

THE SEMANTICS OF DEGREE VERBS AND THE TELICITY ISSUE

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ABSTRACT. This paper addresses the formal representation of Degree Verbs (DVs), also known as degree achievements, using data from English and Italian. After assessing the similarities and differences of DVs vis-à-vis the accomplishment predicates within the set of “incremental theme verbs”, a double scale system is proposed to account for the telicity calculus. It is shown that DVs should be regarded as telic even though in most cases they do not imply culmination, but rather the mere attainment of a “contingent” telos. This formalism can be exploited to account for related phenomena, such as the so-called “conative oblique constructions” and “non-culminating” telic predicates.¹

Keywords. Aspect; Actionality; Aktionsart; Degree Achievements; Degree Verbs; Tense

RESUMEN. Este trabajo explora la representación formal de los verbos graduales, también conocidos como realizaciones graduales, empleando datos del inglés y del italiano. Tras revisar las relaciones y diferencias de estos verbos con los predicados de realización que pertenecen a la clase de verbos de tema incremental, se propone un sistema de doble escala para dar cuenta del cálculo de la telicidad. Se muestra que los verbos graduales deben concebirse como télicos aunque en la mayor parte de los casos no impliquen una culminación, sino solo la simple obtención de un telos ‘contingente’. Este formalismo puede ser empleado para dar cuenta de fenómenos relacionados, como las llamadas construcciones oblicuas conativas o los predicados télicos no culminativos.

Palabras clave. Aspecto; Accionalidad; Aktionsart; Realizaciones graduales; Verbos graduales; Tiempo

1. Introduction

The present paper addresses the semantics of a specific set of predicates, often referred to as “degree achievements” after Dowty (1979). The set includes verbs such as *complicate*, *increase*, *widen*, *improve*, *get older*, *empty*, *lengthen*, *fatten*, *deepen*, *clear*, *lower*, *heat*, etc., characterized by the fact that they can typically be used to indicate successive incremental stages along a given abstract dimension, without necessarily implying the possible attainment of a final goal. For instance, *lengthen* indicates a development along the metrical dimension of length; *increase* indicates a development along at least one of the following dimensions: cardinality, volume, weight, intensity. See section 2 for further qualification.

Among the alternative names proposed for this set of predicates, one can cite “gradual completion verbs” (Bertinetto & Squartini 1995) and “deadjectival verbs” (Kearns 2007). The latter denomination should best be avoided, since not all DVs are based on adjectives. Here they will be called “degree verbs” (henceforth **DVs**), in analogy with the established label “degree words”, owing to their intrinsic nature as predicates implementing a comparison between two stages measured along a scale within one and the same event. In the eyes of the present authors, the denomination

¹ The authors wish to thank Olga Batiukova, Andrea Bonomi, Jukka Havu, Fabienne Martin, and Mario Squartini for their very useful suggestions.

DVs is definitely more appropriate than “degree achievements”, also used in the literature, since the term “achievement” turns out to be confusing in this connection.

DVs have been the object of a number of studies: Vendler (1967), Dowty (1979, 1991), Declerck (1979), Krifka (1989; 1992), Tenny (1994), Bertinetto and Squartini (1995), Levin and Rappaport Hovav (1995), Jackendoff (1996), Ramchand (1997), Hay (1998), Filip (1999), Hay, Kennedy, and Levin (1999), Kennedy & Levin (2002), Kennedy & McNally (2005), Rothstein (2003), Borer (2005), Kearns (2007), Kennedy & Levin (2008), Piñón (2008), Kennedy (2010), Beavers (2013). The aim of this paper is to present a new insight into the semantic structure of DVs.

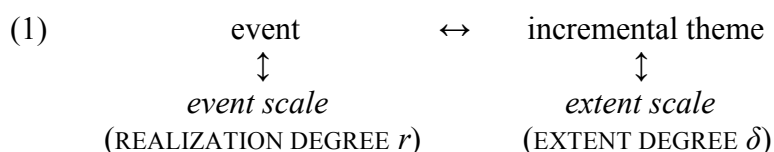
The present authors adhere to the recent trend (Kennedy & Levin 2002) consisting in analyzing DVs within a larger set of predicates characterized by the presence of an incremental theme, in the sense defined by Dowty (1979) and further refined by Krifka (1989, 1992). Despite similarity, however, DVs present specific properties that single them out within the larger set of incremental theme verbs, here referred to as GRADUAL VERBS. These correspond to the “gradual change verbs” of Kennedy and co-workers, and typically include:²

- a. creation/destruction/affection verbs (*eat, build, paint, repair ...*)
- b. directed motion verbs (*run home, creep into ...*)
- c. DVs (*complicate, increase, widen, improve, dry ...*).

The predicates in (a) and (b) are commonly considered accomplishments (henceforth ACCs) and thus inherently telic, whereas DVs receive different interpretations by the different authors. It is worth noting that, according to Caudal & Nicolas (2004) and Beavers (2013), and for reasons to be spelled out below, one should also include achievements among the gradual verbs set:

- d. achievements (*leave, die, receive, ...*).

To describe the semantic structure of gradual verbs, one can exploit the following conceptual scaffold, to be further elaborated in the remainder of this paper:



Both event and incremental theme are mapped onto a corresponding scale. The EVENT SCALE concerns the aspectual interpretation (perfective/imperfective). It is worth underlining that in this paper, for the sake of simplicity, the term “imperfective” will be used in the restricted sense of “progressive”, to the exclusion of other imperfective nuances, such as habituality (see fn. 4). By contrast, the EXTENT SCALE concerns the degree of affectedness of the theme, as conceived of in holistic terms (see fn. 8). The values along each scale are expressed by the appropriate type of degree: the realization degree r and the extent degree δ . The notion of “extent degree” might look deceptively reminiscent of Piñón’s (2008) “extent degree” or Kennedy and collaborators “degree of change”. However, as the following discussion will

² Rappaport Hovav (2014) presents a different, and carefully detailed, grouping of essentially the same verb classes. In her model, however, the position of DVs is not as clearly distinguishable as in Kennedy and co-workers.

show, these notions do not coincide. In particular, it will be shown below that telicity does not only depend on the value attached to the “extent degree”, but on the joint effect of both scales (event and extent).

The two scales in (1) are mutually connected by some kind of homomorphic relation, provided the notion of homomorphism is not interpreted in a strictly mereological sense (i.e., in the physical sense of this word). This point can be illustrated with the example of *repair the computer*. Here the actual theme should not be identified with the computer itself, but rather with a sequence of goal-oriented, procedural actions eventually involving (in the physical sense of this word) the computer. As the repairing event is gradually realized, the goal is progressively attained, although each sub-event (or stage) along the repairing trajectory does not correspond to a specific part of the computer, nor to a specific degree of affectedness of the computer itself. The homomorphic view should thus be understood as referring to the mapping of the successive parts/stages of the event onto the parts/stages of the procedural actions involved in the repairing strategy, which constitutes the actual theme (Rothstein 2003), rather than onto the physical parts of the syntactic object (the computer), which may be but weakly involved in the incremental fulfillment of the event.

A scale can be defined, in a very simplified manner, as an ordered set of points on a rational number set, conventionally ranging from 0 to 1, giving rise to a transitive, antisymmetric, reflexive, and connected relation. The kind of scale relevant for the purpose at stake involves: (i) an abstract property (size, position, cost, weight, distance etc.); (ii) a set of degrees expressing possible values along the selected property.

As mentioned, some authors (Caudal & Nicolas 2004, Beavers 2013) accommodate achievements within the gradual verbs set by assigning them a radically reduced scale, only including two points: minimal (0) and maximal (1). Since, however, this is only marginally relevant for the present concern, achievements will be neglected here, except for a detail worth pointing out in section 4.

A scale is considered closed if it includes the maximal value 1, open otherwise. One can illustrate this with respect to the scales composing the conceptual scaffold in (1), for instance the event scale. Whenever the aspectual value is perfective, the realization degree r saturates to 1. By contrast, imperfectivity (to be intended, for the sake of this paper, in the specific sense of progressivity) implies non-saturation, expressed as an undefined value ranging from 0 to 1: $0 < r < 1$. Although scales can be closed or open at both sides, for the linguistic purpose at stake it is enough to consider the right (or top) extreme.

As a preliminary step towards developing a formal treatment, the next section will compare ACCs and DVs within the set of gradual verbs, pointing out a number of differences that legitimate a parallel, but crucially diverging analysis of these two types of predicates. Section 3 will present the theoretical motivation for a double scale model based on the homomorphic event / theme relation. The model implementation will be detailed in section 4, while section 5 will show how telicity can be assessed by means of a straightforward mathematical calculus. Finally, section 6 will briefly address the non-culminating telic verbs issue.

2. ACCs vs DVs

Both ACCs and DVs involve degrees of affectedness of the theme along the extent scale. This is measured, as shown in (1), by the extent degree. However, due to

the specific nature of DVs, it is useful to posit a terminological distinction, according to which the kind of extent degree involved by DVs is called “differential degree” Δ (or “differential” for short). This section will provide the conceptual motivation for this terminological contrast (extent degree δ vs differential degree Δ).

The crucial difference between ACCs and DVs is as follows. With ACC verbs, the affectedness of the incremental theme is fundamentally concrete/objectual, with subsequent phases of the event progressively carried out until telic completion, i.e. until total affectedness of the theme. With DVs, by contrast, what is affected is an abstract/dimensional property of the theme as defined by the appropriate scale (e.g., weight, length, volume, height etc.). As an example, compare the ACC *repair the computer* with the DV *empty*. In the former case, subsequent phases of the event add to each other alongside the gradual development of the repairing event, so that the theme is progressively affected, although not in a strictly mereological sense, as illustrated in the preceding section. In the DV *empty*, by contrast, what is affected is the abstract property of volume, so that – independently of the actual degree reached within the ideal emptiness scale – every single event of “emptying X” implements a specific differential with respect to the stage at which the emptiness scale was at the initial instant t_I .

As the following three points will show, there is robust syntactic evidence for the distinction ACCs vs DVs, over and above the just illustrated semantic contrast:

i. Lack of resultative constructions with DVs (Rappaport 2008, quoted by Kennedy 2010, ex. 25-26):

- (2) a. ACC: We steamed the clothes *dry / clean / stiff*
 b. DV: * John dimmed the room *dark* / John cooled the room *cold*.

This is due to the fact that DVs, as in (2b), imply an intrinsic scale relating to a relevant abstract property, which inevitably competes with the additional scale introduced by the resultative small clause. Such a constraint, witness (2a), is ostensibly absent in the relevant type of ACCs, which are only indirectly associated with a scale.³ As it happens, the scale implicit in ACCs can be made explicit by adding a secondary scale measuring the degree of affectedness of the theme. Note, however, that the measure introduced by means of a resultative small clause is forced to saturate to 1 (i.e. $\delta = 1$). By contrast, as the following point also indicates, DVs typically allow intermediate values (i.e. $0 < \Delta < 1$), although saturation is not excluded for the relevant subset of DVs (see section 4 and the contrast “alpha / beta” DVs).

ii. Lack of an intrinsic differential measure with ACCs:

- (3) a. ACC: * John *ate* an apple by three mouthfuls
 [rather: the volume of the apple *decreased* by three mouthfuls]

³ As Fabienne Martin pointed out to us, the resultative construction is best (possibly only) observed with verbs that present the transitive/intransitive alternation (Kratzer 2004; see Rappaport Hovav & Levin’s 1998 “non-core transitives”), like *steam* in (2). Hence, the resultative transformation is not available with all and every ACC. However, to the extent that some ACCs accept it while no transitive DV does, point (i) preserves its validity. It goes without saying that many ACCs are intransitive and thus, by definition, immune from the phenomenon at stake.

- b. ACC: * John *ran* home by one kilometer
[rather: the distance from goal *decreased* by one km]
- c. DV: The level of the water *decreased* by one meter.

As (3a-b) demonstrate, as opposed to (3c), the only way to make explicit the differential measure of an ACC is by using an appropriate DV (in the above examples: *decrease*), i.e. one corresponding to the property implicitly involved (in the given case: volume and distance). This even applies, as shown in (3b), to directed motion Vs (a subset of gradual verbs), implicitly relating to a trajectory scale easily translatable into a spatial measure.

iii. As first pointed out by Bertinetto & Lentovskaya (2013), DVs crucially exhibit a high degree of compatibility with vague comparison adverbs, such as *perceptibly* and *noticeably*, whose usage with ACCs is at least dubious and often brings about an ironic/comical flavor. This unique property highlights the intrinsic nature of DVs as true “degree words”; namely, their capacity to give rise to a comparison between two different stages of the given event, just as the gradable adjective in (4b-c) implements a comparison between two referents, or between two temporal stages of the same referent. As (4d) shows, this property is ostensibly absent in ACCs:

- (4) a. DV: Phil *has* perceptibly/noticeably *grown* (with respect to last year)
Leo *è* sensibilmente/percettibilmente *cresciuto* (rispetto all’anno scorso)
- b. ADJ: Phil *is* perceptibly/noticeably *taller* than Bill
Leo *è* sensibilmente/percettibilmente *più alto* di Beppe
- c. ADJ: Phil *is* perceptibly/noticeably *taller* with respect to last year
Leo *è* sensibilmente/percettibilmente *più alto* rispetto all’anno scorso
- d. ACC: * Phil *has* perceptibly/noticeably *written his dissertation* (with respect to last week)
* Leo *ha* sensibilmente/percettibilmente *scritto la sua dissertazione* (rispetto all’anno scorso).

As the following sections will detail, the comparative nature of DVs is at the core of their very peculiar telic inclination. Whenever – as indeed is often the case – the event does not involve attainment of the MAXIMAL TELOS, it must nevertheless involve a CONTINGENT TELOS, namely a (possibly specifiable) differential degree of change. What (4a) states, therefore, is that at the reference moment there is a noticeable difference with respect to a previous stage at which Phil was observably shorter. Although the full extent of the tallness scale has not been saturated (and as a matter of fact, this would not even be possible with such a predicate), the event consists in the attainment of a definable change, namely a contingent telos, between two successive stages. It follows that, out of context, the notion of EXTENT TELOS is underdetermined with respect to maximality or contingency as far as DVs are concerned.

The remaining of this paper will substantiate the above claim. To start with, the following section will spell out the theoretical justification for the conceptual scaffolding in (1).

3. Single vs double scale models

In recent contributions, telicity has been formalized by means of a single scale. In particular, Kennedy and collaborators proposed a semantic treatment of gradual verbs based on what they called “degree of change” argument. The core thesis was that the telic vs atelic value of the predicate yields a defined (hence, saturated) vs undefined value of the degree of change. Although this use of the notion “definedness” is an extremely valid theoretical suggestion, there are a few critical points to be highlighted.

As a first observation, Piñón (2008) objected on formal grounds that a defined/undefined degree, as proposed by Kennedy and co-workers, is not a sufficient condition for supporting the contrast telic vs atelic. The fault consists in formally defining the saturation-triggering capacity without explicitly considering the effect of the cumulative vs quantized properties of the theme. Indeed, whenever the incremental theme consists of a mass noun or an indeterminate plural (i.e., nouns implying a cumulative reading), the interpretation is atelic, as often noted in the literature on actionality. Without a carefully crafted formalism one would get the unwelcome consequence that both *John wrote a letter* and *John wrote letters* would exhibit a defined degree of change. In the approach proposed here, a fundamental suggestion by Piñón will thus be adopted: namely that, in order to derive (a)telicity, one should take into account the extensional properties of the incremental theme (quantized vs cumulative). This is taken care of, in the present formal treatment, by means of the extent/differential degree, as a measure of the extent scale.

In addition, it is important to underline that a single scale system is inadequate to exhaustively treat the semantics of gradual predicates, and specifically to provide a fully-fledged account of telicity. A double scale approach is indeed a necessary prerequisite, if one considers that fulfilled telicity entails perfectivity, witness the well-known “imperfective paradox”, according to which a progressive sentence suspends the telic reading of the relevant predicates (cf.: *John was writing a letter*). Needless to say, this relation is not bi-directional, since atelic events may easily be conceived of as perfective (cf.: *Yesterday at noon little Tim cried loudly*). Thus, perfectivity is a necessary, but by no means sufficient condition for telicity; in other words, perfectivity doesn’t entail telicity. Since, however, the converse entailment holds (i.e. telic \rightarrow perfective), there are robust reasons to claim that, besides the independently needed extent scale, the semantic apparatus of telicity must also involve the event scale, measuring the aspectual interpretation of the sentence via the realization degree *r*.

This claim is supported by the well-known fact that atelicity may stem from two possible sources: the imperfective value of the sentence, as in (5’),⁴ or the non-quantized nature of the theme, as in (5’). The result is ultimately the same in both cases, but the source is ostensibly different. This proves that both the event scale and the extent scale may be involved in atelic events:

(5’) John was writing a letter

⁴ An obvious exception to imperfectivity as the source of atelicity is offered by habitual sentences. The reason for this is self-evident: in order for a given event to repeat itself within a habitual situation, each occurrence must be completed, hence (if the predicate is telic) telically fulfilled. For a formal definition of habituality within the domain of “gnomic” imperfectivity, see Lenci & Bertinetto (2000) and Bertinetto & Lenci (2012).

- (5'') a. John wrote letters
 b. John drank wine
 c. John wrote his dissertation for a week

In the case of fulfilled telicity, both scales are necessarily involved since (as pointed out above) telicity entails perfectivity. In order to fulfill the telicity requirement, the extent scale must be saturated – or rather, as detailed in the next section – it must receive a defined interpretation, but this in turn presupposes saturation of the event scale. Thus, telicity necessarily results from the combined effect of both scales. In (5'), non-saturation of the event realization scale, yielding imperfectivity, entails non-saturation of the extent scale, hence atelicity. As for (5''), atelicity directly depends on the non-saturation of the latter scale, although the event scale is saturated (at least in the default, perfective reading of these sentences, as opposed to the habitual interpretation available for sentences a-b).

In order to properly qualify the notion of telicity, it is also necessary to dissociate two properties that are often identified, namely: culmination and quantization. Consider the following sentences, where the adverb *completely* is used as telicity detector:⁵

- (6) a. Jim ate an apple completely [perfective, telic (= culminating, quantized)]
 Leo ha mangiato completamente una mela
 b. Jim ate half an apple completely [perfective, telic (= culminating, quantized)]
 Leo ha mangiato completamente una mezza mela
 c. * Jim ate an apple until half of it completely / Jim ate half of an apple completely [perfective, telic? (= non-culminating, quantized)]
 * Leo ha mangiato completamente una mela fino a metà / per metà
 d. * Jim ate apples completely [perf., atelic= (non-culminating, non-quantized)]
 * Leo ha mangiato mele completamente.

Example (6b) shows that, independently of the ontological degree of affectedness of the theme, what matters is the contextually adopted telos, which does not need to coincide with a whole object. In other words, (6a) and (6b) do not differ as far as telicity is concerned, but rather with respect to the portion of the object that is focused on as the event's goal. As for (6d), it should be read in the sense that each apple belonging to the relevant subset was completely eaten, but this fails to obtain the telic interpretation of the sentence, due to the indeterminate cardinality of the apples set.⁶ The crucial example is (6c). This sentence is deceptively similar to (6b), but differs from it in an important detail: in (6b) the extent degree can be set at 1, due to the contextual calibration of the telos, whereas in (6c) it must be limited to 0.5. In practice, (6b) depicts a situation in which Jim had half an apple to start with and ate it all, whereas (6c) depicts a situation in which Jim had a whole apple but ate no more than half of it. Thus, in terms of culmination, (6c) depicts an ostensibly incomplete

⁵ To avoid misunderstandings, it is not implied here that *completely* is an efficient telicity detector with all telic predicates, i.e. all predicates included in the gradual verbs set. As a matter of fact, it fails not only with many achievements, but also with directed motion verbs and with one class of DVs (those that in §4 will be called "alpha" DVs). Besides, in section 6 (with respect to non-culminating telic verbs) it will be proposed that telicity is safeguarded even when negative concessive clauses of the type ... *although not completely* are added. However, to the extent that this adverb gives rise to a grammatical sentence, it does signal telicity.

⁶ The alternative (and ungrammatical) formulation **Jim completely ate apples* would not allow this reading.

situation. Despite this, however, (6c) exhibits the quantization property, for no subpart of *eat an apple until half of it* is an event of the same sort (i.e., an eat-an-apple-until-half-of-it event). Consequently, (6c) features an intermediate case between the full telicity of (6a-b), which involve both culmination and quantization, and the full atelicity of (6d), which involves neither culmination nor quantization. If one considers quantization as the very essence of telicity, as assumed by the present authors according to a widely shared line of thought (including at least works by Bennett and Partee, Verkuyl, and Krifka), it follows that (6c) turns out to be a telic sentence despite lack of culmination. This will have important consequences in the treatment of the DVs' semantics, as developed in section 4.

To complete this reasoning, and also to avoid a possible misunderstanding, one should add that the above mereological view does not apply to examples such as *repair a computer* (cf. **John repaired half a computer*).⁷ This, however, does not mean that such predicates should not be considered within the present model, since whenever the sentence yields a quantized reading, they are by definition telic. Indeed, as mentioned in section 1, the actual theme of *repair a computer* consists in a series of goal-oriented actions that preserve the essential nature of the homomorphic relation between event and theme. In the given case, this relation maps the successive phases of the event onto the diverse and sequential steps of the repairing procedure. Thus, the only difference with respect to mereological-relation cases (as in the apple-eating event) consists in the fact that in predicates such as *repair a computer* quantization necessarily forces culmination, as shown by the pragmatic implausibility of **John repaired half a computer* (not to be confused with *John half repaired a computer*). The important thing to retain, for the present purposes, is that since culmination is the strongest condition, it should be regarded as a sufficient but by no means necessary telicity requisite.

Summing up the discussion in this section, one should underline the need for a double-scale system in order to have a proper understanding of telicity. As claimed above, (a)telicity stems from the combined effect of two different sources, namely:

- (i) the event scale, relating to the (im)perfective value of the sentence (cf. 5'');
- (ii) the extent scale, relating to the (non-)quantized nature of the theme (cf. 5'').

A comprehensive formal theory should take this into account, by jointly considering the two mentioned scales. Furthermore, it has been claimed that the ultimate essence of fulfilled telicity lies in quantization, with culmination playing a minor role.

The following section presents a new proposal concerning the semantic structure of gradual verbs.

4. A new proposal

As observed above, gradual verbs imply two scales with their corresponding degrees: the event scale with its realization degree r , and the extent scale with either the extent degree δ (for all gradual verbs, including culminating DVs), or the differential (degree) Δ (for non-culminating DVs). Adopting a suggestion by Kennedy and collaborators, the values in each scale may be defined or undefined. In practice, they range from the minimal value 0 to the maximal value 1, but can have a defined (possibly specified) value between the two extremes or, alternatively, an undefined (existentially bounded) value between these two extremes ($0 < (\delta \text{ or } \Delta) < 1$). The different situations are recapitulated in (7):

⁷ This does not depend on the verb *repair* itself, as proved by *John repaired half a fishnet*.

- (7) realization degree r $\left\{ \begin{array}{l} 1: \text{defined/saturated} \quad [\text{PERFECTIVE}] \\ 0 < r < 1: \text{undefined} \quad [\text{IMPERFECTIVE-PROGRESSIVE}] \end{array} \right.$
- extent degree δ (for ACC)
or
differential Δ (for DV) $\left\{ \begin{array}{l} 1: \text{defined/saturated} \\ \iota\delta \text{ or } \iota\Delta: \text{defined/non-saturated} \\ 0 < (\delta \text{ or } \Delta) < 1: \text{undefined} \end{array} \right.$

In the remaining of this section, the application of the two scales/degrees will be illustrated with different types of gradual verbs.

Let us first consider ACCs, as illustrated in (8) by creation/destruction/affection verbs. The event scale measures the realization degree of the event denoted by the verb (*ate, was eating*). Any telically fulfilled ACC presupposes a realization degree r saturated to 1, implying perfectivity. This is true of both (6a) and (6b), repeated below as (8a-b) with the adjunction of a temporal adverbial. The extent scale, by contrast, indicates the degree of affectedness of the theme (*an apple, half an apple, half of an apple, apples*). In (8a), the event is saturated and the object is completely affected, whereas in (8b) the event's saturation doesn't imply complete object affectedness. Example (8c) is quantized and thus telic, since (as noted above) no subpart of *eat half of an apple* is an eat-half-of-an-apple event, although, in terms of event culmination, it clearly falls short of reaching the maximal telos. Thus, (8a-b) are quantized and culminating, (8c) is quantized but non-culminating, (8d-e) are both non-quantized and non-culminating, although for different reasons:

- (8) a. Mary ate an apple in a minute
Maria ha mangiato una mela in un minuto
 $r = 1 \mid \delta = 1$ [perfective; culminating, quantized]
- b. Mary ate half an apple in a minute
Maria ha mangiato una mezza mela in un minuto
 $r = 1 \mid \delta = 1$ [perfective; culminating, quantized]
- c. Mary ate an apple until half of it in a minute (* for a minute)
Maria ha mangiato una mela fino a metà in un minuto (* per un minuto)
 $r = 1 \mid \delta = 0,5$ [perfective; non-culminating, quantized]
- d. Mary ate apples for ten minutes / * in ten minutes
Maria ha mangiato mele per dieci minuti / * in dieci minuti
 $r = 1 \mid 0 < \delta < 1$ [perfective; non-culminating, non-quantized]
- e. Mary ate an apple for a minute
Maria ha mangiato una mela per un minuto
 $r = 1 \mid 0 < \delta < 1$ [perfective; non-culminating, non-quantized]
- f. Mary was eating an apple
Maria stava mangiando una mela
 $0 < r < 1 \mid 0 < \delta < 1$ [imperfective; non-culminating, non-quantized]

It is worth noting that (8e) is potentially, and quite marginally, compatible with the apple being completely eaten at the end of the given interval; thus, one might want to re-write the right part of the formula as $0 < \delta \leq 1$. However, due to vagueness, this does not guarantee telicity: indeed, the default, vastly preferred reading of such

sentences suggests that the actually reached extent is not the saturated, maximal value. As a consequence, δ remains undefined. As for (8f), the imperfective-progressive view is expressed by the undefined value of the realization degree r . Thus, by definition, the extent degree cannot saturate to 1, yielding the expected atelic reading.

DVs present a similar picture:

- (9) a. Mary emptied the tank in an hour
 Maria ha svuotato il serbatoio in un'ora
 $r = 1 \mid \Delta = 1$ [perfective; culminating, quantized]
- b. Mary emptied the tank by 20 liters in 5 minutes
 Maria ha svuotato il serbatoio di 20 litri in 5 minuti
 $r = 1 \mid \iota\Delta (= 2 \text{ lt})$ [perfective; non-culminating, quantized]
- c. Mary emptied the tank (*by 20 liters) for 10 minutes
 Maria ha svuotato il serbatoio (*di 20 litri) per 10 minuti
 $r = 1 \mid 0 < \Delta < 1$ [perfective; non-culminating, non-quantized]
- d. Mary was emptying the tank
 Maria stava svuotando il serbatoio
 $0 < r < 1 \mid 0 < \Delta < 1$ [imperfective; non-culminating, non-quantized]

Example (9a) exhibits saturation of both scales. Example (9b) corresponds to (8c) inasmuch as it is non-culminating, for the event does not involve the whole tank, but quantized, as proved by compatibility with the telicity-detector adverb *in X TIME*. Interestingly, (9b) presents the specification of the differential by means of the measure phrase *by 2 liters*, a possibility uniquely accessible to DVs, as opposed to ACCs (see point (ii) of sect. 2). Without this measure phrase, the sentence would coincide with (9a), yielding saturation of r .

However, not all DVs admit saturation of the differential degree, as in (9a). As Bertinetto & Squartini (1995) observed, there are two major types of DVs: ALPHA *vs* BETA, characterized by absence *vs* (potential) presence of the maximal telos (i.e. $\Delta = 1$). This corresponds to the existence of an open *vs* closed scale, as proposed in Kennedy and collaborators contributions:

- (α) Mary widened the hole \leftrightarrow Mary completely widened the hole
 (β) Mary emptied the tank \rightarrow Mary completely emptied the tank

Despite this divergence, both alpha and beta DVs share the existence of a potentially infinite number of differential degrees, to be interpreted as the set of all differentials between 0 and 1. To illustrate with the tank-emptying event: at t_x Mary emptied the tank until level x , at t_y Mary emptied the tank until level y , etc. The existence of a differential is also implied by imperfective sentences such as (9d): indeed, whatever the stage reached by the event at the contextually given moment, one has to assume that the emptying event has already given rise to an undefined (and possibly minimal) differential Δ . However, such Δ value remains undefined, due to undefined r value.

In languages like English or Italian the divide alpha *vs* beta DVs is a matter of semantic intuition, but it is interesting to observe that in other languages it may have overt morphosyntactic manifestation. As Jukka Havu pointed out to the present authors, in Finnish this divide is manifested by case choice. It is important to note – to remain in very broad terms – that the accusative prototypically marks the object as “total” while the partitive marks it as “partial”. Interestingly, with beta DVs like

tyhjentää ‘empty’ the accusative implies culmination (cf. 10a), while the partitive implies non-culmination (cf. 10b), namely attainment of a merely contingent telos, rather than the maximal telos (see the end of section 2 for this distinction, within the notion of extent telos). With alpha DVs like *leventää* ‘widen’, by contrast, the alternation accusative/partitive does not bring about a salient difference of interpretation, provided the degree of change is left implicit (cf. 10c-d). If, however, a measure of change is added – as in (10f) – then the partitive is the only available option:

- (10) a. Liina tyhjensi tankin (ACC)
 ‘Liina emptied the tank’
 b. Liina tyhjensi tankia (PART) kahden litran verran
 ‘Liina emptied the tank by two liters’
 c. Työmiehet levensivät tien (ACC) / tietä (PART)
 ‘(The) workers widened the street’
 d. Työmiehet levensivät tien (ACC) / tietä (PART) paremmaksi ajaa
 ‘(The) workers widened the street for better driving’
 e. Työmiehet levensivät *tien (ACC) / tietä (PART) kaksi metriä
 ‘(The) workers widened the street by two meters’

It is worth noting that for many DVs the classification as alpha or beta is not given once and forever, but depends on the context. For instance, *widen* is typically alpha in *widen the hole* (but see below for further qualifications) and beta in *widen the angle*, since an angle cannot be indefinitely widened. Apart from this, alpha DVs (as illustrated in 11) behave like beta DVs in the most relevant respects (cf. 9). The only difference between (9) and (11) concerns example (a), which involves a saturated differential in (9a), and a defined/quantized but unspecified differential in (11a):

- (11) a. Mary widened the hole (in an hour)
 Maria ha allargato il buco (in un’ora)
 $r = 1 \mid \iota\Delta$ (or $\Delta=1$) [perfective; non-culminating (or culminating), quantized]
 b. Mary widened the hole by 10 cm (in an hour).
 Maria ha allargato il buco di 10 cm (in un’ora)
 $r=1 \mid \iota\Delta (= 10 \text{ cm})$ [perfective; non-culminating, quantized]
 c. Mary widened the hole (* by 10 cm) for an hour
 Maria ha allargato il buco (* di 10 cm) per un’ora
 $r = 1 \mid 0 < \Delta < 1$ [perfective; non-culminating, non-quantized]
 d. Mary was widening the hole
 Maria stava allargando il buco
 $0 < r < 1 \mid 0 < \Delta < 1$ [imperfective; non-culminating, non-quantized]

Example (11a) is actually liable to a double interpretation. In the default case, it excludes reference to a saturated extent telos, due to the basically alpha nature of the predicate (hence, $\iota\Delta$). However, in particular contexts, this sentence might refer to a specified goal (e.g., in a context such that a worker was given the task of widening the hole by a specified measure). In the latter case, one can assume the contextually specified goal as the contextually relevant maximal telos (hence, $\Delta=1$).

It is also worth noting that although both (9c) and (11c) are incompatible with the specification of the differential, example (12a) may admit a “reversible” reading (also known as “annulled result”), such that at the end of the given period the level of the

water returned to the initial value. Thus, (12a) does not exclude attainment of a specifiable differential, similar to what happens in (9b) and (11b) with *in X TIME* adverbials. Remarkably, annulled result is a feature to be observed in what Bertinetto (1986) called “reversible achievements”, as shown by (12b). Thus – limited to the relevant subset of DVs, namely those that admit an annulled result reading – the denomination “degree achievements” finds some partial justification, except that it would not work with non-reversible DVs (as in: *The workers widened the street for two days*, which, even to the extent that it is pragmatically acceptable, has no reversible reading). Further support to the possible telic interpretation of some DVs with *for X TIME* adverbials comes from iterative-distributive readings, as in (12c), indicating an iteratively attained specified increment:

- (12) a. The level of the water increased by 20 cm for an hour
 Il livello dell’acqua è aumentato di 20 cm per un’ora
 $r = 1 \mid \iota\Delta (= 20 \text{ cm})$ [perfective; non-culminating, quantized]
- b. Susy left for two days [i.e., Susy came back at the end of the given period]
 Gina parti per due giorni
- c. The level of the water increased by 20 cm for two (successive) days; all in all, it increased by 40 cm
 Il livello dell’acqua è aumentato di 20 cm per due (successivi) giorni; in tutto, è aumentato di 40 cm
 $r = 1 \mid \iota\Delta (= 10 \text{ cm per day})$ [perfective-iterative; non-culminating, quantized]

At first sight, the telic reading extends to cases such as (13a). However, comparison with (13b) shows one important feature: as it happens, the adverbial *in X TIME* includes, in and by itself, the notion of goal attainment, so that it is hardly compatible with the explicit mention of the goal itself. Thus, the grammaticality of (13a) only suggests that *for X TIME* is at most compatible with the explicit mention of the goal, rather than directly denoting telicity. Ultimately, (13a) is comparable to (13c), featuring a normal case of detelicized ACC. One should thus consider (13a) and (13c) as expressing a merely pragmatic notion of referential vagueness:

- (13) a. In order to reach its final height, the level of the water increased for 2 hours.
 Per attingere la sua altezza finale, il livello dell’acqua è aumentato per 2 ore.
- b. ?? In order to reach its final height, the balloon rose in 2 hours.
 ?? Per attingere la sua altezza finale, il pallone è salito in 2 ore.
- c. In order to produce the present situation, John painted the wall for 2 hours.
 Per creare la situazione attuale, Gianni ha dipinto la parete per 2 ore.

It is important to note, at any rate, that both alpha and beta DVs may or may not support a specifiable differential, namely an explicit measure of change. This depends not only on the semantic reasons already discussed (i.e. the presence of *for X TIME* adverbials), but on pragmatics, i.e. on the granularity of the incremental change, which accounts for the existence vs. non-existence of a conventional measure. Thus, specifiability is a sufficient but by no means necessary property of DVs, and in any case it does not interfere with the implicit “definedness” of the differential involved:

- (14) a. The machine rusted by ???
 b. The clothes dried by ???
 c. The situation got worse by ???

Before concluding this section, mention must be made of the so-called English “conative oblique construction”, of the type *John wrote at his dissertation*. As Beavers (2013) correctly points out, these sentences should be considered within the framework of incremental theme verbs. In the view of the present authors such sentences show striking resemblance with the situation of DVs, as shown by their compatibility with vague comparison adverbs (cf. (15a) and point (iii) of sect. 3). Interestingly, this possibly also applies to ACCs modified by *further*, as in (15b). This suggests that in both cases one has to do with derived DVs, just as directed-motion verbs may be regarded as derived ACCs. Thus, the analysis here proposed for DVs could also account for the examples in (15):

- (15) a. John has perceptibly drunk at his bottle, as compared with a moment ago.
 b. John has noticeably further written his dissertation, as compared with last week.

5. Deriving telicity

This section will detail a formal proposal to deal with the notion of telicity. The proposal is partly indebted to Piñón’s (2008) technicalities, although departing from it due to a different interpretation of the double scale system.⁸ Telicity is expressed as the product d of r and δ/Δ . This follows from the fact that telicity presupposes perfectivity, as observed in sect. 3, in addition to satisfying the quantization condition. To make things simple, most examples in this section, except (18), will be presented in the perfective reading.

In a nutshell, the proposal is as follows: the event is telic if the product d is a defined degree ($d = 1$, or $= \iota\delta$, or $= \iota\Delta$), atelic otherwise ($0 < d < 1$). ACCs are illustrated in (16), beta DVs in (17a’-c’), alpha DVs in (17a”-c”):

⁸ In unpublished work (including the plenary talk *Incrementality by degrees* given at the “Chronos 9” conference in Paris, as well as a talk given at Scuola Normale Superiore, Pisa, in 2013), Piñón proposed a double scale mechanism, but his model radically differs from the one presented here. In a sentence like *John ate an apple*, his formalism would involve a degree d for the event of eating and a degree d' for the apple to be consumed. The combined effect of the two scales is expressed, as also proposed here, by the product of the two degrees. In the present model, however, the realization degree r concerns the aspectual interpretation, since its saturation (yielding perfectivity) is a precondition for telicity fulfillment. As for the extent degree δ , it concerns the affectedness of the theme in a holistic fashion, taking into account, at the same time, both the event of eating and the apple consumption. Indeed, for self-evident reasons, a transitive event could not be conceived of independently of its object, for they are the two sides of the same coin. As a matter of fact, even the external argument may affect the actional interpretation of a predicate, as in *Mary read the letter* (human agent: accomplishment) vs. *The inscription read: “Armed control”* (inanimate referent: stative). Interestingly, with respect to a sentence of the type of *Mary read the book*, Rothstein (2003) claims that the event consists in Mary’s continuously changing psychological state, which constitutes the ultimate theme over and above the gradual “consumption” of the book, although the latter is the syntactic object. This confirms that the actional nature of a predicate should best be addressed holistically, by taking into account all the contextually relevant syntactic components.

- (16) a. Mary ate an apple
 $(r = 1 \otimes \delta = 1) = d = 1$ [perfective; culminating, quantized]
- b. Mary ate half an apple
 $(r = 1 \otimes \delta = 1) = d = 1$ [perfective; culminating, quantized]
- c. Mary ate half of the apple
 $(r = 1 \otimes \delta = 0.5) = d = 0.5$ [perfective; non-culminating, quantized]
- d. Mary ate apples
 $(r = 1 \otimes 0 < \delta < 1) = 0 < d < 1$ [perfective; non-culminating, non-quantized]
- (17) a'. Mary emptied the tank
 $(r = 1 \otimes \Delta = 1) = d = 1$ [perfective; culminating, quantized]
- b'. Mary emptied the tank by 2 lt
 $(r = 1 \otimes (\iota\Delta = 2 \text{ lt})) = d = \iota\Delta$ [perfective; non-culminating, quantized]
- c'. Mary emptied the tank for 2 hours
 $(r = 1 \otimes 0 < \Delta < 1) = 0 < d < 1$
 [perfective; non-culminating (by default), non-quantized]
- a''. Mary widened the hole
 $(r = 1 \otimes \iota\Delta) = d = \iota\Delta$ [perfective; non-culminating, quantized]
- b''. Mary widened the hole by 10 cm.
 $(r = 1 \otimes (\iota\Delta = 10 \text{ cm})) = d = \iota\Delta$ [perfective; non-culminating, quantized]
- c''. Mary widened the hole for two hours
 $(r = 1 \otimes 0 < \Delta < 1) = 0 < d < 1$ [perfective; non-culminating, non-quantized]

Examples (17b'), (17a'') and (17b'') are non-culminating, for they do not imply a maximal extent telos (hence, $\Delta < 1$), yet they are quantized. In (17b') and (17b'') non-culmination stems from the measure indication, whereas in (17a'') it is directly due to the alpha nature of the predicate (in its default reading)⁹, which bars the existence of a maximal telos. However, despite being non-culminating, the given events present a contingent telos. This notion, informally introduced at the end of section 2, can now be understood as a defined degree $d (= r \otimes \Delta)$ not coinciding with the maximal extent telos. The presence of a contingent telos suffices to enable a perfectly used DV to denote a quantized event, independently of the attainment of the maximal goal, possibly available to beta DVs (cf. 17a') as well as to alpha DVs verbs contextually reinterpreted as beta.

Summing up, the formal mechanism proposed here consists in adopting as the measure of telicity the product d of the two degrees (realization degree r , and either the extent degree δ or the differential Δ). The event is considered telic if and only if d has a defined value.

As already mentioned, a necessary precondition for telicity is the perfective value of the sentence. The effect of imperfectivity (or, more exactly, progressivity) on the semantics of DVs is shown below, showing how the atelicity of such sentences directly follows from the formalism. The extension to ACCs can be easily inferred. Examples (18a'-b') and (18a''-b'') contain a beta and an alpha DV, respectively. The imperfective view corresponds to an existentially bounded realization degree r on the event scale ($0 < r < 1$). This necessarily yields an undefined product d whatever the

⁹ See the discussion of example (11a) for an alternative, contextually specified reading.

value of the differential Δ . As (18b') shows, the imperfective interpretation does not allow the specification of the differential. Indeed, via product any explicit measure of specification would yield an undefined result, since – whatever the product value – it would inevitably turn out to be an interval:

- (18) a. Mary was emptying the tank
 $(0 < r < 1 \otimes 0 < \Delta < 1) = (0 < (d = (r \otimes \Delta)) < 1)$
- b. ?? Mary was emptying the tank by 2 lt [prevision only]
 $(0 < r < 1 \otimes 0 < \Delta < (\iota\Delta = 2\text{lt})) = (0 < (d = (r \otimes \iota\Delta)) < \iota\Delta)$
- a'. Mary was widening the hole
 $(0 < r < 1 \otimes 0 < \Delta < 1) = (0 < (d = (r \otimes \Delta)) < 1)$
- b'. ?? Mary was widening the hole by 10 cm [prevision only]
 $(0 < r < 1 \otimes 0 < \Delta < (\iota\Delta = 20\text{cm})) = (0 < (d = (r \otimes \iota\Delta)) < \iota\Delta)$

6. Non-culminating telic verbs.

In this last section a brief attempt will be done to show how the above presented double scale formalism can be exploited to address the now highly debated “non-culminating telic verbs” issue, which was also the topic of a workshop organized by Hamida Demirdache and Fabienne Martin in the Chronos 11 conference (Pisa, June 16-18th 2014). The present authors are indebted Fabienne Martin for bringing the problem to their attention. Consider the following examples:¹⁰

- (19) a. John ate his pizza (in 5 minutes), although not until the very end
 Gianni ha mangiato la pizza (in 5 minuti), anche se non fino alla fine
- b. Mary broke her doll (in a matter of 2 minutes), but not completely¹¹
 Maria ha rotto la sua bambola (in qualcosa come 2 minuti), ma non completamente
- c. Lou has practically finished her dissertation (in less than six weeks)
 Lia ha praticamente completato la sua dissertazione (in meno di sei settimane).

These sentences depict non-culminating events, although they are ostensibly perfective in the most obvious interpretation (i.e., barring the possible habitual reading of the English version of [19a-b]). From this point of view, they are similar to (8c). The question then is: are they telic? According to the present authors, the answer is positive, as also shown by their compatibility with the telically-oriented adverbials within parenthesis.

A puzzle arises, however – as suggested by Demirdache & Martin (to appear) – as soon as one compares (19) with (20). At first sight, the culmination-denying expressions in (20) are like the ones in (19), yet the grammaticality judgment is radically different:

¹⁰ The adverb *almost* may give rise to interpretations similar to those in (19), at least in the relevant interpretation. However, as is well-known, it also has an avertive reading (as in *John almost fell*) which should be addressed differently.

¹¹ It is worth noting that there marginally exist a DV reading of *break*, as shown by *Mary has noticeably broken her doll*, suggesting that a breaking event may consist of successive steps (as qualified by adverbs like: *just noticeably*, *perceptibly*, *substantially*, *dramatically*, *completely*). This is a normal instance of actional hybridism (in the case at stake, an achievement / DV hybridism). See Bertinetto & Lentovskaya (2013) for further examples of hybridism involving DVs.

- (20) a. ?? John ate his pizza, but did not finish it
 ?? Gianni ha mangiato la pizza, ma non l'ha finita
 b. * John ate his pizza, but a good deal of it is still there
 * Gianni ha mangiato la pizza, ma una buona parte è ancora lì
 c. * Mary has broken the dolly, although she did not complete her job
 * Maria ha rotto la bambola, anche se non ha completato la faccenda.

This divergence suggests that the two types of culmination-denying expressions address different components of the tense-aspect structure. Sentences (19) are grammatical because the adversative/concessive final clause in (19a-b) and the adverb *practically* in (19c) merely cancel the conversational implicature relative to the culmination of the extent telos, due to the expected saturation of the extent degree δ . This is not surprising: in our daily experience we often face situations whereby a given action/procedure has practically achieved its inherent goal, even though the extent telos is not saturated. For instance, the speaker of (19c) might integrate her/his saying by adding that Lou only needs to insert the bibliography and a few missing footnotes, besides checking once more the style-sheet; but apart from these details, the paper is (practically) ready. What seems to be involved here is a kind of semantic vagueness relating to the maxim of quantity. Speakers normally agree that a result is (practically) obtained as soon as a vaguely defined STANDARD telos, sufficiently close to the maximal extent telos, has been attained. The acceptability of (19) can thus be explained in pragmatic terms.

Making use of the above presented formalism, this approximation to the maximal goal could be expressed as in (21), where the δ value is potentially definable as soon as the appropriate pragmatic information becomes available. For instance, a pizza might be completely eaten, except for the last two mouthfuls; a doll might be completely broken, except for its still working artificial voice, etc.:

- (21) a. John ate his pizza, although not until the very end
 b. Mary broke her dolly, but not completely
 c. Lou has practically finished her dissertation
 $(r = 1 \otimes \iota\delta) = d = \iota\delta$ [with δ tending to 1]
 [perfective; non-culminating, quantized]

At first sight, the above formulation might be regarded as unsatisfactory, for it might be interpreted as cumulativity-tolerant. To see why, let us consider a situation such that Lou only needs to write the three last footnotes in order to complete her dissertation. Needless to say, slightly before that stage, Lou needed to write the fourth-to-last footnote. Now, apparently, the latter situation is of the same type as the former, in the sense that the event of having practically finished the dissertation is cumulatively implemented. However, in the mind of the present authors this inference is not correct, because it does not take into account the proper sense of “standard telos”, as hinted at by the assumption of δ tending to 1. What this means is that there is a range of values within which the approximation to saturation is safeguarded. What really makes the difference is the lower boundary of such range. Although this cannot be detailed in any precise way – as is typical of pragmatic notions – there is common consensus that Lou could not be considered to have practically finished her dissertation if a lot of footnote-writing still had to be done. Thus, to the extent that a pragmatically conceived lower range value is defined (which might be a matter of personal choice), the quantized nature of the event is guaranteed, since there is a

definable limit below which Lou cannot be said to have practically written her dissertation.

The notion of “standard” has been used in the formalization of comparatives, although admittedly in a slightly different meaning (see Kennedy 2005 among others). It usually defines a context-sensitive threshold level, which in the case of telic predicates may be understood as coinciding with the maximal extent *telos*. The modification proposed here consists in introducing the concept of “*telos range*”; namely, an indifference area characterized by tendency to extent saturation. The standard *telos* can thus be defined as the lower value of this range. As a matter of fact, such a notion is often tacitly at work. This can be shown even in the case of eating an apple, routinely used to illustrate the idea of event saturation. In real life, an apple is considered as completely eaten even though the skin and the inner part of it are left over. Nobody would claim that the event of eating an apple is cumulative, simply because having eaten the apple except for skin and inner part is cumulatively included into the event of having eaten the apple except for just its inner part. Here again, there is a pragmatically agreed-upon lower level, beyond which the apple is considered to be (virtually completely) eaten, despite possible residues.

Let us now turn to the agrammaticality of (20). Rather than depending on pragmatic reasons, this seems to depend on truly semantic reasons, namely on the clash between the meaning conveyed by the second clause (as expressed, e.g., by the negation of the terminative verbs *finish / complete*) and the perfective interpretation of the first clause. Apparently, the semantic content of the second clause in each of these sentences is antithetic not only to attainment of the maximal goal, but even to attainment of the standard goal, no matter how this can be pragmatically defined. In practice, in (20) the realization degree *r* turns out to be at the same time asserted (by the perfective reading of *ate* and *broke*) and negated by the subsequent clause. Hence, the semantic interpretation crashes.

The fact that aspect and lexical meaning can interfere is proven by the idiosyncratic choice made by different languages in this respect. At least since Ikegami (1985) it has been known that some languages are maximally reluctant to assign the telicity value at the lexical level, and allow instead the context to provide the actual interpretation. Since then, this behavior has been observed in a constantly growing number of languages. Demirdache & Martin (to appear) list the following ones (see the cited paper for bibliographical references): Adyghe, Bagwalal, Hindi, Japanese, Karachay-Balkar, Korean, Mandarin, Mari, Russian,¹² Salish languages, Tamil, Tagalog, Thai. The following example stems from the quoted paper:

- (22) a. Mandarin (Demirdache & Sun 2014)
 Yuēhàn shāo le tā-de shu, dàn méi shāo-zháo
 Yuēhàn burn PERF 3SG-DE book but NEG completely-burn-destroy
 literally: ‘Yuēhàn burned his book, but it wasn’t consumed by fire’.

As the example shows, the literal translation into English or any other European language yields a semantically anomalous sentence. Evidently, the meaning of *shāo* ‘burn’ does not necessarily imply, even in connection with a direct object, the telic involvement of the theme, but rather gives rise to a twofold lexical interpretation,

¹² The present authors have strong reservations about the inclusion of Russian in the given list. The possible reason for this is the ambiguous behavior of the so-called ‘imperfective’ verbs with respect to telicity. However, the lexical specification of their ‘perfective’ cognates is absolutely context-independent (Bertinetto & Lentovskaya 2012).

namely: (i) a reading that might be approximated by the conative oblique construction ('burn at X'); (ii) a fully-fledged telic reading. Languages that present this ambiguity leave the actual interpretation of the lexical meaning to the context. As a consequence, no anomaly arises from an explicit negation of telic fulfillment.

No attempt is done here to provide an account for which verbs, in the different languages, are compatible with non-culminating clauses. The authors wish to refer to Demirdache & Martin (to appear) for a proposal. It is worth noting, at any rate, that although the Agent Control Hypothesis suggested by a number of authors explains a substantial share of the data, it does not work with Mandarin sentences like *Huǒ shāo le tā-de shu, dàn méi quán shāo-huǐ* [fire burn PERF 3SG-DE book but NEG completely-burn-destroy] 'The fire burned his book, but it wasn't consumed by fire'.

It is in any case important to observe (see again Demirdache & Martin), that even the Indo-European languages may exhibit, with selected predicates, a contextually dependent behavior as far as telicity is concerned, as shown by: *Mary explained the matter to John in two minutes* vs. *Mary explained the matter to John, but he did not fully understand it*. In this case, however, the situation is ostensibly different with respect to the examples in (19), since the ambiguous verb *explain* – in conjunction with the telicity-negating expression – allows the deletion of the possible telic reading or, at the very least, its modulation with respect to a contextually appropriate standard telos. This is strong evidence of a direct contribution of (language-specific) lexical meaning in the structuring of non-culminating events.

7. Conclusion

In this paper, a new proposal has been put forth to deal with the semantics of DVs. The model builds upon three basic suggestions by previous work: (i) the fact that DVs belong to the class of gradual verbs (also known as incremental theme verbs), together with ACCs – as well as achievements – namely with predicates involving a scalar semantics (see work by Kennedy and co-workers, Levin, and Beavers, among others); (ii) the suggestion by Kennedy and co-workers concerning definedness as a characterizing feature of telicity; (iii) Piñón's (2008) suggestion concerning the existence of two scales, each presupposing a specific degree, such that the product of the two degrees yields a third degree expressing the telicity value. However, the model presented here departs from any previous proposal on two important respects.

First, the double scale system is motivated with respect to the inherent structure of telicity, which necessarily involves two components: the aspectual component (imperfectivity / perfectivity), and the theme's affectedness component (cumulativity / quantization). Each component involves a dedicated scale, with the appropriate type of degree: the event scale, with the realization degree r , and the extent scale, with the extent degree δ (or the differential Δ). Second, and consequently, the product of the two degrees is directly exploited to calculate the telic value of the event, to be checked against the saturation of the realization degree r (yielding perfectivity) and the defined (i.e., quantized) value of the extent degree δ (or differential Δ). Hence, telicity is explicitly measured against both components (aspectual and affectedness), rather than merely against affectedness.

An important step in this reasoning concerns the possibility of non-culminating telic events. This situation, occasionally observed with ACCs (see example (6c)), is often at stake with DVs, which in most of their uses do not involve attainment of the maximal extent telos. Indeed, the so-called alpha DVs – unless they are contextually

reinterpreted as beta – do not even admit a maximal telos (i.e., they are inherently non-culminating), but only a potentially infinite set of (quantized) contingent telē. By replacing the extent degree δ with the differential degree Δ , the proposed model accounts for the semantics of DVs, thus demonstrating their intrinsic telic value. This solves the frequently pointed out paradox stemming from the equal compatibility of DVs with both *for* X TIME adverbials (which, in most languages, disrupt the telic reading of ACCs), and *in* X TIME adverbials (often used as diagnostics for ascertaining the event's telic value). Since DVs are not forced to involve saturation of the differential degree Δ , they can easily co-occur with both types of adverbial. The extension of the present model to account for the non-culminating telic verbs issue, as proposed in section 6, is an interesting fall-out of the theory.

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