



Boundedness in locative prepositions: Evidence from Catalan

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Abstract

This paper provides evidence from Catalan for the existence of bounded and unbounded locative prepositions, and proposes that boundedness in the adpositional domain is derived similarly to boundedness in the verbal, nominal or adjectival domains. Our contribution is both empirical and theoretical. First, we show that Catalan has two simple locative prepositions, *a* and *en*, which form a minimal pair as far as boundedness is concerned and exhibit, correspondingly, different selection patterns: while bounded *a* only selects DPs with a quantity interpretation, unbounded *en* can combine with both NPs and DPs, which receive a homogeneous interpretation. Second, we develop a syntactic and semantic theory to account for these facts that relates them to the crosscategorical property of boundedness: *a*-PPs, but not *en*-PPs, contain an aspectual projection that imposes the interpretation that the otherwise homogeneous region denoted by the preposition is delimited. Moreover, we show that the difference between the structures licensed by *a* and *en* has consequences for the interpretation of quantifiers within PP. Specifically, we set eyes upon a particular context in which *a* and *en* take a universally quantified singular DP as complement and form a minimal pair. We propose that while the bounded preposition *a* allows for the interpretation of the quantifier *tot* ‘all’ as a universal quantifier of parts, the unbounded preposition *en* does not. Instead, with *en* the quantifier behaves as an adjective of sorts associated to a maximality operator. Our paper contributes to furthering our understanding of boundedness across categories in human language.

Keywords Locative prepositions · Boundedness · Aspect · Quantification · Negative polarity items · Catalan

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1 Introduction

There is robust evidence that boundedness is a major grammatically relevant notion in different domains (Jackendoff 1991). In the verbal domain, it is known since at least Kiparsky (1998) that case marking in certain languages is dependent on the aspectual properties of the event, that is, on the (un)boundedness of its denotation. Within the nominal domain, the mass and count nominal distinction impacts on pluralization, combinability with indefinites and, in languages that have them, combinability with certain classifiers (Cheng and Sybesma 1999). In the domain of adjectives, the kin notion of gradability—(un)boundedness of the scalar structure associated with properties—has also proved crucial in establishing different semantically and syntactically relevant classes within this category (Kennedy and McNally 1999). All in all, the property of (un)boundedness seems to be an important grammatically relevant one across languages and across categories.

With respect to the domain of adpositions, and in particular those encoding locative denotations, Jackendoff (1991) shows that certain locative prepositions are sensitive to the (un)boundedness of the Figure, explaining the pattern of acceptability in sentences like *There {was water/were books/*was a book} all over the floor*. More recently, within a syntactically oriented framework, Tortora (2008) provides evidence from Italian that non-directional prepositions may come with a bounded or an unbounded value. Thus, minimally different PPs headed by complex prepositions, like *dietro a l'albero* “lit. behind at the tree” and *dietro l'albero* “behind the tree,” have a different interpretation: while the former is understood as a bounded location, the latter is understood as an extension. However, Tortora fails to provide a formal definition of bounded/unbounded location, which makes the distinction vague and difficult to grasp. Moreover, the purported semantic difference does not seem to be linguistically relevant with respect to the syntactic distribution of these PPs: they are allowed in the same contexts. Other authors like Koopman (2000), Den Dikken (2010) and Svenonius (2003, 2010) propose an aspectual projection within the PP, in the spirit of developing a uniform approach to the functional projections of all lexical categories. However, they fail to supply empirical support for this projection in the representation of locative prepositions. What we are lacking, therefore, is a case study combining clear empirical evidence for a bounded/unbounded distinction in locative adpositions and an accompanying formal characterization, both in terms of syntax and semantics, that takes into account crosscategoriality. Our paper aims to be that case study. First, we describe a linguistic system that clearly distinguishes bounded and unbounded locations in simple adpositions, namely the Catalan system comprising the bounded preposition *a* and the unbounded preposition *en*. We use notions from the formal semantic literature, namely, divisiveness and cumulativity, to characterize (un)boundedness. And second, we show that the same syntactic structure proposed to account for boundedness in other categorial domains can be posited for locative prepositions.

The patterns of categorial selection and semantic interpretation of the otherwise seemingly identical prepositions *a* and *en* have puzzled those grammarians that have tried to understand the semantics and syntax of these prepositions. For instance, locative *a* cannot combine with mass nouns: e.g., **a sorra* ‘at sand.’ Complementarily, *en* may take definite DPs but it imposes on them an abstract interpretation: e.g., *en*

l'església 'in the Church,' characterizes the Church as the institution, not as a building. We account for these differences via a quantity-related projection, Asp_B , akin to Borer's (2005b) Asp_Q in the event domain, but with a subscript B for Boundedness: *a*-PPs contain $\text{Asp}_B P$, and *en*-PPs do not (see Sect. 2).

In addition to explaining these selection facts, we show how the syntactically represented property (un)boundedness explains other striking and previously unnoticed differences between *a* and *en*. An outstanding one is how they are interpreted when they take a universally quantified DP as a complement:

- (1) a. Aquesta espècie de rèptil no viu a tot Mallorca.
 this species of reptile not lives *a* all Majorca
 'This species of reptile does not live everywhere in Majorca.'
 b. Aquesta espècie de rèptil no viu en tot Mallorca.
 this species of reptile not lives *en* all Majorca
 'This species of reptile does not live anywhere in Majorca.'

In the *a*-version the universal quantifier is interpreted as scoping under negation. That is, the interpretation of (1a) allows for some places in Majorca to be the habitat of the species of reptile. By contrast the sentence in (1b) only allows for a wide scope interpretation of the universal quantifier. Thus, in example (1b), the only possible interpretation is that in which the species of reptile does not live anywhere on the island.

We discuss two other distinguishing properties that we have unearthed in connection with the same context, that is, with the presence of the singular universal quantifier *tot* 'all.' First, *en*-PPs embedding this quantifier behave like Negative Polarity Items (NPIs) in that they need syntactic contexts like negative sentences. *a*-PPs embedding the same quantifier do not behave as NPIs:

- (2) a. Aquesta espècie de rèptil viu a tot Mallorca.
 this species of reptile lives *a* all Majorca
 'This species of reptile lives everywhere in Majorca.'
 b. *Aquesta espècie de rèptil viu en tot Mallorca.
 this species of reptile lives *en* all Majorca

Second, *a-tot*-PPs allow for a distributive reading of the location, which is interpreted as a plurality of disjoint subregions. By contrast, *en-tot*-PPs receive a collective interpretation: the location is interpreted as a single atomic region. These two interpretations are illustrated with the examples below:

- (3) a. Hi ha cent espècies de rèptil a tot Mallorca.
 CL.LOC has hundred species of reptile *a* all Majorca.
 'There are one hundred species of reptile everywhere in Majorca.'
 b. Hi ha cent espècies de rèptil en tot Mallorca.
 CL.LOC has hundred species of reptile *en* all Majorca.
 'There are one hundred species of reptile in the whole of Majorca.'

The sentence in (3a) is true when one hundred species are found scattered throughout Majorca.¹ Hence, this sentence is compatible with a situation in which there are more than one hundred species of reptile on the whole island, since different parts of the island contain each one hundred species. By contrast, the sentence (3b) is only true if the one hundred species of reptile are found on the whole of the island.² That is, the sentence asserts that the sum of all the species within the island is one hundred and is incompatible with an interpretation where there are more than one hundred species in total.

We develop an explanation whereby the presence of the projection *Asp_BP* is crucial in allowing *tot* ‘all’ to behave as a universal quantifier. By contrast, when this projection is absent, *tot* behaves as an adjective of the likes of English *whole*. We argue that the different status of *tot* is at the base of the contrast in (1) and (3). We suggest, more speculatively, that the NPI behaviour of *en-tot* is related to the absence of *Asp_BP* as well.

The paper is structured as follows. In Sect. 2 we describe the syntactic distribution of the locative prepositions *a* and *en*, with an examination of apparent counterexamples in the Appendix. In Sect. 3, we present the syntactic and semantic analysis of PPs headed by these two prepositions. In Sect. 4, we show how our proposal explains the patterns of selection of *a* and *en* described in Sect. 2. In Sect. 5 we explain why *a*-PPs and *en*-PPs are interpreted differently when they take a DP headed by *tot* ‘all’: the difference with respect to the collective/distributive interpretation, the apparent difference in scope with respect to negation, and the NPI-status of *en-tot*-PPs. Section 6 concludes and identifies issues for future research.

2 Syntactic distribution and basic semantic interpretation of prepositions *a* and *en*

This section presents the main semantic and syntactic properties of the Catalan locative prepositions *a* and *en*.³ We must first point out that there is variation among dialects with respect to the system of basic locative prepositions. For example, in Valencian Catalan there is only one possible simple locative preposition, *en*, and the contrast that we study in this paper between *a* and *en* does not obtain. Other varieties

¹ We follow the Leipzig glossing conventions.

² Note that in this example, the *en-tot*-PP is licensed in the absence of an overt NPI licenser. We claim that focal stress allows the cardinal (*cent* ‘a hundred’) to be interpreted as involving a covert ‘only’ operator and thus license the *en-tot*-PP. See Sect. 5.2 for more details.

³ These prepositions derive from Latin *AD* and *IN*, respectively, and have cognates in the rest of Romance: *a* (Romanian, Rhaeto-Romance, Italian, Sardinian, Occitan, French, Aragonese, Asturian, Spanish, Galician, Portuguese), *en* (Rhaeto-Romance, Occitan, French, Aragonese, Asturian, Spanish, Galician), *em* (Portuguese), *in* (Sardinian, Italian), *în* (Romanian). Catalan *a* and *en* come closest in syntactic and semantic behaviour with their cognates in other Central Romance languages like Italian and French, since the latter are also clearly locative. However, to the best of our knowledge, the strict distinction based on boundedness that we describe in this paper is not exhibited by the corresponding prepositions in these two languages. For instance, both Italian and French use *IN* with names of countries, as in It. *in Germania*, Fr. *en Allemagne* ‘in Germany.’ By contrast, Catalan uses *AD* in the same context, since Germany, as a standard, physical location, is interpreted as a bounded one: *al*en Alemanya*. See Real-Puigdollers (2021) for further discussion.

show patterns of syncretism affecting not only *a* and *en*, but also *amb* ‘with.’ We have thus chosen to delimit the empirical domain to the system found in Central Catalan. This variety is the one with the highest number of speakers and upon which the standard is based. Central Catalan belongs to the Eastern Catalan group of dialects, and is spoken in the areas around Girona, Barcelona, and Tarragona. In Central Catalan, as in other varieties that realize /a/, /e/ and /ɛ/ as [ə] in unstressed syllables, prepositions *a* and *en* are pronounced [ə] and [ən] respectively. The literature has discussed the similarity in realization and the actual phonetic convergence that we witness in a restricted set of contexts (see the [Appendix](#); see, also, among others, Cabré 1980; Clua 1996; Sancho Cremades 2002; Albareda 2013).

Both *a* and *en* define a simple location, and are thus different from the monomorphemic locative prepositions that incorporate some other topological notion, like *sobre* ‘on,’ *dins* ‘inside,’ *sota* ‘under,’ etc.⁴

With respect to the selectional properties of these two prepositions, Sancho Cremades (2002) observes that *a* appears with DPs (4) and proper nouns (5), and rejects bare plural NPs (6) and mass singular NPs (7), while *en* shows the reverse pattern:

- (4) dormir a / *en l’ hostel; dormir als / *en els albergs.
 sleep a / en the hostel; sleep a.the.PL / en the.PL hostels
 ‘to sleep at the hostel; sleep at the hostels’
- (5) L’Empar viu a/*en Arequipa/Lima.
 the Empar live.3SG a/en Arequipa/Lima
 ‘Empar lives in Arequipa/Lima.’
- (6) dormir en/*a albergs/pensions
 sleep en/*a hostels/guest_houses
 ‘to sleep at hostels/guest houses’
- (7) posar els cogombres en/*a oli/vinagre
 put the cucumbers en/*a oil/vinegar.
 ‘to put the cucumbers in oil/vinegar’

Both prepositions can combine with indefinites and numerals, with a subtle change in interpretation:

- (8) a. Vam dormir a/en diverses habitacions.
 PST.1PL sleep a/en several rooms.
 ‘We slept in several rooms.’
- b. Vam dormir a/en dues habitacions separades.
 PST.1PL sleep a/en dues rooms separate
 ‘We slept in two separate rooms.’

Regarding, for instance, example (8b), speakers tend to agree that *a* favours a multiple events reading whereby we slept in two different rooms, perhaps during two consec-

⁴For a different semantic characterization of *a* and *en*, see the cognitive approach in Sancho Cremades (1994).

utive nights. By contrast, *en* favours a single event (single night) reading whereby some of us slept in one of the rooms and the rest slept in the other room.⁵

Contrary to *a*'s general rejection of bare nominals, there are three cases where it seems to combine with such expressions: certain bare singular NPs (9), certain bare plural NPs (10), and toponyms (11):

- (9) *a* {casa / ciutat / classe / escola / muntanya / taula / terra}
 a home / city / class / school / mountain / table / ground
- (10) *a* comarques
 a counties
- (11) Vam viure a Barcelona.
 PST.1PL live *a* Barcelona.
 ‘We lived in Barcelona.’

In parallel, there are examples with preposition *en* combining with definite and indefinite DPs:

- (12) *en* aquest/aquell/algun/un lloc.
 en this/that/some/a place
 ‘in this/that/some/a place’
- (13) els defectes que trobem *en* l'església.
 the flaws that find.1PL *en* the.church
 ‘the flaws that we find in the Church’

The examples in (9)–(12) are not genuine counterexamples to Sancho Cremades's (2002) characterization. The cases in (9) and (10) can be analysed as weak nominals, which can be argued to involve a definiteness layer. The example in (11) involves a proper noun of location, which can also be argued to feature a covert determiner. A closer examination of the examples in (12) shows that in these contexts, featuring a vowel-initial determiner, preposition *en* is the spelling of an allomorph of preposition *a*, namely, [ən]. We refer the reader to the Appendix, where we discuss these cases in more detail.

Regarding cases like (13), they are actually unquestionable cases of *en* combined with article-headed DPs. In these cases, *en* is apparently in free distribution with *a* (Fabra 1956).

- (14) els defectes que trobem *en/a* l'església.
 the flaws that find.1PL *en/a* the.church
 ‘the flaws that we find in the Church’

As it turns out, (14) does not illustrate free distribution, but a minimal pair. As pointed out by Ruaix (1988) and Sancho Cremades (2002), among others, in the version with *a*, *l'església* is understood as a physical entity and *defectes* ‘flaws’ as physical wrongs or defects, while in the version with *en*, *l'església* is understood as the institution,

⁵We leave a more fine-grained exploration of the contrast and, more generally, an exploration of plural reference objects with *a* and *en*, for future research. See also Albareda (2013).

Table 1 The selectional properties of locative *a* and *en* in Central Catalan

	<i>a</i>	<i>en</i>
DPs as standard locations	YES	NO
DPs as abstract locations	NO	YES
Weak nominals	YES	NO
Pronouns as abstract locations	NO	YES
Bare plural or mass singular NPs	NO	YES

the Church, and *defectes* ‘flaws’ as shortcomings. This abstract interpretation is also found when *en* appears before personal pronouns:

- (15) En tu hi veig el teu pare.
en you LOC see.1SG the your father
 ‘I see your father in you.’

Note that the availability of *a*, observed in (14), disappears in examples in which the abstract interpretation is the only possible one, as in (16).⁶

- (16) Hi ha esperança *en*/**a* l’església.
 LOC have.3SG hope *en/a* the.church
 ‘There is hope in the Church.’

The examples in (14) and (15) suggest that the preposition *en* can indeed select DPs, but only provided that they denote a non-standard abstract location.

The distribution of *a* and *en* is as summarized in Table 1. Only *en* may appear with bare singular and bare plural NPs without a weak definite reading. By contrast, bare singular and bare plural NPs with a weak definite reading only accept *a*. Both prepositions may appear with DPs, but show contrastive interpretations: *a* requires a standard location reading, whereas *en* is only compatible with an abstract location reading. Finally, the distribution is also strictly contrastive with strong personal pronouns: *en* only licenses an abstract location reading, whereas *a* builds either a dative or an accusative.

Preposition *en* is shown to be more liberal in its c-selection properties. Thus, it may appear with determined and determiner-less nominals, and pronouns, whereas *a* cannot appear with determiner-less nominals unless they are bare count singular nouns, which behave as weak definites (cf. Carlson et al. 2006; Aguilar and Zwarts 2010; Aguilar 2014; see also the Appendix) and, hence, we claim, are underlyingly determined.⁷ We take the fact that *a*’s c-selection is more restricted than *en*’s to be a

⁶Some speakers report that the *a*-PP *a l’església* ‘a the church’ in (14) could refer to the institution. We believe that this is related to the fact that some abstract nouns can be construed either as count (i.e., bounded) or mass (i.e., unbounded), as is frequently pointed out in the literature—see Grimm (2014) and Zamparelli (2000).

⁷Analyses of bare count nominals of the type in (9) and (10) have been proposed by Stvan (1998) and Collins (2007), among others. Some authors propose that this type of nouns are concealed DPs (Longobardi 1996, 1997, 2005; Collins 2007). Moreover, as these nouns have the same distribution and interpretation as weak definites in Catalan, it is straightforward to assume an analysis as DPs, parallel to Longobardi’s analysis of proper names (Longobardi 2001). See the Appendix for discussion.

consequence of the fact that the former involves more structure, as developed in the next section.

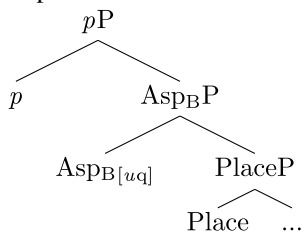
3 A syntactic and semantic analysis of the distinction between *a* and *en*

In this section, we propose an analysis of the syntax and semantics of the locative prepositions *a* and *en* in Central Catalan. Our main claim is that preposition *a* corresponds to a configuration containing a functional projection that provides quantity structure and that we call Aspect-Boundedness Phrase, Asp_BP . The presence of this projection induces the interpretation that a particular location has limits and identifiable subregions. Preposition *en* realizes a structure not containing Asp_BP .

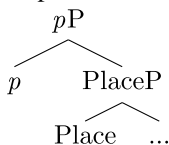
3.1 Syntactic analysis: Licensing boundedness

Both *a*-PPs and *en*-PPs are headed by *p*, a functional head that is responsible for the introduction of the Figure relation (Svenonius 2003, 2010; Wood 2015; a.o.). They also both contain a Place projection, embedded under the projection of *p*, $p\text{P}$, that maps the object denoted by the Ground nominal onto a region. Over Place we may find the functional projection responsible for boundedness, Asp_BP . Preposition *a* requires the projection of Asp_BP , containing an uninterpretable quantity feature, $[uq]$, which gives rise, when properly licensed, to a quantity interpretation of the region (17a). By contrast, *en* involves no Asp_BP , and the region it builds is interpreted as partless (17b):

- (17) a. Preposition *a*

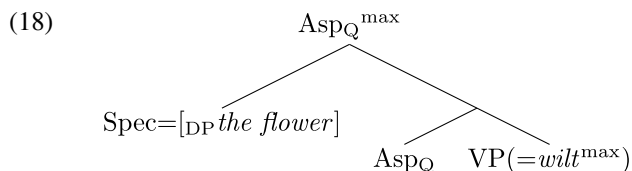


- b. Preposition *en*

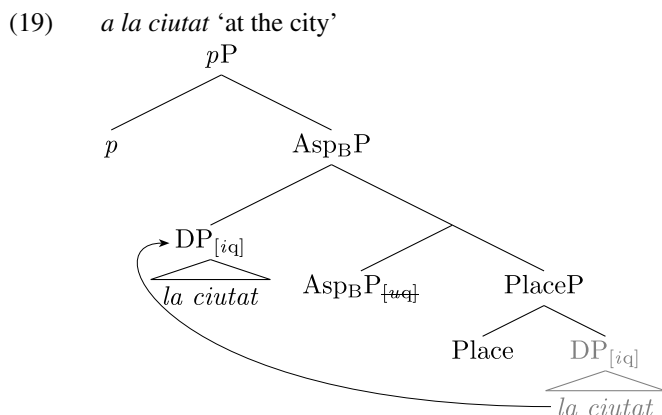


The account is directly inspired by Borer's (2005b) proposal for the encoding of quantity in the domain of events. Borer puts forward a functional head, Asp_Q , that

imposes divisions on the event, making it into a quantity event and giving thus rise to telicity (from Borer 2005b, 72):



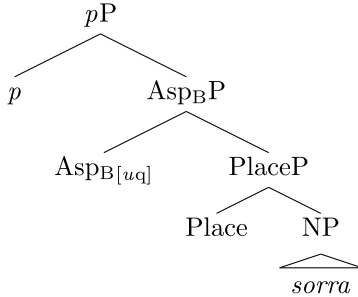
In this structure the projection of Asp_Q is licensed by the presence, in its specifier, of the quantity DP *the flower*. The event of wilting is thereby understood as quantity, that is, there is a singular, delimited event of wilting involving and being temporally homomorphic with a definite change in the flower: *The flower wilted in some days*. By contrast, the absence of Asp_Q yields a non-quantity, that is, atelic event (for instance: *The flower wilted for days*). Applying this logic to the domain of locations, i.e., of locative prepositions, we propose that quantity DPs sitting as complements of Place (thus interpreted as Grounds: Talmy 1975; Svenonius 2003) can license the Asp_P projection involved in *a*-PPs:⁸



The quantity status of the Ground DP *la ciutat* ‘the city’ licenses Asp_P and makes the derivation a viable and interpretable one (see MacDonald 2008 for a similar mechanism applied to telicity). The licensing relation is represented on the tree via the two [q] features, the interpretable one, [iq], on the DP, and the uninterpretable one, [uq], on Asp_P . When the DP moves to Spec- Asp_P , the former feature has the effect of deleting the latter. The overall semantic effect is the imposition of divisions on the region denoted by the PP, making it into a quantity region. By contrast, Asp_P cannot be licensed in the absence of an [iq]-bearing DP in its specifier. For instance, a non-quantity NP like *sorra* ‘sand’ fails to license Asp_P because it is not endowed with an interpretable quantity feature, staying below PlaceP:

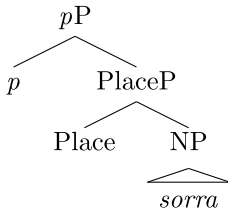
⁸Unpronounced copies are represented as grayed out.

- (20) *
- a sorra*
- ‘a sand’



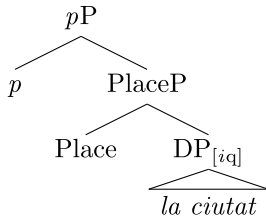
In this case, the [_{uq}] feature of *Asp_B* remains undeleted and the derivation crashes at LF. This is the source of the ungrammaticality —rather than semantic deviance— of the combinations of prepositions like *a* and non-quantity Grounds, like mass singulars. This kind of DP survives, as expected, with the preposition *en*, since it involves no *Asp_B* in need of being licensed and, hence, does not force the raising of the Ground DP:

- (21)
- en sorra*
- ‘en sand’



A prepositional structure without an *Asp_BP* projection is interpreted, necessarily, as unbounded. When the Ground is non-quantity, as in the example above (*en sorra* ‘en sand’), the interpretation of the PP matches well with the interpretation that the nominal has by itself. Things are different if a quantity DP like *la ciutat* ‘the city’ is merged as a Ground in a structure without an [_{uq}] feature, as in (22):

- (22)
- en la ciutat*
- ‘in the city’



As far as the structure of the preposition is concerned, we do not expect ungrammaticality to arise, and none indeed arises: there is no uninterpretable [_q] feature to be checked. However, by the same token, the layer of functional structure responsible for the interpretation of a quantified region is missing. This has a coercive effect on the interpretation of the Ground DP: it must be interpreted as non-quantity. In the

case at hand, the effect boils down to a necessarily abstract, unbounded reading of *la ciutat*.

3.2 The interpretation of *a*- and *en*-PPs

In this section, we describe the semantic interpretation of the locative prepositions *a* and *en*, with respect to boundedness. In Sect. 3.2.1, we discuss the interpretation of the functional heads involved in the syntax of locative PPs, namely, Place, Asp_B , and *p*. In Sect. 3.2.2, the semantic contribution of these heads is examined for the specific case of PPs headed by *a* and *en*.

3.2.1 Locative PPs: Regions, divisiveness and cumulativity

Drawing on Wunderlich (1991), Zwarts and Winter (1997, 2000), and Svenonius (2010), among others, we take locative PPs to involve more than one semantic component. From a top-down perspective, the compositional approach to locations assumed here involves, at the very least, two syntactic heads, *p* and Place, which contribute differently to meaning. We assume that the functional head *p* places an event, the Figure, in a location, a region, which we define as a set of points in space, following the definition of regions in Rothstein (2020). Subsequently, Place takes the DP complement, the reference object or Ground, and maps it onto its location in space or *eigenspace*, in the spirit of Wunderlich (1991) and Zwarts and Winter (2000).

By assumption, PlaceP, in the absence of a dedicated functional projection, denotes a homogeneous predicate of regions, which is both divisive and cumulative. This idea applies Borer's (2005a, 2005b) observations regarding the nature of the reference of nominal and verbal predicates to the reference of locative expressions. That is, nominal and verbal predicates, in the absence of dedicated structure, are also homogeneous, both divisive and cumulative, and it is only when quantity-related structure is added that a quantity predicate emerges. Likewise, for locative PPs, when the projection Asp_B P is present, as in the case of *a*-PPs, a quantity predicate of regions emerges. Let us make the notions of divisiveness and cumulativity more precise.

Authors working on aspect in different categorial domains have based the definition of quantization on two more basic notions: divisiveness and cumulativity. In her influential work on nominal aspect, Borer (2005a, 127), building on Krifka (1989) and Kiparsky (1998), considers that a predicate P is homogeneous if it is both divisive and cumulative. Otherwise, the predicate is non-homogeneous (quantity). In turn, she provides the following definitions of divisive and cumulative reference:

- (23) a. P is divisive iff $\forall x[P(x) \rightarrow \exists y(P(y) \wedge y < x)] \wedge \forall x, y [P(x) \wedge P(y) \wedge y < x \rightarrow P(x - y)]$
 b. P is cumulative iff $\forall x [P(x) \wedge P(y) \rightarrow P(x \cup y)]$

While definitions of cumulativity like Borer's work well for nominal reference, they do not work properly for the kind of reference involved in the domain of space, that is, of adpositions. This has to do with how the sum operation required in the definition of cumulativity applies in the different ontological domains. The sum of two apples and three apples is a set of five apples, irrespective of where the apples are. By contrast,

spatial entities like regions and paths, beyond having a scalar quantity, possess, by virtue of being part of a topological space, spatial coordinates that restrict their sum. Thus, Zwarts (2005b) observes that the sum operation contained in the definition of cumulativity (\cup), when applying to paths, is of a different nature from that used for nominals, and cannot apply to any two entities (paths) falling under the denotation of the predicate. In particular, Zwarts takes the sum of two paths, \mathbf{p} and \mathbf{q} , to correspond to *concatenation*, namely, the creation of a larger path where the head of \mathbf{p} and the tail of \mathbf{q} are the same point in space. It is thus evident that not any two paths falling under the denotation of a predicate can be concatenated (i.e., “summed”). This is why Zwarts (2005a, 751) must introduce a further condition in order for a predicate of paths to have cumulative reference (condition i below):

- (24) A set of paths \mathbf{X} is *cumulative* iff
- (i) there are $\mathbf{p}, \mathbf{q} \in \mathbf{X}$ such that $\mathbf{p} + \mathbf{q}$ exist and
 - (ii) for all $\mathbf{p}, \mathbf{q} \in \mathbf{X}$, if $\mathbf{p} + \mathbf{q}$ exists, then $\mathbf{p} + \mathbf{q} \in \mathbf{X}$.

In the spirit of Zwarts’ definition of *concatenation* for paths, we take the sum of two regions, r and s , to correspond to *merger of regions*, which is defined as follows:

- (25) Merger of regions. Given two regions, r and s , if $r \cap s \neq \emptyset$, then the merger of r and s , $r + s$, exists and is equivalent to $r \cup s$.

This definition has the consequence that two regions r and s falling under the denotation of a predicate will only be summable if they are minimally adjacent, i.e., if they share at least one point. Applying Zwarts’ definition of cumulativity for paths to regions and taking into account the operation merger of regions, our definition of cumulativity for regions looks as follows:

- (26) A set of regions R is *cumulative* iff
- (i) there are $r, s \in R$ such that $r + s$ exists and
 - (ii) for all $r, s \in R$, if $r + s$ exists, then $r + s \in R$.

As for divisiveness, we adopt the following definition, based on Borer’s (2005a):⁹

- (27) A set of regions R is *divisive* iff $\forall r[r \in R \rightarrow \exists s(s \in R \wedge s < r)]$ and $\forall r, s[r \in R \wedge s \in R \wedge s < r] \rightarrow (r - s) \in R$.

A predicate of regions is homogeneous if and only if it is divisive and cumulative. Otherwise, it is non-homogeneous. Our claim is that the Asp_B projection creates a non-homogeneous predicate.

Let us now consider how homogeneity and non-homogeneity emerge compositionally from the structure of the PP (see also Csirmaz 2012). As mentioned before, we propose that Place creates a homogeneous predicate of regions. When Place combines with a singular DP, like for instance, *l’olla*, ‘the pot,’ the semantic composition of the syntactic fragment [$_{\text{PlaceP}}$ Place [$_{\text{DP}}$ *l’olla*]] is understood as the set of regions where the pot is located. In turn, Asp_BP denotes a predicate of partitioned regions that have the part-structure of the reference object that has raised from Compl-Place

⁹We assume $r - s$ to be the operation of subtracting s to the region r , s being a subregion of r .

to Spec-Asp_B. This homomorphism is effected via the syntactic checking relation between the reference object, endowed with [iq] and Asp_B, endowed with [uq].

Finally, the topmost layer of an adpositional projection is *pP*. Unlike the standard view, which takes *p* to be a head akin to Voice in the event domain (Kratzer 1996; Svenonius 2003; Wood and Marantz 2017), we consider that *p* takes a predicate of regions, denoted by PlaceP or Asp_B, and yields a predicate of events. Thus, *pP* combines with *vP*, also denoting a predicate of events, via predicate conjunction. We assume that the functional head *p* introduces the thematic role of Figure, defined as a relation by which an event is located with respect to a region.¹⁰

After reviewing how the concept of homogeneity applies to locations and how we understand the semantic interpretation of the syntactic structure of locative PPs, we are now in a position to understand how *a* and *en* are interpreted in Catalan.

3.2.2 (Non-)homogeneity of *a*-PPs and *en*-PPs

As advanced in Sect. 3.1, *a*-PPs involve regions with defined subparts (denoted by Asp_BP), while *en*-PPs involve regions with no differentiated subparts (denoted by PlaceP). A minimal pair is difficult to obtain, since, as shown in the Appendix, the allomorphy triggered by some determiners blurs the distinction between these two prepositions. In cases in which speakers allow both prepositions, as for some indefinites, the difference is subtle and difficult to grasp for most speakers (e.g., *Dormien a/en dos hotels* ‘They slept in two hotels’). For this reason, in order to illustrate the semantic difference between these two prepositions, we examine *a*-PPs that take a DP as reference object (28a), and *en*-PPs that take a mass noun as reference object, (28b).

- (28) a. Hi ha grans d’arròs a l’olla.
 LOC have.3SG grains of.rice *a* the.pot
 Lit.: ‘There are grains of rice at the pot.’
 b. Hi ha grans d’arròs en aigua.
 LOC have.3SG grains of.rice *en* water
 ‘There are grains of rice soaking in water.’

The sentence in (28a) is judged to be true in any situation in which there are grains of rice located at any point within the *eigenspace* of the pot. This includes situations where some grains of rice are on the external walls of the pot, as long as there is contact with the pot’s surface. Conversely, the sentence in (28b) would be deemed false in a scenario in which the grains of rice are not completely covered in water.

The predicates denoted by *a*-PPs are divisive, but not cumulative. By contrast, those denoted by *en*-PPs are both divisive and cumulative. Let us examine *a*-PPs first. A PP like *a Catalunya* ‘a Catalonia’ is divisive, since, if it can be applied to a certain region, like Catalonia itself, it can automatically also be applied to any subregion thereof, like Barcelona or Gràcia (a neighbourhood in Barcelona). This is

¹⁰Motivation for this characterization of *pP* as denoting a predicate of events comes from the well known fact that (low) locative PPs cannot combine with non-eventive predicates (see, among many others, Maienborn 2007).

shown in the following entailments. They illustrate that if an individual is located in a region that falls under the denotation of *a Catalunya* ‘in Catalonia,’ the same is true when the individual is located in a subregion of Catalonia, like Barcelona (29b) or the Barcelonan neighbourhood of Gràcia (29c):

- (29) Context: Catalonia > Barcelona > Gràcia
- a. En Tià és a Catalunya. → ‘Tià is in Catalonia.’
the Tià is *a* Catalonia.
 - b. En Tià és a Barcelona. → ‘Tià is in Catalonia.’
the Tià is *a* Barcelona.
 - c. En Tià és a Gràcia. → ‘Tià is in Catalonia.’
the Tià is *a* Gràcia.

a-PPs do not have cumulative reference. This is because not every pair of regions in their denotation can undergo merger, that is, construe a single region, which in turn is due to the fact that they are not adjacent: they do not share any spatial point. Consider *a Barcelona*, for instance. When construed as regions, both Gràcia and Sants, as districts of Barcelona, fall under the denotation of *a Barcelona*. However, they are not adjacent: they do not share any spatial point and can therefore not be merged. Thus, one of the conjoined conditions of our definition of cumulativity in (26) does not hold, which makes *a Barcelona* non-cumulative.

Let us consider *en*-PPs now. It is easy to show that their denotation is also divisive. In (28b), for instance, any subregion of the region identified by *en aigua* ‘en water,’ occupied by a portion of the grains of rice, can also be said to be *en aigua*.¹¹ Unlike *a*-PPs, however, *en*-PPs have cumulative reference. This is true in a trivial sense, since they do not involve subparts buildable as identifiable regions. We cannot identify subregions in the denotation of *en aigua*, as we can in the case of *a l’olla* ‘a the pot’ or *a Catalunya* ‘a Catalonia.’ Thus, there is one single partless region that, evidently, falls under the denotation of the PP. Importantly, the partless nature of *en*-PPs is not due, as an anonymous reviewer suspects, to the semantic properties of the reference object, that is, to the fact that that object is not quantity. Thus, reference objects that count as quantity, like those denoted by *l’església* ‘the church/Church’ or *Barcelona*, yield partless (and abstract) regions when combined with *en* (see Sect. 2 and the Appendix), in the same way as non-quantity reference objects such as *aigua* ‘water’. The very fact that *en* imposes the creation of a partless region is what forces *l’església* and *Barcelona*, otherwise denoting quantity predicates involving differentiated subparts, to obtain an abstract interpretation.

In conclusion, *a*-PPs denote a particular point within the region defined by the reference object and their reference is divisive but not cumulative, in sum, non-homogeneous. By contrast, *en*-PPs assert that the event takes place in the region defined by the reference object, understood as a homogeneous one. Preposition *en* builds PP that have both divisive and cumulative reference. The interpretation of

¹¹ In fact, as an anonymous reviewer brings to our attention, divisiveness turns out to be a trivial property of a locative PPs. Zwarts (2005b, 752–753) already observes that divisiveness is not the algebraic property that characterizes unbounded PPs, and he explicitly argues in favour of taking into consideration only cumulativity in order to characterize boundedness in PPs.

a-PPs as sets of non-homogeneous regions emerges from the quantity interpretation imposed on the reference object by the functional projection Asp_B , endowed with a $[\text{uq}]$ feature. The fact that *en*-PPs lack the Asp_B projection explains why they denote sets of partless, homogeneous, regions.

4 Accounting for the patterns of selection of *a* and *en*

In this section, we show how our proposal captures the patterns of selection described in Sect. 2. We start with preposition *a*. As discussed in Sect. 2, preposition *a* involves a structure in which Place is combined with Asp_B , endowed with an uninterpretable quantity feature that has to be checked by a quantity nominal. Our prediction is that only DPs/NPs that receive a quantity interpretation are allowed as complements of *a*. Indeed, according to Borer (2005a), all definite and indefinite DPs are interpreted as quantity, and hence are rightly predicted to be possible as complements of the preposition *a*. That is, all nominals except mass nouns and bare plurals will be allowed as the complement of this preposition.

We approach now the problematic cases of nominals that appear without overt determiners, like some cases of bare singulars (see (30a) and (30b)), bare plurals (see (30c)), and proper place names (30d), and that can, nevertheless, only appear as complements of the preposition *a*:

- (30)
- a. A aquella hora, en Lluç era a casa.
at that hour, the Lluç was *a* house
'At that time, Lluç was at home.'
 - b. Asseu-te a terra, si vols descansar.
sit.down.IMP.2SG *a* floor, if want.PRES.2SG rest
'Sit down on the floor, if you want to rest.'
 - c. Aquestes coses només les trobaràs a comarques.
these things only ACC.FEM.PL find.FUT.2SG *a* counties
'You will only find such things outside the capital.'
 - d. Vivim a Barcelona.
live.FUT.1PL *a* Barcelona
'We live in Barcelona.'

With respect to the cases of bare singular and plural NPs (30a), (30b), (30c), in Sect. 2 we already pointed out that they did not represent real counterexamples to Sancho Cremades's (2002) generalization that *a* selects DPs (and see the fully developed argument in the Appendix). The remaining type of determinerless nominals appearing as the complement of *a* is that of toponyms, (30d). Many proper nouns of location or toponyms in Catalan must appear with a determiner (e.g., *l'Argentina* 'Argentina'), but most do not (e.g., *Barcelona*). Irrespectively of whether a definite determiner is present, the only possible preposition that can build standard locations is *a*.¹² This is not in the least surprising, provided what we know about the selectional properties

¹²See Franco and Lorusso (2019) and Matushansky (2016) for an overview of the selectional requirements that locative prepositions impose on toponyms in Italian and French, respectively.

of *a*: toponyms define locations that are unique (they are proper nouns), and have a part-whole structure, and therefore have a quantity interpretation.

Turning now to preposition *en*, the analysis proposed in Sect. 3 establishes that this preposition does not impose c-selectional restrictions on its complements. Indeed, we find it with toponyms and DPs, albeit forcing an abstract interpretation thereof:¹³

- (31) a. El turisme urbà té en Barcelona l'exponent.
the tourism urban have.3SG *en* Barcelona the exponent
'Barcelona is the exponent of urban tourism.'
- b. Rodoreda va trobar la seva inspiració en la novel·la
Rodoreda PST.3SG find the her inspiration *en* the novel
psicologista europea del s. XX.
psychological European of.the c. XX
'Rodoreda found her inspiration in the European psychological novel
of the XX c.'

Crucially, the *en*-PPs in these examples refer to the city of Barcelona and to the class of novels as concepts, rather than a proper location.

Finally, the kind of weak nominals that we saw were fine with *a*, like *casa* 'house, home,' bluntly reject *en*:

- (32) *Som en casa.
we.are *en* house

As definites, we would expect weak nominals like *casa* to be found as complements of *en* under an abstract interpretation, as we have seen is the case with non-weak DPs and toponyms. We surmise, however, that the same coercion attested with the latter is not possible in this case. This is most probably linked to the fact that weak nominals have an obligatorily contextual interpretation (Aguilar and Zwarts 2010; Aguilar 2014). In the case at hand, *casa* refers to someone's home, a contextually retrievable reference. This clashes with the semantics of abstract nominals, which are by nature incompatible with situation-specific reference.

5 Preposition *a/en* + a universally quantified DP: The effects of (un)boundedness

In this section we present a series of novel empirical observations on the different semantic interpretations licensed by *a* and *en* when they take a singular DP headed by the universal quantifier *tot* 'all.' In Sect. 5.1 we show that *a* licenses a distributive interpretation of the region denoted by the PP, while the interpretation licensed by *en* is collective. In Sect. 5.2 we show a striking interpretational contrast between *a-tot*- and *en-tot*-PPs attested when they are embedded in a negative context. With *a-tot*-PPs the universal quantifier appears to take scope below negation, as expected. By contrast, with *en-tot*-PPs the quantifier, surprisingly, takes scope above negation. We

¹³Example (31a) adapted from *El Punt Avui*, 24 July 2022, <https://www.elpuntavui.cat/societat/article/5-societat/2167563-ens-interessa-el-visitant-que-es-mou-i-s-implica.html>.

argue that, despite appearances, the contrast is not due to a different scope between *tot* and negation in *a*-PPs and *en*-PPs. Furthermore, we observe that *en-tot*-PPs, unlike *a-tot*-PPs, are actually NPIs. In Sect. 5.3 we develop an account of the facts described in Sects. 5.1 and 5.2, based on the analysis of *a*-PPs and *en*-PPs presented in Sect. 3: the former involve an Asp_PP projection with a [*uq*] feature that allows for a quantificational reading of *tot*, whereas the latter does not involve an Asp_PP and *tot* lacks quantificational force. Finally, in Sect. 5.4, we speculate why *en-tot*-PPs behave as NPIs.

5.1 *a-tot*-PPs vs. *en-tot*-PPs: Distributive vs. collective reading

Locative PPs embedding a singular DP headed by the universal quantifier *tot* ‘all’ license strikingly different interpretations with *a* and *en*. While *a* induces a distributive reading of the location, *en* induces a collective reading, as the following contrast shows:

- (33) a. Hi ha 100 espècies de rèptil a tot Mallorca. #Viuen al
 LOC have.3SG 100 species of reptile *a* all Majorca #live.3PL *a* the
 parc natural de s’Albufera.
 reserve natural of the Albufera
 ‘There are one hundred species of reptile everywhere in Majorca. #They
 live in the nature reserve in s’Albufera.’
 b. Hi ha 100 espècies de rèptil en tot Mallorca. Viuen al
 LOC have.3SG 100 species of reptile *en* all Majorca live.3PL *a* the
 parc natural de s’Albufera.
 reserve natural of the Albufera
 ‘There are one hundred species of reptile in the whole of Majorca. They
 live in the nature reserve in s’Albufera.’

In (33b) the *tot*-DP is interpreted as ‘the whole of Majorca.’ This interpretation is compatible with a situation in which all the species of reptile are concentrated in a single spot on the island, namely, the Albufera nature reserve. By contrast, in (33a) the singular *tot*-DP is interpreted as ‘in every part of Majorca.’ This is why the sentence sounds odd if the 100 species of reptiles are only found in a single spot, as entailed by the appended extension. Thus, the interpretations of *tot*-DPs as complements to *a* and to *en*, are, respectively, distributive and collective.

The distinction comes to light in other examples. Consider first the case in which the PP is complement to a superlative:

- (34) a. Aquesta espècie de rèptil és la més abundant a tot Mallorca.
 this species of reptile is the most abundant *a* all Majorca
 ‘This species of reptile is the most abundant everywhere in Majorca.’
 b. Aquesta espècie de rèptil és la més abundant en tot Mallorca.
 this species of reptile is the most abundant *en* all Majorca
 ‘This species of reptile is the most abundant in the whole of Majorca.’

Here again, *a* yields a distributive reading, so that the abundance of the species is verified in all places in the island; with *en* we know that the species is the most

abundant in the island but not necessarily in every part of the island. The extensions used in (33) reveal the difference clearly:

- (35) a. Aquesta espècie de rèptil és la més abundant a tot Mallorca, #però
 this species of reptile is the most abundant *a* all Majorca but
 viu només al parc natural de s'Albufera.
 live.3SG only *a*.the reserve nature of the Albufera
 'This species of reptile is the most abundant everywhere in Majorca,
 # but it only lives in the nature reserve in s'Albufera.'
- b. Aquesta espècie de rèptil és la més abundant en tot Mallorca, però
 this species of reptile is the most abundant *en* all Majorca but
 viu només al parc natural de s'Albufera.
 live.3SG only *a*.the reserve nature of the Albufera
 'This species of reptile is the most abundant in the whole of Majorca,
 but it only lives in the nature reserve in s'Albufera.'

With superlative-like elements like the adjective *únic* 'unique' or *pioner* 'pioneering' the collective/distributive distinction again shows up:

- (36) És un centre d'investigació únic/pioner #*a/en* tot Europa.
 is a centre of research unique/pioneering *a/en* all Europe.
 'It is a unique/pioneering research centre in the whole of Europe.'

In this example the *en*-version is compatible with the interpretation that there is one research centre that is unique or pioneering with respect to the whole set of research centres in Europe. The *a*-version sounds odd because it forces a distributive interpretation whereby there is a unique research centre in every one of the contextually relevant parts of Europe. If we force a kind interpretation of *centre d'investigació* 'research centre,' that is, an interpretation whereby we refer to an institution with different branches in all regions of Europe, then the version with *a* becomes possible and the version with *en* becomes, as expected, anomalous:

- (37) a. És un centre d'investigació únic/pioner a tot Europa i
 is a centre of research unique/pioneering *a* all Europe and
 n'hi ha un a cada regió.
 PART LOC have.3SG one *a* every region
 'It is a unique/pioneering research centre in all of Europe and there is
 one branch in every region.'
- b. #És un centre d'investigació únic/pioner en tot Europa i
 is a centre of research unique/pioneering *en* all Europe and
 n'hi ha un a cada regió.
 PART LOC have.3SG one *a* every region
 '#It is a unique/pioneering research centre in all of Europe and there is
 one branch in every region.'

Bearing in mind the analysis of *a* and *en* developed in Sect. 3, in Sect. 5.3 we show that the distributive vs. collective interpretation of both PPs is a consequence of the presence/absence of the projection *AspbP*. Before tackling the analysis of the

distributive/collective readings of *a/en-tot*-PPs, we will provide an analysis of the interpretation of *a/en-tot*-PPs in the context of negation.

5.2 *a-tot*- and *en-tot*-PPs in the context of negation

One of the main empirical contributions of our study is the contrast we first presented in (1a) of Sect. 1, related to the interpretation of a universally quantified DP as complement of *a* and *en* and in the context of negation. We repeat it below, made even clearer via extensions of the sentences:

- (38) a. Aquesta espècie de rèptil no viu a tot Mallorca. Viu només
 this species of reptile not live.3SG *a* all Majorca live.3SG only
 al nord.
 in.the north
 ‘This species of reptile does not live in all of Majorca. It lives only in the north.’
 b. Aquesta espècie de rèptil no viu en tot Mallorca. #Viu només
 this species of reptile not lives *en* all Majorca #live.3SG only
 al nord.
 in.the north
 ‘This species of reptile does not live anywhere in Majorca. It lives only in the north.’
 b’ Aquesta espècie de rèptil no viu en tot Mallorca. Es
 this species of reptile not live.3SG *en* all Majorca REFL.3SG
 va extingir al s. XIX.
 PST.3SG die.out in.the c. XIX
 ‘This species of reptile does not live anywhere in Majorca. It died off in the XIX c.’

The extension asserting that the effect of negation is not exhaustive is possible with *a* but not with *en*. Thus, the version with *a* is compatible with a situation in which there are some places in Majorca where the species of reptile can be found, like the northern part of the island. By contrast, the version with *en* is only compatible with the nonexistence of the species of reptile anywhere in the island, as made clear in (38b).

The most natural hypothesis that comes to mind when considering (38) is that the interpretational difference is a consequence of a scopal interaction between the negative operator and the universal quantifier *tot*, which appears in the complement position of prepositions *a* and *en*. In particular, one could think that, in the version with *a*, the universal quantifier scopes under negation, while in the version with *en*, it scopes above negation. That is, the interpretation of the corresponding sentences would be roughly as follows.

- (39) Aquesta espècie de rèptil no viu a tot Mallorca.
 this species of reptile not live.3SG *a* all Majorca.
 ‘This species of reptile does not live everywhere in Majorca.’
 $\neg > \forall$

- (40) Aquesta espècie de rèptil no viu en tot Mallorca.
 this species of reptile not live.3SG *en* all Majorca.
 ‘This species of reptile does not live anywhere in Majorca.’
 $\forall > \neg$

The scope-based hypothesis rests on the assumption that *tot* in these expressions is always a quantifier. If this is the case, the pattern is puzzling, since we would expect to find the same scopal pattern with both prepositions, contrary to fact. The question now is whether *tot* is behaving as a quantifier in both expressions.

Outside of the cases with prepositions *a* and *en*, Espinal (2002), assuming that *tot* is a quantifier when accompanying singular DPs, claims that negation always takes scope over it.¹⁴ For instance, in sentence (41), we only obtain the interpretation whereby the teacher may have explained some parts of the lesson.

- (41) El professor no ha explicat tot el tema.
 the teacher not has explained all the lesson
 ‘The teacher has not explained all the lesson.’

In fact, examples with the universal quantifier *tot* above negation sound deviant, as shown in the contrast in (42). The subject needs to be in postverbal position and it is never understood as having wide scope over negation.

- (42) a. *Tota la classe no va aprovar l’examen.
 all.F the class not PST.3SG pass the exam
 b. No va aprovar l’examen tota la classe.
 not PST.3SG pass the exam all.F the class
 ‘Not all the class passed the exam.’

If *tot* always takes narrow scope with respect to negation in Catalan, the interpretation that we obtain when *tot* is embedded under the preposition *en* in (40) is not expected.

An additional piece of evidence against the scope-based analysis comes from another hitherto unknown fact: *en-tot*-PPs behave as NPIs. This is shown in the contrast in (43). While the version with *a* is fine with or without negation, the version with *en* needs the negation.

- (43) a. Aquesta espècie de rèptil (no) viu a tot Mallorca.
 this species of reptile (not) live.3SG *a* all Majorca
 ‘This species of reptile {lives/does not live} everywhere in Majorca.’
 b. Aquesta espècie de rèptil *(no) viu en tot Mallorca.
 this species of reptile *(not) live.3SG *en* all Majorca
 ‘This species of reptile does not live anywhere in Majorca.’

The version with *en* can be rescued with other negative items, such as the determiner *cap* ‘(not) any’ or the adverb *mai* ‘(n)ever’, in the varieties that accept these elements without sentential negation (Tubau et al. 2023).

¹⁴We assume Laka’s (1990) hypothesis that, in Romance languages, sentential negation, hosted in a polarity projection, is situated above TP.

- (44) Cap espècie de rèptil viu en tot Mallorca.
not.any species of reptile live.3SG *en* all Majorca
'No species of reptile lives anywhere in Majorca.'
- (45) Aquesta espècie de rèptil mai ha viscut *en* tot Mallorca.
this species of reptile never has lived *en* all Majorca
'This species of reptile has never lived anywhere in Majorca.'

Other contexts counting as NPI-licensing also support *en-tot*-PPs, such as comparatives (Hoeksema 1983), superlatives (von Fintel 1999) or superlative-like adjectives like *primer* 'first,' *últim/darrer* 'last', *únic* 'only' or *pioner* 'pioneering' (Espinal 2002):

- (46) Hi ha més amfibis en un toll de l'Amazònia que en tot
LOC have.3SG more amphibians in a puddle of the Amazonia than *en* all
Mallorca.
Majorca
'There are more amphibians in a puddle in the Amazon than anywhere in
Majorca.'
- (47) És la iniciativa social més interessant en tot Mallorca.
is the initiative social most interesting *en* all Majorca
'It is the most interesting social initiative anywhere in Majorca.'
- (48) És {la primera/l'última} empresa d'embotits en tot Mallorca.
is the first/the last company of sausage *en* all Majorca
'It is the first/last sausage company anywhere in Majorca.'
- (49) És una iniciativa social única/pionera/*interessant en tot Mallorca.
is a initiative social unique/pioneering/*interesting *en* all Majorca
'It is a unique/pioneering/*interesting social initiative anywhere in Majorca.'

Finally, focal adverbs like *només* 'only' applied to cardinal expressions can also license *en-tot*-PPs.

- (50) Hi ha (només) una oficina d'aquest banc en tot Mallorca.
LOC have.3SG only one branch of this bank *en* all Majorca
'There is only one branch of this bank in the whole of Majorca.'

This sentence entails that there is one single branch of the bank on the whole of the island. Exhaustivity operators like *only* are well known to license NPIs (Giannakidou 2006). Note that in the above examples, *només* 'only' is presented as optional. In fact, we believe it is, provided that the cardinal maintains the focal stress and thereby, the exhaustive reading licensing the NPI.¹⁵

¹⁵We suggest, following Linebarger (1987), that the *en-tot*-PP, in the version without *només* 'only,' is licensed by implicature, that is, by an inferred statement that includes a negation: in the above case, something like *No hi ha més d'una oficina d'aquest banc en tot Mallorca* ('There is no more than one branch of this bank on the whole of Majorca'). We note that well-established NPIs like the minimizer *una merda* 'shit, a damn' and the existential *gens* 'at all' are also licensed in similar contexts, without an overt licenser and involving a focused cardinal.

If *en-tot*-PPs are NPIs, the question emerges whether *tot* is really behaving as a proper universal quantifier in these contexts. As it turns out, there is independent evidence that it is not. Consider first the entailing properties of the universal quantifier. It is well known that the universal quantifier has the property of being downward entailing on its restrictor (Ladusaw 1979), and upward entailing on its scope:

- (51) δ is downward entailing iff $\forall X, Y[(X \subset Y) \rightarrow (\llbracket \delta \rrbracket(Y) \subset \llbracket \delta \rrbracket(X))]$
(from Zeijlstra 2013, 807)

This property is illustrated in (52) and (53): if the sentence in (52) is true, it also holds for a subset of the set of whales, (53).

- (52) Every [whale]_{RESTRICTOR} is [a mammal]_{SCOPE}.
(53) Every [blue whale]_{RESTRICTOR} is [a mammal]_{SCOPE}.

Under the definition of downward entailing in (51), Catalan *tot* ‘all’ is downward entailing under *a* but not under *en*. We illustrate with the behaviour of these PPs with superlatives:

- (54) a. Aquesta espècie de rèptil és la més abundant a tot Mallorca.
this species of reptile is the most abundant *a* all Majorca
‘This species is the most abundant in all Majorca.’
b. Aquesta espècie de rèptil és la més abundant en tot Mallorca.
this species of reptile is the most abundant *en* all Majorca
‘This species is the most abundant in all Majorca.’

If sentence (54a) is true, then it also holds for any part of Majorca: any part where this species is found, the species is the most abundant one among other reptiles. By contrast, if the sentence in (54b) is true, it does not necessarily hold that this species is the most abundant in a specific part of Majorca (it could be true or not). The sentence requires for the species of reptile to be the most abundant one in the totality of the territory of Majorca.

All in all, the data show that *tot* is a universal quantifier when embedded under *a*, since it is downward entailing on its restrictor, and upward entailing on its scope.

- (i) Aquí hi ha UNA persona que li importi {una merda/gens} el que
here LOC have.3SG ONE person that DAT.3SG matter.SBJV.3SG {a shit/at.all} the what
dic; a la resta tant els fa.
say.1SG; to the rest so.much DAT.3PL do.3SG.
‘Here there is a single person that {gives a shit / cares at all} about what I say; the rest do not care.’

By contrast, *tot*, when embedded under *en*, is not behaving as a quantifier, but as an adjectival element of the likes of English *whole*.¹⁶

5.3 Accounting for the contrast between *a-tot*-PPs and *en-tot*-PPs via aspect-boundedness

Having discarded a scope-based analysis of the interpretational difference between *a-tot*-PPs and *en-tot*-PPs in the context of negation, in this section we show that this difference should be related to the distinct syntactic structures that these prepositions spell out, with associated semantics: one that imposes a homogeneous interpretation on the location (*en*) and one that imposes a quantity interpretation (*a*). In what follows, we will describe the syntax and the associated semantics of *a-tot*-PPs and *en-tot*-PPs.

Let us consider first *a-tot*-PPs in the example (1) of the introduction and repeated here in (55):

- (55) Aquesta espècie de rèptil no viu a tot Mallorca
 this species of reptile not live.3SG *a* all Majorca
 ‘This species of reptile does not live in all parts of Majorca.’

To begin with, we assume a syntax and a semantics for proper nouns of location similar to the syntax assumed for proper nouns of human beings by Longobardi. The proper noun contains a D which can be overt or covert, depending on the particular noun (see Sect. 4 for discussion). The denotation of these DPs is a singular entity, a constant. When *tot* combines with the DP *Mallorca*, we obtain the interpretation in which Majorca is a collection of parts and we consider all of them. In this respect, we follow Moltmann (1997), who describes the semantic compositionality of Italian *tutto* ‘whole’ when combined with a singular DP. Note that the collection-of-parts interpretation is found in any context in which *tot* is combined with a singular entity-denoting DP, not only within PP.

- (56) L'estudiant va llegir tot el llibre
 the.student PST.3SG read all the book
 ‘The student read the whole book.’

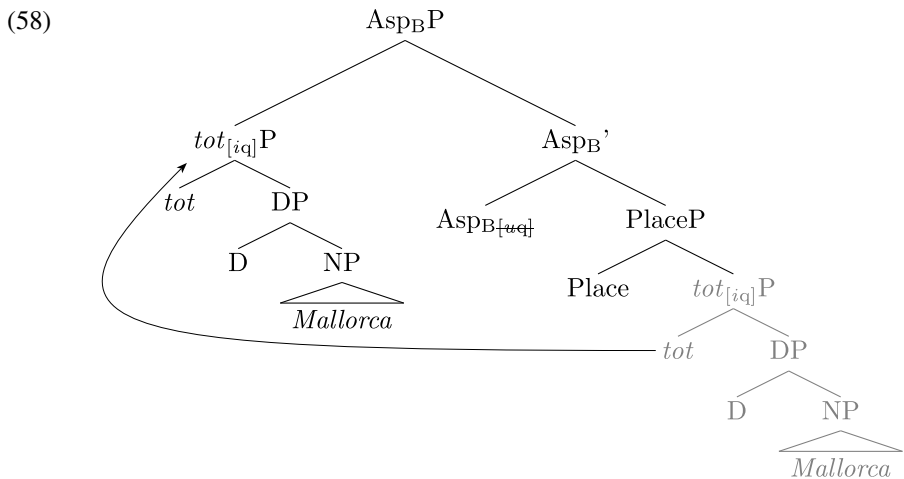
Crucially, the semantics proposed for *tot* in the example in (56) conforms with the Generalized Quantifier analysis of Barwise and Cooper (1981). The difference between singular contexts and plural contexts such as (57) is that in the former *tot*

¹⁶Our assumption that *tot* when embedded under *a* is a universal quantifier before a DP is at odds with the received knowledge that the universal quantifier should not combine with entity-denoting nominals (cf. the Generalized Quantifier analysis: Barwise and Cooper 1981). In the next section, we argue that the universal quantifier *tot* can take an entity-denoting DP and give rise to a universal part quantification, similarly to the analysis of Italian *tutto* in Moltmann (1997).

quantifies over parts of an individual, whereas, in the latter, it is a generalized part quantifier that requires the predicate it combines with to apply to all the subparts that make up the quantified entity (cf. Moltmann 1997; Brisson 1998; Morzycki 2002).

- (57) L'estudiant va llegir tots els llibres.
 the.student PST.3SG read all.PL the books
 'The student read all the books.'

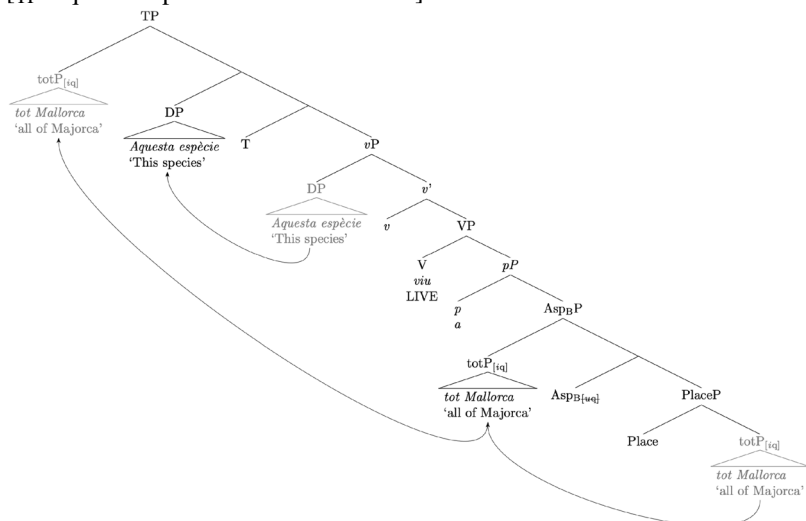
Coming back to our case study in (55), the *totP* combines first with the functional head *Place*, which maps an entity onto a region. Above *Place*, *Asp_B* is merged, endowed with an uninterpretable feature [*uq*], in need of checking: the DP *tot Mallorca* raises to Spec-*Asp_BP* and deletes the [*uq*] feature in *Asp_BP*. This ensures that the derivation will not crash at LF.



Since *Asp_B* is projected on top of *PlaceP*, it defines a region containing disjoint subregions. Above *Asp_BP*, *p* is merged, creating a predicate of events. Above this head, *V* is merged. The main predicate, the verb *viure* 'live' is assumed here to be a non-dynamic verb denoting the event of living. We assume a Neodavidsonian approach to argument structure, as in Wood and Marantz (2017). With these authors, we also assume that *v* is the argument-introducing head, which can have a different semantic value depending on the context of insertion. We take it that in this case, *v* assigns to the external argument the thematic role of Theme. Moreover, the PP *a tot Mallorca* is a low adjunct in the sentence *Aquesta espècie de rèptil viu a tot Mallorca* 'That species of reptile lives in all Majorca' and combines with the verbal predicate via Predicate Conjunction. We propose that *totP*, after raising to the specifier of *Asp_BP*,

moves again to TP as a quantifier.¹⁷ For simplicity, we leave aside projections like CP.

(59) [TP Aquesta espècie viu a tot Mallorca]



The sentence, according to (59), would be true if for every subpart of Mallorca, there is an event of the species of reptile living in that part. Note also that the universal quantifier takes scope over the whole TP and hence also over the event variable. This explains directly the distributive readings associated with the *a*-PP version that we have described in Sect. 5.1 (see below).

When negation is added to the sentence, above TP, it takes scope over the universal quantifier, and can therefore access the universally quantified distinct subregions of Mallorca. The negated sentence is, hence, true if it is not the case that for every subregion of Mallorca, there is an event of the species living in that subregion. It would be true in a situation in which the species lives in some subregions, but not in all of them.

The derivation of *en-tot*-PPs differs in crucial ways from what we have just described for *a-tot*-PPs:

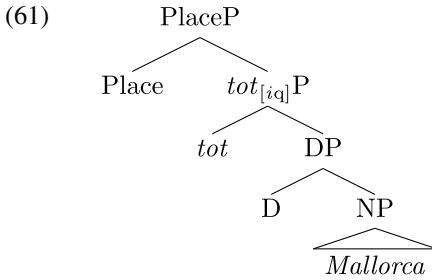
¹⁷ We are assuming that the raising of *totP* to TP, with a quantifier interpretation ensuing, is possible due to its previous raising to an aspectual projection, in this case Asp_{BP} . Independent evidence for the relationship between aspect and quantifier readings is provided by interpretational effects induced by *tot* in verbal predicates that are naturally ambiguous between a telic and an atelic interpretation. In particular, *tot* forces telic readings in otherwise aspectually underspecified transitive predicates like *escombrar* 'sweep':

- (i) a. En Pau ha escombrat el terra. TELIC/ATELIC (See Borer 2005b, 225)
the Pau has swept the floor
'Pau has swept the floor.' (Completely or not)
- b. En Pau ha escombrat tot el terra. TELIC/*ATELIC.
the Pau has swept all the floor
'Pau has swept the whole floor.' (Completely)

Reasons of space force us to leave this interesting issue for further research.

- (60) Aquesta espècie de rèptil no viu en tot Mallorca
 this species of reptile not live.3SG *en* all Majorca
 ‘This species of reptile does not live anywhere in Majorca.’

In this case there is no Asp_BP , endowed with a $[uq]$ feature, and thus movement of the DP *tot Mallorca* cannot take place (see footnote 17 for the special relation between *tot* and the aspectual projection):



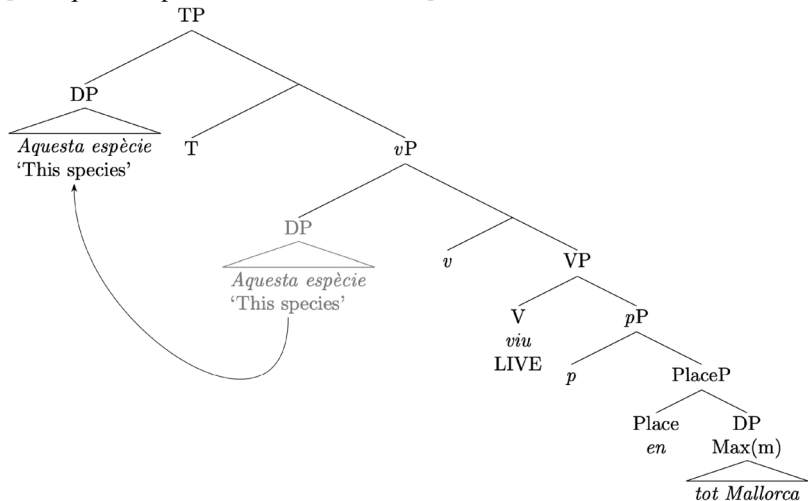
If Asp_BP is not present, no partitions over the region defined by *tot Mallorca* are created. Additionally, the derivation obtained for *en tot Mallorca* differs from the one proposed for *a tot Mallorca* in that there is no quantifier raising. Since *tot* is not raising, we propose that it cannot function as a generalized quantifier. In fact, *tot* in *en tot Mallorca* is interpreted as an adjective of sorts and denotes the maximal region of Majorca. We are therefore claiming that one and the same functional element, which we will refer to informally as *tot*, may have different denotations depending on its syntactic context. Following Marantz’s (2013), Wood’s (2015), and Wood and Marantz’s (2017) treatment of the various interpretations of items like *v* and Voice as “allosemes” triggered by competing rules at LF, we propose that *tot* has two interpretations: it can be interpreted as a maximality operator (Rullmann 1995) or as a universal part quantifier of sorts (Moltmann 1997).

The former interpretation of *tot* is a context-independent, elsewhere interpretation. This alloseme of *tot* corresponds to a maximality operator, which takes an entity understood as a collection of parts and picks out the unique part of *x* that exhaustively contains all the parts of *x*.

The other alloseme of *tot* corresponds to a generalized part quantifier. This alloseme is selected when *tot* raises to some quantificational projection, in this case Asp_B (see footnote 17). In turn, movement to Asp_B allows *tot* to eventually raise to the edge of TP, where it can take scope.

Bearing these qualifications in mind, the derivation of the deviant sentence **Aquesta espècie viu en tot Mallorca* would be as follows:

(62) [TP Aquesta espècie viu en tot Mallorca]



Recall that when the *pP* is merged with the *V viure* ‘live,’ they combine via an operation of Predicate Conjunction, whereby the eventuality variable introduced by the functional head *p* is identified with the eventuality variable introduced by *V*. The sentence would be true if for a given species, there is an event in which that species lives in the only part of Majorca that contains all the parts of Majorca. Note that the collective interpretation of the predicate in the sentence above arises from the fact that there is only one single event of the species living in a region. It should be evident now why the sentence as such produces deviance: an individual is interpreted to live in a region containing all the parts of Majorca, in a singular event. The presence of negation renders the sentence grammatical since the predicate imposes a weaker condition: namely, that the species does not live in Majorca considered as a whole.

(63) Aquesta espècie de rèptil no viu en tot Mallorca.
 this species of reptile (not) live.3SG *en* all Majorca
 ‘This species of reptile does not live anywhere in Majorca.’

Our analysis of the behaviour of *a-tot*-PPs and *en-tot*-PPs with respect to negation, and, in particular, the claim that the quantified DP can raise with *a*, but not with *en*, allows us a fairly natural explanation for the contrast shown in (50), repeated here as (64):

(64) Hi ha una oficina d’aquest banc a/en tot Mallorca.
 LOC have.3SG one branch of.this bank *a/en* all Majorca
 ‘There is one branch of this bank {everywhere in/in the whole of} Majorca.’

Recall that, with *a*, we can interpret that there are several branches of the bank, one per each of the contextually relevant parts of Majorca. By contrast, with *en*, there is necessarily only one single branch of the bank on the whole of the island. Thus, with *a*, *tot* behaves as a proper universal quantifier, and we can obtain a bound variable reading of *una oficina* ‘a branch.’ By contrast, with *en*, there is no universal quan-

tification and the predicate *en tot Mallorca* is collective. This is why *una oficina* ‘a branch’ can only receive a cardinal interpretation: the total number of offices on the island is one.¹⁸ In conclusion, with *en*, *tot Mallorca* remains in situ, and cannot quantify over *una oficina d’aquest banc* ‘a branch of this bank.’ The inability of the DP introduced by *tot* to raise when *en* is used has of course to do with the lack of projection of Asp_BP . It is this projection that licenses *tot* as a quantifier, and, hence, allows the DP to LF-raise to TP. When Asp_BP is not projected, the DP does not raise, is not interpreted as a quantifier and does not take scope over the indefinite.

5.4 Towards an explanation of the NPI status of *en-tot*-PPs

Having assumed that *en* fits into a prepositional structure with no Asp_BP projection, we are in a position to speculate about the reason behind the NPI status of *en-tot*-PPs:

- (65) Aquesta espècie de rèptil *(no) viu en tot Mallorca/l’illa.
 this species of reptile *(not) live.3SG *en* all Majorca/the island
 ‘This species of reptile does not live anywhere {in Majorca/on the island}.’

In our account, there is a non-trivial relationship between the partless semantics of *en*-PPs and the NPI status of *en-tot*-PPs.

Observe, first, that the NPI status of these PPs hangs on both the presence of *en* and the presence of the quantifier *tot*.¹⁹ Thus, *tot*-DPs on their own certainly do not behave as NPIs, since they survive in non-NPI environments like affirmative sentences:

¹⁸Some speakers report that the *a*-version of the example in (64) also allows the wide scope interpretation of the indefinite, in which there is a single eventuality of a specific branch being in Majorca. We find this type of reading with other predicates. See for instance the example in (i):

- (i) a. L’arquitecta va construir un edifici a tot el solar.
 the architect PST.3SG build a building *a* all the site.
 Interpretation₁: ‘The architect built a building, and there were building events happening at different parts of the building site.’
 Interpretation₂: ‘The architect built a building that occupies different parts of the site.’
 b. L’arquitecta va construir un edifici en tot el solar.
 the architect PST.3SG build a building *en* all the site.
 ‘The architect built only one building on the whole site.’

The sentence in (ia) has two readings: the distributive reading in which there are multiple events of building, and the collective reading in which there is a single event and there is a single building, whose different parts occupy different parts of the site. This last reading seems to be at odds with our proposal, in which we expect *a-tot*-PPs to have only distributive readings. Although we do not have an explanation at this moment, we note that the behaviour of Catalan *tot* in these examples is not different from the widely discussed behaviour of the English quantifier *all*, in that it allows collective readings in some contexts (Dowty 1987; Taub 1989; Brisson 1998; and subsequent discussion). Importantly, as argued in those previous works, the collective reading of *all* always carries distributive sub-entailments, as shown in the collective interpretation of (ia), in which the building is understood as being distributed over all the parts that make up the site. By contrast, the collective reading that we obtain in (ib) does not carry this sub-entailment. We leave these examples for further research.

¹⁹An anonymous reviewer draws our attention to certain parallelisms between Catalan *tot* and Dutch *heel* ‘all/whole,’ as studied by Den Dikken (2002). Among them, *heel* can also behave as an NPI, albeit not needing the concurrence of a preposition. For reasons of space we cannot explore the comparison between the two items in this article, and we must leave the issue for future research.

- (66) Des de la Talaia de la Victòria es pot veure tot Mallorca.
 from of the Talaia de la Victòria REFL.3SG can.3SG see *tot* Majorca
 ‘From Talaia de la Victòria one can see the whole of Majorca.’

The same can be said about *en*-headed PPs:

- (67) He posat els cogombres en vinagre.
 have.1SG put the cucumbers *en* vinegar
 ‘I have put the cucumbers in vinegar.’

Interestingly, however, *en* is found in certain complex words like *enlloc* ‘anywhere’ or in lexicalized or semi-lexicalized expressions like *en absolut* ‘at all’ or *en ma vida* ‘in my whole life,’ which do behave as NPIs:

- (68) *(No) he vist un rèptil així en-lloc.
 no have.1SG seen a reptile like.this *en*-place
 ‘I have not seen a reptile like this one anywhere.’
- (69) *(No) m’agraden els rèptils en absolut.
 no DAT.1SG.please.3PL the reptiles *en* absolute
 ‘I do not like reptiles at all.’
- (70) *(No) he vist un rèptil així en ma vida.
 no have.1SG seen a reptile like.this *en* my life
 ‘I have not seen a reptile like this one in my whole life.’

This provides further evidence that *en* is playing a crucial role as an ingredient of the NPI-hood of *en-tot*-PPs. The combination of *en* and *tot* (or other expressions like *-lloc* or *ma vida*) is what triggers the NPI status of *en-tot*-PPs. But how exactly does each component contribute to this NPI behaviour? And how can we make sense of that semantic contribution in order to explain that *en-tot*-PPs need a certain kind of environment to be licensed? Let us first briefly consider this latter issue.

As has been pointed out in Sect. 5.2 and is well known in the literature (see Kadmon and Landman 1993; Chierchia 2006; a. o.), NPIs are licensed in downward entailing contexts, i.e., contexts, like negation, that generate entailments from sets to subsets. This is due, according to Kadmon and Landman (1993), to the fact that NPIs widen the referential domain with respect to non-NPI indefinites, and such denotation is maximally informative, hence fitting, in downward entailing contexts.²⁰ On the contrary, in upward entailing contexts, the denotation of an NPI yields a statement that is weaker than that involving a non-NPI indefinite. This is the reason why NPIs are not licensed in such contexts. It is the property of downward entailment that we want to focus on. The intuition is that the partless semantics of *en-tot*-PPs is only compatible with such contexts.

As far as *tot* and *en* are concerned, the former forces the DP to be considered as a complete collection of parts. On the other hand, *en* forces a homogeneous reading on its Ground by disallowing divisions to be imposed. The collection of parts that is denoted by *tot* must therefore be interpreted as a homogeneous whole. By con-

²⁰See Chierchia (2013) for arguments that domain widening needs to be replaced by domain alternatives. For a defense of domain widening, see Zeijlstra (2022).

trast, with *a* (and other prepositions), all the parts brought out by the presence of *tot* are available to be targeted as locations. The reading of these PPs involves a whole collection of individuated locations.

Upward entailing contexts generate entailments from subsets to sets, and not the other way around. In other words, subsets are presupposed to exist. This is what clashes with the semantics of *en-tot*-PPs, which entail the nonexistence of subsets. In downward entailing contexts, however, the problem does not arise, since entailments go from the set to the subsets. It is the whole set that is presupposed, not the subsets. The partless, atomic reading of *en-tot*-PPs is compatible with this environment.

Speculating more widely, we believe that *en-tot*-PLACE NAME constructions are analytic NPIs, showing the components of what any NPI probably boils down to: a whole structure denoting exhaustiveness (i.e., domain widening), via the Max operator denoted by *tot*, homogeneity (i.e., no possible entailments from subsets to sets), via *en*, and a restriction, via the place name.²¹

6 Conclusions and prospects

Through the examination of the syntactic and semantic differences between the locative prepositions *a* and *en*, we have provided evidence for the grammatical relevance of quantification, *qua* boundedness, in the domain of locative adpositions. In particular, we have proposed the existence of a quantificational projection, Asp_BP , akin to Borer's AspQP in the domain of events. Preposition *a*, but not preposition *en*, involves the projection of Asp_BP , which must be licensed, as Borer's aspectual projection in English, via the merger of a quantity nominal in its specifier. Asp_BP imposes a partition of the otherwise homogeneous region denoted by PlaceP . In tune with existing proposals on the quantity/aspect of entities and events, homogeneity and non-homogeneity have been defined in terms of the more primitive notions of divisiveness and cumulativeness. While both *a*-PPs and *en*-PPs have divisive reference, only *en*-PPs have, in addition, cumulative reference, and hence only they are homogeneous. The presence of Asp_BP in *a*-PPs and its absence in *en*-PPs accounts with ease for the otherwise mysterious c-selection properties of these prepositions, as recorded in the literature.

The paper contributes the observation of three additional striking empirical facts distinguishing *a* and *en* when they take a singular DP introduced by the quantifier *tot* 'all.' First, *a-tot*-PPs license a distributive reading of the sentence it appears in, while sentences with *en-tot*-PPs are necessarily interpreted as collective. Second, in negative sentences, *a-tot*-PPs seem to take scope below negation, whereas *en-tot*-PPs seem to take scope above negation. Third, but relatedly, *en-tot*-PPs, but not *a-tot*-PPs, are NPIs.

A general conclusion that can be drawn from our study is that we can ascertain the existence, across categories, of a syntactic projection introducing quantified divisions. To the layer encoding quantity in nominals Borer (2005a) and the one encoding telicity in events (Borer 2005b; MacDonald 2008) we add the one encoding boundedness

²¹ See also Israel (2001) on the lexicalization patterns of PIs, which normally include expressions denoting minimal or maximal points of a scale.

in the adpositional domain. While previous work like Koopman (2000), Svenonius (2003, 2010), Tortora (2008), and Den Dikken (2010) had also posited the existence of an aspectual projection in the functional structure of PPs, these authors had not scrutinized its syntactic and semantic effects in depth, nor had a clear minimal pair, like the one formed by *a* and *en*, been identified earlier.

Finally, future research should try to extend the empirical domain, first to other prepositions in central Catalan, and, second, to other varieties of Catalan (like Valencian) and other languages. As regards the first empirical extension, it is worth pointing out how rich locative prepositions, that is, prepositions involving a more complex topological denotation (axial parts, in terms of Svenonius 2006) seem to behave like *a*, and not like *en*, at least as far as the interaction between negation and *tot* is concerned. For instance, the preposition *sobre* ‘on’ in the next example only allows the non-homogeneous reading of the region occupied by the surface of the table, whereby some parts of the surface table may be dry:

- (71) No hi ha aigua sobre tota la superfície de la taula.
not LOC have.3SG water on all.F the surface of the table
‘There is not water on the whole surface of the table.’

Second, while other Romance languages like Spanish and Portuguese do not seem to have a lexicalized distinction analogous to that between *a* and *en* in Catalan, they show relevant ambiguities with their simple locative prepositions *en* and *em*, respectively. We illustrate, again, with examples involving negation and the universal quantifier *todol-a*, cognate with Catalan *tot* ‘all’:

- (72) Esta especie de reptil no vive en toda la isla.
this species of reptile not live.3SG in all.F the island
(73) Esta espécie de réptil não vive em toda a ilha.
this species of reptile not live.3SG in all.F the island

These Spanish and Portuguese translations of our Catalan example are ambiguous between a narrow and a wide scope interpretation of the quantifier, as though Sp. *en* / Port. *em* could correspond to either Catalan *a* or Catalan *en*. Intriguingly, however, speakers report that the “wide scope” reading, the one corresponding to the one licensed by Catalan *en*, requires an emphatic pronunciation of the quantifier *toda* ‘all.’

Appendix: Apparent counterexamples to the c-selection properties of *a* and *en*

In this appendix, we deal with a series of apparent counterexamples to Sancho Cremades’s (2002) generalizations on the c-selection properties of *a* and *en*, as pointed out in Sect. 2. We first consider those cases in which *a* seems to select a bare noun (singular or plural). We then examine the cases in which *en* is combined with a vowel-initial determiner.

Preposition *a* can select bare singular NPs, different from the mass nouns in (7) (see Sect. 2). Unlike mass nouns, bare singular NPs cannot be quantified. Compare

the bare singular masculine noun *terra* ‘ground,’ which cannot be quantified, with the homonymous feminine mass term *terra* ‘earth, soil,’ which does accept quantification, (74b).

- (74) a. caure a (*molt de / *poc de) terra
 fall a (*much of / little of) ground
 ‘to fall to the ground’
 b. posar els bulbs en molta terra.
 put the bulbs *en* much earth
 ‘to put the bulbs in a lot of earth’

Moreover, non-mass bare singulars (see (9), Sect. 2) do not accept modifiers (75a), which are possible with mass singulars (75b):

- (75) a. viure a muntanya (*alta), seure a taula (*de cuina), caure a terra
 live a mountain (*high), sit a table (*of kitchen), fall a ground
 (*brut)
 (*dirty)
 ‘to live on the mountain, to sit at the table, to fall to the ground’
 b. posar els cogombres en oli (verge/de girasol)/vinagre (de poma).
 put the cucumbers *en* oil (virgin/of sunflower)/vinager (of apple)
 ‘to put the cucumbers in (virgin/sunflower) oil / (apple) vinegar’

Finally, unlike mass singulars, PPs containing non-bare count singulars denote conventionalized locations. For instance, in the example (76), the PP *a escola* describes a school-related setting more than a precise location.

- (76) La Jana és a escola.
 the Jana is a school
 ‘Jana is at school.’

The sentence in (76) could be uttered even if at that very precise moment, Jana is on a trip to a museum organized by her school and not in the school building. Bare singulars of this type are semantically equivalent to weak definites (Carlson et al. 2006; Aguilar and Zwarts 2010) and are frequently in complementary distribution with them (Aguilar 2014). Weak definites have the following properties: 1) they do not refer to a unique individual (more than one individual can satisfy the content of the definite description) (77a); 2) in elliptical contexts they allow for sloppy reference (77b); 3) they are restricted to a specific type of nouns (77c); 4) they can only be modified by adjectives that establish subclasses (77d); 5) they lose the weak reading if their number morphology is altered (77e); 6) they do not only refer to an entity or type of entity but also to a type of activity (77f); and 7) they do not need to be anaphoric (77g) (examples extracted and adapted from Aguilar 2014²²):

- (77) a. Mary took the train to go home. [Maybe she took different trains to go home]

²²The list is not exhaustive. We refer the interested reader to Aguilar (2014).

- b. Mary read the newspaper and Louise did too. [Context: they read different newspapers]
- c. Martha listened to the radio/#walkie-talkie and Alice did too.
- d. Lola went to the mental/#old hospital.
- e. Alice went to the mountain/#mountains.
- f. Lola went to the hospital. [Meaning: Lola went to get medical care]
- g. Laila bought a new book and a magazine. After wondering what to read, she decided to read the newspaper.

Coming back to Catalan *a*, the bare singular NPs that combine with this preposition turn out to present almost the same distribution as weak definites. Thus, they do not denote a unique referent (78a), they allow sloppy readings in elliptical contexts (78b), they are only possible with a restricted set of nouns (78c), they do not admit number modification (78d), they can denote a type of activity (78e), and they do not need to refer back to any previously mentioned entity (78f):

- (78)
- a. L'Elna sempre ha viscut a ciutat
the Elna always has lived *a* city.
'Elna has always lived in a city.' [She may have lived in different cities]
 - b. La Marta era a escola i l'Elsa també.
the Marta was *a* school and the Elsa too.
'Marta was at school and Elsa too.' [Context: they were at different schools]
 - c. ser a escola/#universitat/#metge
be *a* school/#university/#doctor
 - d. A la Berta li agradava ser a casa/*cases.
at the Berta DAT.3SG like.PST.3SG be *a* home/*homes.
'Berta liked to be home.'
 - e. L'Elsa era a piscina.
the Elsa was *a* piscina
'Elsa was at the swimming pool class.'
 - f. Marta entered the cafeteria and saw that the bar was crowded. After wondering a bit where she would sit, she sat *a taula* 'a table.'

The only difference shown with respect to weak definites is that bare singulars in *a*-PPs never allow modification, even by classifying adjectives (see (75a) and Aguilar 2014).²³

In conclusion, bare count singulars behave as weak definites. If bare singulars are amenable to DPs at some level of analysis, it is not surprising, given Sancho-Cremades's characterization, that *a* may select them.

The second apparent counterexample to the claim that preposition *a* does not select bare nominals involves its combination with certain bare plurals, like *comarques* 'counties':

²³For more information about bare singulars in Catalan, see Espinal (2010) and Espinal and McNally (2011).

- (79) Aquest embotit es fa només a comarques.
 this sausage REFL.3 make.3SG only a counties.
 ‘This sausage is made only in the countryside.’

The bare plural *comarques* ‘counties’ seems to be interpreted as the bare singular nouns discussed above. Its denotation corresponds, roughly, to the territory excluding the capital. Crucially, in spite of being a plural, it does not denote a plurality of entities, as run-of-the-mill bare plurals like *llibres* ‘books’ do. This is shown by the next contrast:

- (80) a. En Marc viu a comarques.
 the Marc live.3SG a counties.
 ‘Marc lives in the countryside.’
 b. En Marc ha comprat llibres.
 the Marc has bought books.
 ‘Marc has bought books.’

The sentence in (80a) is aberrant with the interpretation of Marc living in a plurality of counties. Actually, the sentence is judged to be true in a situation in which Marc is living in a single county, showing that the plural in *comarques* is not interpreted. By contrast, in order for the sentence in (80b) to be true, Marc must have bought at least two books.

Analogously to our conclusion regarding non-mass bare singulars, bare plurals like *comarques* ‘counties’ behave as weak definites DPs, which makes their combination with preposition *a* unsurprising.

The second set of counterexamples to Sancho Cremades’s (2002) generalizations concerns preposition *en*. In particular, there is a set of cases in which a preposition spelled as *en* builds standard locations in combination with a DP headed by the vowel-initial determiners *aquest* ‘this,’ *aquell* ‘that,’ *algun* ‘some,’ and *un* ‘a.’ With these determiners, a plain [ə] sounds odd in Eastern dialects (81a).²⁴ Prescriptive grammars (Fabra 1933, 118) advise that [ən] should be spelled *en* in these cases (81b):

- (81) a. L’Empar viu [ən]/*[ə] aquesta/aquella/alguna/una
 the.Empar live.3SG [ən]/*[ə] this.FEM/that.FEM/some.FEM/a.FEM
 ciutat del Perú.
 city of.the Peru.
 ‘Empar lives in this/that/some/a city in Peru.’
 b. L’Empar viu en/⁺a aquesta/aquella/alguna/una ciutat
 the.Empar lives en/⁺a this.FEM/that.FEM/some.FEM/a.FEM city
 del Perú.
 of.the Perú.

²⁴Note that *a* does not surface as [ən] in front of the vowel-initial definite article *el*. The reason is that the exponent of the masculine definite article in Catalan is actually an underlying consonant: /l/. The initial vowel of the article, spelled as *e*, is an epenthetic vowel (Mascaró 2007). The combination of preposition *a* and the article /l/ results in the form [əl] in Eastern Catalan, while the combination of *en* and *el* yields [ənəl].

There are, however, reasons to believe that [ən] in (81a) does not correspond to preposition *en*, but to *a* (see also Cabré 1980).

First, [ən] does not emerge before nominal expressions corresponding to standard locations that are not headed by the mentioned determiners, even if they are vowel-initial:

- (82) [ə]/*[ən] {Alemanya/escola}.
 Germany/school
 ‘in Germany, at school’

This means that the [ən] found in PPs denoting standard locations is contextually determined—even if not wholly phonologically determined. Furthermore, beside the exponents [ə] and [ən], we find similar non-normative forms like [ənə], [əm] or [əmbə] in the same phonological contexts (Albareda 2013).²⁵

The second piece of evidence comes from crossdialectal comparison. Clua (1996) shows that Tortosan, a dialect that maintains the distinction between the mid vowel [e] and the low vowel [a] in unstressed syllables, features three phonetically different items in its inventory of simple locative prepositions: [a], [an], and [en]. Crucially, before the set of determiners shown in (81), Tortosan uses [an], not [en] (examples from Clua 1996):

- (83) Es van quedar [an]/*[en] aquella habitació.
 REFL.3 PST.3PL stay [an]/*[en] that room
 ‘They stayed in that room.’
- (84) Viuen [an]/*[en] algun país.
 live.3PL [an]/*[en] some country
 ‘They live in some country.’
- (85) Sempre ha viscut [an]/*[en] una casa molt gran.
 always has.3SG lived [an]/*[en] a house very big
 ‘S/he has always lived in a very big house.’

[an] is thus a contextually-determined realisation of *a*, which is realised [a] before the definite article and before proper nouns (irrespectively of whether they begin with a vowel or a consonant):

²⁵Other varieties of Eastern Catalan show even more striking cases of phonetic syncretism. For instance, in the Camp de Tarragona variety the form [əm(b)ə] is used as the exponent of the prepositions *a*, *en*, and *amb* ‘with’ (Cabré 1980; Albareda 2013):

- (i) a. [əm] la Txell li agrada la xocolata.
 the Txell DAT.3SG like.3SG the chocolate
 ‘Txell likes chocolate.’
- b. Parlo [əm] la Txell.
 talk.1SG *amb* the Txell.
 ‘I am talking with Txell.’
- c. Preparo musclos [əm] salsa verda.
 prepare.1SG mussels *en* green sauce.
 ‘I am preparing mussels in green sauce.’

- (86) Ha treballat tres anys [a]/*[an]/*[en] la fàbrica.
has worked three years [a]/*[an]/*[en] the factory
'S/he has worked in the factory for three years.'
- (87) Viuen [a]/*[an]/*[en] Amposta/Tortosa.
live.3PL [a]/*[an]/*[en] Amposta/Tortosa
'They live in Amposta/Tortosa.'

As expected, [en], and not [an] or [a], is the item found before bare plurals or determiners other than demonstratives, the indefinite article and *algun* 'some' (Clua 1996):

- (88) Viuen [en]/*[an]/*[a] grans edificis.
live.3SG [en]/*[an]/*[a] big buildings
'They live in big buildings.'
- (89) Ho faré [en]/*[an]/*[a] tres dies.
it do.FUT.1SG [en]/*[an]/*[a] three days
'I will do it in three days.'

In conclusion, Tortosan Catalan distinguishes two different items, [an] and [en], that vowel-reduction varieties realize as [ən]. Going back to these latter varieties, it is natural to see the sequence [ən] in (81) as a contextually-determined realization of *a* and not the realization of *en*. This had been already contended by Fabra (1933, 1983–1984), or Badia i Margarit (1962), who report that it was usual to write *an* in order to represent the realisation [ən] of preposition *a* before standardization of Modern Catalan took place.²⁶

Supplementary information The judgments come from the authors and other native speakers of Catalan. Consultants are native speakers of the Central Catalan variety living in the areas of Barcelona, Girona, Penedès and Camp de Tarragona.

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²⁶See Albareda (2013) for an account of the allomorphy of preposition *a* in Western, Tortosan and North-Eastern Catalan dialects.

Declarations

Competing Interests The authors declare no competing interests.

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References

- Aguilar, Ana. 2014. Weak definites. Semantics, lexicon and pragmatics. PhD diss., Universiteit Utrecht.
- Aguilar, Ana, and Joost Zwarts. 2010. Weak definites and reference to kinds. In *Semantics and linguistic theory*, Vol. 20, 179–196.
- Albareda, Cristina. 2013. Les variants al·lomòrfiques de la preposició ‘a’ en algunes varietats del català: descripció i anàlisi. *Estudis de Llengua i Literatura Catalanes, Miscel·lània Albert Hauf* 66: 261–300.
- Badia i Margarit, Antoni M. 1962. *Gramàtica catalana*. Madrid: Gredos.
- Barwise, Jon, and Robin Cooper. 1981. Generalized quantifiers and natural language. *Linguistics and Philosophy* 4: 159–219.
- Borer, Hagit. 2005a. *In name only*. New York: Oxford University Press.
- Borer, Hagit. 2005b. *The normal course of events*. New York: Oxford University Press.
- Brisson, Christine M. 1998. Distributivity, maximality, and floating quantifiers. PhD diss., Rutgers University.
- Cabré, Teresa. 1980. Sobre les preposicions febles en català a-en. Master's thesis, Universitat Autònoma de Barcelona.
- Carlson, Greg, Rachel Sussman, Natalie Klein, and Michael Tanenhaus. 2006. Weak definite noun phrases. In *Proceeding of NELS 36*, eds. Christopher Davis, Amy Rose Deal, and Youri Zabbal. Vol. 1 of *Conference proceedings*, 179–196. Amherst: GSLA, University of Massachusetts.
- Cheng, Lisa Lai-Shen, and Rint Sybesma. 1999. Bare and not-so-bare nouns and the structure of NP. *Linguistic Inquiry* 30(4): 509–542.
- Chierchia, Gennaro. 2006. Broaden your views: Implicatures of domain widening and the “logicality” of language. *Linguistic Inquiry* 37(4): 535–590.
- Chierchia, Gennaro. 2013. *Logic in grammar: Polarity, free choice, and intervention*. Oxford: Oxford University Press.
- Clua, Esteve. 1996. Weak prepositions in Tortosan Catalan: Alternation of prepositions, allomorphy or phonological process. *Catalan Working Papers in Linguistics* 5: 29–66.
- Collins, Chris. 2007. Home sweet home. *NYU Working Papers in Linguistics* 1: 1–34.
- Csirmaz, Aniko. 2012. Durative adverbials and homogeneity requirements. *Lingua* 122(10): 1112–1133. <https://doi.org/10.1016/j.lingua.2012.05.002>. <https://www.sciencedirect.com/science/article/pii/S0024384112001088>.
- Den Dikken, Marcel. 2002. Direct and parasitic polarity item licensing. *Journal of Comparative Germanic Linguistics* 5: 35–66.
- Den Dikken, Marcel. 2010. On the functional structure of locative and directional PPs. In *Mapping spatial PPs: The cartography of syntactic structures*, eds. Guglielmo Cinque and Luigi Rizzi. Vol. 6, 74–126. New York: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195393675.001.0001>.
- Dowty, David. 1987. Collective predicates, distributive predicates, and all. In *Proceedings of the 3rd ES-COL (Eastern States Conference on Linguistics)*, eds. Fred Marshall, Ann Miller, and Zhengsheng Zhang, 97–115. Columbus: Ohio State University.
- Espinal, M. Teresa. 2002. La negació. In *Gramàtica del català contemporani*, ed. Joan Solà, Maria Rosa Lloret, Joan Mascaró, and Manuel Pérez Saldanya. Vol. 3 of *Sintaxi*, 2727–2797. Barcelona: Empúries.

- Espinal, M. Teresa. 2010. Bare nominals in Catalan and Spanish. Their structure and meaning. *Lingua* 120(4): 984–1009.
- Espinal, M. Teresa, and Louise McNally. 2011. Bare nominals and incorporating verbs in Spanish and Catalan. *Journal of Linguistics* 47(1): 87–128.
- Fabra, Pompeu. 1933. *Gramàtica catalana*. Barcelona: Institut d'Estudis Catalans.
- Fabra, Pompeu. 1956. *Gramàtica catalana*. Barcelona: Teide.
- Fabra, Pompeu. 1983–1984. *Converses filològiques. A cura de joaquim rafel*. Barcelona: Edhasa.
- Franco, Ludovico, and Paolo Lorusso. 2019. The expression of proper location and beyond: Motion-to and state-in in Italian spatial adpositions. In *NELS 49: Proceedings of the forty-ninth annual meeting of the North East linguistic society*, Vol. 1, 279–290.
- Giannakidou, Anastasia. 2006. Only, emotive factive verbs, and the dual nature of polarity dependency. *Language* 82(3): 575–603.
- Grimm, Scott. 2014. Individuating the abstract. In *Proceedings of Sinn und Bedeutung 18*, eds. Urtzi Etxeberria, Anna Maria Fălăuş, Aritz Iruztun, and Bryan Leferman, 182–200.
- Hoeksema, Jack. 1983. Negative polarity and the comparative. *Natural Language & Linguistic Theory* 1(3): 403–434.
- Israel, Michael. 2001. Minimizers, maximizers and the rhetoric of scalar reasoning. *Journal of Semantics* 18(4): 297–331.
- Jackendoff, Ray. 1991. Parts and boundaries. *Cognition* 41(1–3): 9–45.
- Kadmon, Nirit, and Fred Landman. 1993. Any. *Linguistics and Philosophy* 16(4): 353–422.
- Kennedy, Christopher, and Louise McNally. 1999. From event structure to scale structure: Degree modification in deverbal adjectives. In *Semantics and linguistic theory IX*, eds. Tanya Matthews and Devon Strolovitch, 163–180. Ithaca: Cornell University.
- Kiparsky, Paul. 1998. Partitive case and aspect. In *The projection of arguments: Lexical and compositional factors*, eds. Miriam Butt and Wilhelm Geuder, 265–307. Stanford: CSLI Publications.
- Koopman, Hilda. 2000. Prepositions, postpositions, circumpositions and particles: The structure of Dutch PPs. In *The syntax of specifiers and heads: Collected essays of Hilda J. Koopman*, ed. Hilda Koopman, 125–138. New York: Routledge Leading Linguistics.
- Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase structure and the lexicon*, eds. Johan Rooryck and Laurie Zaring, 109–137. Dordrecht: Springer. <https://doi.org/10.1007/978-94-015-8617-7>.
- Krifka, Manfred. 1989. Nominal reference, temporal constitution and quantification in event semantics. In *Semantics and contextual expression*, eds. Renate Bartsch, Johan van Benthem, and Peter van Emde, 75–115. Dordrecht: Foris Publication. <https://doi.org/10.1515/9783110877335-005>.
- Ladusaw, William. 1979. Negative polarity items as inherent scope relations. PhD diss., University of Texas at Austin.
- Laka, Itziar. 1990. Negation in syntax: On the nature of functional categories and projections. PhD diss., Massachusetts Institute of Technology.
- Linebarger, Marcia C. 1987. Negative polarity and grammatical representation. *Linguistics and Philosophy* 10(3): 325–387.
- Longobardi, Giuseppe. 1994. Reference and proper names: A theory of N-movement in syntax and logical form. *Linguistic Inquiry* 25(4): 609–665.
- Longobardi, Giuseppe. 1996. The syntax of N-raising: A minimalist theory. *OTS Working Papers* 96(005): 1–55.
- Longobardi, Giuseppe. 2001. How comparative is semantics? A unified parametric theory of bare nouns and proper names. *Natural Language Semantics* 9(4): 335–369.
- Longobardi, Giuseppe. 2005. Toward a unified grammar of reference. *Zeitschrift für Sprachwissenschaft* 24(1): 5–44.
- Longobardi, Giuseppe. 1997. N-raising and place names. In *Scribthair a ainm nogaim. Scritti in memoria di Enrico Campanile*, eds. Riccardo Ambrosini, et al., 521–533. Pisa: Pacin.
- MacDonald, Jonathan. 2008. *The syntactic nature of inner aspect*. Amsterdam: John Benjamins.
- Maienborn, Claudia. 2007. On Kimian and Davidsonian states. In *Existence: Semantics and syntax*, eds. Ileana Comorovsky and Klaus von Heusinger, 107–130. New York: Kluwer Academic.
- Marantz, Alec. 2013. Locality domains for contextual allomorphy across the interfaces. In *Distributed Morphology Today: Morphemes for Morris Halle*, 95–115. Cambridge: MIT press.
- Mascaró, Joan. 2007. External allomorphy and lexical representation. *Linguistic Inquiry* 38(4): 715–735.
- Matushansky, Ora. 2016. On the syntax of place names. Handout of a talk presented at workshop “Namen-grammatik”, March 2016, in Delmenhorst, Germany.

- Moltmann, Friederike. 1997. *Parts and wholes in semantics*. New York: Oxford University Press.
- Morzycki, Marcin. 2002. Wholes and their covers. In *Proceedings of the 12th semantics and linguistic theory conference, held March 8-10, 2002*, ed. Brendan Jackson, 184–203. San Diego: University of California, San Diego State University.
- Real-Puigdollers, Cristina. 2021. A minimalist approach to the syntax of *p*: A romance perspective. *Linguistic Variation* 21(1): 90–134.
- Rothstein, Susan. 2020. Locations. *Journal of Semantics* 37(4): 611–649.
- Ruaix, Josep. 1988. *El català/2*. Moià: Ruaix.
- Rullmann, Hotze. 1995. Maximality in the semantics of *wh*-constructions. PhD diss., University of Massachusetts Amherst.
- Sancho Cremades, Pelegrí. 1994. *Les preposicions en català*. València: Universitat de València.
- Sancho Cremades, Pelegrí. 2002. La preposició i el sintagma preposicional. In *Gramàtica del català contemporani*, eds. Joan Solà, M. Rosa Lloret, Joan Mascaró, and Manuel Pérez Saldanya. Vol. 2 of *Sintaxi*, 1689–1796. Barcelona: Empúries.
- Stvan, Laurel Smith. 1998. The semantics and pragmatics of bare singular noun phrases. PhD diss., Northwestern University.
- Svenonius, Peter. 2003. Limits on P: Filling in holes vs. falling in holes. *Nordlyd* 31: 431–445.
- Svenonius, Peter. 2006. The emergence of axial parts. *Nordlyd* 33(1): 49–77.
- Svenonius, Peter. 2010. Spatial P in English. In *Mapping spatial PPs: The cartography of syntactic structures*, eds. Guglielmo Cinque and Luigi Rizzi. Vol. 6, 127–160. New York: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195393675.001.0001>.
- Talmy, Leonard. 1975. Figure and ground in complex sentences. In *Annual meeting of the Berkeley linguistics society*, Vol. 1, 419–430.
- Taub, Alison. 1989. Collective predicates, aktionsarten and *all*. *University of Massachusetts Occasional Papers in Linguistics* 15: 16.
- Tortora, Christina. 2008. Aspect inside PLACE PPs. In *The syntax and semantics of spatial P*, eds. Berit Gehrke, Anna Asbury, Jakub Dotlačil, and Rick Nouwen, 273–301. Amsterdam: John Benjamins.
- Tubau, Susagna, Urtzi Etxeberria, and M. Teresa Espinal. 2023. A new approach to negative Concord: Catalan as a case in point. *Journal of Linguistics*.
- von Fintel, Kai. 1999. NPI licensing, Strawson entailment, and context dependency. *Journal of Semantics* 16: 97–148.
- Wood, Jim. 2015. *Icelandic morphosyntax and argument structure*, Vol. 90. Berlin: Springer.
- Wood, Jim, and Alec Marantz. 2017. The interpretation of external arguments. In *The verbal domain*, eds. Roberta D'Alessandro, Irene Franco, and Ángel J. Gallego, 255–278. Oxford: Oxford University Press.
- Wunderlich, Dieter. 1991. How do prepositional phrases fit into compositional syntax and semantics? *Linguistics* 29(4): 591–622.
- Zamparelli, Roberto. 2000. *Layers in the determiner phrase*. New York: Garland Publishing.
- Zeijlstra, Hedde. 2013. Negation and negative polarity. In *The Cambridge handbook of generative syntax*, ed. Marcel den Dikken, 793–826. Cambridge: Cambridge University Press.
- Zeijlstra, Hedde. 2022. *Negation and negative dependencies*, Vol. 80. London: Oxford University Press.
- Zwarts, Jan-Wouter. 2005a. A note on functional adpositions. In *Organizing grammar: Linguistic studies in honor of Henk Van Riemsdijk*, 689–695. Berlin: de Gruyter.
- Zwarts, Joost. 2005b. Prepositional aspect and the algebra of paths. *Linguistics and Philosophy* 28(6): 739–779.
- Zwarts, Joost, and Yoad Winter. 1997. A semantic characterization of locative PPs. In *Semantics and linguistic theory*, Vol. 7, 294–311.
- Zwarts, Joost, and Yoad Winter. 2000. Vector space semantics: A model-theoretic analysis of locative prepositions. *Journal of Logic, Language and Information* 9(2): 169–211.