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Strong and weak resultatives with result roots in English and Spanish

Ryan Walter Smith
Rutgers University
0009-0003-5627-3833
ryanwalter.smith@rutgers.edu

Josep Ausensi
Universitat Rovira i Virgili
0000-0002-0193-6594
josep.ausensi@urv.cat

Jianrong Yu
Independent Researcher
0000-0002-3971-6749
jianrong26988@gmail.com

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Abstract

We consider a subclass of result verbs in Rappaport Hovav & Levin's (2010) sense built on roots that entail change (Beavers & Koontz-Garboden, 2020), e.g., *break, melt, explode,* and *tear*. We argue that this class of roots possesses different grammatical properties between English and Spanish with respect to resultative constructions: these roots productively appear in both strong and weak resultatives in English but form only weak resultatives in Spanish (Washio, 1997). We propose an account of this asymmetry between the two languages rooted in differences in the semantic properties of the root class and independent differences in the inventory of prepositional heads available in each language: English possesses eventive change of state roots and eventive prepositions that express

change of location/state, while their Spanish equivalents are stative, with the roots entailing change of state. This suggests that translational equivalents of roots across languages may differ in their grammatical properties and, therefore, possess different distributions in other constructions despite contributing the same conceptual content.

Keywords: resultatives, Talmy's typology, event structure, manner, result, roots, English, Spanish.

1. Introduction

With respect to differences among languages regarding the expression of resultative events, the best-known typological classification is one originally laid out by Leonard Talmy, who claimed that languages can be divided into two broad classes depending on whether the manner or result of a resultative event is typically expressed in the main verb. In a series of works, Talmy (1991; 2000) proposed that what he called verb-framed languages, e.g., Romance languages, need to encode the result of the event in the main verb, and optionally the manner can only be expressed by means of adjunct clauses. In contrast, satellite-framed languages, e.g., Germanic languages, typically express the manner of the event in the main verb and can express the result outside the verb by means of what Talmy dubbed a satellite.[1] This is illustrated in the English resultative below, in which the main verb *hammer* describes the manner that brings about the result introduced by the satellite PP *into a sword*.[2]

(1) The blacksmith **hammered** the noble metal *into a sword*.
≈ The blacksmith turned the noble metal into a sword by hammering it.

In contrast, verb-framed languages lack this configuration since the main verb needs to encode the result of the event, and the expression of manner in the main verb is thus precluded (Aske, 1989; Talmy, 2000; Mateu, 2002, 2012; Mateu & Rigau, 2002; Folli & Ramchand, 2005; Real-Puigdollers, 2013; Acedo-Matellán & Mateu, 2013; Acedo-Matellán & Mateu, 2015; Acedo-Matellán, 2016; Folli & Harley, 2020; Bigolin & Ausensi, 2021; McNally & Spalek, 2022; Acedo-Matellán & Kwapiszewski, 2024; Bigolin, 2024: among many others). Verb-framed languages instead resort to expressing the manner via optional adjunct clauses, as in the Spanish resultative below, where the manner component is expressed via the gerundive adjunct clause *martilleándolo* 'hammering it'.

[1] Talmy originally only considers events of motion, e.g., *The bottle floated into the cave*, when laying out his typological classification. Namely, languages differ with whether what Talmy calls the path, i.e., the result of an event of change of location, needs to be encoded in the main verb, as in verb-framed languages, or independently of the main verb by a satellite, as in satellite-framed languages. Later, Talmy (2000) extends his original classification to all types of events that involve a result since the effects of his typological classification are not exclusive of events of motion, but whether languages need to encode the result of the event in the main verb or not affects the expression of resultativity in general. In the present paper, we focus specifically on resultatives involving change of state in English and Spanish.

[2] As pointed out to us by our handling editor, Talmy's binary classification into verb-framed vs. satellite-framed languages is based on his work from 1991 onwards. Earlier, Talmy assumed a tripartite classification (e.g., Talmy, 1975, 1985), in which what mattered for the typology was not so much whether path was encoded in the main verb, but rather *which element* was encoded: path, as in Spanish, manner, as in English, or figure, as in Atsugewi.

(2) El herrero convirtió el noble metal *en una espada*
the blacksmith turn.PFV.3SG the noble metal in a sword
martilleándolo.
hammer.GER=ACC.M.SG
'The blacksmith turned the noble metal into a sword by hammering (it).'

Although verb-framed languages disallow resultatives in which the main verb encodes the manner of the event, what are generally known as *strong resultatives*, they still allow so-called *weak resultatives* in the sense of Washio (1997), since in this type, resultative semantics is still encoded in the main verb, and satellites simply provide a further specification of the result introduced by the verb.[3] For instance, an English resultative such as *The vase broke into many pieces* most naturally involves a *weak resultative* interpretation since the satellite *into many pieces* is introducing a result that builds on the result encoded by the main verb *break* (Rappaport Hovav & Levin, 1998; Beavers, 2011). Weak resultatives are therefore predicted to be possible in verb-framed languages, as illustrated by the Spanish translational equivalent *El vaso se rompió en muchos trozos* (see Section 3.1 for details).

In this paper, we propose analyses of strong and weak resultatives in English and Spanish, and show that they are capable of accounting for the range of possible resultative constructions in these two languages. Our main claim is that whether a language permits resultatives of the sort that Washio (1997) called strong resultatives can be explained by appealing to the differences languages exhibit with respect to the semantics of their inventory of lexical items. In order to do so, we specifically focus on resultatives formed from a subclass of result roots in Rappaport Hovav & Levin's (2010) sense that lexically entail change (Beavers & Koontz-Garboden, 2020), e.g., *break, melt, explode, tear*. We propose that this class of result roots differs semantically between English and Spanish, although they entail change in both languages (Beavers *et al.*, 2021): in English, result roots are *eventive*, and denote relations between individuals and events of change of state, while Spanish result roots are *stative*, and denote relations between individuals and states that come about as the result of a prior event.[4] By arguing that the type-theoretic properties of a root determine how roots are integrated into an event structure template (Embick, 2009; Levinson, 2014; Yu *et al.*, 2023), our approach explains differences in the range of possible resultative constructions with result roots in English and Spanish, while maintaining a single analysis for this type of resultatives in each language. Namely, no structural or semantic distinction is made between weak and strong resultatives in the analysis of English; rather, we claim that English resultatives are able to express a wider range of meanings owing to independent properties of the relevant verbal roots and prepositions in the language.

[3] Washio's (1997) distinction between so-called weak and strong resultatives is not originally formulated in terms of Talmy's typology of verb-framed vs. satellite-framed languages; it is later work by Mateu (2010, 2012); Acedo-Matellán (2010, 2016); Croft *et al.* (2010) who connect the classification in Washio with Talmy's typology. We thank our handling editor for drawing our attention to this.

[4] An anonymous reviewer wonders whether this implies that Spanish speakers conceptualize change of state differently from English speakers. Our claim is that result roots ultimately make the same truth-conditional contribution in both languages and that languages may differ in what predicate roots return upon composing with an individual: either a predicate of states resulting from a change, or a predicate of events that result in some particular state. We wish to emphasize then that our analysis makes no claim about how speakers conceptualize changes of state at a cognitive level.

Moreover, our approach provides a unified analysis for the few instances of weak adjectival resultatives found in Spanish, particularly *cognate resultatives*, e.g., *Juan limpió el suelo bien limpio* lit. 'Juan cleaned the floor well clean' (Demonte, 1991; Armstrong, 2012) and resultatives formed from *verbs of coloring*, e.g., *Kim pintó verde la pared* 'Kim painted the wall green'. In both cases, as in our analysis of PP weak resultatives with result roots, e.g., *Sam broke the vase into many pieces*, the denotation of the result phrase is conjoined with that of the root, and is predicted to be successful as long as the state description contributed by the root and that contributed by the result phrase may be construed as describing the same state. No such restrictions are predicted for English resultatives, which are predicted to permit (but not require) reference to distinct states contributed by the root and the result phrase. On our approach, the observation that English allows both descriptively strong and weak resultatives, while Spanish allows only weak resultatives, falls out from the type-theoretic properties of verbal roots and their integration into a resultative event structure in the two languages.

The present paper ultimately supports the view that the effects of Talmy's typology can largely be explained by considering the lexical resources languages have available for the expression of result and change of state/location (Beavers *et al.*, 2010), as well as the denotation of the verbal roots used to construct resultatives.[5] On this view, variation regarding the expression of resultativity in English and Spanish arises from the fact that these two languages do not have the same lexical options available to them, e.g., the availability (as in satellite-framed languages) or lack (as in verb-framed languages) of prepositions encoding resultative semantics, such as English *to*, and differences in the type-theoretic properties of verbal roots across English and Spanish.[6]

We proceed as follows. In Section 2, we provide a brief overview of the classification of resultative constructions laid out by Washio (1997). In Section 3, we discuss two points of variation between English and Spanish, the grammatical properties of result roots and the differential availability of eventive prepositions. In Section 4, we lay out analyses of resultatives with result roots in English and Spanish, and propose that verbal roots of the same semantic class need not possess the exact same denotations across these two languages. By assuming that type-theoretic properties determine how a root is integrated into an event structure template, our approach is shown to be capable of accounting for variation in the range of possible resultative constructions in English and Spanish. In Section 5, we provide further evidence in favor of the analyses we develop and discuss the predictions that follow from said analyses, which we show are borne out. Section 6

[5] Our appeal to what we call *lexical resources* here should not be taken to mean that we adopt a form of lexicalism in this paper. In fact, our approach adopts much of the core tenets of Distributed Morphology, a decidedly anti-lexicalist theory (Halle & Marantz, 1993; Marantz, 1997; Harley & Noyer, 1999). We use the term *lexical* simply to mean "of or relating to terminal nodes," and amounts to the claim that it is the meanings of the terminal nodes of a syntactic structure that affect what kinds of structures can be composed and interpreted.

[6] In the remainder of this paper, we will use the more general, descriptive and theory-neutral label *result phrase* to refer to what Talmy originally described as *satellites*. More specifically, we follow Beavers *et al.* (2010) in assuming that satellites mainly encompass adjective and prepositional phrases and can either introduce an independent result, as in *knock somebody unconscious*, or simply provide further details about the result the main verb encodes, as in *paint the house red*. Germanic-like particles like English *off* as in *John tore a page off* would also constitute a result phrase in our account, and hence, a satellite. As pointed out to us by an anonymous reviewer, we therefore assume that prepositions are satellites as well, yet this is not strictly assumed by Talmy, but is in line with Beavers *et al.* (2010). See Section 2 for detailed discussion.

concludes.

2. The Distribution of Resultatives in English and Spanish

Washio (1997) proposed an influential classification of resultatives into two distinct general classes.[7] On the one hand, *strong resultatives* contain a separate phrase that adds a result interpreted as brought about by the action encoded in the main verb, which itself does not entail a result, e.g., *shoot*, *wipe*, *hammer* and *sweep* in (3).[8] Strong resultatives thus typically involve manner verbs, i.e., verbs that encode the manner in which an action is carried out (see next subsection for details; Rappaport Hovav & Levin, 2010). In strong resultatives, illustrated below in (3), the meaning of the verb and that of the result phrase, what Talmy would call the satellite, are understood to be independent of each other.

(3) a. Yesterday police **shot** *dead* a miner outside Sucre.
b. He even remembered to **wipe** the knife *clean of fingerprints*.
c. The pendant was also silver, crudely **hammered** *into a flat circle*.
d. Sawdust was **swept** *into a pile* near the sink.

(COCA)

Washio originally notes that in resultatives of the strong type, the type of result that can follow cannot be predicted by looking at the meaning of the manner verb. That is, a *hammering* event can lead to a number of distinct result states, e.g., *being flat, in the ground*, or no result state at all, which bear no intrinsic semantic relation to the manner the verb provides.

In contrast to the strong type, the second major class of resultatives, what Washio called *weak resultatives*, involve result phrases that do not introduce distinct independent result states. Rather, the meaning of the verb and that of the result phrase complement each other, as the result phrase further specifies the result introduced by the main verb, as illustrated by the examples below in (4). Weak resultatives thus involve result verbs, e.g., *burn*, *freeze*, *melt* and *paint* (4), i.e., verbs that encode a specific type of change of state or location.

(4) a. The East Village is going to be **burned** *to ashes*.
b. Medicinal teas that are **frozen** *into popsicles* for sale.
c. The last bite of ice cream has **melted** *into a puddle* the size of a teardrop.
d. The window trims he **painted** *white* and the front door *red*.

(COCA)

[7] Washio (1997) includes a third class that he dubs *spurious resultatives*, e.g., *cut the meat thin/thinly*. We set this class aside since it is not relevant to Talmy's typology, as they do not involve the same kind of change of state entailments as true resultatives. For example, *cut the meat thin* does not mean that somebody causes the meat to become thin by cutting it, but rather that someone produced *thin cuts* from the meat. See Washio (1997), Rapoport (1999), Mateu (2000), Levinson (2010) and Rapoport & Zarka (2021) for details.

[8] English examples were extracted from Google Books (GBooks), Corpus of Global Web-based English (GloWbE) (Davies, 2013) and Corpus of Contemporary American English (COCA) (Davies, 2008). Spanish examples were extracted from Corpus del Español (CES) (Davies, 2016), Corpus de Referencia del Español Actual (CREA) (Real Academia Española, online) and Google Books (GBooks). Examples with no source were constructed by us, and examples extracted from simple web searches are indicated with Web.

The facts just discussed show that the effects of Talmy's typology appear to be operational only when it comes to strong resultatives, since only this class of resultatives involves a configuration in which resultative semantics is not expressed within the main verb. Verb-framed languages are thus expected to allow weak resultatives, because this type obeys Talmy's generalization that the result of the event must be encoded within the main verb in this class of languages. By combining the proposals made by both Talmy and Washio, we arrive at a typological classification where languages have a tendency to show variation with respect to whether they allow both strong and weak resultatives, i.e., satellite-framed languages like English, German or Dutch, or just weak resultatives while disallowing resultatives of the strong type, i.e., verb-framed languages like Romance languages, Japanese or Hebrew (Washio, 1997; Talmy, 2000; Beavers *et al.*, 2010; Mateu, 2012; Real-Puigdollers, 2010, 2013; Acedo-Matellán, 2016; Folli & Harley, 2020; McNally & Spalek, 2022; Hopperdietzel, 2022; Acedo-Matellán & Kwapiszewski, 2024). In what follows, we specifically concern ourselves with the availability of resultative constructions in English and Spanish that involve verbs built on result roots, e.g., *burn, freeze, melt, paint* etc. We observe that whereas English result roots can be both integrated into event structure templates with a strong or weak resultative interpretation, Spanish result roots in contrast can only be integrated into event structure templates that involve a weak resultative interpretation. We propose that both English and Spanish result roots entail change, but differ with respect to their type-theoretical properties, which in turn determines how they can be integrated into a resultative event structure template.

2.1. Resultatives with Result Verbs

As discussed in the previous section, it is often assumed that strong and weak resultatives involve distinct classes of verbs: strong resultatives have been observed to involve manner verbs, whereas weak resultatives involve result verbs (see Rappaport Hovav & Levin, 2010; Beavers, 2011; Rappaport Hovav, 2014). This semantic classification of verbal roots was proposed in the work of Beth Levin and Malka Rappaport Hovav (Levin & Rappaport Hovav, 1991; Rappaport Hovav & Levin, 1998, 2010; Levin & Rappaport Hovav, 2013, 2014; Rappaport Hovav, 2014; Levin, 2015, 2017) in the context of MANNER/RESULT COMPLEMENTARITY, according to which verb classes fall into two wide semantic types. On the one hand, manner verbs encode the manner in which an action is carried out, but are silent with respect to whether a result follows from the action in question (5-a). Result verbs, on the other hand, encode result states, but are silent with respect to how the result state was brought about (5-b). For instance, a result verb like *kill* encodes a result state of *being dead* that can be brought about by many types of actions, e.g., *shooting, poisoning, stabbing*. In contrast, a manner verb like *scrub* encodes a specific type of action that can give rise to many different result states, e.g., *being clean, tired, bloody,* etc. Additional examples of each class are provided below.

(5) a. Manner verbs: *jog, run, scrub, sweep, swim, walk, wipe, hammer ...*
b. Result verbs: *break, burn, freeze, tear, rip, melt, split, burn ...*

Although previous work often equates weak resultatives with result verbs and strong resultatives with manner verbs (Rappaport Hovav & Levin, 2010; Beavers, 2011; Rappaport Hovav, 2014), we observe this picture is not empirically accurate: result verbs

are not limited to expressing weak resultatives, at least in English (see e.g., Embick, 2009; Acedo-Matellán & Mateu, 2014). For instance, the verb *explode*, which constitutes a canonical instance of a result verb under MANNER/RESULT COMPLEMENTARITY, can be used in both a strong (6-a) and a weak resultative (6-b) context, as illustrated below.

(6) a. Then Desdemona **exploded** *into a thousand bats* and flew away. (GBooks)
b. My right passenger window suddenly **exploded** *into pieces* while driving. (Web)

In (6-a), the result PP *into a thousand bats* is most naturally interpreted as a change of state resulting in the creation of a thousand bats, which does not bear on the result expressed by *explode*. In contrast, in (6-b), the result PP *into pieces* is interpreted as introducing further information about the type of result state the main verb encodes. In other words, while (6-a) involves a strong resultative interpretation, (6-b) instead involves a weak resultative, as the PP is not introducing an independent result state unconnected to the one encoded in the main verb.

Importantly, this dual behavior of result verbs is not an idiosyncrasy of *explode*. Other result verbs, like *break*, *melt* or *tear*, show the same flexibility (see Ausensi & Bigolin, 2023; Yu *et al.*, 2023). What these verbs have in common is that they are formed from what Beavers and Koontz-Garboden (2020) have recently dubbed *result roots*,[9] i.e., a class of roots that independently entail the existence of a prior process leading to the result state they define.[10] This is illustrated by the examples below, which involve either a weak or a strong resultative interpretation depending on whether the result phrase is interpreted as building on the state description provided by the main verb or as introducing a result state separate from that provided by the main verb.

(7) a. A couple of monks **broke** the corpse *loose from the deck*$_{\text{AP}}$. (COCA) STRONG
b. John **broke** the vase *in half*. WEAK

(8) a. [...] the way she heals up after **tearing** her skin *open*$_{\text{AP}}$. (COCA) STRONG
b. Search for documents that have been **torn** *into pieces*. (GBooks) WEAK

(9) a. Scientists just **melted** *a hole*$_{\text{DP}}$ through 3,500 feet of ice. (Web) STRONG
b. Forces get dissolved and **melted** *into a single mass*. (GBooks) WEAK

It is also important to note that the examples in (7)-(9) which involve a strong resultative interpretation do not contain results introduced by PPs, strongly suggesting that this is not due to the syntactic category of the result phrase, as could have been suggested by the contrasts in (6), but due to a more general semantic phenomenon, as we

[9] Result roots contrast with what Beavers & Koontz-Garboden call *property concept roots*, which form deadjectival result verbs such as *open, whiten, lengthen* etc., and involve property concepts related to dimension, physical properties, color, etc. Property concept roots differ from result roots in not entailing change as part of their semantics; they predicate a state of an individual without specifying that it came about as a result of a previous event. See Section 3.1 for further discussion.

[10] As an anonymous reviewer correctly points out, not all result verbs built on result roots allow strong resultatives, e.g., result verbs like *destroy*, *damage*, *bury*, and *eliminate*. Strong resultative formation therefore appears to be a defining property of only a subclass of result roots, i.e., being built on a result root appears to be a necessary but not a sufficient condition for strong resultative licensing in the case of result verbs. In this respect and for further discussion and a classification of result roots according to their compatibility with strong resultatives see Martin et al. (2025).

discuss in detail in the next section.

By contrast, the flexibility observed with English result verbs in the formation of resultatives is not observed in their equivalents in verb-framed Spanish. In this language, the existence of a result phrase in a resultative that cannot be construed as modifying the result in the verb leads to ungrammaticality (10) (and see the further examples and discussion in Section 4.3) (Mateu, 2002, 2012; Acedo-Matellán & Mateu, 2013; Acedo-Matellán & Mateu, 2015; Acedo-Matellán, 2010, 2016; Bigolin & Ausensi, 2021; McNally & Spalek, 2022). We illustrate with the result verb *explotar*, the Spanish equivalent of 'explode' as in the English example in (6). In this case, only the Spanish equivalent of (6-b), which involves a weak resultative, is possible. Note that this is unlikely to be a syntactic effect, since in both cases in (10), the same verb *explotar* and PP headed by *en* 'in' are involved, showing that the contrast is purely a semantic one.[11]

(10) a. Justo antes de que el avión **explote** *en*
just before of that the.M.SG plane.M.SG explode.SBJV.PRS.3SG in
mil pedazos.
thousand pieces.M.PL
'Just before the plane explodes into a thousand pieces.' (Gbooks) WEAK

b. *Desdemona **explotó** *en mil murciélagos*.
Desdemona explode.PFV.3SG in thousand bats.M.PL
Intended: 'Desdemona exploded into a thousand bats.' STRONG

In what follows, we propose a semantic account of the differences between English and Spanish with respect to the types of resultative constructions involving result roots that these languages allow. Our starting point is differentiating between two points of variation in the lexical inventory of verb-framed and satellite-framed languages like Spanish and English. First, a verb-framed language like Spanish lacks eventive, path-denoting prepositions contributing change of state/location as English *to* and has only stative ones like *en* 'in' or *a* 'at' (Beavers *et al.*, 2010). Second, result verbs built on result roots of the *explode* type, e.g., *break, melt, freeze, tear*, entail change in both English and Spanish (Beavers & Koontz-Garboden, 2020; Beavers *et al.*, 2021), but have different type-theoretic properties: in English, we propose they are eventive, while in Spanish, they are stative.

3. Two Points of Variation between English and Spanish

In the previous section, we noted that strong resultatives are not necessarily restricted to manner verbs, as was generally assumed in previous work (Rappaport Hovav & Levin, 2010; Beavers, 2011; Rappaport Hovav, 2014). We observed that in English result verbs

[11] Spanish acceptability judgments were obtained by informally surveying ten speakers of Peninsular Spanish, together with the input by one of the authors, who is a native speaker of Peninsular Spanish. The speakers surveyed were asked to judge pairs of sentences involving the same verb as the one in (10) which only differed in the type of resultative interpretation. The speakers shared our judgment that a result phrase that is not interpreted as building on the state description expressed by the main verb is not acceptable in Spanish, as observed in previous works (cf. Mateu 2012). In addition, while Spanish examples which involve a weak resultative context (10-a) frequently occur in the corpora we consulted, examples involving a strong resultative interpretation as the one in (10-b) are unattested.

like *explode* can appear in either a strong or a weak resultative depending on whether the result phrase is interpreted as bearing a semantic relation to the result state the main verb encodes. In a context where it is understood that some entity is created by means of having exploded, as in *explode into a thousand bats*, the interpretation is that of a strong resultative, since a conversion of something into bats does not bear on the result state *explode* encodes. In contrast, examples like *explode into pieces* involve a weak resultative interpretation, as the result phrase *into pieces* is simply further specifying that the state holding due to the explosion is a state of being in pieces as well.

In this section, we propose that English and Spanish differ systematically in the lexical semantics of result roots, namely, English result roots are eventive, while in Spanish they are stative. This difference will determine in turn how they are integrated into a resultative event structure. In addition, English and Spanish further differ in the grammatical properties of their inventory of available prepositions, specifically those encoding paths along which change occurs. We thus attribute the effects of typological classifications such as Talmy's and Washio's to variation in the grammatical properties of the lexical inventories of languages (Beavers *et al.*, 2010). The core of the proposal is to account for the fact that English result roots entailing change can form both strong and weak resultatives, while Spanish result roots cannot and only form weak resultatives. As noted above, there are two main points of variation in the lexical inventory of English and Spanish that can provide an initial answer to the question of why languages should differ in the types of resultative constructions they allow. In what follows, we turn to discuss these two points of variation in detail.

3.1. Result Roots in English and Spanish

The first point of variation between English and Spanish concerns the semantics of result roots. Before addressing this semantic difference between result roots in Spanish and English, it is important to recall that result roots are associated with change-of-state entailments (Beavers & Koontz-Garboden, 2020). Evidence for the fact that result roots in both English and Spanish entail change mainly comes from analyzing the interaction of this root class with sublexical modifiers, such as *again*, which are widely known to be able to target specific subevents of an event structure (Dowty, 1979; von Stechow, 1996; Beck & Johnson, 2004; Beavers & Koontz-Garboden, 2020; Beavers *et al.*, 2021). Importantly, *again* generates an ambiguity between repetitive and restitutive readings in sentence-final position only when it modifies result verbs built on *property concept roots*, which form deadjectival result verbs like *open*, *whiten* or *lengthen*, whose roots do not inherently entail change. When property concept roots are modified by *again* in sentence-final position, the resulting sentence is ambiguous between a repetitive and a restitutive reading, illustrated in (11).

(11) John opened the door again.

a. John opened the door again, and it had been open before. RESTITUTIVE
b. John opened the door again, and it had opened before. REPETITIVE

The same ambiguity occurs with the Spanish equivalent of *again*, *otra vez*, when it modifies verb phrases headed by verbs formed from property concept roots as the examples in (12) show (Beck, 2005; Cuervo, 2014).

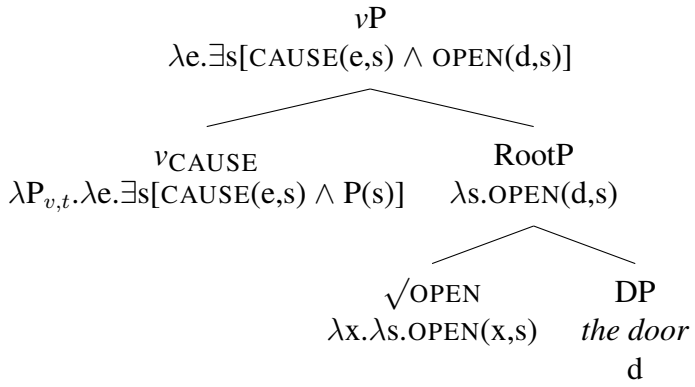
(12) Juan abrió la ventana otra vez.
'Juan opened the window again'
a. Juan opened the window again, and it had been open before. RESTITUTIVE
b. Juan opened the window again, and it had opened before. REPETITIVE

The restitutive reading involves restoration of a prior state, with no requirement that there be a previous change that brought it about. This shows that *again* is able to target a stative constituent in the event structure that does not include change as part of its meaning. This can be accomplished by treating property concept roots as denoting relations between an individual and a state, with no change of state component (Beavers & Koontz-Garboden, 2020).

(13) $[\![\sqrt{\text{OPEN}}]\!]$: λx.λs.OPEN(x,s)

When *again* modifies RootP in (14) below, a presupposition is triggered that a state of the same kind denoted by RootP held in the past, with no particular requirements on how that state came about.

(14) John opened the door.



We illustrate this further by considering examples from Beavers & Koontz-Garboden (2020: 85), which include result verbs built on property concept roots like *sharpen*, *lengthen* and *enlarge* in contexts that explicitly rule out any repetitive reading. The contexts below thus satisfy restitutive readings in which no prior change of state occurred, thereby providing evidence that property concept roots do not inherently entail change, as Beavers & Koontz-Garboden originally argued.

(15) a. CONTEXT: John buys a knife that was forged in such a way that it was already sharp. John uses it until it becomes blunt. He uses a whetting stone to make it sharp once more.
John sharpened the knife again. (OK just one sharpening)
b. CONTEXT: A film producer makes a 4 hour long film, which is significantly longer than the norm. She is pressured to reduce its length, so cuts it to be two hours. But then the director and actors protest, so she restores it to 4 hours.
The producer lengthened the film again. (OK just one lengthening)
c. CONTEXT: Kim takes a photo that is too large to use as a Facebook profile

photo. She shrinks it to a more appropriate size, but thinks it does not look good. So she restores it to its original size and puts it on her personal website instead.
Kim enlarged the photograph again. (OK just one enlarging)

In contrast to property concept roots, result roots in English and Spanish cannot be decomposed into a constituent that does not entail change of state. This is because change of state is encoded directly in the root's meaning (Beavers & Koontz-Garboden, 2020). This predicts that *again* should not generate a restitutive reading when modifying a RootP built on a result root in either language. In other words, *again* should always produce a repetitive presupposition when modifying a RootP containing a result root, and never a restitutive one.[12] This is borne out, and shown by the following examples from Beavers & Koontz-Garboden (2020: 85) and Yu (2020) (see also Rappaport Hovav, 2008).[13]

(16) a. CONTEXT: Mary requested a potter to make a plate in separate pieces so she can practice her pottery-mending skills. She took a day to put the pieces together. John, who was secretly angry with Mary for previously breaking his favorite bowl, snatched the mended plate from Mary broke it.
John broke the plate again. (necessarily two breakings)

b. CONTEXT: Leah kills a rabbit, takes it home and skins and butchers it and then puts the fresh meat in the freezer for three days. She then takes it out and puts it on the table to thaw.
Leah thawed the meat again. (necessarily two defrostings)

c. CONTEXT: An ice cream factory manufactures ice cream from a package of ingredients by adding water and then freezing the result. After adding the contents of the package to water and freezing it, Kim lets it melt into a liquid state.
Kim melted the ice cream again. (necessarily two meltings)

Spanish result roots show the same behavior in contexts that explicitly rule out a repetitive reading (cf. Beavers *et al.*, 2021). This is shown below in the Spanish examples, which are translational equivalents of the English contexts above with the result verbs which are built on result roots *romper* 'break', *descongelar* 'thaw' and *derritir* 'melt'.

(17) a. CONTEXT: María le pidió a un alfarero que hiciera un plato en trozos separados para que pudiera practicar sus habilidades de reparación de cerámica. Le costó un día poner todas las piezas juntas. Juan, el cual estaba enfadado en secreto con María por haberle roto su bol favorito, se llevó el plato que María había reparado y lo rompió.

[12] Technically speaking, on our analysis of Spanish and Beavers & Koontz-Garboden's analysis of English result roots, a restitutive reading *is* available, as there is a constituent that denotes a predicate of states suitable to serve as *again*'s argument. However, this reading is for all intents and purposes *indistinguishable* from a repetitive reading, as the change of state entailment encoded in the root is inherited by *again*'s presupposition, and therefore ends up presupposing not only the existence of a previous state of the same sort in the assertion, but also the existence of an event of change into that state.

[13] The reported judgments in (16) are from Beavers and Koontz-Garboden (2020), who note that there exists some variation among speakers regarding their acceptability. However, the crucial point here is that an approach on which roots entail change, as in Beavers & Koontz-Garboden's and ours, explains the fact that it is indeed the case that many speakers do get the judgments in (16).

Juan rompió el plato otra vez. (necessarily two breakings)

b. CONTEXT: Lucía mata un conejo, se lo lleva a casa y lo pela y pone la carne fresca en el congelador durante tres días. Después de tres días, lo saca del congelador y lo pone en la mesa para que se descongele.
Lucía descongeló la carne otra vez. (necessarily two defrostings)

c. CONTEXT: Una empresa de helados fabrica helados añadiendo agua a un paquete de ingredientes y después lo congelan. Después de añadir agua al contenido del paquete y de congelarlo, Quim deja que se derrita hasta que se hace líquido.
Quim derritió el helado otra vez. (necessarily two meltings)

We propose that English and Spanish agree on a change-of-state semantics for result roots (Beavers *et al.*, 2021), but differ slightly in what denotations they assign to such roots. English result roots are *eventive*, and denote relations between individuals and events, such that the event leads to the individual being in some state. A result root like $\sqrt{\text{EXPLODE}}$, for example, denotes a relation between an individual and an event of change, such that the event is an explosion and that individual ends up in a state of being in multiple pieces due to that event (18). The state is existentially quantified over, and the notion of change is formally represented using the BECOME relation (Dowty, 1979). In contrast, we propose that translationally equivalent result roots in Spanish, like $\sqrt{\text{EXPLOT-}}$, are *stative*, and denote relations between an individual and a state, while specifying that the state in question is the consequence of a previous change, represented by an existentially quantified event related to the state by the BECOME relation (19).

(18) a. $[\![\sqrt{\text{EXPLODE}}]\!]$: $\lambda x.\lambda e.\exists s[\text{EXPLODE}(e) \wedge \text{BECOME}(e,s) \wedge \mu_{piece}(x)(s) > 1]$
b. $[\![\sqrt{\text{FREEZE}}]\!]$: $\lambda x.\lambda e.\exists s[\text{FREEZE}(e) \wedge \text{BECOME}(e,s) \wedge \text{FORM}(s) \wedge \text{HOLDER}(s) = x]$

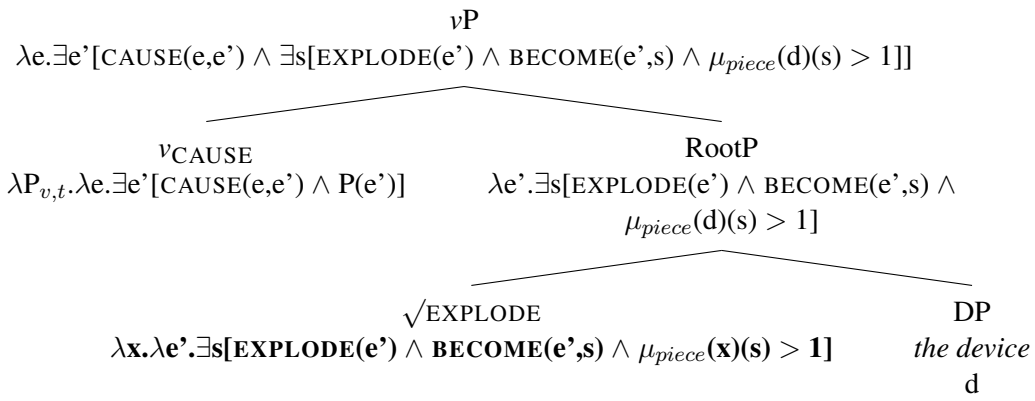
(19) a. $[\![\sqrt{\text{EXPLOT-}}]\!]$: $\lambda x.\lambda s.\mu_{piece}(x)(s) > 1 \wedge \exists e[\text{EXPLODE}(e) \wedge \text{BECOME}(e,s)]$
b. $[\![\sqrt{\text{CONGEL-}}]\!]$: $\lambda x.\lambda s.\text{FORM}(s) \wedge \text{HOLDER}(s) = x \wedge \exists e[\text{FREEZE}(e) \wedge \text{BECOME}(e,s)]$

Thus on our approach result roots in both English and Spanish can be further differentiated according to the type of result state they encode. One class comprises the roots of *explode/explotar*-type verbs, e.g., *break/romper*, *tear/rasgar*, which encode a state of being in more than one piece as a result of an event. In the case of *explode/explotar*, this event is specified to be an explosion. A second class consists of the roots of *freeze/congelar*-type verbs, which encode a change in form as the result of a change in temperature, as in the roots of *freeze*, *burn* or *melt*. For instance, something undergoes a freezing when it changes form due to lowering temperature, such as when water turns to ice. Likewise, something undergoes a burning when it changes form due to rising temperature, such as when wood turns to ash. As we discuss in detail in Section 4, the difference in root meaning between these two root classes will be key in explaining the sorts of resultatives they are compatible with, especially in Spanish.

In what we call a simplex transitive event of change, in which the manner that brings about the result of the event is not expressed, in contrast to VPs like *hammer the metal flat* where a manner and result are named, English result roots are merged as complements of the eventive *v* head v_{CAUSE}, which encodes causative semantics as rep-

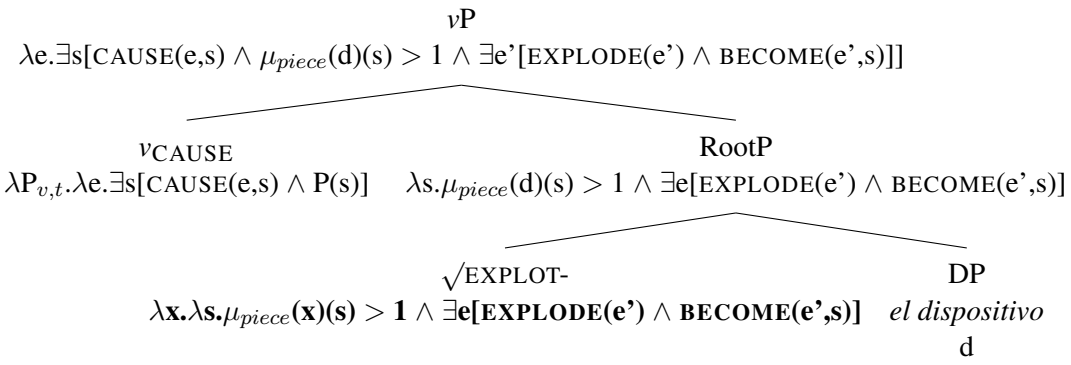
resented by the operator CAUSE (Kratzer, 2005).

(20) Lucy exploded the device.



Spanish result roots also merge as complements of v_{CAUSE}. The only difference is that result roots in this language denote properties of states, in contrast to English result roots, which denote properties of events. In this case, v_{CAUSE} takes a property of states as its first argument. We illustrate with the Spanish result root $\sqrt{}$EXPLOT- '$\sqrt{}$EXPLODE' which involves the same structure as the English one above (20) and only differs with respect to the denotation of the root.

(21) Lucía explotó el dispositivo.



Importantly, both English and Spanish result roots make the same contribution to the truth-conditions; they both contribute an event of change leading to a result state named by the root. However, the type-theoretic properties of result roots differ between the two languages, and consequently they differ in their compositional properties, and therefore their ability to be integrated into different resultative event structures. This will be key in explaining the (in)ability of result roots to form strong and weak resultatives in each language, as made explicit in the discussion to follow.

3.2. Types of Prepositions Available in English and Spanish

The second point of variation concerns the types of prepositions available in each language, since these can function as the heads of PPs serving as result phrases, as in *hammer the metal into the ground*. In this respect, it has been noted that not all languages have prepositions with change of state/location semantics, what are generally known as path-

denoting prepositions. In particular, verb-framed languages such as Spanish have been observed to lack eventive, path-denoting prepositions equivalent to the English *to*, and only have stative prepositions like *a* 'at,' which express locative meanings (Song, 1997; Folli & Ramchand, 2005; Fábregas, 2007; Gehrke, 2008; Beavers *et al.*, 2010). Although these stative prepositions are compatible with directional semantics, such a change of state/location interpretation is only possible when a stative preposition is combined with a verb that encodes direction by itself. For instance, in Spanish, although *a* 'at' appears to be a close equivalent to the English path-denoting preposition *to*, it can only express directional semantics in combination with verbs of inherently directed motion (Levin, 1993; Rappaport Hovav, 2014), such as *ir* 'go,' *entrar* 'enter,' and *volver* 'return.' In these cases, stative/locative prepositions like *a* are most naturally translated as *to*, as illustrated by the following examples in (22) (Beavers *et al.*, 2010).

(22) Las chicas **fueron/entraron/volvieron** *a la casa de*
the.F.PL girl.F.PL go/enter/return.PFV.3PL at the.F.SG house.F.SG of
la abuela de Begoña.
the.F.SG grandmother.F.SG of Begoña
'The girls went/entered/returned to Begoña's grandmother's house.' (based on CREA)

If the verb in question does not encode directed motion, but simply a manner of motion, *a* is not capable of introducing directional semantics on its own. This is illustrated below in (23), where the verbs *bailar* 'dance', *nadar* 'swim' and *gatear* 'crawl' do not encode directed motion, and *a* possesses only a locative meaning (Beavers *et al.*, 2010; Real-Puigdollers, 2013; Martínez Vázquez, 2015).

(23) *Los niños **bailaron/nadaron/gatearon** *a la sala.*
the.M.PL child.M.PL dance/swim/crawl.PFV.3PL at the.F.SG room.F.SG
Intended: 'The kids danced/swam/crawled to the room.'

The general consensus, then, is that verb-framed languages like Spanish, Italian and French lack prepositions with path-denoting semantics equivalent to the English preposition *to*. Despite the fact that the Spanish preposition *a* is often treated as the English counterpart of *to*, it in fact simply expresses a stative, locative interpretation, and is better paraphrased with English *at*, since directional readings only arise when the main verb encodes directed motion (22).[14]

[14] Some Romance manner of motion verbs have been observed to occur in directed motion contexts, where *a* allegedly introduces directional semantics, parallel to English examples like *The kid ran in the room*, which are compatible with a directional reading despite containing the locative preposition *in*. For instance, Spanish verbs like *volar* 'fly' or *correr* 'run' can combine with *a* to express a directional meaning (Folli & Ramchand, 2005; Fábregas, 2007; Gehrke, 2008; Mateu, 2012): *Juan corrió al hospital* 'John ran to the hospital' (see also Zubizarreta & Oh, 2007; Nikitina, 2008; Real-Puigdollers, 2010). These verbs, however, have been argued to encode direction, in addition to manner, hence explaining why they can express directional semantics in combination with locative prepositions like *a*. As illustrated above for (23), manner of motion verbs in Spanish that do not encode any direction cannot express directional readings when combined with *a*. Similarly, Beavers *et al.* (2010) argue that the directional interpretation of stative prepositions like *a* in Spanish or *in* in English is due to a pragmatic inference, since it is only possible in specific contexts and with particular verbs. Namely, while English examples involving manner of motion verbs like *run*, as in *John ran in the room*, are ambiguous between a directional and locative interpretation,

The non-existence of path-denoting prepositions in Romance languages naturally correlates with the unavailability of strong resultatives and in turn with variation regarding Talmy's typology (Aske, 1989; Talmy, 1991, 2000; Napoli, 1992; Song, 1997; Washio, 1997; Folli & Ramchand, 2005; Gehrke, 2008). For instance, Spanish also disallows expression of resultative events in which the result phrase is a PP expressing change of location. Since stative prepositions like *a* in Spanish simply indicate location, the satellite-framed pattern is not possible in this language, neither in cases of directed motion (23) nor in examples like those below, in which the main verb expresses a manner of carrying out an action, e.g., *martillear* 'hammer', *barrer* 'sweep', *golpear* 'knock' (24).

(24) a. *María **martilleó** el clavo *a* la pared.
María hammer.PFV.3SG the.M.SG nail.M.SG at the.F.SG pared.F.SG
Intended: 'María hammered the nail into the wall.'
b. *María **barrió/golpeó** el clavo *a* la basura.
María sweep/knock.PFV.3SG the.F.PL nail.F.PL at the.F.SG trash.F.SG
Intended: 'María swept/knocked the nail into the trash.'

Adopting the view that Spanish lacks path-denoting prepositions, we propose that English and Spanish PPs serving as result phrases in resultative constructions are semantically distinct. In particular, in English, PPs like *into pieces* or *to the side* type are eventive, and thus contribute change of state or location (25-a). For example, *into* is clearly decomposable into *to*, which characterizes a path of change, and *in*, which characterizes the endpoint of the path (e.g., Svenonius, 2010). Since Spanish lacks directional prepositions, PPs like *en pedazos* are stative (25-b). Again, taking the presence of BECOME to indicate change of state, we provide a semantics for PPs in English and Spanish in (25-a) and (25-b) respectively, where the former is a predicate of events after taking an individual argument, whereas the latter returns a predicate of states. For the sake of explicitness, we take *pieces/pedazos* to encode a *measure function* μ_{piece}, intuitively counting the number of pieces an object is divided into at a particular state.[15]

(25) a. $[\![$*into a thousand pieces*$]\!]$: $\lambda x.\lambda e.\exists s[\text{BECOME}(e,s) \,\&\, \mu_{piece}(x)(s) = 1000]$
b. $[\![$*en mil pedazos*$]\!]$: $\lambda x.\lambda s.\mu_{piece}(x)(s) = 1000$

4. Integrating Result Roots in English and Spanish Resultatives

Against the backdrop provided in the previous subsections, we are now ready to see how result roots are integrated into a resultative event structure template differently in English and Spanish. In what follows, we develop analyses of resultative constructions with

pure manner of motion verbs like *dance* as in *John danced in the room* are only compatible with a locative reading.

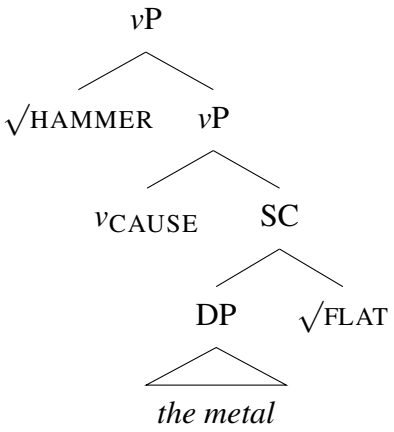
[15] A reviewer wonders whether the two differences between English and Spanish result roots and types of prepositions we propose here are meant to be independent or connected, namely that English result roots are eventive, and Spanish result roots are stative and that the types of prepositions available in these two languages also differ in that only English contains eventive prepositions. We do believe that they are connected in the sense that they pattern together with respect to eventivity and stativity. In principle, they could be independent as it is not a consequence of our analysis that they must pattern the same way in every language. However, going beyond the formalism, it is enticing to think that the differences between English and Spanish in exactly these two domains are not accidental.

result roots in English and Spanish on which differences in the expression of resultativity in these two languages follow from lexical variation in the inventory of lexical items across English and Spanish. This allows us to naturally explain differences in the range of possible resultatives with result roots in English and Spanish, while maintaining a single analysis for such resultatives in each language. We start by considering English, and then move on to Spanish.

4.1. Brief Background on Resultatives

Before moving onto the analyses of resultatives in English and Spanish, it is necessary to briefly spell out the type of approach that we assume towards event structure. For expository purposes, we adopt a syntactic approach to event structure, where little *v* heads represent distinct event structure templates. In particular, we assume a syntactic event structure template for resultative constructions consisting of a little *v* head encoding causation, with a small clause phrase as complement (e.g., Hoekstra, 1988; Folli & Harley, 2005; Kratzer, 2005; Mateu, 2012; Beavers & Koontz-Garboden, 2020). Resultatives are therefore on par with lexical causative verbs, the sole difference being that *v*P is modified directly by a root, whereas lexical causatives involve incorporation of a root into *v* (e.g., Harley, 2005).

(26) Mary hammered the metal flat.



Little *v* is assumed to take a constituent denoting a predicate of eventualities (either events or states) as argument, and introduces a CAUSE relation between some event and the eventuality introduced by this argument, leading to a resultative meaning (Kratzer, 2005).

(27) $[\![v_{\text{CAUSE}}]\!]$: $\lambda P_{v,t}.\lambda e.\exists e'[\text{CAUSE}(e,e') \wedge P(e')]$

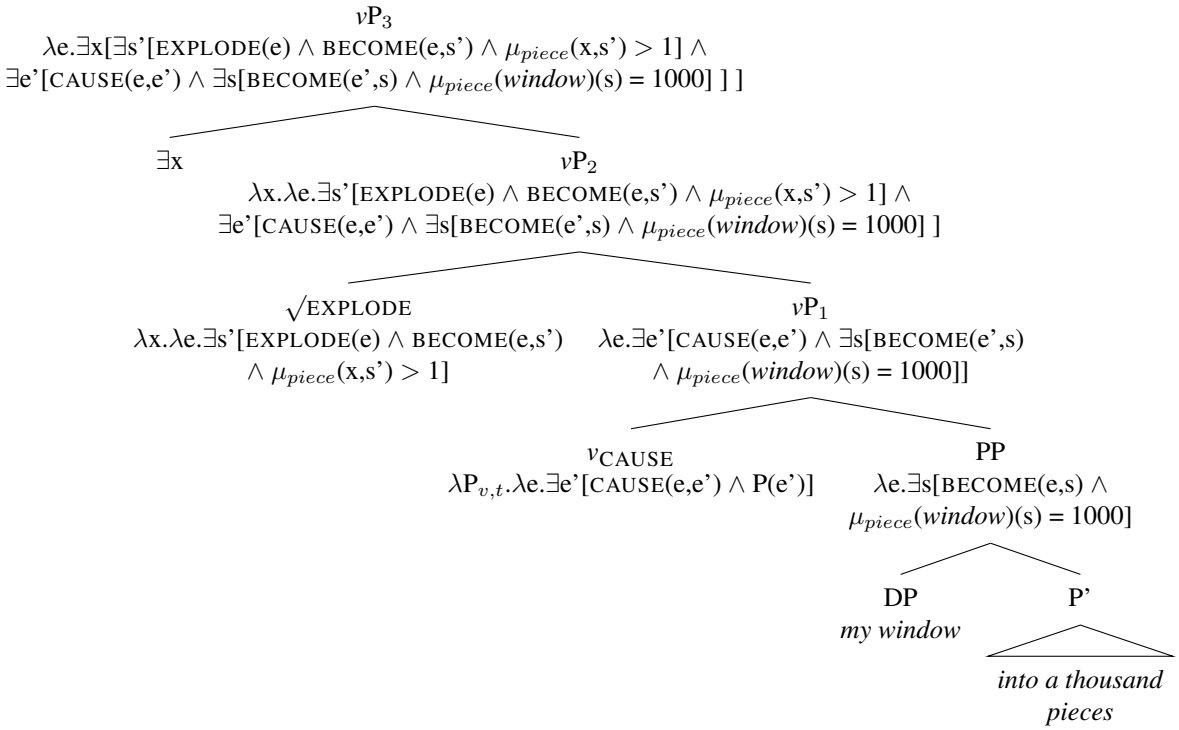
In the discussion to follow, the range of resultative constructions available in English and Spanish will be accounted for by assuming that the type-theoretic properties of roots determine how roots are integrated into the event structure (Marantz, 1997; Embick, 2004; Harley, 2005; Embick, 2009; Levinson, 2010; Yu *et al.*, 2023). For instance, manner roots forming verbs like *hammer*, taken to denote simple predicates of events (e.g., Embick 2009), directly modify the entire *v*P via generalized PREDICATE MODIFICATION (Heim & Kratzer, 1998), thereby providing a manner specification to the causing event.

Consequently, if languages may differ in the type-theoretic properties of their inventory of verbal roots, this can provide a natural explanation for why languages like English and Spanish differ in the range of resultative constructions verbal roots are compatible with.

4.2. Resultatives with Result Roots in English

Since an English result root like $\sqrt{\text{EXPLODE}}$ denotes a relation of type $<e,<v,t>>$, it is integrated into the event structure as a modifier of the entire *v*P when there is an eventuality-characterizing constituent serving as complement of v_{CAUSE}. These two expressions compose by the compositional rule EVENT IDENTIFICATION (Kratzer, 1996), which takes two functions of type $<e,<v,t>>$ and $<v,t>$, and returns a function from individuals to predicates of events where the event descriptions of the two input functions are logically conjoined. We further assume that a rule of EXISTENTIAL CLOSURE applies at the *v*P level to produce an event predicate in order for composition with an argument-introducing head like VOICE to proceed (Alexiadou *et al.*, 2014).

(28) My window exploded into a thousand pieces ≈ (6-b)



A key property of the analysis of English resultatives is that the state variable introduced by the result root and the one introduced by the result PP are bound by distinct existential quantifiers. This means there are two ways to resolve the reference of the state variables that satisfy the truth conditions of existential quantification. The first is to construe the two state variables as referring to the same state. In such a situation, the state descriptions predicated of this same state must be conceptually compatible. By this, we mean that the meaning of one of the state descriptions must restrictively modify the meaning of the other. For example, the result state contributed by the root of *explode* (18) is one of being in more than one piece, while the state contributed by *into a thousand pieces* is a state of being in one thousand pieces. Because the set of states of being in

one thousand pieces is a subset of the set of states of being in more than one piece, the former may restrict the latter, and the two state descriptions are compatible in our sense. This essentially maps to a weak resultative interpretation, as previously illustrated by the examples in (4), which we repeat below for convenience.

(29) a. The East Village is going to be **burned** *to ashes*.
b. Medicinal teas that are **frozen** *into popsicles* for sale.
c. The last bite of ice cream has **melted** *into a puddle* the size of a teardrop.
d. The window trims he **painted** *white* and the front door *red*.
(COCA)

These examples involve a weak resultative interpretation because the two state variables are naturally construed as referring to the same state. For example, in (29-a), the result PP *to ashes* describes a change into a state of *being ash*, which is a further specification of the state of *being in some form* caused by a burning, introduced by the main verb *burn*. This can be understood in terms of entailment: just as *being in one thousand pieces* entails *being in more than one piece*, *being in ashen form* entails *being in some form*. Thus, two state descriptions S and S' are compatible when a state described by S is necessarily a state described by S' or *vice versa*.

On the other hand, if the state variables are construed as referring to distinct states, the state descriptions each variable is predicated of can be different, incompatible properties; one description need not entail the other. This amounts to a strong resultative interpretation, as previously illustrated in (7)-(9). Additional examples are provided below.

(30) a. The methods of obtaining blocks involve first isolating them by cutting narrow trenches then **splitting** them *free from the bed*. (Web)
b. I could **rip** your throat *out* if I wanted.[16]
c. Hurricane Sandy **tore** *a path* through the Northeast yesterday. (COCA)
d. A lot of the water sprayed onto the ship had **frozen** *onto the steel*. (GloWbE)

For instance, in (30-b), the two state descriptions are naturally interpreted as applying to different states with distinct holders. This is because some part of the skin becomes ripped, but it is the referent of the direct object that undergoes the change of location introduced by the particle *out*. Similar comments apply to the rest of the examples. The upshot of the analysis of English resultatives is that a single analysis is able to capture both descriptively weak and strong resultatives; no *analytical* distinction is made between two types of resultatives in English (cf. Mateu, 2012). Rather, whether a resultative is interpreted as "weak" or "strong" depends on the resolution of separately quantified state variables to either the same or distinct states, respectively.

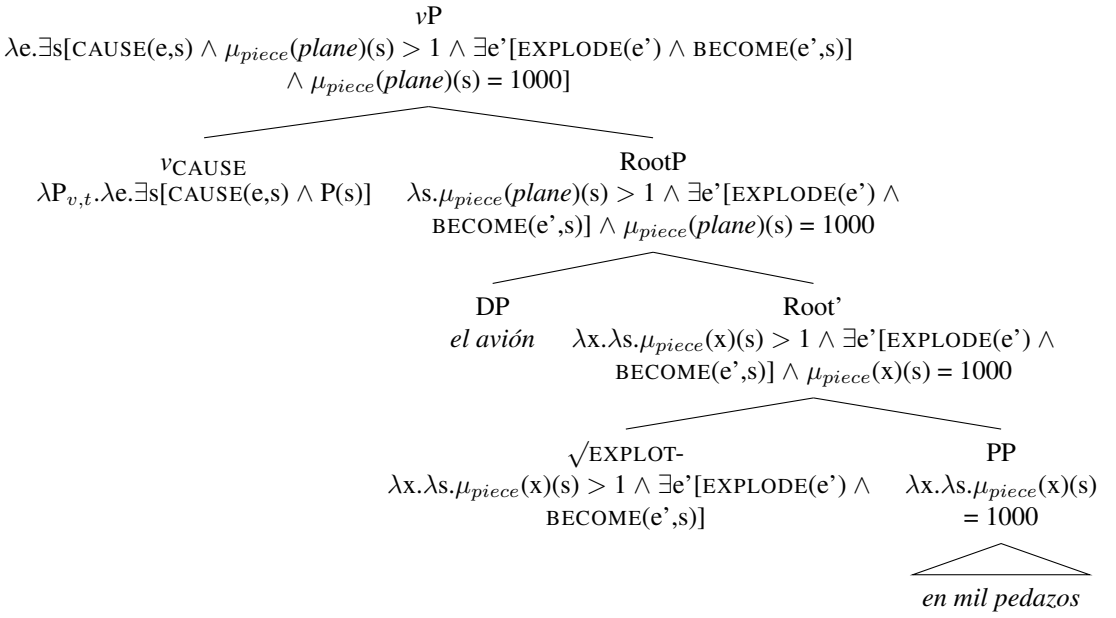
4.3. Resultatives with Result Roots in Spanish

Moving on to Spanish, recall our proposal that result roots in the language are stative rather than eventive, as in (19). This means that unlike English, Spanish result roots cannot modify the *v*P as in (6-b), since *v*P is eventive and any attempt to compose a

[16] *Locke and Key*, Season 2, Episode 10: https://tinyurl.com/6954mutz.

Spanish result root with it via the compositional rules we have adopted would result in a type-mismatch. Rather, given its stative character, the result root must be integrated as the complement of v_{CAUSE}, since v_{CAUSE} may take either an eventive or stative constituent as its first argument. In the presence of an additional PP, which was shown previously to always be stative (25-b), the root composes first with the PP via (generalized) PREDICATE MODIFICATION, ensuring that it shares its arguments with the PP. The resulting stative constituent then serves as the argument of v_{CAUSE}, and is thereby interpreted as being the result of a causing event.

(31) El avión explotó en mil pedazos ≈ (10-a)
'The plane exploded into a thousand pieces.'



We turn now to a key difference between English and Spanish: in Spanish, the state variables of the result root and PP are *identified*, and *bound by the same existential quantifier*. This means that Spanish does not have any flexibility in terms of interpreting the state introduced by the root; it must always be identical to the state introduced by the PP. Consequently, this requires that the two state descriptions always be predicated of the same state, and thus they must always be compatible properties: the state description in the PP must entail the state description contributed by the verb. PPs that do not contribute a state description that entails the state description in the verb, even if headed by the same preposition as one that does, are predicted to be infelicitous.

We can make this intuition sharper by relating compatibility of state descriptions to a similar example in event semantics from Davidson (1969): if a ball simultaneously rotates and warms up at the same time, we do not speak of there being a single event that is both a rotating of the ball and a warmning of the ball. Rather, we speak of there being two events, the rotating of the ball and the warming of the ball, which happen to occur at the same time. No event described as a warming up can be an event described as a rotating, but an event of warming up by two degrees is necessarily an event of warming up, and event of rotating 35 degrees is necessarily an event of rotating. The same is true of states and their descriptions: no state can be simultaneously described as a state of being in some number of pieces and a state of being some number of bats. These are

necessarily two distinct states. On the other hand, a state of being in one thousand pieces is necessarily a state of being in some number of pieces. This is what it means for state descriptions to be compatible.

This compatibility condition is precisely what distinguishes the examples in (10), repeated below in (32): being in one thousand pieces is a further specification of being in some number of pieces (the result state encoded in *explotar* 'explode'), and thus a single state is compatible with both descriptions. On the other hand, the set of states of being one thousand bats are disjoint from the set of states of being in more than one piece, and thus the PP cannot restrict the interpretation of the result state in the verb in (32-b).

(32) a. Justo antes de que el avión **explote** *en*
just before of that the.M.SG plane.M.SG explode.SBJV.PRS.3SG in
mil pedazos.
thousand pieces.F.PL
'Just before the plane explodes into a thousand pieces.' (Gbooks)

b. *Desdemona **explotó** *en mil murciélagos*.
Desdemona explode.PFV.3SG in thousand bats.M.PL
Intended: 'Desdemona exploded into a thousand bats.'

We provide additional examples illustrating this contrast for Spanish in (33); these are licit because they involve verbs built on result roots and the result PPs provide further specifications of the states encoded in the roots in the sense we have just mentioned.

(33) a. El núcleo se **rompe** *en dos o más fragmentos*.
the.M.SG core.M.SG REFL break.PRS.3SG in two or more fragments.M.PL
'The core breaks into two or more fragments.' (CREA)

b. El soldadito lentamente se **derritió** *en una*
the.M.SG soldier.M.SG.DIM slowly REFL melt.PFV.3SG in a.F.SG
masa sin forma.
mass.F.SG without form.F.SG
'The little soldier slowly melted into a mass without shape.' (CES)

c. Observamos que [el agua] se **congeló** *en una*
observe.PFV.1PL that the.F.SG water.F.SG REFL freeze.PFV.3SG in a.F.SG
masa sólida y cristalina.
mass.F.SG solid.F.SG and crystalline.F.SG
'We observed that the water froze into a solid and crystalline mass.' (Web)

In contrast, the examples in (34) show that the Spanish translational equivalents of the English examples in strong resultative contexts are unacceptable, even if the same preposition heads the resultative PP.[17] For instance, in (34-a) a state of being in the glass does not entail being in more than one piece, nor does a state of being on the carpet in (34-b) entail being in a liquid state, the result state encoded in *derritir* 'melt.'

(34) a. *Él **rompió** los huevos *en/al vaso*.
he break.PFV.3SG the.M.PL egg.M.PL in/at.the.M.PL vase.M.SG

[17] Note we use * for the Spanish examples which are ungrammatical on the resultative interpretation. Examples like *romper los huevos en el vaso* are, of course, perfectly fine on an interpretation where the PP modifies the verb phrase, and thus specifies the location where the event took place.

Intended: 'He broke the eggs into the glass.' (Levin & Rappaport Hovav, 1995: 60-61)

b. *El chocolate se **derritió** *en/a la alfombra.*
the.M.SG chocolate.M.SG REFL melt.PFV.3SG in/at the.F.SG rug.F.SG
Intended: 'The chocolate melted onto the carpet.' (based on Goldberg & Jackendoff, 2004: 551)

c. *Hacía tanto frío que los engranajes de sus vehículos
do.IPFV.3SG so cold that the.M.PL gears.M.PL of their vehicles.M.PL
y armas se **congelaron** *en/a inutilidad.*
and weapons.M.PL REFL freeze.PFV.3PL in/at uselessness
Intended: 'It was so cold that the gears of their vehicles and weapons froze into uselessness.' (GBooks)

In closing this section, we note that an anonymous reviewer raises the concern that our proposal might overgenerate and incorrectly predict the acceptability of sequences such as *congelar sólido* 'freeze solid' in Spanish. In fact, given our approach to the meaning of the roots of verbs like *congelar* 'freeze' and *quemar* 'burn' as encoding changes in form brought about by a particular kind of event (18)-(19), one can actually argue that *sólido* and *congelar* encode incompatible state descriptions, despite the tendency in the literature to argue for the contrary. Recall that we understand compatibility of state descriptions to be about entailment. Note further that being solid does not entail being in any particular form, the latter being the description encoded by the root of *congelar* (19-b); *sólido* merely describes a property of an object, not its form. Many things are solid without being in some form brought about by a freezing, just as things that freeze need not be solid. Naturally occurring examples can be found that demonstrate this, as in (35) (for English) and (36) for Spanish.

(35) a. To make LNG, the gas is **frozen** *into a liquid form.* (Web)

b. El helio puede ser **congelado** *en un líquido* en
the helium can be.INF freeze.PTCP.3SG.M in a liquid in
temperaturas criogénicas.
temperatures cryogenic
'Helium can be frozen into a liquid at cryogenic temperatures.' (Web)

It is clear from these examples that the result state encoded in *freeze*/*congelar* is not one of being solid. Therefore, *sólido* does not restrict the meaning of the stative component of *congelar*, and in this sense the state of being in some form due to freezing and the state of being solid must describe two distinct states. Since this is impossible in Spanish resultatives, *congelar sólido* is correctly ruled out on our analysis. In contrast, *en una masa sólida* as in (33-c) is acceptable as a result phrase because this sort of result phrase *does* restrict the result state of *congelar* by specifying what form was brought about by the freezing.

4.4. Revisiting Adjectival Resultatives in Spanish

The approach we have developed also gives us a handle on an outstanding problem in the literature on weak resultatives in Spanish. Namely, as pointed out by an anonymous reviewer, while adjectival resultatives are generally dispreferred in Spanish, a few examples

exist, which generally fall into two classes. The first class consists of what Armstrong (2012) calls *cognate resultatives*, in which a change of state verb occurs with an adjective phrase that shares the same root as the verb and is modified by a degree modifier (see also Bosque 1990; Demonte 1991; Espinal & Mateu 2018).

(36) a. **Secaron** la ropa *bien seca*.
dry.PFV.3.PL the.F.SG clothes well dry.F.SG
'They dried the clothes really dry.'
b. Los trabajadores **limpiaron** la habitación *bien limpia*.
the.M.PL workers clean.PFV.3.PL the.F.SG room well clean.F.SG
'The workers cleaned the room really clean.'
c. Juan **llenó** el tanque *bien lleno*.
Juan fill.PFV.3.SG the.M.SG tank well full.M.SG
'Juan filled the tank really full.' (based on Armstrong, 2012)

The second class consists of verbs of coloring entailing change of state, such as *pintar* 'paint', *teñir* 'dye,' or *tintar* 'tint', accompanied by a color adjective, as illustrated by the examples below.

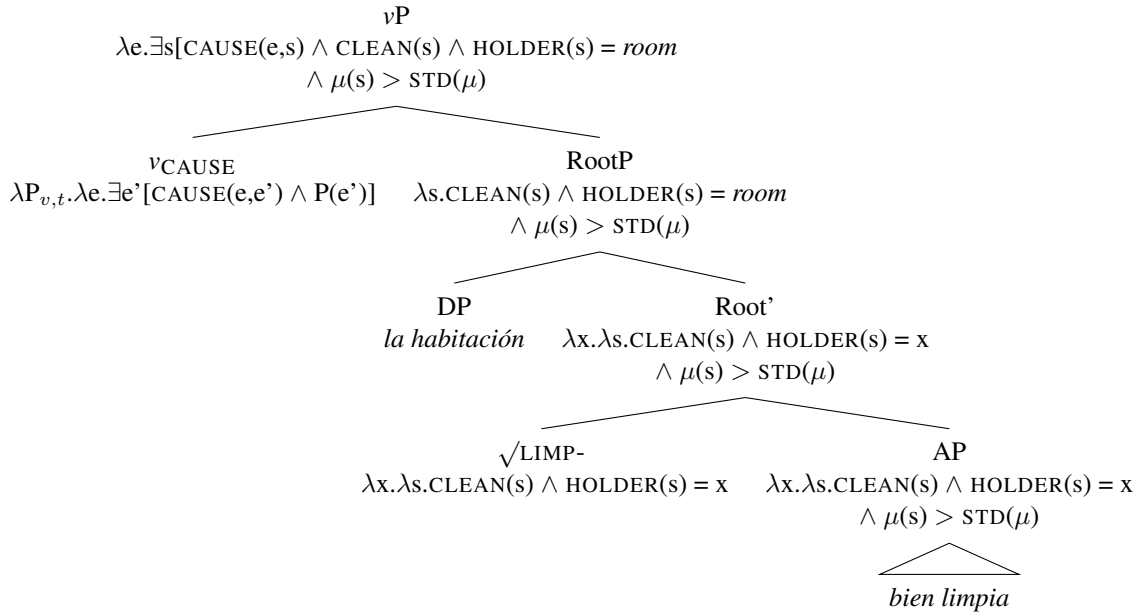
(37) a. Y el cielo lo he **pintado** *verde*, porque
and the.M.SG sky ACC.M.SG have.PRS.1SG paint.PTCP green, because
ahí hay vida.
there there.be.PRS.3SG life
'I painted the sky green, because there is life in there.' (CREA)
b. Robbie se cortó el pelo y se lo
Robbie REFL cut.PFV.3SG the.M.SG hair and REFL ACC.M.3SG
tiñó *rojo*.
dye.PFV.3SG red.M.SG
'Robbie got his hair cut and dyed it red.' (Web)
c. La papa y el plátano presentaron menos cambios,
the.F.SG potato and the.M.SG banana present.PFV.3PL fewer changes,
se **tintaron** *azul* pero no de negro.
REFL tint.PFV.3SG blue but no of black
'The potato and the banana showed fewer changes, they turned blue, rather than black.' (Web)

On the assumption, building on Wellwood (2014; 2015), that adjectives relate individuals to states, our approach can immediately apply to, and explain, these exceptions to the general absence of adjectival resultatives in Spanish. Beginning with the cases in (36), the adjective and the verbal root are identical in meaning, and thus are trivially able to be construed as referring to the same state upon being conjoined. We represent the effect of *bien* 'well' as requiring that the *measure* of the state in the context exceed the contextual standard, again building on Wellwood, in particular her measure function-based approach to degree constructions in adjective phrases.[18] Note that since the adjective and

[18] Armstrong (2012) notes that cognate resultatives are ungrammatical in the absence of a degree modifier on the adjective phrase. Though Armstrong offers a syntactic approach to this problem, we have available to us a pragmatic explanation, based on the semantics we provide in (38): if the verbal root and the adjective have identical semantic contributions, the cognate resultative ends up being synonymous with

verbal root are synonymous, identical conjuncts can be dropped, due to idempotence of conjunction, which we take advantage of in the first step of composition in the derivation in (38).

(38) Limpiar la habitación (bien) limpia.
'Clean the room really clean.'



The adjective phrase, by virtue of containing an adjective built on the same root as the root of the verb, contributes the same state description as the verbal root, and thus straightforwardly satisfies the requirement that result phrases be able to describe the state contributed by the verb. An account of cognate resultatives thus automatically falls out from our approach to weak resultatives in Spanish.

The second case, that of verbs of coloring with color adjectives as result phrases, as presented in (37), requires more detailed discussion. First, we need to show that the roots of verbs of coloring fall into the result root class, like the roots discussed earlier in this paper. This amounts to showing that the relevant roots entail change of state. We offer two main diagnostics, drawing on Beavers and Koontz-Garboden (2020; see also Shibatani, 1976). First, verbs of coloring possess result entailments, as diagnosed by the infelicity of attempts to deny the result entailed by the verb (Rappaport Hovav & Levin, 2010; Beavers, 2011). This holds in both English and the Spanish translational equivalents.

(39) a. #María ha pintado la pared, pero no hay nada diferente en ella.
'#María painted the wall, but nothing is different about it.'
b. #María ha pintado la pared, pero la pared no está pintada.
'#María painted the wall, but it isn't painted.'
c. #María se ha teñido el pelo, pero no hay nada diferente en él.

the change of state verb without the adjective phrase. In other words, the addition of the adjective phrase is redundant, and the structure without the adjective phrase is to be preferred by virtue of being less complex. The presence of a degree modifier, however, renders the presence of the adjective phrase non-redundant, as the semantic contribution of the adjective phrase is non-trivial.

'#María dyed her hair, but nothing is different about it.'

d. #María se ha teñido el pelo, pero su pelo no está teñido.
'#María dyed her hair, but it isn't dyed.'

Second, as discussed above for other result roots, verbs of coloring lack restitutive readings with *again* in both languages.[19]

(40) a. María ha pintado la pared otra vez.
'María painted the wall again.' (necessarily two paintings)

b. María ha teñido su pelo otra vez.
'María dyed his hair again.' (necessarily two dyeings)

Taken together, these diagnostics argue in favor of an analysis of verbs of coloring as constructed from result roots of the same sort as the roots of *break*/*romper* and *explode*/*explotar* discussed above.

In line with our analysis in the previous section, we propose that verbs of coloring are constructed out of result roots that entail change. We illustrate with the root of *pintar* 'paint'.

(41) $[\![\sqrt{\text{PINT-}}]\!] = \lambda x.\lambda s.\text{COLOR}(s) \wedge \text{HOLDER}(s) = x\ \exists e[\text{PAINT}(e) \wedge \text{BECOME}(e,s)]$

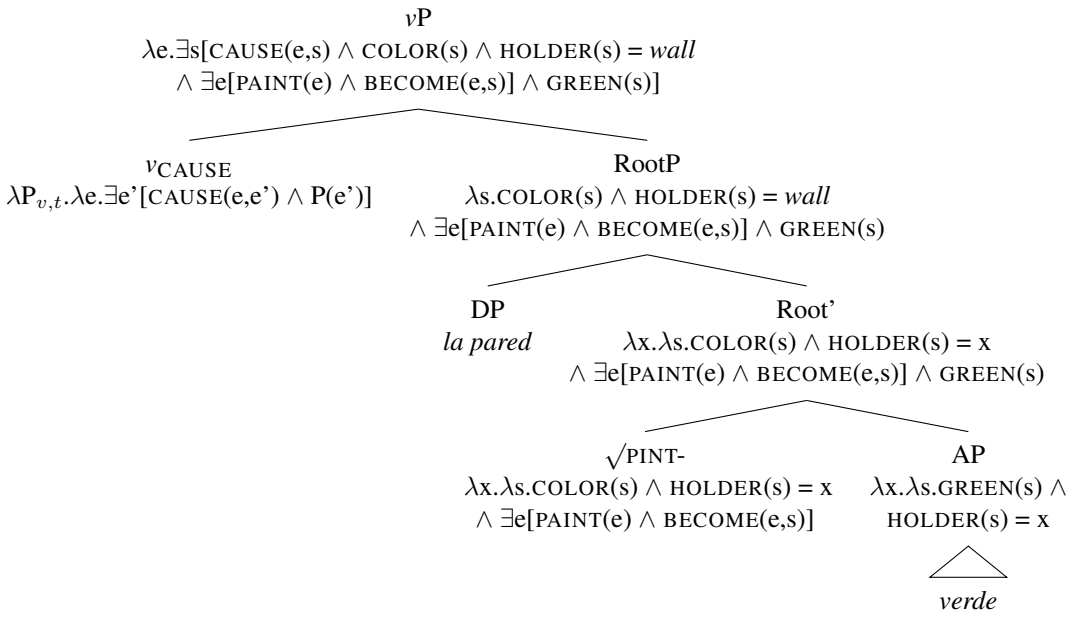
As a relation between individuals and colored states, the root can be conjoined with a color adjective phrase. As being colored and being some particular color are compatible state descriptions, in that the latter may further specify the former, they may refer to the same state. They can thus be successfully conjoined, deriving the weak resultative reading as in (42). Again, we suppress identical conjuncts, here the thematic role function $\text{HOLDER}(S) = x$, due to idempotence of conjunction.

[19] It is difficult to come up with contexts in which a restitutive reading would even be plausible with these verbs: walls cannot be painted without a prior painting event, and hair cannot be dyed without a prior dyeing event. The closest we can get to what looks like a restitutive reading is the following for *paint*:

(i) CONTEXT: John came across a wall that had paint all over it. He scraped off all of the paint, and then *painted the wall again.*

Note, however, that this is not very good evidence for the presence of a restitutive reading with *paint*. Notice, for instance, that the wall had paint on it when John came across it. Since walls are not created with paint on them, a prior painting event must have taken place. Second, the fact that John need not have been the agent of this prior, implied painting event need not be due to a restitutive reading of *again*. Rather, *again* also permits *agentless* repetitive readings, in which a prior event of the same kind, but with a distinct agent, is presupposed, as discussed by Bale (2007) and Smith and Yu (2022). We thus conclude that no restitutive reading is possible with verbs of coloring of the *paint* or *dye* sort.

(42) Pintar verde la pared.
'Paint the wall green.'



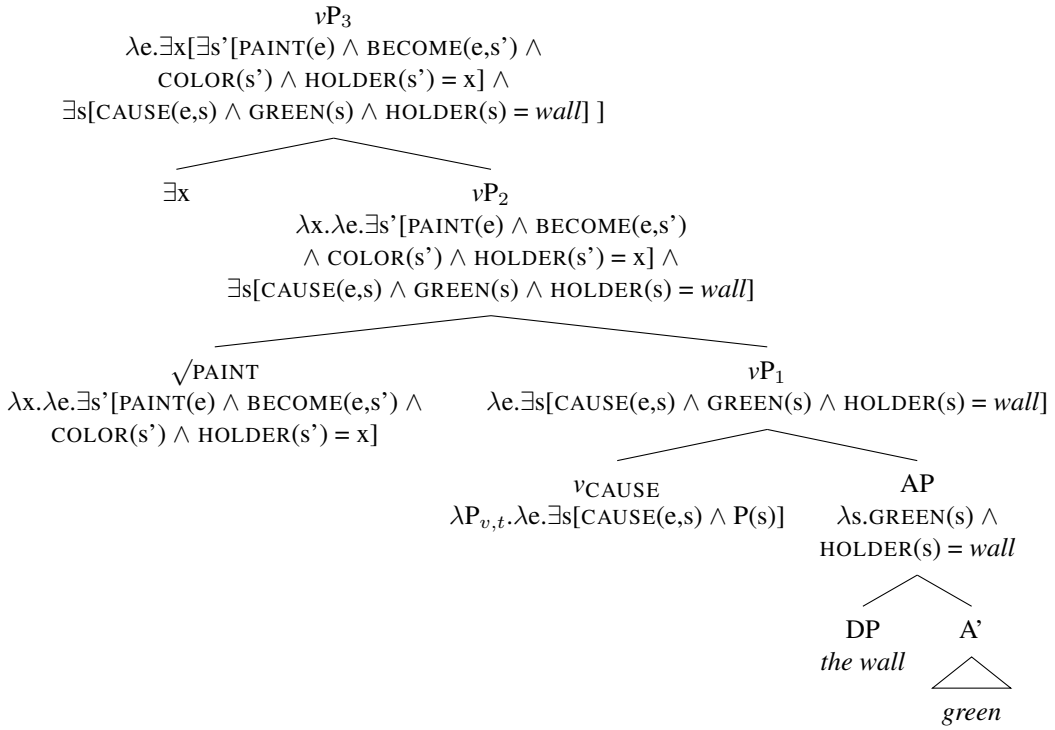
We see, then, that our approach to weak resultatives in Spanish can also be extended to attested cases of adjectival resultatives in the language. Unlike adjectival resultatives in English, which are relatively free in their distribution, the relative paucity of adjectival resultatives in Spanish stems from the more general requirement that the state descriptions contributed by the result phrase (here, an adjective phrase) be compatible with the state description contributed by the verb, implemented by analyzing them as a conjunction of the description contributed by the verb and that contributed by the adjective.

We close by considering how resultatives with verbs of coloring in English would be analyzed. Given our general approach to the difference between English and Spanish, we treat the root of English *paint* as a relation between an individual and an event of becoming painted (43).

(43) $[\![\sqrt{\text{PAINT}}]\!] = \lambda x.\lambda e.\exists s[\text{PAINT}(e) \wedge \text{BECOME}(e,s) \wedge \text{COLOR}(s) \wedge \text{HOLDER}(s) = x]$

As with other cases of resultatives with result roots in English, the adjective phrase (with a DP specifier) serves as complement to v_{CAUSE}, the root is integrated into the event structure as a modifier of *v*P, and its individual argument is saturated by EXISTENTIAL CLOSURE (44).

(44) Paint the wall green.



The result of this derivation is a predicate of events *e*, such that, for some individual *x*, *e* is a change into a painted state whose holder is *x*, and *e* causes the wall to be green. As in our explanation of our previous examples, the existentially quantified variables may be resolved to identical values: the existentially quantified states may be resolved to the same states, and the existentially quantified individual can be resolved to the wall. On this construal, *e* is an event of *the wall becoming painted* that causes the wall to be green, the right interpretation for (44). But this analysis, coupled with our approach to their Spanish near-equivalents, makes additional predictions: as with other resultatives based on result roots, English should permit strong, unselected resultatives with verbs of coloring, but Spanish should disallow them. This prediction is borne out: as shown in (45), English permits strong resultatives with verbs of coloring.

(45) a. Mary **painted** John *out of the picture.*
b. I made some changes to this artisan guild two headed troll king, printed and **painted** him *into a single headed wizard*! (Web)

Note, in particular, that what is painted/dyed need not be the overt object of the verb, nor can the result state encoded in the result phrase (here a PP) be construed as identical to the result state encoded in the root. The (a) example in (45), for instance, involves painting over a picture so that John's image is no longer in it, and in the (b) example, a printed out figure of a fictional troll king is modified by a painting event so that it is now a figure of a wizard. In contrast, similar sentences in Spanish are ungrammatical, as predicted.

(46) a. *María **ha** **pintado** a Juan *fuera del* *cuadro*.
María have.PRS.3SG paint.PTCP DOM Juan out of.the picture

Intended: 'María has painted Juan out of the picture.'

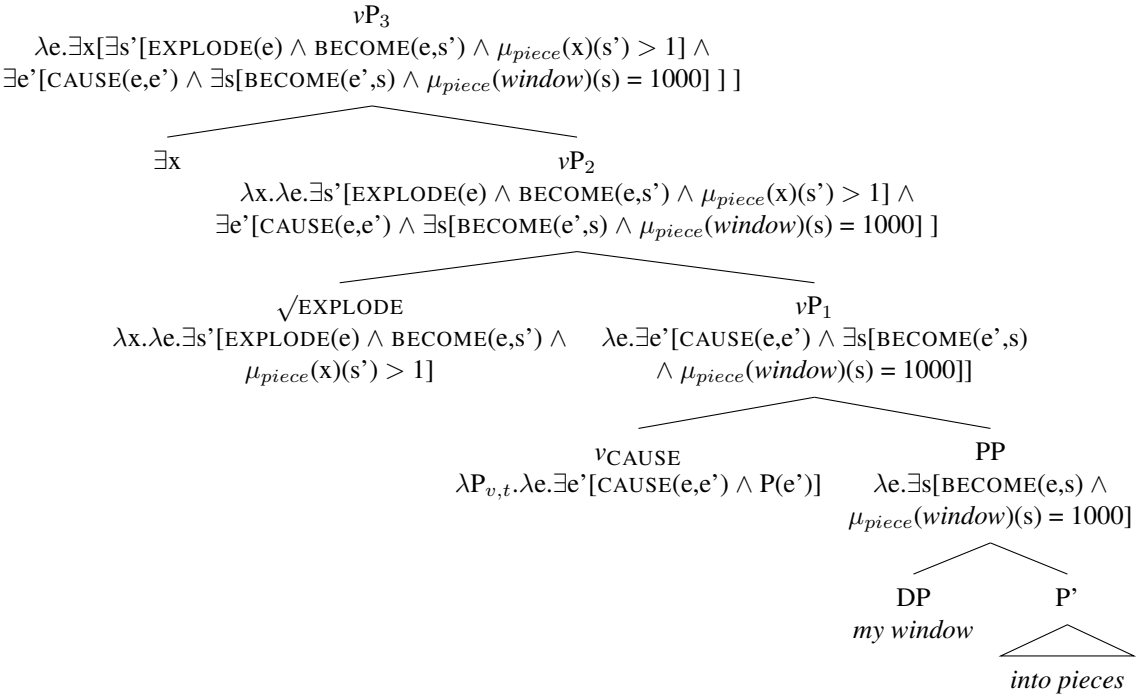
b. *El ladrón **pintó** la Mona Lisa *en un mono*
the.M.SG robber paint.PFV.3SG the.F.SG Mona Lisa in a monkey
saltarín.
jumping
Intended: 'The robber painted the Mona Lisa into a jumping monkey.'

This falls out from our approach, as the states encoded in the PPs in these examples are not construable as being the same state. For instance a state of *being out of the picture* is not construable as a state of *being colored*, because the former kind of state does not entail the latter description. The former thus cannot restrictively modify the latter. Our approach to the semantics of resultatives of verbs of coloring in English and Spanish thus delivers the right predictions about the availability of strong resultatives with such verbs in each language.

5. Predictions & Further Evidence

We wish to close by addressing the fact that our analysis makes several crucial predictions about the differences between English and Spanish resultatives. Given that, on our analyses, English and Spanish result roots are integrated into resultative event structures differently, we expect different parts of the event structure to be available for modification by presupposition triggers like *again* and the Spanish equivalent *otra vez*. Recall that English PPs like *into* are decomposable, consisting of a directional and a stative preposition (Svenonius, 2010; Mateu, 2012; Acedo-Matellán, 2016). Furthermore, note that the entire PP constituent in (28), repeated below, is taken as argument by v_{CAUSE} independently of the result root that adjoins structurally higher.

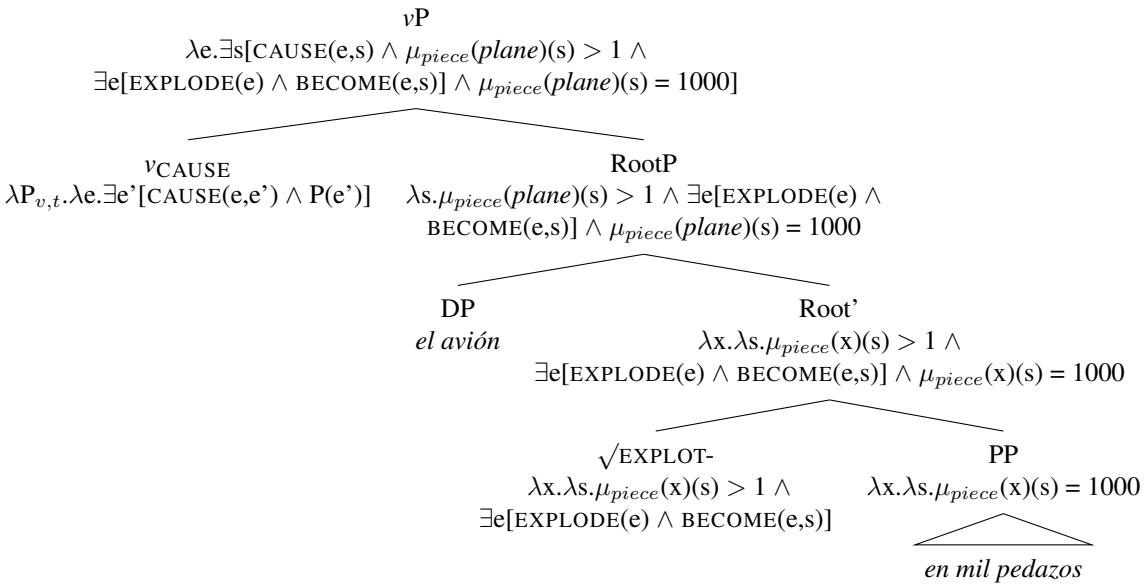
(47) A window exploded into a thousand pieces.



This means that modifiers of the right type should be able to independently modify the stative component headed by *in* in *into*. One such modifier is *again* and its Spanish equivalent *otra vez*, discussed in Section 3.1 above (cf. Dowty, 1979). Following previous work, we treat *again/otra vez* as an event predicate modifier of type $<<v,t>,<v,t>>$, denoting an identity function over event predicates in the assertion and introducing a presupposition that an eventuality of the same type as its complement happened previously (e.g., von Stechow, 1996; Beck & Johnson, 2004). When attached to an eventive constituent, *again* produces a repetitive interpretation, but when attached to a stative constituent, it produces a restitutive presupposition, e.g., *John opened the door again (and it had been open before/and it had been opened before)*, as discussed in previous sections. The Spanish equivalent *otra vez* has been noted to display the same sort of structural repetitive-restitutive ambiguity (Beck, 2005; Cuervo, 2014).

The analyses of result roots and their event structural integration in English versus Spanish in (28) and (31) make predictions about the kinds of readings available with *again*-like modifiers. In English, *again* should be able to target the stative constituent headed by the stative part of *into*, presupposing that this state held previously independent of the way this state was brought about. By contrast, in Spanish, *otra vez* should not be able to target the stative component introduced by *en* independently of an event of change. This is because no predicate of states is present in the structure until the individual argument of RootP is saturated, and the state variable predicated of the PP or AP is identified with that of the result root, which entails change, as can be seen in (31), repeated below. *Otra vez* must therefore always include an entailment of change in its presupposition when modifying such structures.

(48) El avión explotó en mil pedazos.
'The plane exploded into a thousand pieces.'



In other words, *again* in English should be able to modify the stative component of the PP or AP directly, and therefore produce a restitutive presupposition with no presupposed prior change of state. In Spanish, on the other hand, such a presupposition should be excluded, and any presupposition produced by *otra vez* should presuppose the existence of a prior change of state. As illustrated by the examples below (49), this

prediction is borne out.

(49) a. CONTEXT: A plate was manufactured in ten separate pieces. Juan bought it and put the pieces together, making the plate whole. While he managed to use it for a long time, one day he dropped it on the ground, breaking it into its ten component pieces.
El plato se rompió en diez pedazos otra vez.
Intended: 'The plate broke into ten pieces again.'

b. CONTEXT: A solid chunk of earth has always existed, but it was heated up by a crazy scientist, and melted into lava. Another crazy scientist came and blasted it with liquid nitrogen, freezing it into a solid mass.
El trozo de tierra se congeló en una masa sólida otra vez.
Intended: 'The chunk of earth froze into a solid mass again.'

c. CONTEXT: A wall was made out of a blue material, so it had always been blue. The wall was in constant contact with the sun, so it lost all its blue color over time and it turned white in the end. Fortunately, when Jim saw it, he rushed to paint the wall blue again.
Jim pintó azul la pared otra vez.
Intended: 'Jim painted the wall blue again.'

This is a welcome prediction, and offers further support for our view that translationally equivalent result roots in English and Spanish do not share the same lexical semantic properties, and are integrated into event structures differently.[20]

An additional piece of evidence for the fact that the type-theoretic properties of roots determine their integration into the event structure comes from considering property concept roots, in contrast to result roots, as briefly discussed above. Recall from the discussion in Section 3.1 that property concept roots form deadjectival verbs such as *cool*, *lengthen* or *whiten*, and denote relations between individuals and states with no entail-

[20] An anonymous reviewer points out that durative modification with *for/durante*-phrases has been proposed as a diagnostic for distinguishing state-denoting from event-denoting result roots (Yu *et al.*, 2023). The logic of the test is that durative modifiers measure the runtime of the eventuality introduced by the root: if the root is event-denoting, the resulting interpretation should be eventive (often iterative for achievements), whereas if the root is state-denoting, the modifier should instead measure the duration of the resultant state, e.g., *John opened the door for ten minutes*. The reviewer observes that, in Spanish, *durante*-modification of result roots does not generally yield clear state-denoting interpretations, e.g., *La puerta se rompió durante una semana* lit. 'The door broke for a week' does not naturally mean that the door remained broken for a week, which would seem unexpected if Spanish result roots were uniformly state-denoting. At the same time, the reviewer notes that some Spanish result predicates do allow durative state readings, e.g., *El lago se congela durante cuatro meses cada año* 'The lake freezes for four months every year', suggesting that the diagnostic may be unstable. We agree that *for/durante*-modification is not a reliable indicator of root type, as its interpretation is systematically affected by independent conceptual and pragmatic factors. In particular, durative modification of a result state is felicitous only when the state is construed as naturally reversible or temporally bounded; result states that normally persist unless externally reversed resist state readings and yield process-related or iterative interpretations regardless of root ontology. Namely, world knowledge and expectations about the typical temporal profile of the state play a crucial role in this respect. These effects are also attested cross-linguistically, including in English, where even roots analyzed as event-denoting (Yu *et al.* 2023) readily support durative state readings under appropriate conceptual conditions, e.g., *The lake froze for three months last winter*. Taken together, the sensitivity of *for/durante*-modification to reversibility, cyclicity, and contextual coercion undermines its usefulness as a diagnostic for distinguishing state- from event-denoting result roots.

ment of change (Beavers & Koontz-Garboden, 2020). Type-theoretically speaking, then, English property concept roots are analyzed on a par with Spanish result roots, as both are of type $<e,<s,t>>$. The present account thus predicts that English property concept roots should behave like Spanish result roots by virtue of not occurring in strong resultative constructions. The following examples show that this prediction is borne out as well. Namely, the intended interpretation is that the result state introduced by the result phrase is brought about by the event that leads to the state introduced by the property concept root, which does not appear to be a possible interpretation.

(50) a. *The citizens **darkened** the city *invisible*.
CANNOT MEAN: The citizens caused the city to become invisible by darkening.
(based on Embick, 2009)

b. *The dentist **whitened** his teeth *clean*.
CANNOT MEAN: The dentist caused the teeth to become clean by whitening.
(Ausensi, 2021: 235)

c. *We **cooled** the people *out of the room* with the air-conditioner on too high.
CANNOT MEAN: We caused the people to be out of the room by cooling (the room).
(Rappaport Hovav, 2008: 23)

d. *Kim **dimmed** her eyes *sore*.
CANNOT MEAN: Kim caused her eyes to become sore by dimming (the lights).
(Beavers & Koontz-Garboden, 2012: 340)

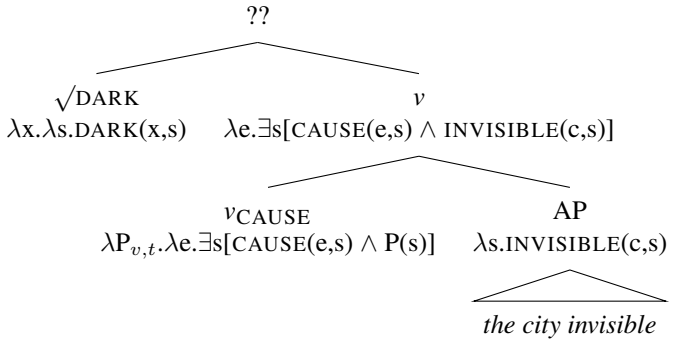
e. *I **thinned** the soup *tasteless*.
CANNOT MEAN: I caused the soup to become tasteless by thinning (the soup).
(Rappaport Hovav, 2014: 276)

f. *My kid **cleared** his bedroom *empty*.
CANNOT MEAN: My kid caused his bedroom to become empty by clearing (his room). (based on Kennedy, 2012)

g. *Kim **opened** the door *into the garden*.
CANNOT MEAN: Kim caused the door to go into the garden by opening (it).
(Yu *et al.*, 2023: 1604)

The examples above involve constructions in which an AP built out of a property concept root or a result phrase like a PP serves as the complement of v_{CAUSE}. We illustrate this below where v_{CAUSE} takes the AP *invisible* as its stative argument. As the complement position is occupied by another phrase, the only other position for a root to compose with *v*P is by acting as a *v*P modifier. However, this position is not available for property concept roots, as the *v*P is a property of events, and no compositional rule exists that would allow the property concept root to modify an event predicate. Composition of a property concept root in modifier position with the rest of the *v*P thus fails, as illustrated in (51).

(51) *The citizens **darkened** the city *invisible*.



At the same time, the present approach also makes the prediction that English property concept roots should be able to occur in weak resultative constructions. Namely, if Spanish result roots do occur in weak resultative constructions, and English property concept roots are analyzed on a par with Spanish result roots, it then follows that English property concept roots are predicted to occur in weak resultative constructions as well. As the data below shows, this prediction is indeed borne out.[21]

(52) a. The woman **opened** the door *ajar* and looked at me kindly.
b. Rhy's smile **widened** *into a grin*.
c. The food worker has **cooled** the soup *to 70 F*.
d. I also **lengthened** the skirt *to 30' inches*.

(Web)

These examples involve property concept roots occurring in weak resultative constructions since the result phrases denote states that are a further specification of the state encoded by the roots. For instance, a result phrase like *ajar* does not introduce a distinct result state than that of the state encoded by the property concept root, but specifies the degree of *openness* of the door (see Rappaport Hovav & Levin, 2010; Beavers, 2011; Mateu, 2012).

Our approach is thus able to derive the generalization in the previous literature that property concept roots in English are incompatible with strong resultatives (Ausensi, 2021, 2024; Yu *et al.*, 2023). In fact, our analysis ties this to a deeper property of the distinction between property concept and result roots in English: the stativity of the former, and the eventivity of the latter. By contrast, no distinction is predicted to exist between the two root classes in Spanish: both classes are stative, and thus cannot compose with the *v*P in modifier position.

6. Conclusion

We developed a novel analysis of the observation that English allows both strong and weak resultatives, while Spanish allows only weak resultatives with result roots entailing change of state. We appealed to differences in the semantic properties of the inventory of verbal roots and prepositions in English and Spanish. On our account, the fact that

[21] We are grateful to an anonymous reviewer for drawing our attention to this additional piece of evidence in favor of our approach.

result roots form both strong and weak resultatives in English, but only weak resultatives in Spanish, falls out from their different types, which place constraints on how roots can be integrated into resultative event structures in the two languages: the eventivity of result roots in English permits them to modify causative *v*P, and thereby to introduce a potentially independent result state, while the stativity of Spanish result roots precludes this compositional option, and their ability to introduce a result state independent from the result phrase.

While we have used the terms "strong" and "weak" resultative throughout this paper, in keeping with the prior literature, on our approach, ultimately, these terms are descriptive labels to which we assign no theoretical status. In particular, no structural distinction exists between putative strong and weak resultatives in English, since what we have called "weak resultative interpretations" are simply those in which the independently existentially quantified state variables may be resolved to the same state. What we have assigned theoretic status to is the structural and semantic differences between English and Spanish resultatives built on result roots, from which the differences between the two languages are derived. On our approach, both English and Spanish have only one resultative structure, and the properties that these structures have lead to a different range of resultatives being possible in each language.

Our account ultimately adds evidence to and supports the view that the effects of Talmy's typology can be reduced to and explained by considering the lexical resources languages have available to express resultative events of change (Beavers *et al.*, 2010). Our account therefore contrasts with syntax-centric approaches to Talmy's typology that attribute its effects to a syntactic deficiency of verb-framed languages with respect to either their inventory of functional heads or to the presence or absence of a specific syntactic operation that builds strong resultatives (Real-Puigdollers, 2010, 2013; Acedo-Matellán & Mateu, 2013; Mateu, 2002, 2010, 2012, 2017; Mateu & Rigau, 2010: among others). By contrast, in our view, variation with respect to the expression of resultativity across languages could arise from the fact that languages do not have the same lexical semantic resources available to them (Beavers *et al.*, 2010), such as the availability (as in satellite-framed languages) or lack (as in verb-framed languages) of prepositions independently encoding change of state semantics (English *to*), as well as independent differences between languages in the lexical semantics of root classes, even if they express the same conceptual content.

We conclude with a natural question that follows from our approach in a broader cross-linguistic context: if examples like *congelar sólido* 'freeze solid' are unacceptable in Spanish because the state description encoded in the adjective is incompatible with the state description encoded in the verb root, why are there languages claimed to only permit weak resultatives in which the translational equivalents of *freeze solid* are completely acceptable?[22] Japanese is just such a language, as shown in (53), and discussed at length by Washio (1997).

(53) ike-wa kachikachini koot-ta.
pond-TOP hard/solid freeze.PST
'The pond froze solid.' (Croft *et al.*, 2010)

[22] We thank Jaume Mateu for raising this point.

While a full analysis of cases like (53) in Japanese is beyond the scope of this paper, and must ultimately be left to future research, we can provide an initial answer to the issue that Japanese raises in the context of our approach. In particular, it is well-known that there are independent differences between Japanese and Spanish that explain the acceptability of examples like (53) in the former. The most crucial difference is this: Washio himself argues that Japanese allows for result XPs that describe results that are merely *implied*, rather than strictly entailed by the verb. He provides the following examples to illustrate this phenomenon (Washio, 1997: 9, ex. 26).

(54) a. John-wa pankizi-o usuku nobasi-ta.
John-TOP dough-ACC thin roll.out-PST
'John rolled the dough thin.'

b. John-wa kinzoku-o pikapika-ni migai-ta.
John-TOP metal-ACC shiny polish-PST
'John polished the metal shiny.'

c. John-wa niku-o yawarakaku ni-ta.
John-TOP meat-ACC soft boil-PST
'John boiled the meat soft.'

Washio explains this as follows:

> Note that verbs like these, which can form well-formed resultatives in Japanese, are not necessarily "change of state" verbs. Some, like *nobas-u* 'roll' in (26a) [(54-a)], seem to imply change, but others, like *migak-u* 'polish' in (26b) [(54-b)], do not: e.g., without the result phrase, (26b) [(54-b)] would normally describe a simple activity of polishing the metal. However, such verbs do strongly imply that the activities they name are done for certain specific purposes, such as to make an object thin, shiny, or soft. In other words, although these verbs do not necessarily imply that their object-referents (the patients) change their states, they nevertheless imply that, if the states of the patients do change, then they would change in certain fixed directions to reach such final states as "thin," "shiny" or "soft." Intuitively, we can say that such verbs have a "disposition" toward certain states (e.g., *migak-u* 'polish' has a "disposition" toward the state "shiny", though it does not logically imply it). Thus, the class of verbs that can appear in weak resultatives is not equal to the class of "change of state" verbs or "accomplishment" verbs: the latter class of verbs is smaller than, and contained in, the former" (Washio, 1997, 9–10).

A similar view can be found in Beavers (2011), who, citing Washio, states that "the generalization is that the Japanese resultatives diagnostic picks out (implicated) patients, while the English one picks out force recipients [...]" (Beavers 2011, 344). Japanese, then, allows for resultatives formed with implied result states, in addition to those that are compositionally available and supplied by the verb root, the only option available to Spanish. It is possible, at least in principle, to develop an analysis of the Japanese phenomena that is compatible with the approach we have defended here for Spanish. For example, one might take the Japanese verbs discussed above to possess modifiable result states after all, and to take them to not be strictly entailed due to being *modalized* by an implicit possibility modal introduced within the verbal structure dominating the root. On

this view, Japanese verb roots may encode, in addition to actual result states, a range of possible results that may or may not hold in the actual world. Such an approach has been proposed for independent reasons by Beavers & Koontz-Garboden (2020), where they analyze certain ditransitives as occurring with a modalized variant of v_{CAUSE}, as well as by Bhadra (2024), who allows for verb roots to encode a variety of different possible outcomes. While we cannot fully develop the technical details of this account here, we consider this a promising avenue for future research.

Competing interests

The authors declare no competing interests.

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Author's contributions

All three authors contributed equally to this paper and should be considered co-first authors.

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