




Degree achievements and maximalization: a cross-linguistic perspective

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Abstract

This paper discusses degree achievements cross-linguistically, focusing on the maximalization possibilities reported in the literature. I introduce a four-way typology where languages differ regarding whether they overtly mark (with lexical items) degree maximalization (i.e., the scale of the degree achievement is bounded in an event) and/or event maximalization (i.e., there is a unique maximal event in the denotation of the predicate), and account for the variation. The four types are represented by English, which does not overtly mark degree or event maximalization; Southern Aymara, which overtly marks degree but not event maximalization; Polish, which overtly marks event maximalization only; and Hungarian, which overtly marks event maximalization with an additional requirement regarding the presence of lexical maxima (if available). I provide tests to distinguish degree vs. event maximalization. My proposal is implemented in Beavers's (2011, 2012) Figure/Path Relation model, making use of a restricted set of lexical items to account for the variation. I suggest that the typology examined is exhaustive, and discuss the variation in telicity contrasts that arise as a result of different maximalization possibilities.

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This paper examines cross-linguistic variation regarding maximalization in degree achievements. Degree achievements are verbal predicates conveying the meaning that an individual increases in the extent to which a property applies to it (Dowty 1979; Abusch 1986; Levin & Rappaport Hovav 2005; Hay et al. 1999; Winter 2006; Kennedy & Levin 2008; Piñón 2008a; Beavers 2011; Bochnak 2015b; Pedersen 2015; Martínez Vera 2018b). These are illustrated in (1) in English. The theme *the rod* increases in the extent to which a property (straightness) applies to it.¹

(1) Mary straightened the rod.

When uttered out the blue, (1) is understood as the theme reaching a specified degree of straightness (usually, the maximal degree) in the event described. This is degree maximalization (Kennedy & Levin 2008; Pedersen 2015; Martínez Vera 2018b). Event maximalization picks out the largest unique event in the denotation of a predicate of events, which, in general, is possible when, in addition to degree maximalization, the quantity of the theme is determined (Filip & Rothstein 2006; Filip 2008; Kardos 2012, 2016). This is illustrated in (2) in Hungarian: besides a bounded scale, the quantity of the theme can be determined—*the rod* is quantized.

(2) A nő ki-egyenesítette a rud-at.
the woman ki-straightened the rod-ACC
'The woman straightened the rod.'

Overall, this paper zooms in into two properties, degree and event maximalization, which fall under the broader category of viewpoint aspect, making explicit how they are separate categories and how they interact in natural language.

While expressions with degree achievements cross-linguistically involve the derivation of some boundary by maximalization, languages differ as to whether they overtly mark (with lexical means) degree or event maximalization—'marked' is used when overt lexical means indicate degree or event maximalization; 'unmarked' is used in their absence. I propose a descriptive four-language typology based on the languages studied so far—this is a semantic typology that touches on issues of relevance for the syntax-semantics interface.

- (3) *Maximalization in degree achievements*
- a. Languages like English (Kennedy & Levin 2008; Beavers 2011, 2012) do not mark degree or event maximalization; degree and event maximalization are left open (to, e.g., pragmatic considerations).
 - b. Languages like Southern Aymara (Martínez Vera 2018b) mark degree maximalization; event maximalization is unmarked.
 - c. Languages like Polish (and other Slavic languages) (Filip 2008) mark event maximalization; although this implies that there must be degree maximalization, pragmatic considerations may play a role in determining the maximal degree.
 - d. Languages like Hungarian (Kardos 2016) mark event maximalization, and lexical maximal degrees are required (if available) when event maximalization is marked.

This paper provides tests to distinguish these types, and provides an analysis building on Beavers's (2011, 2012) Figure/Path Relation (FPR) model, making use of a restricted set of lexical items to account for the variation. I discuss the predictions of the analysis regarding the exhaustivity of this typology, and discuss the variation in telicity contrasts that arise as a result of different maximalization possibilities—the discussion shows that similar interpretative effects may derive from underlyingly different structures and are achieved in different domains (here, degrees vs. events).

The data discussed are based on two sources of information: previous work on these languages and elicitation material prepared by the author. Some of the references on which the elicitation

¹ Research in degree expressions identifies a split between degree and degreeless languages (Beck et al. 2004; Bochnak 2015a,b). The main difference between them regards the availability of gradable predicates (i.e., type <*d*, *et*> and related). This paper concentrates on languages for which gradable predicates are available, which are the ones where maximalization has been studied.

material is based are as follows. For English, relevant references were Hay et al. (1999), Kennedy & Levin (2008), Beavers (2011; 2012). For Aymara, relevant references were Cerrón-Palomino (2008), Gonzalo Segura (2011), Martínez Vera (2018a,b). For Polish, relevant references were Filip (1999, 2005, 2008), Filip & Rothstein (2006), Lazarczyk (2010), Corre (2015). For Hungarian, relevant references were É. Kiss (2005), Piñón (2008b), Kardos (2012, 2016). Information about the methodology and materials used for data collection is included in Appendix 1. The material was run with two speakers of each language (the sentences in this paper report the judgments of these speakers). The elicitation process involved the presentation of contextual scenarios using English (with English, Polish and Hungarian speakers) or Spanish (with Aymara speakers) as auxiliary languages, which was followed by a request for a felicity judgment on a sentence given that contextual scenario. I refer the reader to Matthewson (2004), Davis et al. (2014), Bochnak & Matthewson (2015) for discussion regarding the soundness and validity of the aforementioned choices.

The discussion is organized as follows. Section 2 introduces the cross-linguistic picture summarized in (3). Section 3 provides a compositional semantics based on Beavers's (2011, 2012) FPR model, and discuss whether the analysis proposed to account for (3) exhaust the cross-linguistic maximalization possibilities. Section 4 is the conclusion.

2 Maximalization cross-linguistically

This section introduces the cross-linguistic variation regarding maximalization. Section 2.1 introduces the notions and tests that are relevant to tease language types apart. Section 2.2 presents an overview of unmarked vs. marked forms in the languages discussed. The properties of unmarked and marked forms are addressed in section 2.3.

2.1 Notions and tests

This section informally introduces the key notions and tests to tease apart cross-linguistic variation regarding maximalization.² The notions are degree achievements, bounded scale, quantized theme and telicity (see section 3 for a formalization). I assume that these apply cross-linguistically (following previous literature).

Degree achievements are understood as in (4) (see, e.g., Beavers 2011, 2012; Kennedy & Levin 2008). (4c) captures that idea that there is always a starting point in the scale from which change for a theme occurs.

- (4) *Degree achievement*
- a. A degree achievement describes an event where there is a change in some property of the theme along a scale.
 - b. The scale associated with a degree achievement is a set of linearly ordered degrees along the dimension associated with that degree achievement.
 - c. The scale associated with a degree achievement is always bottom closed (Beavers 2011; see also Kennedy & Levin 2008) but may not be top-closed (i.e., there may/may not be a lexically determined maximal degree in the scale).

Consider (5) in English—these are used throughout this section for illustration.

- (5)
- a. Mary straightened the rod.
 - b. Bill widened the road.

These examples describe events where the themes increase in degree in the scales (i.e., straightness or width). The scale associated with *straighten* (5a) is top-closed, i.e., there is a

² Event maximalization applies to more predicates beyond degree achievements; degree achievements are taken as a case study on which it could be built in future research (see Filip 2008; Beavers 2011, 2012; Kardos 2012, 2016; Martin 2019). I do not discuss, e.g., creation/consumption predicates, resultatives, verb particles, etc. These topics are not discussed, because the comparison across constructions is not cross-linguistically straightforward. Thus, creation/consumption predicates do not pattern with degree achievements in some respects in English, whereas they are (nearly) identical in Aymara (Martínez Vera 2018b); in a similar vein, Aymara does not allow resultatives (in contrast to English, Polish or Hungarian). See footnote 15 for discussion about verb particles.

lexically determined maximum (of straightness) in the scale. In contrast, the scale associated with *widen* (5b) is not top-closed, i.e., there is no degree representing maximal width.³

The second notion is bounded scale in an event (see, e.g., Beavers 2011, 2012; Kennedy & Levin 2008):⁴

(6) *Bounded scale*

The scale associated with a degree achievement is bounded in an event iff the degree reached at the end of that event is maximal, where the maximal degree could be lexical or contextual.

Thus, (5a) describes an event where the rod increases reaching the maximum of straightness—the scale is bounded. If such a degree is not reached, which is the case when (5b) is uttered out-of-the-blue, the scale is unbounded.

Whether a scale is bounded in an event is tested via an entailment test involving a continuation canceling out that the theme ends up in the positive extension of the gradable predicate on which the degree achievement under consideration is based (Tenny 1994; Kennedy & Levin 2008; Beavers 2011). If a contradiction arises, the scale in the event is bounded; if no contradiction arises, the scale is unbounded. As (7) shows, the test applied to (5a) yields a contradiction (when uttered out-of-the-blue); the scale is thus bounded. No contradiction arises when the test is applied to (5b); the scale is thus unbounded.

- (7) a. Mary straightened the rod, ??but the rod didn't end up straight.
b. Bill widened the road, but the road didn't end up wide.

When the scale is bounded, the entailment test does not tease apart if the maximum reached must be lexical or if it can be contextual. This distinction will be relevant in different maximalization possibilities. I make use of contextual cues that manipulate this property (I refer to this as the contextual test).⁵ When uttered out-of-the-blue, (7a) is understood in terms of the lexical maximum being reached (the theme ends up fully straight). The question is whether this must be the case. In English, it is not: in a context where it is made explicit that what counts as maximally straight is not complete straightness, but, instead, being sufficiently straight is enough (i.e., being a little bent is enough to count as straight in that context), (7a) is still felicitous. Thus, the scalar bound can be contextual as well.

The third notion concerns whether the quantity of the theme can be determined—this is relevant regarding the discussion of event maximalization and telicity (see below). For ease of exposition, I limit the discussion to quantized themes, which, in general, suffices to illustrate the issues involved in event maximalization (see, e.g., Krifka 1989, 1998; Beavers 2011, 2012):⁶

3 Whether the scale associated with a predicate is top-closed can be determined via expressions targeting an absolute endpoint. Expressions that are used to test it are *completely* or *100%* (Hay et al. 1999; Kennedy & McNally 2005). Consider the degree achievements *clean* and *dirty* (and their bases). While it is possible to combine the former with these expressions (i), doing so with the latter is degraded (ii). This suggests the scale associated with *clean* is top-closed; the scale associated with *dirty* is top-open.

- (i) a. The table is completely/%100 clean.
b. The person completely cleaned the table.
(ii) a. ??The table is completely/%100 dirty.
b. ??The person completely dirtied the table.

4 The notion in (6) applies to complete events in the sense of Martin (2019), i.e., cases where the scale is bounded but such a bound is not reached in the event described are set aside—this is the case with, e.g., the English progressive in *Mary was straightening the rod*, *when she got interrupted* or modifiers like *halfway* in *Mary straightened the rod halfway*. See footnote 30 for discussion about non-culminating accomplishments, which are predicates that are not discussed in this paper but are relevant in this regard. I thank an anonymous reviewer for pointing this out.

5 I am setting aside the discussion of additional means, specifically, lexical means that may play a role in connection to maximalization possibilities. A case of this is represented by the English examples I use, which involve a non-progressive past form. In English, in the presence of such forms (e.g., *was straightening*), degree maximalization does not take place. Throughout this paper, I use non-progressive past forms across languages to keep things equal. Note, however, that the languages under discussion differ regarding the effects of, e.g., the progressive in connection to maximalization. For instance, in Aymara, the presence/absence of the progressive does not have an effect on maximalization (Martínez Vera 2018b).

6 The references to quantization will only be made in connection to how they are involved in degree and event maximalization. I set aside the consideration of quantified themes like *at least/more than three apples*, which display special properties, and are relevant when discussing whether event maximalization is needed in languages like English or whether it follows from general properties of the FPR model. See section 3.3. See Beavers (2012) and Kardos (2016) for details.

(8) *Quantized theme*

The theme in an event to which a predicate applies is quantized iff no subpart of anything described by the theme can also be described by the theme in that event with respect to that predicate.

Intuitively, this means that no part of the theme, e.g., a part of *the rod* or *the road* in (5), also describes the whole rod or road under consideration, i.e., if a predicate applies to the theme, it does not apply to its subparts. For current purposes, if the theme is not quantized, it is cumulative.

It will also be discussed whether cumulative themes are possible across the board (quantized themes are always possible) (see Filip 2008; Kardos 2012, 2016). The test consists of shifting the quantized themes in sentences like (5) to cumulative ones—I use bare plurals for this test. This test is referred to as the shift-of-the-theme test.

- (9) a. Mary straightened rods.
b. Bill widened roads.

Degree maximalization and event maximalization can be tested in terms of there being a bounded scale in an event and a theme having a specific quantity. The former requires that there be a bounded scale; the latter requires that both the scale be bounded and the theme have an identifiable quantity.

The fourth notion is telicity (see Tenny 1994; Krifka 1998; Kratzer 2004; Rothstein 2004; Borer 2005; Beavers 2011, 2012):

(10) *Telicity*

A predicate is telic iff for any event the predicate describes, it does not describe a subpart of it.

Assuming that the initial part of the event is fixed (Beavers 2011, 2012; see section 3.1), consider the predicate *straighten the rod (to the maximal degree)* (5a). This predicate is telic, since no subpart of the event of straightening the rod (to the maximal degree) is also an event of straightening the rod (to the maximal degree). In contrast, the predicate *widen the road (to some non-maximal degree)* (5b) is atelic: the subparts of this predicate can also be described similarly. Telicity arises when the maximum in the scale associated with the relevant degree achievement is reached and the theme is quantized. In the absence of one of these two elements, the predicate is atelic.

The diagnostic used for telicity contrasts is the *in/for* test (see Rothstein 2004 for more tests). *In* adverbials, e.g., *in an hour*, are compatible with telic predicates: they introduce a bound in the time span described, which is possible when the scale is bounded and the theme is quantized. *For* adverbials, e.g., *for an hour*, are compatible with atelic predicates: they are compatible with ongoing events, which is possible when the scale is not bounded or the theme is cumulative. *In/for* adverbials are adjoined to (5) to determine whether the predicates under consideration are telic. The contrast shows that, when uttered out-of-the-blue, (11a) is telic; (11b) is atelic. The contrast lies in whether the scale is bounded (11a) or not (11b) (the theme is quantized); if the themes are changed for cumulative ones, the predicates (in particular, the predicate in (11a)) are atelic.

- (11) a. Mary straightened the rod *in/for* an hour.
b. Bill widened the road *in/for* an hour.

2.2 Marked and unmarked expressions

I introduce the expressions with degree achievements in English, Southern Aymara (henceforth, Aymara), Polish and Hungarian. The tests are applied to tease apart maximalization possibilities. The expressions in each language on which the tests are applied appear below. Some comments are in order. First, the expressions across languages share the meaning that a theme increases in some property along a scale in an event. Second, I make use of two cases per language: one with a top-closed scale and one with a top-open scale. Third, English only has unmarked expressions. Fourth, Aymara, Polish and Hungarian have unmarked and marked expressions. The question

is whether the presence vs. absence is tied to degree or event maximalization. Fifth, the themes are quantized unless stated otherwise.

(12) repeats (5). (12a) includes a degree achievement with a top-closed scale; (12b) includes a degree achievement with a top-open scale.⁷

- (12) a. Mary straightened the rod. (English, top-closed)
 b. Bill widened the road. (English, top-open)

The Aymara sentences appear in (13)–(14).⁸ The former include a degree achievement with a top-closed scale; the latter, a degree achievement with a top-open scale. They contrast minimally in that the marked version (the b sentences) contains an additional suffix, *-su*. The glosses anticipate that, in Aymara, there is a contrast in that no culmination is reached in the unmarked case, but only in the marked case.⁹ As is argued in the next sections, this contrast lies in whether there is degree maximalization (marked case) or not (unmarked case).

- (13) a. Mariya uka ñikuta llusk'acha-i. (Aymara, top-closed)
 Mary that hair straighten-3S
 'Mary was straightening that (bunch of) hair.'
 b. Mariya uka ñikuta llusk'acha-su-i. (Aymara, top-closed)
 Mary that hair straighten-su-3S
 'Mary straightened that (bunch of) hair.'
- (14) a. Mariya uka ñikuta phurqicha-i. (Aymara, top-open)
 Mary that hair curl-3S
 'Mary was curling that (bunch of) hair.'
 b. Mariya uka ñikuta phurqicha-su-i. (Aymara, top-open)
 Mary that hair curl-su-3S
 'Mary curled that (bunch of) hair.'

The Polish sentences appear in (15)–(16).¹⁰ The former include a degree achievement with a top-closed scale; the latter, a degree achievement with a top-open scale. They contrast minimally in that the marked version (the b sentences) contains a prefix. The glosses anticipate the distinction that in the absence of prefixes no culmination is reached (the a examples); in the cases with prefixes (the b examples) a culmination is reached—as will be argued, this is a contrast in the presence/absence of event maximalization. (15a) is felicitously uttered when Marcin was cleaning the drawer but stopped halfway. (15b) is felicitously uttered when Marcin cleaned the drawer, leaving it spotless (see Appendix 1 for detailed contexts for most examples discussed in this paper).¹¹

⁷ English degree achievements have been studied extensively, e.g., Dowty (1979); Abusch (1986); Levin & Rappaport Hovav (2005); Hay et al. (1999); Winter (2006); Kennedy & Levin (2008); Beavers (2011); Pedersen (2015).

⁸ The discussion about Aymara is based on Martínez Vera (2018b). For an overview on the Aymara grammar, see Cerrón-Palomino (2008).

⁹ Following Filip (2008) and Kardos (2012, 2016), I translate the unmarked sentences of Aymara, Polish and Hungarian making use of an English progressive form.

¹⁰ Many Slavic languages, like Polish, lack determiners (see, e.g., Bošković 2008) and bare nominals can receive a quantized/cumulative interpretation, as well as singular or plural interpretations. Unless indicated otherwise, I translate the sentences with the English definite article and in the singular for simplicity.

¹¹ For Filip (2008), lexical means *can be* associated with event maximalization in Slavic—these lexical means do not convey event maximalization directly; in addition, prefixes convey preposition like meanings similar to *on, away*, etc. (Gehrke 2008). Thus, when a prefix is attached to a degree achievement to yield a perfective form (in the absence of a prefix, degree achievements are, in general, imperfective), event maximalization occurs—as has been indicated, the focus is only on the maximalization properties associated with the sentences under discussion in connection to (some) lexical items. However, Filip (2008) provides arguments showing that the prefixes do not convey the meaning of event maximalization directly, but that event maximalization generally applies with perfective forms (in the presence of a prefix here). One argument is based on the possibility of building an imperfective form out of a perfective one; this would suggest that event maximalization does not occur in this case, even though there is a prefix (see Filip 2008). I only focus on the simpler imperfective vs. perfective forms, setting aside more complex imperfective forms where an imperfective is built on top of a perfective (see Gehrke 2008). The crucial contrast here lies in the presence/absence of prefixes. See Filip (2008) for discussion of some imperfective predicates that may be telic.

- (15) a. Marcin czyściła szufladę, kiedy... (Polish, top-closed)
 Marcin cleaned drawer when
 ‘Marcin was cleaning the drawer, when...’
- b. Marcin **wy**-czyściła szufladę. (Polish, top-closed)
 Marcin **wy**-cleaned drawer
 ‘Marcin cleaned the drawer.’
- (16) a. Student giął patyk, kiedy... (Polish, top-open)
 student bent stick when
 ‘The student was bending the stick, when...’
- b. Student **z**-giął patyk. (Polish, top-open)
 student **z**-bent stick
 ‘The student bent the stick.’

The Hungarian sentences appear in (17)–(18).¹² The former include a degree achievement with a top-closed scale; the latter, a degree achievement with a top-open scale. They contrast minimally in that the marked version (the b sentences) contains a particle.¹³ The glosses anticipate the distinction that no culmination is reached without a particle (the a examples); the cases with a particle involve culmination (the b examples)—as will be argued, this is a contrast in the presence/absence of event maximalization.

- (17) a. A nő egyenesítette a rud-at, amikor... (Hungarian, top-closed)
 the woman straightened the rod-ACC when
 ‘The woman was straightening the rod, when...’
- b. A nő **ki**-egyenesítette a rud-at. (Hungarian, top-closed)
 the woman **ki**-straightened the rod-ACC
 ‘The woman straightened the rod.’
- (18) a. A munkások szélesítették a folyó-t, amikor... (Hungarian, top-open)
 the workers widened the river-ACC when
 ‘The workers were widening the river, when...’
- b. A munkások **ki**-szélesítették a folyó-t. (Hungarian, top-open)
 the workers **ki**-widened the river-ACC
 ‘The workers widened the river.’

2.3 Properties of marked and unmarked expressions

Recall from section 2.1 that the properties and tests to be discussed are the following:

- (19) *Properties and tests*
- Whether a bound is entailed in an event is tested by the entailment test.
 - Whether the bound must be lexical when a bound is entailed is tested by the contextual test.
 - Whether the theme must be quantized is tested by the shift-of-the-theme test.
 - Whether the relevant predicate is telic is tested by means of the *in/for* adverbial test.

Sections 2.3.1 and 2.3.2 discuss the properties of unmarked and marked forms respectively.

2.3.1 Unmarked expressions

Table 1 summarizes the properties of unmarked expressions. The values are understood as follows: ‘possible’ means that the relevant property is sometimes the case (e.g., in English, the ‘possible’ under ‘bound entailed’ means that, with an unmarked form, a bound may/may not be entailed, which is the case when comparing expressions with, e.g., *straighten* vs. *widen* when uttered out-of-the-blue); ‘possible’ also indicates that there are no lexical means (i.e., unmarked forms) requiring that the relevant property be the case—pragmatic considerations

¹² Following Kardos’s work, I do not discuss issues like the interaction with focus, negation, etc.

¹³ I focus on verb particles. See, e.g., Surányi (2009) and Kardos (2012; 2016) for discussion of additional means (e.g., resultatives), including cases where particles and resultatives may co-occur (these are set aside here).

may be involved. The ‘no’ value means that the relevant property is never the case (e.g., in Aymara, the ‘no’ under ‘bound entailed’ means that, when there is an unmarked form, a bound is never entailed). ‘N/A’ means that that property cannot be tested (e.g., in Aymara, since a bound is not entailed, whether the bound is lexical cannot be tested).

	Bound entailed	Lexical bound	Quantized theme	Telic predicate
English	Possible	Possible	Possible	Possible
Aymara	No	N/A	Possible	No
Polish	No	N/A	Possible	No
Hungarian	No	N/A	Possible	No

Table 1 Unmarked expressions.

The first property regards the boundedness of the scale—tested via the entailment test. In English, there is a contrast in that a bound in the scale is reached only if the relevant scale is top-closed—the sentences are thought of as uttered out-of-the-blue. (20) (= (7)) shows this contrast (see Kennedy & Levin 2008; Beavers 2011). The scale associated with the degree achievement in (20a) is top-closed; the one in (20b) is top-open.

- (20) a. Mary straightened the rod, ??but the rod didn’t end up straight. (English, top-closed)
 b. Bill widened the road, but the road didn’t end up wide. (English, top-open)

In contrast to English, Aymara, Polish and Hungarian do not show this alternation. Regardless of the degree achievement having a top-closed/top-open scale, the scale is unbounded—the entailment test for Polish is the one Filip (2008) uses, with the continuation *but not completely*.

- (21) a. Mariya uka ñikuta llusk’acha-i, ukatha uka ñikuta (Aymara, top-closed)
 Mary that hair straighten-3S but that hair
 janiwa llusk’acha-ta-:-ka-i-ti.
 not straighten-PART-BE-NEG-3S-NEG
 ‘Mary straightened that (bunch of) hair, but it isn’t straight.’
 b. Mariya uka ñikuta phurqicha-i, ukatha uka ñikuta (Aymara, top-open)
 Mary that hair curl-3S but that hair
 janiwa phurqicha-ta-:-ka-i-ti.
 not curl-PART-BE-NEG-3S-NEG
 ‘Mary curled that (bunch of) hair, but it isn’t curly.’
- (22) a. Marcin czyściła szufladę, ale niezupełnie. (Polish, top-closed)
 Marcin cleaned drawer but not.completely
 ‘Marcin cleaned the drawer, but not completely.’
 b. Student giął patyk, ale niezupełnie. (Polish, top-open)
 student bent stick but not.completely
 ‘The student bent the stick, but not completely.’
- (23) a. A nő egyenesítette a rud-at, de a rúd (Hungarian, top-closed)
 the woman straightened the rod-ACC but the rod
 nem let egyenes.
 not became straight
 ‘The woman straightened the rod, but it did not end up straight.’
 b. A munkások szélesítették a folyó-t, de a folyó (Hungarian, top-open)
 the workers widened the river-ACC but the river
 nem let széles.
 not became wide
 ‘The workers widened the river, but it did not end up wide.’

Whether the bound in the scale must be lexical with unmarked forms can only be tested for English (see [Table 1](#))—this is the case if the degree achievement has a top-closed scale. The degree may/may not be lexical. Consider (24) (= (5a)). If it is uttered out-of-the-blue, the

theme ends up fully straight. If it is made explicit in context that what counts as maximally straight does not correspond to complete straightness, the degree the theme reaches would be this contextual maximum. This would be the case in a context where the theme needs to be straightened, but it needs to be straightened in such way that it ends up a little bent (suppose that the rod needs to fit in a particular mold, so it needs to be almost fully straight).

(24) Mary straightened the rod. (English, top-closed)

The literature (see Kennedy & Levin 2008) indicates that English is subject to pragmatic considerations in this regard. This is the case in (24). In addition to the contextual manipulation to determine whether the maximum is lexical/contextual, it can also be made explicit that the theme does not end up straight. Instead, it may only end up straighter. Consider a case where Mary straightened the rod for a while; she will continue straightening it afterwards. In this scenario, the predicate *straighten* behaves more similarly to *widen* in that it describes an event where no maximal degree is reached.

Being subject to pragmatic considerations is also the case with sentences like (5b), repeated below. Although when uttered out-of-the-blue this sentence means that the theme ends up wider, context may make explicit that some degree actually counts as maximal in that context. Suppose that the road has steep hills on each side. Suppose that it has been widened almost reaching the points where the really steep parts begin. In this context, the road cannot be widened any more; the contextual maximal degree of width is reached.

(25) Bill widened the road. (English, top-open)

To capture this flexibility, the literature (Kennedy & Levin 2008; Pedersen 2015) proposes that English degree achievements are subject to the pragmatic principle of Interpretive Economy. It captures that there is a default (out-of-the-blue) case, but if there are cues that indicate otherwise (e.g., contextual cues), these cues are the ones taken into consideration. This principle is stated in (26) (Kennedy & Levin 2008: 169). It guarantees that whenever the degree achievement considered has a top-closed scale, the scale is bounded (unless indicated otherwise), since there is a lexical maximum (the ‘possible’ value in [Table 1](#) captures that the lexical maximum may be reached). In the absence of such a degree, i.e., with a top-open scale, the scale is unbounded (unless indicated otherwise). As a result, degree maximalization is pragmatically determined.

(26) *Interpretive Economy*
 Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

The third property in [Table 1](#) is the quantization of the theme. That the theme must be quantized is not the case in any of the languages: it can be quantized/cumulative—the shift-of-the-theme test is applied below. This shows that unmarked sentences remain underspecified regarding the nature of the theme cross-linguistically. In Aymara, the plural marker *-ra* needs to be included for plural themes, indicated in parentheses. In Polish (Filip 2008), the bare nominal can thus receive a quantized/cumulative interpretation.

(27) a. Mary straightened the rod/rods. (English, top-closed)
 b. Bill widened the road/roads. (English, top-open)

(28) a. Mariya uka ñikuta / ñikuta-naka llusk’acha(-ra)-i. (Aymara, top-closed)
 Mary that hair hair-PL straighten(-PL)-3S
 ‘Mary was straightening that (bunch) of hair/ (bunches of) hair.’
 b. Mariya uka ñikuta / ñikuta-naka phurqicha(-ra)-i. (Aymara, top-open)
 Mary that hair hair-PL curl(-PL)-3S
 ‘Mary was curling that (bunch) of hair/ (bunches of) hair.’

(29) a. Marcin czyściła szufladę, kiedy... (Polish, top-closed)
 Marcin cleaned drawer when
 ‘Marcin was cleaning the drawer/drawers, when...’

- b. Student giął patyk, kiedy... (Polish, top-open)
 student bent stick when
 ‘The student was bending the stick/sticks, when...’
- (30) a. A nő egyenesítette a rud-at / rud-ak-at (Hungarian, top-closed)
 the woman straightened the rod-ACC rod-PL-ACC
 egyenesített, amikor...
 straightened when
 ‘The woman was straightening the rod/rods, when...’
- b. A munkások szélesítették a folyó-t / folyó-k-at (Hungarian, top-open)
 the workers widened the river-ACC river-PL-ACC
 szélesítettek, amikor...
 widened when
 ‘The workers were widening the river/rivers, when...’

The last property in [Table 1](#) regards telicity. Applying the *in/for* adverbial test to (5) (= (11)) (involving a quantized theme), shows that, in English, predicates are telic in the out-of-the-blue cases if the relevant scale is top-closed. Otherwise, they are atelic. Pragmatic considerations similar to the ones discussed above may also play a role in that if it is made explicit that the maximal degree is not reached (when the relevant scale is top-closed), the predicate is atelic (so adjoining a *for* adverbial becomes possible). A similar reasoning holds for cases with top-open scales: if a contextual maximal degree is made salient, the predicate is telic (so adjoining an *in* adverbial becomes possible)—besides, if the theme is shifted to a cumulative one, the predicates are atelic (which is as expected).

- (31) a. Mary straightened the rod in/??for an hour. (English, top-closed)
 b. Bill widened the road ??in/for an hour. (English, top-open)

In contrast, Aymara, Polish and Hungarian do not show such flexibility: the predicates in unmarked expressions are atelic—only *for* adverbials are admissible. In Aymara, the contrast between *in/for* adverbials is indicated by the presence/absence of the ablative marker *-tha*, its presence indicating that the temporal expression includes a bound (since the scale is unbounded in the unmarked case (the predicates are already atelic), it does not matter whether the theme is quantized/cumulative).

- (32) a. Mariya ?*10 minutos-*tha* / 10 minutos uka ñikuta (Aymara, top-closed)
 Mary 10 minutes-ABL / 10 minutes that hair
 llusk’acha-i.
 straighten-3S
 ‘Mary was straightening that (bunch of) hair ?*in/for 10 minutes.’
- b. Mariya ?*10 minutos-*tha* / 10 minutos uka ñikuta (Aymara, top-open)
 Mary 10 minutes-ABL / 10 minutes that hair
 phurqicha-i.
 curl-3S
 ‘Mary was curling that (bunch of) hair ?*in/for 10 minutes.’
- (33) a. Marcin czyściła szufladę *w 3 minuty / przez 3 (Polish, top-closed)
 Marcin cleaned drawer in 3 minutes / for 3
 minuty.
 minutes
 ‘Marcin was cleaning the drawer *in/for 3 minutes.’
- b. Student giął patyk *w 3 minuty / przez 3 minuty. (Polish, top-open)
 student bent stick in 3 minutes / for 3 minutes
 ‘The student was bending the stick *in/for 3 minutes.’
- (34) a. A nő *10 perc alatt / 10 perc-ig (Hungarian, top-closed)
 the woman 10 minute under / 10 minute-for
 egyenesítette a rud-at.
 straightened the rod-ACC
 ‘The woman was straightening the rod *in/for 10 minutes.’

- b. A munkások *10 perc alatt / 10 perc-ig (Hungarian, top-open)
 the workers 10 minute under / 10 minute-for
 szélesítették a folyó-t.
 widened the river-ACC
 ‘The workers were widening the river *in/for 10 minutes.’

The maximalization possibilities in English are as follows. Since there are only unmarked forms, there is room for flexibility. There are no requirements in that the scale does not need to be bounded; if the scale is bounded, the bound need not be lexical; the theme need not be quantized; and the predicate need not be telic. Pragmatic considerations play a role regarding maximalization. In contrast, the unmarked forms in Aymara, Polish and Hungarian do have particular properties: the scale cannot be bounded and the predicate must be atelic; the only place where some flexibility is allowed regards the theme, which can be quantized/cumulative.

2.3.2 Marked expressions

Table 2 summarizes the properties of marked expressions. The values are understood as follows: ‘yes’ means that the relevant property is always the case (e.g., in Aymara, the ‘yes’ under ‘bound entailed’ means that a bound is always entailed). The ‘possible’ value means that the relevant property is sometimes the case (e.g., in Polish, the ‘possible’ under ‘lexical bound’ means that the degree bound may/may not be lexical; the lexical means do not require that the relevant property be the case; pragmatic considerations may be involved). Since English does not have marked expressions, it is not discussed in this section.

	<i>Bound entailed</i>	<i>Lexical bound</i>	<i>Quantized theme</i>	<i>Telic predicate</i>
<i>English</i>	N/A	N/A	N/A	N/A
<i>Aymara</i>	Yes	Yes	Possible	Possible
<i>Polish</i>	Yes	Possible	Yes	Yes
<i>Hungarian</i>	Yes	Yes	Yes	Yes

Table 2 Marked expressions.

The first property regards the boundedness of the scale. Applying the entailment test shows that there is a contradiction, so the marked expressions in Aymara, Polish and Hungarian require that the scale be bounded.

- (35) a. Mariya uka ñikuta llusk’acha-su-i, #ukatha uka (Aymara, top-closed)
 Mary that hair straighten-su-3S but that
 ñikuta janiwa llusk’acha-ta-:-ka-i-ti.
 hair not straighten-PART-BE-NEG-3S-NEG
 ‘Mary straightened that (bunch of) hair, #but it isn’t straight.’
- b. Mariya uka ñikuta phurqicha-su-i, #ukatha uka (Aymara, top-open)
 Mary that hair curl-su-3S but that
 ñikuta janiwa phurqicha-ta-:-ka-i-ti.
 hair not curl-PART-BE-NEG-3S-NEG
 ‘Mary curled that (bunch of) hair, #but it isn’t curly.’
- (36) a. Marcin wy-czyściła szufladę, ??ale niezupełnie. (Polish, top-closed)
 Marcin wy-cleaned drawer but not.completely
 ‘Marcin cleaned the drawer, ??but not completely.’
- b. Student z-giął patyk, ??ale niezupełnie. (Polish, top-open)
 student z-bent stick but not.completely
 ‘The student bent the stick, ??but not completely.’
- (37) a. A nő ki-egyenesítette a rud-at, #de a rúd (Hungarian, top-closed)
 the woman ki-straightened the rod-ACC but the rod
 nem let egyenes.
 not became straight
 ‘The woman straightened the rod, #but it did not end up straight.’

- b. A munkások **ki-szélesítették** a folyó-t, #de a (Hungarian, top-open)
 the workers **ki-widened** the river-ACC but the
 folyó nem let széles.
 river not became wide
 ‘The workers widened the river, #but it did not end up wide.’

The question is whether the bound must be lexical, i.e., the second property in [Table 2](#). The relevant cases involve top-closed scales, i.e., Aymara (13b), Polish (15b) and Hungarian (17b), repeated below—if the scale is top-open, the bound is contextual. Interestingly, Aymara and Hungarian pattern together, but differently from Polish. In the former, the scale bound must be lexical: sentences with these predicates become infelicitous if it is made explicit that the maximum does not correspond to the lexical one, but to a contextual one (see Appendix 1 for contexts targeting a contextual maximum).¹⁴

- (38) Mariya uka ñikuta llusk’acha-**su**-i. (Aymara, top-closed)
 Mary that hair straighten-**su**-3S
 ‘Mary straightened that (bunch of) hair.’
- (39) A nő **ki-egyenesítette** a rud-at. (Hungarian, top-closed)
 the woman **ki-straightened** the rod-ACC
 ‘The woman straightened the rod.’

In contrast, in Polish, while in the out-of-the-blue cases the lexical maximum is reached, it is possible to provide cues suggesting that the maximal degree is contextual—suppose that the maximum of cleanliness does not require that the drawer ends up spotless (e.g., all dust must be cleaned, but spots may remain); thus, the drawer need not end up completely clean (as determined by the lexical maximal degree).

- (40) Marcin **wy-czyściła** szufladę. (Polish, top-closed)
 Marcin **wy-cleaned** drawer
 ‘Marcin cleaned the drawer.’

I propose that the flexibility Polish displays is similar to the flexibility English displays in that the latter is subject to Interpretive Economy. It follows from this that lexical maxima are preferred in the out-of-the-blue cases, but contextual maxima are possible if additional cues are present. In section 3, I derive the Polish effect based on the same mechanism that derives the English contrasts.

The next property in [Table 2](#) regards the quantization of the theme—tested via the shift-of-the-theme test. The contrast is between Aymara vs. Polish and Hungarian. While the Aymara marked expressions are compatible with quantized/cumulative themes (41) (-*ra* is used with the plural), the Polish (42) and Hungarian (43) ones are only compatible with quantized themes. This is crucial to tease apart degree and event maximalization: the latter requires that both the scale be bounded and the theme be quantized; the former only requires that the scale be bounded. Thus, the marked expressions in Aymara display degree maximalization; the Polish and Hungarian ones, event maximalization. The (im)possibility of having both quantized/cumulative themes appears below. Thus, in Polish, the theme cannot be interpreted as cumulative.

- (41) a. Mariya uka ñikuta / ñikuta-naka llusk’acha-**su(-ra)**-i. (Aymara, top-closed)
 Mary that hair hair-PL straighten-**su(-PL)**-3S
 ‘Mary straightened that (bunch) of hair/(bunches of) hair.’
- b. Mariya uka ñikuta / ñikuta-naka phurqicha-**su(-ra)**-i. (Aymara, top-open)
 Mary that hair hair-PL curl-**su(-PL)**-3S
 ‘Mary curled that (bunch) of hair/(bunches of) hair.’
- (42) a. Marcin **wy-czyściła** szufladę. (Polish, top-closed)
 Marcin **wy-cleaned** drawer
 ‘Marcin cleaned the drawer/*drawers.’

¹⁴ In a follow-up paper, Martínez Vera (2018c) analyzes Aymara -*su* as a verbal superlative. He discusses cases involving interactions between -*su* and focus. When these interactions occur, the lexical maximum need not be reached, as it suffices that the degree reached exceeds any other degree in the comparison class. I set this discussion aside.

- b. Student **z-giął** patyk. (Polish, top-open)
 student **z-bent** stick
 ‘The student bent the stick/*sticks.’
- (43) a. A nő **ki-egyenesítette** a rud-at / (Hungarian, top-closed)
 the woman **ki-straightened** the rod-ACC
 ***ki-egyenesített** rud-ak-at.
 ***ki-straightened** rod-PL-ACC
 ‘The woman straightened the rod/*rods.’
- b. A munkások **ki-szélesítették** a folyó-t / (Hungarian, top-open)
 the workers **ki-widened** the river-ACC
 ***ki-szélesítettek** folyó-k-at.
 ***ki-widened** river-PL-ACC
 ‘The workers widened the river/*rivers.’

The last property in [Table 2](#) regards telicity. With a quantized theme, the Aymara marked cases are telic, which is expected (the scale is also bounded). Thus, adjoining an *in* adverbial is possible; adjoining a *for* adverbial yields ungrammaticality (Martínez Vera 2018b). This appears in (44). If the theme is cumulative, the predicate is atelic, (it does not matter that the scale is bounded). Adjoining a *for* adverbial is possible; adjoining an *in* adverbial yields ungrammaticality. This appears in (45).

- (44) a. Mariya 10 minutos-tha / ?*10 minutos uka ñikuta (Aymara, top-closed)
 Mary 10 minutes-ABL / 10 minutes that hair
 llusk’acha-**su-i**.
 straighten-**su-3S**
 ‘Mary straightened that (bunch of) hair in/?*for 10 minutes.’
- b. Mariya 10 minutos-tha / ?*10 minutos uka ñikuta (Aymara, top-open)
 Mary 10 minutes / 10 minutes that hair
 phurqicha-**su-i**.
 curl-**su-3S**
 ‘Mary curled that (bunch of) hair in/?*for 10 minutes.’
- (45) a. Mariya ?*10 minutos-tha / 10 minutos ñikuta-naka (Aymara, top-closed)
 Mary 10 minutes-ABL / 10 minutes hair-PL
 llusk’acha-**su-ra-i**.
 straighten-**su-PL-3S**
 ‘Mary straightened (bunches of) hair ?*in/for 10 minutes.’
- b. Mariya ?*10 minutos-tha / 10 minutos ñikuta-naka (Aymara, top-open)
 Mary 10 minutes / 10 minutes hair-PL
 phurqicha-**su-ra-i**.
 curl-**su-PL-3S**
 ‘Mary curled (bunches of) hair ?*in/for 10 minutes.’

In contrast to Aymara, the marked expressions in Polish (Filip 2008) and Hungarian (Kardos 2016) include telic predicates. This follows since the scale must be bounded and the theme, quantized. Thus, adjoining an *in* adverbial is possible; adjoining a *for* adverbial yields ungrammaticality. This is shown below.

- (46) a. Marcin **wy-czyściła** szufladę w 3 minuty / *przez 3 (Polish, top-closed)
 Marcin **wy-cleaned** drawer in 3 minutes / for 3
 minuty.
 minutes
 ‘Marcin cleaned the drawer in/*for 3 minutes.’
- b. Student **z-giął** patyk w 3 minuty / *przez 3 minuty. (Polish, top-open)
 student **z-bent** stick in 3 minutes / for 3 minutes
 ‘The student bent the stick in/*for 3 minutes.’

- (47) a. A nő 10 perc alatt / *10 perc-ig (Hungarian, top-closed)
 the woman 10 minute under / 10 minute-for
 ki-egyenesítette a rud-at.
 ki-straightened the rod-ACC
 ‘The woman straightened the rod in/*for 10 minutes.’
- b. A munkások 10 perc alatt / *10 perc-ig (Hungarian, top-open)
 the workers 10 minute under / 10 minute-for
 ki-szélesítették a folyó-t.
 ki-widened the river-ACC
 ‘The workers widened the river in/*for 10 minutes.’

The discussion shows that the marked forms in Aymara (with *-su*), involve degree maximalization—degree maximalization requires that the bound in the scale corresponds to the lexical maximum (if available).¹⁵ The marked forms contrast with the unmarked forms (without *-su*), where degree maximalization cannot occur. In Polish and Hungarian, the marked forms (with a prefix or particle respectively) involve event maximalization—the scale must be bounded and the theme, quantized. The unmarked forms are used when event maximalization does not occur. Polish and Hungarian differ in that Hungarian requires that, in the marked forms, the lexical maximum corresponds to the bound in the scale (if available) (see (39)–(40)).

The discussion of [Tables 1](#) and [2](#) indicates that there are four language types regarding maximalization, as stated in (48) (see (3)). The next section proposes a formal implementation that derives these properties.

- (48) *Maximalization in degree achievements*
- Languages like English do not mark degree or event maximalization; degree and event maximalization are left open (to, e.g., pragmatic considerations).
 - Languages like Aymara mark degree maximalization; event maximalization is unmarked.
 - Languages like Polish (and other Slavic languages) mark event maximalization; although this implies that there must be degree maximalization, pragmatic considerations may play a role in determining the maximal degree.
 - Languages like Hungarian mark event maximalization, and lexical maximal degrees are required (if available) when event maximalization is marked.

3 Proposal

I propose a compositional account that derives the degree and event maximalization possibilities discussed. The analysis is based on Beavers’s (2011, 2012) Figure/Path Relation (FPR) model, which captures the truth conditional content under consideration and derives facts such as telicity, i.e., properties like telicity are emergent effects that follow from the general setup (see Dowty 1991; Tenny 1994; Krifka 1998; Filip 2005, 2008, 1999; Rothstein 2004; Filip & Rothstein 2006; Wechsler 2005; Beavers 2008, 2009; Rappaport Hovav 2008; Piñón 2008a; Kardos 2012, 2016). Such a model is supplemented by work focusing on degree achievements, in particular, Hay et al. (1999) and Kennedy & Levin (2008) (see von Stechow 1984; Abusch 1986; Winter 2006; Piñón 2008a; Bochnak 2015b; Pedersen 2015; Martínez Vera 2018b). I make use of a restricted set of lexical items to account for the different language types. The discussion is as follows: section 3.1 presents the formal setup; section 3.2 derives the maximalization possibilities of each language type; section 3.3 addresses whether the typology is exhaustive.

3.1 Formal setup

Entities in the FPR model fall into (at least) three domains:

- (49)
- U_p is the set of objects.
 - U_E is the set of events.
 - U_H is the set of connected, directed scales (or paths).

¹⁵ A reviewer rightly points out that English *up* (e.g., *warm up*) is similar to Aymara *-su* in that sentences with it do not require a quantity theme (*warm up beverages*), but, if the theme is quantized, the predicate is telic (*warm up the soup in/*for ten minutes*). The difference between Aymara and English is that only in Aymara are there categorical contrasts in sentences with/without *-su* (i.e., degree maximalization only takes place with *-su*); no such contrasts arise with/without *up* (i.e., there can be degree maximalization without *up*).

The entities in each domain are mereologically complex, such that for any $x, x' \in U_x$:

- (50) a. x' may be a subpart of x ($x' <_x x$), or a subpart or equal to x ($x' \leq_x x$).
 b. $x \oplus_x x'$ is the sum (or join) of x and x' .
 c. x is atomic iff for all $x' \leq_x x$, $x = x'$.

A scale is a mereologically complex argument $s \in U_H$ associated with a degree achievement that represents the dimension (or property) of change (e.g., height) such that:

- (51) a. Degrees on s are atomic subparts of s .
 b. Subscales of s are non-atomic subparts of s .
 c. There is a precedence relation \ll_H s.t. for any non-overlapping $s', s'' <_H s$, either $s' \ll_H s''$ or $s'' \ll_H s'$ (i.e., s is linearly ordered).

As for scales and degree achievements, I assume these conventions:

- (52) a. Degrees (and degree variables) are represented with d .
 b. Gradable predicates and the dimension they include are represented with δ .
 c. Scales according to dimension δ (and scale variables) are represented as s_δ .

Characterizing minimal/maximal degrees in the scale of degree achievements is relevant here. For any s_δ :

- (53) a. \min_{s_δ} , the minimal degree in s_δ , is defined as the degree $d <_H s_\delta$ s.t. no $d' <_H s_\delta$ is s.t. $d' \ll_H d$.
 b. \max_{s_δ} , the maximal degree in s_δ , is defined as the degree $d <_H s_\delta$ s.t. no $d' <_H s_\delta$ is s.t. $d \ll_H d'$.

The key notion to analyze dynamic verbal predicates (i.e., those indicating change) is the Figure/Path Relation (FPR), which is a ternary homomorphism θ that guarantees that the event considered is measured relative to the structure of a scale and a theme—(54) is adapted from Beavers (2011: 354, (53)); see also Kardos (2016:12, (25)).^{16,17} I assume that the FPR involves the consideration of an event with at least two subparts, which guarantees that change can actually occur (see below).¹⁸

- (54) *Figure/Path Relation (FPR)*
 θ is a Figure/Path Relation (FPR) between theme x , scale s and event e s.t. $\theta(x,s,e)$ holds iff every unique part of x corresponds to a unique subevent, a subpart of e , and the sum of all such subevents of e constitutes e ; and, for each subevent of e , there is a unique degree in s and vice-versa.

I assume that degree achievements are the result of combining two components: an element that brings in the scale and dimension of the degree achievement, and a degree morpheme, whose function is to turn the former into a dynamic predicate of events in connection to a standard for the degree achievement (the theme occupies a position above degree morphology, as in Kennedy & Levin 2008).¹⁹

¹⁶ I ignore the temporal trace of events, simply assuming that temporal adjacency of events corresponds to scalar adjacency in scales (Beavers 2011, 2012).

¹⁷ Beavers (2012) assumes that potentially all dynamic predicates are associated with scales (and figure-path relations).

¹⁸ Achievements like *die* are analyzed as predicates associated with exactly two subevents in scalar analyses.

¹⁹ This split in the consideration of how the meaning of a degree achievement is built is based on the previous literature that argues that these verbal predicates are the result of combining a scalar element with a degree morpheme (see, e.g., Pedersen 2015). See Kennedy & Levin (2008) for an approach that involves the above-mentioned split, but also includes differential measure functions. I set aside differential measure functions in deriving degree achievements (Kennedy & Levin 2008) (all the languages discussed here appear to allow modifiers targeting differential degrees). An interesting extension of the discussion here would be to consider languages such as Nez Perce, which constitutes an intermediate case between languages like degreeless Washo and degreeful English in that there is no slot for differential modifiers in Nez Perce (Deal & Hohaus 2019). Something to be determined is how Nez Perce behaves regarding event maximalization.

I assume that a gradable predicate denotes the scale associated with that predicate, including a dimension.²⁰ The denotation of gradable predicates appears in (55)—context parameter c and variable assignment g are discussed below.

(55) For any gradable predicate δ , $[[\delta]]^{c,g} = s_\delta$, where s_δ is a scale according to dimension δ .

The denotation of the scalar component of a degree achievement like English *straighten* is the scale associated with gradable *straight* (this scale is top-closed). The dimension corresponds to straightness. The scale and dimension associated with *straighten* are represented as $s_{straight}$.

I assume that the role of degree morphemes in the verbal domain is two-fold. First, they incorporate the relevant scale (the one denoted by the gradable predicate with which they combine) into an eventive scheme that makes explicit how a theme changes in an event along a scale (see Kennedy & Levin 2008). Based on Beavers (2011), I assume that change involves a transition for theme x along a scale in event e . Assuming that there are at least two subparts in e , x 's change is characterizable as a shift from the initial subpart of e to which degree d corresponds (formalized as source relation σ (56a)) to the final subpart of e to which degree d' corresponds (formalized as goal relation γ (56b)). I assume that the initial part of the event is fixed: there is always a (specified) minimum in the scale (min_{s_δ}) corresponding to the initial subevent—i.e., the scales under consideration in degree achievements are always bottom-closed (Beavers 2011; Kennedy & Levin 2008); I assume that the source and goal degrees are not identical.²¹

(56) a. *Source relation* σ

The source relation σ is a relation between degree d , scale s_δ and event e s.t.
 $\sigma(d, s_\delta, e)$ holds iff d is the degree in s_δ corresponding to the initial subpart of e .

b. *Goal relation* γ

The goal relation γ is a relation between degree d , scale s_δ and event e s.t. $\gamma(d, s_\delta, e)$ holds iff d is the degree in s_δ corresponding to the final subpart of e .

The meaning of degree achievements (pending the discussion of the standard; see below) is understood in terms of the FPR relation, which relates themes, scales and events, such that a transition for the theme occurs along the scale in an event from some degree corresponding to the beginning of the event to some other degree corresponding to the end of the event. Hereafter, I do not discuss the source relation σ any further, because the focus is on what happens at the end of the event. For ease of exposition, I do not include the source relation σ in the denotations to follow. I only make reference to the minimum in the scale, which could be one of the values of the standard (see below).

Degree morphemes determine the standard of comparison (i.e., the minimum required to stand out in context). This is tied to determining the degree reached at the end of the event (relative to the scale associated with the degree achievement). When the standard equals the maximum, and such a degree is reached, the theme ends up in the positive extension of the gradable predicate—this is why the degree morpheme is called (verbal) positive morpheme POS. Otherwise, the standard equals a non-maximal degree (in particular, the minimum; see below). Thus, the degree reached at the end of the event need only exceed this degree, so the theme changed (somewhat) in the event. Of importance is how to determine the possible values of the standard. I assume that degree morphemes introduce a free variable (index $i \in \mathbb{N}$) of type d , which is in the scale of a degree achievement (i.e., for any s_δ , $g(i) <_H s_\delta$). Variable assignment g assigns a value to this index; the degree at the end of the event is equal to/exceeds the value assigned to the index, which represents the standard (see Barker 2002; Heim 1994; Sudo 2012).

²⁰ This is not the usual practice in the discussion of degree achievements, where there is a function that relates themes and times/events with degrees. Within the FPR model, relating themes, events and scales is what makes a degree achievement a dynamic predicate. For this reason, my proposal assigns this role to whatever makes a degree achievement a predicate of events, which here is degree morphemes (see below).

²¹ See Pedersen (2015) regarding when this degree is determined lexically/contextually. I set this issue aside in the present discussion and simply assume that all scales are bottom closed as a result of having the σ relation.

The denotation of degree morphemes, POS_i here, appears below (see section 3.2.2 for Aymara *-su*).²²

$$(57) \quad \llbracket \text{POS}_i \rrbracket^{c,g} = \lambda s_\delta : \left. \begin{array}{l} g(i) = \max_{s_\delta}^l \text{ (available if } s_\delta \text{ is top-closed); or} \\ g(i) = \max_{s_\delta}^c; \text{ or} \\ g(i) = \min_{s_\delta} \end{array} \right\} \lambda x \lambda e$$

$$\exists d[\theta(x, s_\delta, e) \wedge \gamma(d, s_\delta, e) \wedge g(i) \leq d]$$

POS_i takes a gradable predicate (represented as the relevant scale (55)), a theme and an event, and is true of these iff the homomorphic relation among the three holds and there is a degree in the relevant scale at the end of the event such that that degree is equal to/exceeds the standard. (58) includes the possible values of the relevant index (i.e., the standard) under g —these are included as a presupposition (as a domain restriction). I assume that there are three possible values for the index (58): the lexical maximum in the relevant scale $\max_{s_\delta}^l$ (this is only available if the relevant scale is top-closed), the contextual maximum in the scale $\max_{s_\delta}^c$, or the minimum in the scale \min_{s_δ} (this degree is always present by assumption). (57) does not say anything regarding how the value of the standard is determined. This is crucial to distinguish languages, as discussed in what follows.

Consider the denotation of English *straighten* in (58). (58) denotes a relation that indicates that the theme increases in straightness in an event, where some degree is reached at the end of the event. This degree is compared to the standard $g(i)$, whose possible values are included as presuppositions—how to set the value is discussed in the following sections.

$$(58) \quad \llbracket \text{straighten-POS}_i \rrbracket^{c,g} \text{ is defined iff } g(i) = \max_{s_{\text{straight}}}^l, g(i) = \max_{s_{\text{straight}}}^c \text{ or } g(i) = \min_{s_{\text{straight}}}$$

Where defined, $\llbracket \text{straighten-POS}_i \rrbracket^{c,g} = \lambda x \lambda e \exists d[\theta(x, s_{\text{straight}}, e) \wedge \gamma(d, s_{\text{straight}}, e) \wedge g(i) \leq d]$

3.2 Language types

This section analyzes the cross-linguistic variation regarding maximalization. Recall the notions defined in section 2.1. The implementation adopted makes explicit under what conditions the maximum at the end of an event is reached (59). The notion of quantization of the theme (60) focuses on determining the quantity of a theme in connection to event maximalization. The telicity of a predicate is indicated in (61); I assume that it follows from the presence/absence of event maximalization, which is tied to having both a bounded scale and a quantized theme. As mentioned in section 2.1, I assume that if (59)–(61) do not hold, the scale is unbounded, the theme is cumulative and the predicate is atelic respectively.

(59) *Bounded scale*

- a. The scale associated with a degree achievement is bounded in an event iff the degree reached at the end of that event is maximal, where the maximal degree could be lexical or contextual.
- b. For any scale s_δ , theme x and event e , s_δ is bounded in e w.r.t. x iff $\theta(x, s_\delta, e)$, $\gamma(\max_{s_\delta}, s_\delta, e)$.

(60) *Quantized theme*

- a. The theme in an event to which a predicate applies is quantized iff no subpart of anything described by the theme can also be described by the theme in that event with respect to that predicate.
- b. For any predicate X , theme x and event e , x is quantized in e w.r.t. X iff there is no x' s.t. if $x' <_p x$ and $X(x, e)$, then $X(x', e)$.

(61) *Telicity*

- a. A predicate is telic iff for any event the predicate describes, it does not describe a subpart of it.
- b. For any predicate X and event e , e is telic w.r.t. X iff there is no e' s.t. if $e' <_E e$ and $X(e)$, then $X(e')$.

²² While I assign degree morphemes two roles (they incorporate the adjectival meaning into an eventive scheme and introduce the standard of comparison), these could be associated with two different elements, i.e., the introduction of an eventive scheme could be done by a lexical item like English *-en* and their counterparts in the other languages, and the introduction of the standard of comparison would be done by degree morphemes (Pedersen 2015). This is not done in the main text for simplicity.

3.2.1 English

Recall the language type English represents (including the properties of its unmarked forms in [Table 3](#)):

- (62) Languages like English do not mark degree or event maximalization; degree and event maximalization are left open (to, e.g., pragmatic considerations).

	Bound entailed	Lexical bound	Quantized theme	Telic predicate
Unmarked	Possible	Possible	Possible	Possible
Marked	N/A	N/A	N/A	N/A

Table 3 English.

The assumptions made above already account for English, since there is no lexical specification (determined by overt means) regarding degree/event maximalization. I focus on the denotations involving the verb and theme (tense is ignored). The LF that I assume appears in (63).

- (63) [[gradable predicate POS_{*i*}] theme]

Examples (5a)–(5b) are repeated; their denotations in (64b)–(65b) indicate that the theme increases in some property along a scale in an event.

- (64) a. Mary straightened the rod. (English, top-closed)

b. $\llbracket \text{straightened-POS}_i \text{ the rod} \rrbracket^{c,g}$ is defined iff
 $g(i) = \max_{s_{\text{straight}}}^l$, $g(i) = \max_{s_{\text{straight}}}^c$ or $g(i) = \min_{s_{\text{straight}}}$
 Where defined, $\llbracket \text{straightened-POS}_i \text{ the rod} \rrbracket^{c,g} =$
 $\lambda e \exists d [\theta(\text{the-rod}, s_{\text{straight}}, e) \wedge \gamma(d, s_{\text{straight}}, e) \wedge g(i) \leq d]$

- (65) a. Bill widened the road. (English, top-open)

b. $\llbracket \text{widened-POS}_i \text{ the road} \rrbracket^{c,g}$ is defined iff $g(i) = \max_{s_{\text{wide}}}^c$ or $g(i) = \min_{s_{\text{wide}}}$
 Where defined, $\llbracket \text{widened-POS}_i \text{ the road} \rrbracket^{c,g} =$
 $\lambda e \exists d [\theta(\text{the-road}, s_{\text{wide}}, e) \wedge \gamma(d, s_{\text{wide}}, e) \wedge g(i) \leq d]$

Regarding the value of index *i* under *g*, there are preferences: when uttered out-of-the-blue, in sentences with a top-closed degree achievement the maximum is reached; in sentences with a top-open degree achievement some non-maximal degree is reached (see section 2.3.1). This is captured via Interpretive Economy (Kennedy & Levin 2008). I implement Interpretive Economy in (66):

- (66) *Interpretive Economy (for Comparison Standards)*

For any expression *a* subject to variable assignment *g* to free variable of index $i \in \mathbb{N}$ (for *i* of type *d*) introduced by POS_{*i*} and scale s_δ s.t. $g(i) <_H s_\delta$:

- $g(i) = \max_{s_\delta}^l$ if there is $\max_{s_\delta}^l$;
- in the absence of $\max_{s_\delta}^l$, $g(i) = \min_{s_\delta}$;
- $g(i) = \max_{s_\delta}^c$ only if additional cues (e.g., contextual cues) are given.

(66) indicates that conventional means are preferred over contextual cues. The lexical maximum or minimum is preferred over the contextual maximum as a value for the standard, capturing the meaning of the English sentences, where conventional means are used whenever available. Based on Kennedy & Levin (2008), I propose that the lexical maximal degree is preferred over the minimum as a value for the standard, because the former is more informative—only the former requires that the whole scale be considered (thus, the homomorphic relation makes reference to the largest interval of the scale).

This approach captures in what sense degree and event maximalization are left open in English. Regarding degree maximalization, whether the scale is bounded is subject to Interpretive Economy. Regarding event maximalization, in addition to the former, there are no restrictions on the quantization of the theme. As a result, a predicate will be telic in general in the out-of-

the-blue cases if the scale associated with the predicate is top-closed, since the standard's value will be the maximum, and if the theme's quantity can be determined (once event maximalization has been discussed, I come back to the presence/absence of event maximalizers in English (and Aymara) in section 3.3).

3.2.2 Aymara

Recall the language type Aymara represents (including the properties of its unmarked/marked expressions in [Table 4](#)):

- (67) Languages like Aymara mark degree maximalization; event maximalization is unmarked.

	Bound entailed	Lexical bound	Quantized theme	Telic predicate
Unmarked	No	N/A	Possible	No
Marked	Yes	Yes	Possible	Possible

Table 4 Aymara.

The novelty here regards degree maximalization. I assume that Aymara $-su_i$ is a degree morpheme similar to POS_p , the difference being that the former's presupposition state that the value of the standard equals the relevant maximum (Martínez Vera 2018b). The proposal is stated in terms of Maximize Presupposition (Heim 1991). For illustration, consider a classical example involving *the* (in the singular) and *a*. These are lexical alternatives in competition that have (almost) identical denotations but differ in that *the* has a uniqueness presupposition (i.e., there is a unique relevant individual) that *a* does not have. Thus, *the*, but not *a*, has a restricted domain. The idea is that whenever there are two expressions ϕ and ψ that differ in that ϕ has *the* and ψ has *a*, and there is a unique (relevant) individual under consideration, the alternative with *the*, ϕ , is used instead of the alternative with *a*, ψ , because ϕ , with *the*, has a restricted domain. Only if the presupposition of *the* in ϕ is not satisfied, ψ , with *a*, is used. This is illustrated in (68). First imagine a context where *the victim's* biological mother is considered; there is one unique (relevant) individual, so the alternative with *the* is preferred over the alternative with *a* (the former has a restricted domain). Now consider a context where *the victim* has two mothers (e.g., a lesbian couple has a child who is *the victim*); the presupposition of *the* is not met and the alternative with *a* is used.

- (68) I talked to the/a mother (of the victim).

For Aymara, the proposal is that POS_i and $-su_i$ are lexical alternatives (LEXALT) in competition (69) ((69b) = (57)).²³ The difference between POS_i and $-su_i$ is that $-su_i$ has a presupposition specifying that the value of the standard is the maximum in the relevant scale, which is done by cases, distinguishing the lexical maximal degree case from the contextual maximal degree case. This is similar to Interpretive Economy in (66) in that there is an order, where lexical means prevail. Assuming that the option with a restricted domain is preferred, $-su_i$ blocks POS_i whenever the maximum is reached in an event. The value of the standard in the absence of $-su_i$ (with POS_i) is the minimum: the inference is that, whenever degree maximalization occurs, there is a marker indicating this. It follows that the scale is bounded with $-su_i$ and unbounded without it—degree maximalization is thus captured.

- (69) a. LEXALT = $\{POS_p, -su_i\}$, where $-su_i$ blocks POS_i if the maximal degree in the scale is reached in an event.

$$\text{b. } \left\{ \begin{array}{l} \llbracket POS_i \rrbracket^{c,g} = \lambda s_\delta : \left\{ \begin{array}{l} g(i) = \max_{s_\delta}^l \text{ (available if } s_\delta \text{ is top-closed); or} \\ g(i) = \max_{s_\delta}^c; \text{ or} \\ g(i) = \min_{s_\delta} \end{array} \right. \end{array} \right\} .\lambda x \lambda e \\
 \exists d[\theta(x, s_\delta, e) \wedge \gamma(d, s_\delta, e) \wedge g(i) \leq d]$$

²³ I use Maximize Presupposition to capture that, in the absence of $-su_i$, maximal degrees are not targetable (i.e., the scale is always unbounded with POS_i). This approach is stronger when compared to others that make use of alternatives (e.g., for scalar implicatures) in that there is no cancelability in the cases here.

$$c. \quad \llbracket -su_i \rrbracket^{c,g} = \lambda s_\delta : \left\{ \begin{array}{l} g(i) = \max_{s_\delta}^l \text{ if } s_\delta \text{ is top-closed} \\ g(i) = \max_{s_\delta}^c \text{ otherwise} \end{array} \right\} . \lambda x \lambda e$$

$$\exists d[\theta(x, s_\delta, e) \wedge \gamma(d, s_\delta, e) \wedge g(i) \leq d]$$

The LF assumed here is (70) (see the LF for English (63))— su_i can also occupy the slot of POS_i .

$$(70) \quad [\text{theme} [\text{gradable predicate } POS_i / -su_i]]$$

The denotations of (13a)–(13b) appear below. The former is a case without $-su_i$ (i.e., with POS_i); the latter includes $-su_i$. Degree maximalization occurs only in the latter. The denotations of the verb combined with the theme indicate the difference regarding the standard: the lexical maximal degree must be used—with predicates with top-open scales (14b), the maximum is contextual, as determined by $-su_i$.

$$(71) \quad a. \quad \text{Mariya uka } \tilde{n}ikuta \text{ llusk'acha-i.} \quad (\text{Aymara, top-closed})$$

Mary that hair straighten-3S
 ‘Mary straightened that (bunch of) hair.’

$$b. \quad \llbracket uka \tilde{n}ikuta \text{ llusk'acha-} POS_i \text{-i} \rrbracket^{c,g} \text{ is defined iff}$$

$$g(i) = \max_{s_{straight}}^l, g(i) = \max_{s_{straight}}^c \text{ or } g(i) = \min_{s_{straight}}$$

Where defined, $\llbracket nuka \tilde{n}ikuta \text{ llusk'acha-} POS_i \text{-i} \rrbracket^{c,g} =$

$$(72) \quad a. \quad \text{Mariya uka } \tilde{n}ikuta \text{ llusk'acha-su-i.} \quad (\text{Aymara, top-closed})$$

Mary that hair straighten-su-3S
 ‘Mary straightened that (bunch of) hair to the (lexical) maximal degree.’

$$b. \quad \llbracket uka \tilde{n}ikuta \text{ llusk'acha-su-i} \rrbracket^{c,g} \text{ is defined iff } g(i) = \max_{s_{straight}}^l$$

Where defined, $\llbracket uka \tilde{n}ikuta \text{ llusk'acha-su-i} \rrbracket^{c,g} =$

$$\lambda e \exists d[\theta(\text{that-hair}, s_{straight}, e) \wedge \gamma(d, s_{straight}, e) \wedge g(i) = \max_{s_{straight}}^l = d]$$

This captures the language type where degree maximalization is tied to lexical means, i.e., $-su_i$ (unlike English). It has nothing to say regarding the quantization of the theme (like English). Thus, telicity contrasts do not follow from the presence/absence of $-su_i$ only.

3.2.3 Polish

This section turns to the third language type, represented by Polish (including the properties of marked/unmarked expressions in [Table 5](#)):

$$(73) \quad \text{Languages like Polish (and other Slavic languages) mark event maximalization; although this implies that there must be degree maximalization, pragmatic considerations may play a role in determining the maximal degree.}$$

	Bound entailed	Lexical bound	Quantized theme	Telic predicate
Unmarked	No	N/A	Possible	No
Marked	Yes	Possible	Yes	Yes

Table 5 Polish.

Here I capture the maximalization/non-maximalization contrasts, which correspond to the presence/absence of a prefix. The analysis also captures the variability regarding lexical/contextual maxima.

The crucial notion is event maximization. Following Kardos (2016) (see Filip 2008; Beavers 2012), I assume that event maximalization is formalized via a monadic operator that applies to a predicate of events to yield a set of maximal events that is a subset of that predicate:

$$(74) \quad \text{Event Maximalization (} \max_E \text{)}$$

Let \max_E be a monadic operator s.t. for any set of events Σ , $\max_E(\Sigma) \subseteq \Sigma$, where \max_E maps Σ onto sets of maximal events $\max_E(\Sigma)$.

A maximal event constitutes the largest unique event in the denotation of predicate of events Σ . I assume that the scale provides a criterion for establishing an ordering in the event considered such that some part of the theme corresponds to a subevent in that event (as follows from the FPR). The idea is that an event of, e.g., straightening the rod to some degree may develop into a larger event of straightening the rod to some greater degree (e.g., to the maximal degree)—i.e., the latter is a “more developed version” of the former (Landman 1992: 23), with the former (and similar events) constituting stages of ‘larger’ events. The maximal event is the largest unique event in the denotation of a predicate; it includes all other smaller events.²⁴ This is the kind of ordering that satisfies the input requirement of max_E (Filip 2008: 221). Note that a bound in the scale must be reached at the end of the event, so event maximalization can occur, since, otherwise, any two subevents of straightening the rod to some degree are indistinguishable—they would fall under the same description. If event maximalization occurs, the predicate is telic, i.e., for any event the predicate describes, it does not describe a subpart of it (see (61))—in Beavers’s (2012: 46) words, “no non-final subevent of any event related to some specific quantity of the theme is also an event related to the same specific quantity of the theme.”

A question arises regarding the locus of event maximalization. Following Filip (1999) (see Gehrke 2008), I assume that event maximalization, which is tied to a prefix, is merged low in the structure, close to the verb—I assume that event maximizers take degree achievements as arguments (i.e., they combine with the scalar element that has combined with a degree morpheme). Assuming that the degree morpheme in Polish is POS_i , the LF I assume is (75)—EM = event maximalizer; see below for the (apparent) type mismatch between the maximalization operation EM introduces and max_E in (74).²⁵

(75) [[EM [gradable predicate POS_i]] theme]

I further assume an abstract element that remains neutral with regard to event maximalization—intuitively, it is the POS_i equivalent for event maximalization. This assumption captures that Polish displays categorical contrasts between examples with/without a prefix regarding the requirements that the scale be bounded and the theme have a quantity. Of relevance is that, with the prefix, the scale must be bounded; without it, the scale is not bounded. This is similar to Aymara: there is a categorical contrast between sentences with/without $-su_i$ (see sections 2.3.1–2.3.2). Therefore, I adopt a similar approach for event maximalization: I formalize event maximalization in terms of Maximize Presupposition. There are two lexical items: event maximalizer EM and an element that remains neutral in this regard, NM. EM, but not NM, presupposes event maximalization. Thus, event maximalization occurs with EM, which blocks NM (the alternative with a restricted domain is preferred (i.e., ‘accidental’ event maximalization without EM does not occur; see [Table 5](#))—my proposal thus analyzes degree and event maximalization uniformly. Thus, when event maximalization occurs, there is a marker indicating this.

The denotations of NM and EM appear below. The former requires that the event be maximalized. The two items constitute lexical alternatives where EM blocks NM if event maximalization occurs— Δ is a variable for degree achievements (the result of combining scalar predicate δ and a degree morpheme).

- (76) a. LEXALT = {NM, EM}, where EM blocks NM if event maximalization occurs.
 b. $\llbracket NM \rrbracket^{e,g} = \lambda\Delta\lambda x\lambda e[\Delta(x), e]$
 c. $\llbracket EM \rrbracket^{e,g} = \lambda\Delta\lambda x\lambda e : max_E(\Delta(x))(e).[\Delta(x), e]$

24 Filip (2008: 224–226) analyzes maximal events in terms of stages:

- (i) If e, e' are events and e is a stage of e' ($e \leq_e e'$):
 a. ‘Part of’: $e \leq_e e'$, e is part of e' (and hence the temporal trace of e is included in the temporal trace of e').
 b. Cross-temporal identity: e and e' share the same essence—they count (intuitively) as the same event/process at different times.
 c. Kinesis: e and e' are qualitatively distinguishable, e is an earlier version of e' , e grows into e' .

25 The only element represented regarding the syntactic locus and denotation in connection to the prefixes is event maximalizer EM. It could be assumed that EM moves higher up in the structure (to, e.g., a higher aspectual projection); this is not done here for simplicity. See Gehrke (2008) for discussion about why the Slavic prefixes head low projections in the syntax, right next to the verbal predicate—the evidence she provides comes from, e.g., the fact that some prefixes alter the verb valence. As pointed out by a reviewer, there is an alternative analysis where elements associated with event maximization are merged higher in the structure (in, e.g., AspP). By doing so, the specific interpretation of the theme could be syntactically motivated, since it would be in the scope of the element tied to maximalization. See, e.g., MacDonald (2008) for additional discussion.

The denotations of (15a)–(15b) appear below. Both denotations convey that the theme becomes cleaner. Only in the latter does event maximalization occur, i.e., the theme reaches the maximum in this case. This is relevant in connection to the standard. When event maximalization does not occur, there is no largest event, so the scale is unbounded and the standard equals the minimum of cleanliness, i.e., $g(i) = \min_{s_{clean}}^c$. When event maximalization occurs (78), where the scale is top-closed, there are two options: the scalar bound could correspond to the lexical or the contextual maximal degree of cleanliness, i.e., $g(i) = \max_{s_{clean}}^l$ or $g(i) = \max_{s_{clean}}^c$ (if the scale is top-open, e.g., (16b), the maximal degree must be contextual). As discussed in section 2.3.2, there is a preference for the lexical maximum. This is expected if Polish is subject to Interpretive Economy (66): the lexical value is chosen in out-of-the-blue cases; the contextual maximum is a possible value when additional cues are given. Thus, POS_i in Polish is subject to pragmatic considerations (like English). The difference lies in that the minimum is excluded in the presence of event maximalization, since the scale must be bounded.

- (77) a. Marcin czyściła szufladę, kiedy... (Polish, top-closed)
 Marcin cleaned drawer when
 ‘Marcin was cleaning the drawer, when...’
- b. $\llbracket \text{NM-czyściła-POS}_i \text{ szufladę} \rrbracket^{c,g}$ is defined iff
 $g(i) = \max_{s_{clean}}^l, g(i) = \max_{s_{clean}}^c$ or $g(i) = \min_{s_{clean}}$
 Where defined, $\llbracket \text{NM-czyściła-POS}_i \text{ szufladę} \rrbracket^{c,g} =$
 $\lambda e \exists d [\theta(\text{drawer}, s_{clean}, e) \wedge \gamma(d, s_{clean}, e) \wedge g(i) \leq d]$
- (78) a. Marcin wy-czyściła szufladę. (Polish, top-closed)
 Marcin wy-cleaned drawer
 ‘Marcin cleaned the drawer.’
- b. $\llbracket \text{EM-czyścił a-POS}_i \text{ szufladę} \rrbracket^{c,g}$ is defined iff
 $g(i) = \max_{s_{clean}}^l, g(i) = \max_{s_{clean}}^c$ or $g(i) = \min_{s_{clean}}$; and
 $\max_E (\lambda e \exists d [\theta(\text{drawer}, s_{clean}, e) \wedge \gamma(d, s_{clean}, e) \wedge g(i) \leq d])$
 Where defined, $\llbracket \text{EM-czyścił a-POS}_i \text{ szufladę} \rrbracket^{c,g} =$
 $\lambda e \exists d [\theta(\text{drawer}, s_{clean}, e) \wedge \gamma(d, s_{clean}, e) \wedge g(i) \leq d]$

This analysis captures that event maximalization is marked overtly (via prefixes). It captures that event maximalization always involves telic predicates; without event maximalization, predicates are atelic—this is also tied to the presence/absence of themes whose quantity can be determined. There is, nonetheless, room for pragmatic considerations regarding the value of the standard (like English).

3.2.4 Hungarian

The last type is represented by Hungarian (including the properties of marked/unmarked expressions in [Table 6](#)):

	Bound entailed	Lexical bound	Quantized theme	Telic predicate
Unmarked	No	N/A	Possible	No
Marked	Yes	Yes	Yes	Yes

Table 6 Hungarian.

- (79) Languages like Hungarian mark event maximalization, and lexical maximal degrees are required (if available) when event maximalization is marked.

My analysis builds on the analysis of Aymara and Polish (sections 3.2.2–3.2.3). I assume that Hungarian has two degree morphemes (like Aymara), and that event maximalization in this language is like Polish (with EM/NM).²⁶

The LFs for Hungarian appear in (80). (80a) is the case without a particle; (80b) includes a particle—EM = event maximalizer (the particle), NM = EM’s non-maximalization counterpart,

26 See Appendix 2 for alternative analyses and why they are dispreferred.

DM_i = degree maximalizer.²⁷ Note that, since POS_i and DM_i are alternatives (see section 3.2.2), only having POS_i in the non-maximalization case and DM_i in the maximalization case follows: POS_i cannot assign the maximum to the standard (which is possible only in the presence of DM_i), making it semantically incompatible with EM. DM_i cannot appear in (80a), because the relevant scale would be bounded, which is not possible in the absence of event maximalization (I assume that all lexical alternatives are replaced together when this takes place (80a); the satisfaction of the presuppositions against the relevant context is then determined at the same time).

- (80) a. [[NM [gradable predicate POS_i]] theme]
 b. [[EM [gradable predicate DM_i]] theme]

The denotations of POS_i and DM_i , and of NM and EM are repeated below (see (69), (76)).

- (81) a. LEXALT = { POS_i , DM_i }, where DM_i blocks POS_i if the maximal degree in the scale is reached in an event.
 b. $\llbracket POS_i \rrbracket^{c,g} = \lambda s_\delta : \left\{ \begin{array}{l} g(i) = \max_{s_\delta}^l \text{ (available if } s_\delta \text{ is top-closed) ; or} \\ g(i) = \max_{s_\delta}^c \text{ ; or} \\ g(i) = \min_{s_\delta} \end{array} \right\} . \lambda x \lambda e$
 $\exists d[\theta(x, s_\delta, e) \wedge \gamma(d, s_\delta, e) \wedge g(i) \leq d]$
 c. $\llbracket DM_i \rrbracket^{c,g} = \lambda s_\delta : \left\{ \begin{array}{l} g(i) = \max_{s_\delta}^l \text{ if } s_\delta \text{ is top-closed} \\ g(i) = \max_{s_\delta}^c \text{ otherwise} \end{array} \right\} . \lambda x \lambda e$
 $\exists d[\theta(x, s_\delta, e) \wedge \gamma(d, s_\delta, e) \wedge g(i) \leq d]$
- (82) a. LEXALT = {NM, EM}, where EM blocks NM if event maximalization occurs.
 b. $\llbracket NM \rrbracket^{c,g} = \lambda \Delta \lambda x \lambda e [\Delta(x, e)]$
 c. $\llbracket EM \rrbracket^{c,g} = \lambda \Delta \lambda x \lambda e : \max_E(\Delta(x))(e). [\Delta(x, e)]$

Consider the denotations of (17a) and (17b). Both denotations convey that the theme increases in straightness, the difference lying in whether there is event maximalization, which only occurs in the latter. Additionally, when event maximalization occurs, the standard equals the lexical maximum—with top-open scales, e.g., (18b), that degree is contextual.

- (83) a. A nő egyenesítette a rud-at, amikor... (Hungarian, top-closed)
 the woman straightened the rod-ACC when
 ‘The woman was straightening the rod, when...’
 b. $\llbracket NM\text{-egyenesítette-}POS_i \text{ rud-at} \rrbracket^{c,g}$ is defined iff
 $g(i) = \max_{s_{straight}}^l, g(i) = \max_{s_{straight}}^c \text{ or } g(i) = \min_{s_{straight}}$
 Where defined, $\llbracket NM\text{-egyenesítette-}POS_i \text{ rud-at} \rrbracket^{c,g} =$
 $\lambda e \exists d[\theta(\text{the-rod}, s_{straight}, e) \wedge \gamma(d, s_{straight}, e) \wedge g(i) = \min_{s_{straight}} < d]$
- (84) a. A nő ki-egyenesítette a rud-at. (Hungarian, top-closed)
 the woman ki-straightened the rod-ACC
 ‘The woman straightened the rod.’
 b. $\llbracket EM\text{-egyenesítette-}DM_i \text{ rud-at} \rrbracket^{c,g}$ is defined iff $g(i) = \max_{s_{straight}}^l$; and
 $\max_E(\lambda e \exists d[\theta(\text{the-rod}, s_{straight}, e) \wedge \gamma(d, s_{straight}, e) \wedge g(i) = \max_{s_{straight}}^l = d])$
 Where defined, $\llbracket EM\text{-egyenesítette-}DM_i \text{ rud-at} \rrbracket^{c,g} =$
 $\lambda e \exists d[\theta(\text{the-rod}, s_{straight}, e) \wedge \gamma(d, s_{straight}, e) \wedge g(i) = \max_{s_{straight}}^l = d]$

My analysis captures that event maximalization is tied to marked forms (involving particles) in Hungarian (like Polish), and always involves telic predicates (in contrast to cases without event maximalization, which involve atelic predicates). The analysis of Hungarian contrasts with that of Polish regarding the value of the standard in connection to maximal degrees. Due to the presence of a degree maximalizer (like Aymara *-su*), lexical maxima must be used if available.

²⁷ Kardos (2016) assumes that particles move from their base position (very close to the verb) to a higher aspectual projection. This movement is not represented. See footnote 25 for an alternative analysis.

3.3 Exhausting the typology

The account proposed is restricted. It relies on the presence of four lexical items: the degree items POS_i/DM_i , and the items involved in event maximalization EM/NM , in combination with semantic blocking. The focus here is on whether the language types exhaust the typology in this domain. My initial answer is that the typology is exhaustive. Nonetheless, I question its exhaustiveness by considering some cases that have not been observed before (see Appendix 2 for discussion of a theoretically possible yet unattested degree maximalizer).

My analysis made explicit the lexical items involved in two languages: Polish has the degree morpheme POS_i , and it has EM/NM ; Hungarian has these three plus DM_i . I have also indicated the degree morphemes in English (POS_i) and Aymara (POS_i and DM_i , i.e., *-su_i*), but have left open the issue of the lack of overt marking with some EM . I consider two possibilities regarding the implementation of event maximalization in English and Aymara (which would have the same effect). The first possibility is that event maximalization (and its absence) does not play a role in the semantic calculation in terms of max_E applying in the derivation, i.e., event maximalization occurs indirectly if the scale is bounded and the theme's quantity is provided. Such an alternative has been suggested for English by Beavers (2012) and followed up by Kardos (2016): event maximalization (and telicity) follow from the options that FPRs already give. The second possibility basically restates the first possibility making a parallel with having POS_i in connection to degree maximalization. This possibility consists of having one item for event maximalization, NM , which remains neutral in this regard, but, in the absence of EM , is compatible with cases where event maximalization occurs or not.

Under a view that takes these two possibilities into consideration, the four-way typological split corresponds to four language types. Thus, the four language types discussed would actually exhaust the typological possibilities regarding degree and event maximalization. The English type would have POS_i in connection to degree maximalization, and event maximalization is achieved as a result of other independently established factors (whether the scale is bounded and the theme has a specific quantity). The Aymara type would be like the English type with the addition of another degree morpheme: *-su_i*. The Polish and Hungarian types would be as indicated: the former type only has the degree morpheme POS_i , and it has EM and NM (for event maximalization); the latter type has these three items plus DM_i .

The problematic cases for these approaches, where max_E does not apply in the semantic derivation in languages like English or Aymara were mentioned in footnote 6 in connection to themes like *at least/more than three rods*. These have been regarded as providing evidence for the need of max_E in the semantic derivation (see Filip 2008; Beavers 2012; Kardos 2016). A relevant example appears in (85). The peculiarity of these cases is that, although the theme is cumulative, the predicate appears to be telic (as can be seen by the felicity of an *in* adverbial, but not of a *for* adverbial). This suggests that, in English (or Aymara), max_E would have to apply in the semantic derivation, as in Polish or Hungarian.

- (85) Mary straightened at least three/more than three rods (English, top-closed)
 (in/??for an hour).

In line with the need for the application of max_E in the semantic derivation, the alternative for English and Aymara would consist of these languages having EM/NM covertly in the semantic derivation. English would be like Polish and Aymara would be like Hungarian: these pairs of languages would have the same items for degree and event maximalization. The difference would lie in that English and Aymara display more flexibility in the sense that, since there is no overt marking associated with event maximalization (as the prefixes in Polish or the particles in Hungarian), EM/NM could be present depending on what expression is considered. This is the most restricted version of the typology—there would only be two language types, the only real difference lying in whether there is an element like Aymara *-su_i*, which is responsible for degree maximalization, in the language under consideration.

However, some examples suggest that this alternative should be dispreferred (instead, one of the previous alternatives would be preferred). In English, examples like (86) (can) convey the meaning that *rods* were straightened to the maximum (see also Aymara (41) for a similar point).

(86) Mary straightened rods. (English, top-closed)

The relevant cases in Polish or Hungarian would be the ones without a prefix or particle respectively, which allow cumulative objects (see Polish (15a)–(16a) and Hungarian (30a)–(30b)). Consider (87) in Polish, where the theme is understood as cumulative.

(87) Marcin czyściła szufladę, kiedy... (Polish, top-closed)
 Marcin cleaned drawer when
 ‘Marcin was cleaning drawers, when...’

Interestingly, cases like (87) cannot mean that the theme reached the maximum; they can only mean that the theme reached some degree on the scale—this is a novel observation. This would argue against the presence of a contrast regarding event maximalization in languages like English or Aymara in exact same terms as Polish or Hungarian (i.e., if event maximalization occurs, degree maximalization also occurs and if event maximalization does not occur, degree maximalization does not occur either).

A suggestion would be that in English or Aymara there is a mechanism of theme maximalization (not event maximalization, as argued for Polish or Hungarian), whereby the quantity of the theme is specified (perhaps whenever possible). Thus, *at least/more than three rods* would not be problematic, as their quantity would be determined (but does not rely on the application of max_p). An approach along these lines would be in the spirit of proposals by Krifka (1998) or Kratzer (2004) (see also Kennedy 2012), where the theme itself plays a crucial role in determining telicity. The picture would naturally be more complicated than they propose, as, e.g., Filip (2008) argues. The suggestion is that there would be a three-way split for maximalization possibilities: besides degree and event maximalization, there would be theme maximalization (at least in languages like English or Aymara).²⁸ Although exploring theme maximalization further lies beyond the aims of this paper, this line of inquiry would mean that the typology discussed here is not exhaustive.^{29,30}

4 Conclusion

This paper discussed a four-way typology regarding maximalization possibilities in the degree achievement domain. I showed that languages differ with regard to whether they overtly mark degree maximalization (i.e., that the scale of the degree achievement is bounded) and/or event maximalization (i.e., that there is a unique maximal event in the denotation of a predicate). The four language types are represented by English, which does not overtly mark degree or event maximalization; Aymara, which overtly marks degree maximalization only (requiring that the lexical maximal degree be reached if such a degree is available); Polish, which overtly marks event maximalization only; and Hungarian, which overtly marks event maximalization with an additional requirement regarding the presence of lexical maximal degrees (if they are

²⁸ A reviewer raises the issue of how event maximalization would take place (if at all) in degreeless languages, since, under the current approach, a scale is required in this regard, but such an object is absent in these languages. I suggest that the answer to this question lies in whether, in degreeless languages, measuring out the event and the theme suffices regarding maximalization (in the absence of a scale). This is a task that is yet to be undertaken.

²⁹ Borer (2005) proposes that, for cases with *at least/more than three apples*, what is needed for telicity are quantities, which subsumes quantized and cumulative themes that are not divisive. The question that remains is that this would not be enough across the board. As Kardos (2016: 21) shows, in Hungarian, explicit event maximalization is required on top of themes like *több, mint három csészét* ‘more than three cups’; otherwise, the sentence is marginal (i).

(i) ??A kukták melegítettek több, mint három csészé-t. (Hungarian, top-open)
 the sous chefs warmed more than three cup-ACC
 ‘??The sous chefs warmed more than three cups.’

³⁰ A relevant topic in this regard is that of non-culminating accomplishments (see, e.g., Martin 2019), which is a phenomenon that has been documented for several languages, including Japanese, Mandarin Chinese, Salish languages, etc. Sentences with these predicates involve a defeasible implicature, i.e., sentences with a non-culminating accomplishment defeasibly imply that the event they describe culminates in the evaluation world. Martin (2019) proposes a typology in this regard. Establishing the links between her typology and the discussion here is left for a future occasion—her typology includes creation/consumption predicates, motion predicates, etc. However, degree achievements like that ones addressed here are not discussed. In this regard, a crucial observation in Martin (2019) is that non-culminating interpretations of telic predicates are partitive (i.e., event fragments are treated as complete events). This contrasts with the discussion in this paper, since such a possibility does not arise.

available). I have identified several tests that distinguish degree and event maximalization that hold cross-linguistically. I have proposed an analysis that builds on Beavers's (2011, 2012) Figure/Path Relation model, and captures the cross-linguistic variation in this domain by making use of a limited number of lexical items that are tied to the calculation of degree or event maximalization. I have explored further consequences of the proposal regarding the exhaustiveness of the proposed typology, pointing out possible avenues for future research.

Abbreviations

3 = third person, ABL = ablative, ACC = accusative, NEG = negation, PART = participial, PL = plural, s = subject.

Additional files

The additional files for this article can be found as follows:

- **Appendix 1.** Methodology and materials for data collection. DOI: <https://doi.org/10.16995/glossa.5883.s1>
- **Appendix 2.** Additional theoretical issues. DOI: <https://doi.org/10.16995/glossa.5883.s2>

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Competing interests

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