕ does not describe a proper subpart of it.

To test for telicity, I use the progressive-to-perfect entailment diagnostic (Dowty 1979), which is exemplified in (62)-(63) (see MacDonald 2017 and Martínez Vera 2022 for discussion of additional telicity tests applied to Spanish). This test targets whether the predicate under consideration is true of all parts of the event described (and is thus atelic) or whether the predicate is true only of the whole completed event (and is thus telic). The diagnostic shows that (62b) does not follow from (62a), which indicates that the predicate *build a sand castle* is telic, since the predicate is only true of the completed event. In

[12] A separate question, which I do not address, is how markedness is captured in natural language. For instance, it could be assumed that marked means less economical (Fox 2000; Bošković & Messick 2017) in that an additional rule needs to apply in the calculation of the truth conditions.

contrast, (63b) does follow from (63a), which indicates that the predicate *push a cart* is atelic, since the predicate is true of all event parts.

(62) a. The boy was building a sand castle.
b. $\not\rightsquigarrow$ The boy has built a sand castle.

(63) a. The boy was pushing a cart.
b. $\rightsquigarrow$ The boy has pushed a cart.

In what follows, I apply this diagnostic to scalar change-of-state verbs, i.e., all verbs with *a-* (i.e., with gradable and non-gradable bases) and verbs with *en-* taking gradable bases. As pointed out in the literature (Krifka 1998; Hay et al. 1999; Beavers 2011), the scale of the predicate plays a key role in the calculation of telicity in that the theme moves unidirectionally along the scale. The examples below show that if the scale associated with the base predicate in the verb of change includes a lexical maximum, the diagnostic indicates that the (b) sentences do not follow from the (a) sentences. This is the case in out-of-the-blue examples, where a preference for a telic interpretation of predicates such as these arises. If contextual cues indicate otherwise, then the sentences may receive a comparative interpretation, where some degree greater than the minimum of the scale of the verb is reached at the end of the event. For example, for (64), suppose that the worker could only flatten the theme for a little while, leaving the work unfinished. Alternatively, a contextually specified degree may also be reached. For (64), suppose that the worker flattened the theme as much as they could, but it is impossible to make it completely flat (e.g., the theme is naturally bent).

(64) a. El trabajador estaba **a-**planando un metal.
the worker was **a-**flat.PROG a metal.
'The worker was flattening a metal.'
b. $\not\rightsquigarrow$ El trabajador ha **a-**planado un metal.
the worker has **a-**flat.PRT a metal.
'The worker has flattened a metal.'

(65) a. El vendedor estaba **a-**caramelando una manzana.
the seller was **a-**caramel.PROG an apple.
'The seller was making the apple caramel-like.'
b. $\not\rightsquigarrow$ El vendedor ha **a-**caramelado una manzana.
the seller has **a-**caramel.PRT an apple.
'The seller has made an apple caramel-like.'

(66) a. El trabajador estaba **en-**derezando una varilla.
the worker was **en-**straight.PROG a rod.
'The worker was straightening a rod.'
b. $\not\rightsquigarrow$ El trabajador ha **en-**derezado una varilla.
the worker has **en-**straight.PRT a rod.
'The worker has straghtened a rod.'

In the absence of a lexical maximum on the relevant scale, the (b) sentences follow from the (a) sentences, i.e., the predicates are atelic in out-of-the-blue cases, as shown in the examples below. If contextual cues are given, then a contextually specified degree may be targeted in the relevant event. For example, for (67), suppose that the theme needs to be shortened so that it ends up of a specific length to fit in the place where the theme needs to be inserted.

(67) a. El chico estaba **a-**cortando una soga.
the boy was **a-**short.PROG a rope.
'The boy was shortening a rope.'

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b. $\rightsquigarrow$ El chico ha **a-**cortado una soga.
the boy has **a-**short.PRT a rope.
'The boy has shortened a rope.'

(68) a. La chica estaba **en-**dulzando un café.
the girl was **en-**sweet.PROG a coffee.
'The girl was sweetening a coffee.'

b. $\rightsquigarrow$ La chica ha **en-**dulzado un café.
the girl has **en-**sweet.PRT a coffee.
'The girl has sweetened a coffee.'

The different possibilities with regard to the specific values assigned to the degree reached by the theme at the end of the event are captured in my proposal by means of variable assignment g as applied in the domain of scales (33). To integrate the above-mentioned preferences, I assume the pragmatic principle of Interpretive Economy (Kennedy 2007: 36), which proposes that conventional means are maximized in the calculation of a sentence's truth conditions (see McNally 2017 for criticism of this view). Thus, in the absence of contextual cues, the truth conditions are calculated in the most economical manner, which consists of using elements that are already present in the denotations of lexical items. If the scale associated with the verb includes a maximum as inherited from the base, then such a degree is to be preferred. In its absence, the reference point is the minimum on the scale, which needs to be merely exceeded (thus, it suffices that some degree greater than the minimum be reached at the end of the event). Finally, if there is a specific degree on the scale that is targeted contextually, then this is the degree that is reached at the end of the event. Below I revise (33) by making explicit that there is a preference (represented as $>$) between options (in particular, with regard to (69b) in the current discussion).[13]

(69) *Variable assignment in U_H (with ranked options)*
For any α subject to variable assignment g to free variables of indices $i \neq j \in \mathbb{N}$ (for i, j that are mapped to objects of type h by g) introduced by lexical items *a-*$_{i,j}$ or *en-*$_{i,j}$, and scale h to which gradable predicate P has applied such that $g(i) \neq g(j) <_H h$:
a. $g(i) = d$, where (i) $d = min_h$ (if present), or (ii) d is contextual.
b. $g(j) = d'$, where (i) $d' = max_h$ (if present), or (ii) d' is some unspecified degree, or (iii) d' has a specific value determined contextually.
c. Assignment of values is ranked, i.e., (i) $>$ (ii), etc.

The progressive-to-perfect entailment diagnostic is applied to cases with verbs with *en-* taking non-gradable bases in the examples below. These are instances where, in my proposal, change of location and, to a lesser extent, change of state takes place; there is a relation between the location of the theme and the location of (some) entity part(s) in the denotation of the base in the relevant event. (70)-(71) illustrate cases that are usually interpreted as locatio (70) and locatum (71)—the base predicate's denotation contains atomic parts. Applying the diagnostic suggests that there is a preference for a telic interpretation, i.e., the (b) cases do not follow from the (a) ones.

(70) a. El trabajador estaba **em**-botellando un vino.
the worker was **en-**bottle.PROG a wine
'The worker was bottling a wine.'

b. $\not\rightsquigarrow$ El trabajador ha **em**-botellado un vino.
the worker has **en-**bottle.PRT a wine
'The worker has bottled a wine.'

[13]The same preference takes place to set a value for the degree at the beginning of the event when considering the lexical minimum vs. contextual degrees on the scale associated with the verb (Kennedy 2007; Pedersen 2015).

(71) a. El jinete estaba **en-**sillando un caballo.
the horseman was **en-**saddle.PROG a horse
'The horseman was saddling a horse.'
b. $\not\rightsquigarrow$ El jinete ha **en-**sillado un caballo.
the horseman has **en-**saddle.PRT a horse
'The horseman has saddling a horse.'

In contrast, there is no preference for telic or atelic interpretations for (72) below—this case is compatible with locatio and locatum interpretations. Note that the base's denotation in (72), in contrast to (70)-(71), lacks atomic parts. As usual, in the presence of additional (e.g., contextual) cues, these defaults may be overridden.

(72) a. El masajista estaba **en-**lodando a un cliente.
the masseur was **en-**mud.PROG a client
'The masseur was covering a client in mud.'
b. $\rightsquigarrow$ / $\not\rightsquigarrow$ El masajista ha **en-**lodado a un cliente.
the masseur has **en-**mud.PRT a client
'The masseur has covered a client in mud.'

Following Krifka (1989), I suggest that key here is the contrast between having a quantized vs. a cumulative base predicate. In (70)-(71), the base predicates describe entities with non-divisible atomic parts, where proper parts of such atomic parts will not satisfy the predicate's description (e.g., no proper part of an atomic part of a bottle may be described as a bottle). This introduces an inherent quantization in the denotation of the predicate. This contrasts with properties of entities with cumulative reference, which lack atoms, as in (72); there is no preference for telic or atelic interpretations in this case. To capture this preference in my proposal, I integrate it into the formulation of variable assignment g as applied in the domain of objects (47), which is revised below.

(73) *Variable assignment in U_P (with ranked options)*
For any α subject to variable assignment g to free variables of indices $i \neq j \in \mathbb{N}$ (for i, j that are mapped to objects of type e by g) introduced by *en-*$_{i,j}$ and entity part y to which non-gradable predicate P has applied such that $g(i), g(j) \leq_P y$:
a. $g(i) = z$, where z is contextual.
b. $g(j) = z'$, where (i) z has a specific value determined contextually, or (ii) z' is some unspecified entity part.
c. If y is quantized, then assignment of values is ranked, i.e., (i) $>$ (ii).

To summarize, addressing telicity has stressed the role of the mereological structure associated with the entities or scales contributed by the base predicates in prefixed verbs. While the findings for prefixed verbs in Spanish are not new in the cross-linguistic discussion of verbs conveying scalar change, the role of quantization and atomicity in particular in connection to the base predicate's denotation in prefixed verbs highlights the importance of the base's contribution in determining whether the verbal predicate describes a completed event.

6 Conclusion

This paper has proposed a compositional account of Spanish prefixed verbs with *a-* and *en-*. I have argued that verbs with *a-* are uniformly analyzed in terms of an increase in the extent to which a property applies to the theme. Verbs with *en-* have a core spatial meaning that yields different results when applying to gradable and non-gradable bases. By concentrating on a particular case study of Spanish, I have provided a proposal that accounts for cases where prefixed verbs sometimes display overlapping

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truth conditions, but may also differ more significantly in other cases, by addressing commonalities and differences regarding different entailment tests (involving change of state and change of location), and compatibility with measure expressions. The discussion has touched on a number of issues. With regard to polysemy, I have shown that the semantics provides a general template that appears to be insensitive to lexical nuances of base predicates. With regard to scalar change, the discussion has shown that it may be extended to non-gradable predicates in systematic ways, further shedding light on how to tell apart cases that, at first glance, may appear to convey scalar change, but, after further inspection, lack key properties tied to these (in particular, in terms of an increase in degree along a scale); the discussion has thus disentangled the consequences of relying on scale structure vs. mereology in the composition of derived verbs of change. With regard to spatial relations, the discussion has made explicit what possible relations, restrictions and extensions there may be in connection to highly concrete (physical) space and more abstract (property) space. With regard to telicity, the discussion has shed light on the importance of quantization and atomicity when establishing preference for telic interpretations in out-of-the-blue cases. Ultimately, the discussion has shed light on semantic subtleties as linked to derivational morphology, showing how, on the surface, different morphological means may yield quite similar or identical semantic outcomes, while at the same time allowing for more substantial differences in verb meaning.

Appendix

This appendix collects sample verbs with *a-* and *en-*. The reader is referred to Gibert Sotelo & Pujol Payet (2015) and Fábregas (2023) for additional examples.

Verbs with *a-* with gradable bases: ***a-****baratar* 'to make cheap' (with base *barato* 'cheap'), ***a-****bobar* 'to make stupid' (with base *bobo* 'stupid'), ***a-****breviar* 'to shorten' (with base *breve* 'short'), ***a-****cercar* 'to bring closer' (with base *cerca* 'close, near'), ***a-****cobardar* 'to become coward' (with base *cobarde* 'coward'), ***a-****cortar* 'to shorten' (with base *corto* 'short'), ***a-****delgazar* 'to thin' (with base *delgado* 'thin'), ***a-****derezar* 'to dress' (with base *derecho* 'legitimate, appropriate'), ***a-****fear* 'to make ugly' (with base *feo* 'ugly'), ***a-****flojar* 'to loosen' (with base *flojo* 'loose'), ***a-****grandar* 'to enlarge' (with base *grande* 'large'), ***a-****gravar* 'to become serious' (with base *grave* 'serious'), ***a-****largar* 'to lengthen' (with base *largo* 'long'), ***a-****lejar* 'to move away' (with base *lejos* 'far'), ***a-****ligerar* 'to make lighter' (with base *ligero* 'light'), ***a-****lisar* 'to straighten' (with base *liso* 'straight'), ***a-****mustiar* 'to become wilted' (with base *mustio* 'wilted'), ***a-****planar* 'to flatten' (with base *plano* 'flat'), ***a-****tibiar* 'to warm' (with base *tibio* 'warm'), ***a-****tontar* 'to stun' (with base *tonto* 'silly')

Verbs with *a-* with non-gradable bases: ***a-****bizcochar* 'to make cake-like' (with base *bizcocho* 'cake'), ***a-****bovedar* 'to turn vault-like' (with base *bóveda* 'vault'), ***a-****calorar* 'to heat' (with base *calor* 'heat'), ***a-****caramelar* 'to make caramel-like' (with base *caramelo* 'caramel'), ***a-****cartonar* 'to stiffen' (with base *cartón* 'cardboard'), ***a-****cuchillar* 'to knife' (with base *cuchillo* 'knife'), ***a-****fantasmar* 'to become ghost-like' (with base *fantasma* 'ghost'), ***a-****filar* 'to sharpen' (with base *filo* 'sharp edge'), ***a-****francesar* 'to become French-like' (with base *francés* 'French'), ***a-****humar* 'to (fill with) smoke' (with base *humo* 'smoke'), ***a-****montonar* 'to pile' (with base *montón* 'pile'), ***a-****murallar* 'to wall' (with base *muralla* 'wall'), ***a-****puñalar* 'to stab' (with base *puñal* 'dagger'), ***a-****rrinconar* 'to corner' (with base *rincón* 'corner'), ***a-****tesorar* 'to treasure' (with base *tesoro* 'treasure'), ***a-****tormentar* 'to torment' (with base *tormenta* 'storm'), ***a-****vinagrar* 'to sour' (with base *vinagre* 'vinegar')

Verbs with *en-* with gradable bases: ***em-****borrachar* 'to get drunk' (with base *borracho* 'drunk'), ***en-****calmar* 'to relax' (with base *calmo* 'calmed'), ***en-****crespar* 'to curl' (with base *crespo* 'curly'), ***en-****derezar* 'to straighten' (with base *derecho* 'straight'), ***en-****dulzar* 'to sweeten' (with base *dulce* 'sweet'), ***en-****durar*

'to harden' (with base *duro* 'hard'), ***en-****flacar* 'to thin' (with base *flaco* 'thin'), ***en-****gordar* 'to fatten' (with base *gordo* 'fat'), ***en-****grosar* 'to thicken' (with base *grueso* 'thick'), ***en-****guarrar* 'to dirty' (with base *guarro* 'dirty'), ***en-****mustiar* 'to become wilted' (with base *mustio* 'wilted'), ***em-****peorar* 'to worsen' (with base *peor* 'worse'), ***en-****seriar* 'to become serious' (with base *serio* 'serious'), ***en-****suciar* 'to dirty' (with base *sucio* 'dirty'), ***en-****tercar* 'to become stubborn' (with base *terco* 'stubborn'), ***en-****tibiar* 'to warm' (with base *tibio* 'warm'), ***en-****tiesar* 'to stiffen' (with base *tieso* 'stiff'), ***en-****turbiar* 'to make turbid' (with base *turbio* 'turbid')

Verbs with *en-* with non-gradable bases: ***en-****aceitar* 'to oil' (with base *aceite* 'oil'), ***em-****botellar* 'to bottle' (with base *botella* 'bottle'), ***em-****betunar* 'to polish' (with base *betún* 'shoe polish'), ***en-****cadenar* 'to chain' (with base *cadena* 'chain'), ***en-****carcelar* 'to jail' (with base *cárcel* 'jail'), ***en-****cumbrar* 'to deify' (with base *cumbre* 'summit'), ***en-****furiar* 'to make someone furious' (with base *furia* 'rage'), ***en-****grasar* 'to grease' (with base *grasa* 'grease'), ***en-****harinar* 'to flour' (with base *harina* 'flour'), ***en-****jaular* 'to cage' (with base *jaula* 'cage'), ***en-****lodar* 'to cover in mud' (with base *lodo* 'mud'), ***en-****mantequillar* 'to butter' (with base *mantequilla* 'butter'), ***en-****marcar* 'to frame' (with base *marco* 'frame'), ***em-****pantanar* 'to make swamp-like, to bog down' (with base *pantano* 'swamp'), ***em-****papelar* 'to paper' (with base *papel* 'paper'), ***en-****redar* 'to tangle' (with base *red* 'net'), ***en-****rollar* 'to roll' (with base *rollo* 'roll'), ***en-****roscar* 'to give the shape of a thread' (with base *rosca* 'thread'), ***en-****sillar* 'to saddle' (with base *silla* 'saddle'), ***en-****terrar* 'to bury' (with base *tierra* 'soil'), ***en-****venenar* 'to poison' (with base *veneno* 'poison'), ***en-****vinagrar* 'to put (in) vinegar' (with base *vinagre* 'vinegar')

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