

Kinds, Properties and Atelicity*

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Abstract Since at least Vendler (1967), one of the most widely discussed data points, often viewed as the ultimate test for (a)telicity, is the behavior of durative modifiers with respect to different VP types as in *John killed mosquitos/*a mosquito for an hour*. In the present paper, I explore a new blend of the two most widespread approaches to this issue, namely (i) the view of durative modifiers as universal quantifiers (e.g., Dowty 1979, a.o.) and (ii) their view as aspect sensitive measure adverbials (e.g. Krifka 1998, a.o.). The blend explored here is based on an economy constraint specific to the scope of adverbial quantification ('do not weaken' cf. Bassa Vanrell 2017) combined with the identification of the special role that kinds *and properties* may play as direct bearers of thematic relations in an event-based semantics.

Keywords: Durative modifiers, (a)telicity, bare arguments, scope.

1 Introduction

Durative/pluractional modifiers (Dur-Mods) are used to probe the status of verbal complexes with respect to (a)telicity. As is well known since at least Verkuyl (1972), with stative- and activity-denoting VPs Dur-Mods are acceptable, as in (1a); with achievements, they give rise to deviance, as in (1b). Famously, moreover, switching from a quantified DP to bare arguments systematically restores grammaticality for achievements, as in (1c).

- (1) a. Mary ran/pushed a cart/was in the cellar for an hour/until 3.
- b. i. * John found a mistake/some mistakes for an hour.
- ii. * Some pets died for weeks, until a vaccine was found.
- c. i. John found mistakes for a whole hour
- ii. Pets died for weeks, until a vaccine was found

One of the two main takes on this so widely discussed phenomenon is the Quantificational approach, according to which, a sentence like (2a) is analyzed as in (2b)

- (2) The Quantificational approach to Dur-Mods
- a. John ran for an hour
- b. For any (relevant) subinterval t of a 1 hour interval, John ran at t

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The pros and cons of the Quantificational approach¹ are:

- Pros: It directly explains why Dur-Mods are deviant with VPs that don't have the subinterval property and are not naturally iterable. E.g., *John died for an hour* is deviant because, John would have to die at each subinterval of a one hour interval.
- Cons: This approach has to rely on some constraint that assigns to A(dverbial)-quantifiers very different scope properties from those of D(eterminer)-quantifiers. Cf. *A mouse was killed every day*, which is perfectly grammatical vs. **a mouse was killed for days*. Where do these differences stem from? and why would universal A-quantifiers have such different scope properties from those of their D-quantifier counterparts?

The second main take on Dur-Mods is sometimes called the 'Measure out' approach and is summarized in (3):

- (3) The Measure-out approach to Dur-Mods
- a. John ran for an hour
 - b. There is an event of John's running which lasted at least an hour
 - c. Dur-Mods are restricted to properties of events with a specific property that makes them atelic: cumulativity, having homogeneous parts, being unquantized, incrementality, etc.²

Pros and Cons of the Measure out approach are roughly the following:

- Pros: It (supposedly) explains the peculiar distributions of Dur-Mods on grounds that the properties of events involving quantified DPs (e.g. *kill a mosquito*) lack the relevant property (e.g., they are quantized, and hence telic)
- Cons: How explanatory is this take? It seems to boil down to claiming that certain Dur-Mods specialize for atelic properties.
- How well do the various attempts at defining (a)telicity work?

The main problem with any definition of (a)telicity is how to distinguish the event properties in (4):

- (4) a. John killed some mosquitos (*for an hour)
 $\Rightarrow \lambda e \exists x [\text{mosquitos}_w(x) \wedge \text{AG}_w(e)(\text{john}) \wedge \text{TH}_w(e)(x) \wedge \text{kill}_w(e)]$

¹ In its classical modern form, this approach was developed in Dowty (1979). An early version of it for *until*-phrases can be found in Mittwoch (1977). More recent variants are, e.g., Moltman (1991), Deo and Piñango (2011), Champollion (2013) a.o.

² The standard reference on this is Krifka (1978); see also Kratzer (2007), Landman and Rothstein (2012a,b), Champollion (2016) a.o.

- b. John killed mosquitos (for an hour)
 $\Rightarrow \lambda e [AG_w(e)(john) \wedge kill\text{-}of\text{-}mosquitos(e)]$

Can you imagine any event that would qualify as the killing of one or more mosquitos (in some world) and not also qualify as a killing of mosquitos (in that same world)? And, viceversa, is it conceivable to have an event that is a killing of mosquitos and not also a killing of one or more mosquitos? And yet, in spite of this prima facie truth-conditional equivalence, the event property in (4a) behaves like a telic one, as is deviant with Dur-Mods, while the event property in (4b) is your prototypical atelic one. In this paper I develop a new blend of the approaches sketched in (1)-(2) that addresses this issue. What is at stake in so doing is:

- The proper characterization of (a)telicity.
- Key aspects of the theory of scope for A-quantifiers vs. D-quantifiers.
- The division of labor between event modification vs. time-interval modification, which constitutes a central knot in the architecture of event based semantics.

This paper is structured as follows: In Section 2 we discuss in detail the Quantificational approach and argue in favor of adding to it an economy based scope constraint, along the lines of Bassa Vanrell (2017). In section 2 we consider a problem with definites in the scope of Dur-Mods and propose that the problem is solved by (i) adding a ‘same participant’ constraint to the semantics of Dur-Mods (as also proposed by Champollion et al 2017) and (ii) by allowing kinds as direct bearers of thematic roles. In section 4, we consider some crosslinguistic consequences of our proposal. Section 5 concludes.

2 Dissecting the Quantificational approach

Dowty’s (1979) approach sketched in (2), adapted to the era of event semantics, can be fleshed out as follows:

$$(5) \quad \underbrace{\exists t [PAST_n(t)]}_{\text{TENSE}} \wedge \underbrace{1_H(t) \wedge \forall t' \subseteq t}_{\text{Dur-Mod}} \rightarrow \underbrace{\exists e [\tau(e) \subseteq t' \wedge AG_w(e)(j) \wedge run_w(e)]}_{\text{Main clause/scope}} \quad ^3$$

In (5), I indicate the respective contributions of tense, of the Dur-Mod and of the main clause which constitutes the scope of the Dur-Mod. Next to (5), we may want to also allow an event-oriented version of Dur-Mods, isomorphic to the interval oriented one, as Dur-Mods can clearly have scope **below** quintessential event modifiers, like *quickly*, as in e.g.:

³ For any event e , the temporal trace function τ maps e into the interval $\tau(e)$ that constitutes the duration of e . See, e.g., Krifka (1998) on this.

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(6) John ran for two hours very quickly. Then he slowed down

In (6) the two-hours run is characterized as an event that unfolds at a quick pace, which means that *for two hours* must be able to modify event properties, not just properties of intervals. This leads us to the following polymorphic version of the semantics in (5)

(7) Base line approach to Dur-Mods:

$$\lambda\alpha\lambda P \left\{ \begin{array}{l} \textbf{Interval Modifier, 'High' attachment:} \\ \text{i. } \lambda t [\alpha(t) \wedge \forall t' [t' \subseteq t \rightarrow P(t')]] \\ \textbf{Event Modifier, 'Low' attachment:} \\ \text{ii. } \lambda e [\alpha(\tau(e)) \wedge \forall t' [t' \subseteq \tau(e) \rightarrow \exists e' [\tau(e') \subseteq t' \wedge P_w(e') \wedge \cup_w (P, e)]]] \\ \text{iii. } \cup_w (P, e) \leftrightarrow_{DF} e = \cup \lambda e' [P_w(e') \wedge \tau(e') \subseteq \tau(e)] \end{array} \right.$$

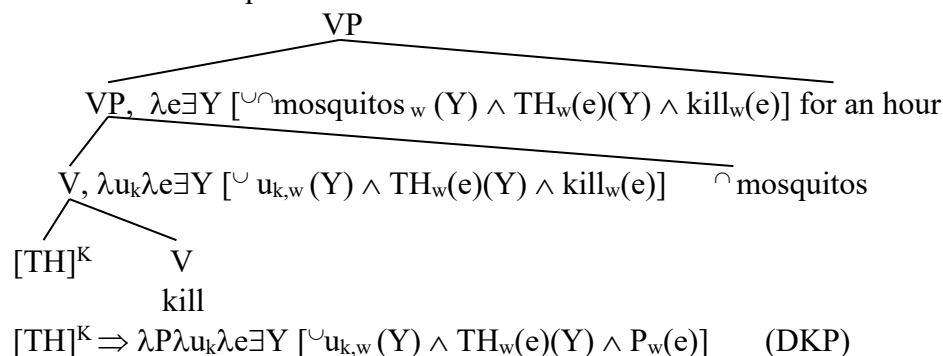
According to (7), a Dur-Mod combines first with a property of intervals ($\alpha = 1$ hour, for example); the result may take two parallel forms. On version (7.i), it looks for a property of intervals (e.g. the property of being the time interval t at which running events by John take place) to return a property of a one-hour time interval t at each of whose subintervals one finds running by John. In this incarnation *for an hour* is of type $\langle\langle in, t \rangle, \langle in, t \rangle\rangle$, with *in* the type of time intervals. This choice calls for a high attachment (above the existential closure of the event-argument). As we shall see shortly, an interval oriented version of Dur-Mods like (7.i) is as necessary as its event oriented one. We also have the variant in (7.ii) of *for an hour*, of type $\langle\langle ev, t \rangle, \langle ev, t \rangle\rangle$; on this variant, *for an hour* looks for, e.g., a property of running events by John to return a property that an event e has if e is the sum of shorter events of John's running which together span an hour.⁴

As noted by Dowty, and recalled above, the Quantificational approach directly explains why Dur-Mods are deviant with VPs that lack the subinterval property: if *P-for an hour* is true of some t , P has to be true at all of t 's (relevant) subintervals. However, while this approach works perfectly for states, it also immediately raises the problem of 'minimal (relevant) parts' for activities like *run*, which require intervals with a specific time granularity to hold: to have some running one must have at least a couple of steps at a certain speed, etc. Much of the literature subsequent to Dowty has been devoted to addressing this issue. And we will follow such literature and emend our Base line approach, by anchoring it to some subdivision of the specified interval retrievable from the context (e.g. from the duration of the interval vis-a-vis the nature of the activity, etc.):

⁴ I'm ignoring here intensions for simplicity's sake. In fact, the type of Dur-Mods should be $\langle\langle w, \langle in, t \rangle \rangle, \langle w, \langle in, t \rangle \rangle\rangle$ and $\langle\langle w, \langle ev, t \rangle \rangle, \langle w, \langle ev, t \rangle \rangle\rangle$ respectively. For the event-oriented variant, the requirement that, e.g., *John ran for an hour* be the sum of runs by John (enforced by the subformula ' $\cup_w (P, e)$ ') is to avoid what Champollion (2016) calls 'leakage', i.e. the inclusion of unduly large intervals between running events, which leads to unwanted consequences, as he shows.

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b. John killed mosquitos for an hour



The assumptions embodied in these examples are taken as relatively uncontroversial in current versions of event semantics. Verbs are treated as monadic predicates of events. Arguments are fed into verbs via suitable, dedicated applicative heads, which correspond to θ -roles and render Vs ‘argument taking’. The outcome, once all arguments have been duly added, is still a property of events that undergoes adverbial modification and eventually existential closure of the event-argument. Then the event’s temporal trace (i.e. the interval that constitutes the event’s running time) undergoes further modification via aspectual and temporal heads. While details vary, assumptions of this sort are fairly standard. Now, it is apparent that regular DPs, like *a mosquito* wind up having a default scope above Dur-Mods as in (9a). In this particular implementation, I am assuming that *a mosquito* is interpreted via a choice function that gets existentially closed above the existential closure of the event argument. But absolutely nothing hinges on these specifics: indefinites can also be thought of as generalized existential quantifiers that then undergo Quantifier Raising (QR). The point is that the Dur-Mods require *their sister* to distribute over some salient temporal cover, which will result for (9a) in iterative killings of the same mosquito. In contrast with this, when kinds are fed as arguments, one can hypothesize the presence of some local adjustment in the applicative TH-head that introduces ‘on the flight’ an existential quantification over instances of the kind, as in (9b). This, then, gives rise to a sensible reading in which killings of different mosquitos are distributed over the relevant cover.

While this is all fine and good, the rather substantive problem with our take so far is the following: what prevents Dur-Mods from scoping out, above the scope site of the indefinite in object position, as schematically illustrated in (10a)?

- (10) a. [for an hour₃ $\exists f$ [John killed $f(\text{mosquito})$ t_3]]
 b. i. John killed a mosquito every minute/a minute
 ii. [every minute₃ [John killed a mosquito at t_3]]

After all, *for an hour* expresses a universal quantification over subintervals of a one hour interval (in the example at hand). So, (9a) ought to allow a logical form like

(10a), parallel to (10b), which expresses through a D-quantifier something very close to what the Dur-Mod expresses. Yet, while clearly (10b.i) does allow for a reading like (10b.ii), sentence (9a) does not seem to readily allow for the reading in (10a). Why? Maybe Dur-Mods are scope rigid and can't be assigned high scope? We will see in the next section that the answer to this conjecture is an unequivocal 'no': there clearly are cases where Dur-Mods *must* be allowed to take 'high' scope. This renders particularly urgent finding a good answer to why (10a) seems to be so strongly disallowed as a reading for (9a).

2.1 Scope matters

There are two very clear classes of cases where Dur-Mods take scope above their surface position. The first involves negation and negative (Downward Entailing – DE) quantifiers. The relevant data is summarized in (11):

- (11) a. I didn't exercise for two hours.
 i. I exercised for less than two hours. **NEG > throughout**
 ii. For two hours, I didn't exercise. **Throughout > NEG**
 (But then I did)
 b. i. I found few mushrooms for a while. But then I found plenty.
 ii. I had no students for my first few years.
 iii. I shot down less than a half a dozen enemy drones for the
 first week. Then I got the hang of it, and started shooting
 down many more.

Notice how sentence (11a) has two equally natural readings: one where negation has wide scope over the Dur-Mod, and one where the opposite is the case. Note moreover, that all the sentences in (11b) have a natural reading in which the Dur-Mod has scope over the quantificational object (for (11b.i) or (11b.iii), they are the *only* natural readings). Since the quantificational objects in (11b.i-iii) must be assigned scope at some canonical scope site, the Dur-Mod must take scope over it, and cannot sit in its base position.

The second class of cases where Dur-Mods must take wide scope is when a universal quantifier is interpolated between the object and the Dur-Mod. The following illustrates:

- (12) a. i. ?? I took a pill for a week Zucchi and White (2001)
 ii. I took a pill a day/every day for a week
 b. i. ?? I found there a mushroom for a week
 ii. I found there a mushroom a day/each day for a week
 c. Contextual effects:
 i. ? We built a snowman for a week Deo and Piñango (2011)
 ii. We built a snowman for many years

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- iii. This bike carried a kid for 10 years Landman and Rothstein (2012a)
- d. i. We built a snowman (every winter) for many years
- ii. This bike carried a kid (every day/every so often) for 10 years

Examples in (12a) are interpreted with the Dur-Mod having widest scope: e.g., (12a.ii) says that for a one week period, for each day within that period, I took a pill. The examples in (12c) show an effect of context, probably due to the covert interpolation of a universal interval quantifier (like, e.g., *every winter* in (12c.ii), or *every so often* in (12c.iii)).

The outcome of this discussion is that the wide scope construal of Dur-Mods appear to be systematically possible, and, in fact, necessary (i) in presence of negation or a DE quantifier and (ii) when a universal D-quantifier over intervals is overtly or covertly interpolated between the object and the Dur-Mod. This makes it particularly urgent to try to understand why wide scope construal of Dur-Mods seem to be banned in combination with a plain indefinite argument (as in *John killed a mosquito for an hour/a year*). As it turns out, Bassa Vanrell (2017) develops an interesting proposal that directly addresses this very issue, proposal to which we now turn.

2.2 An economy constraint on Durative Modifiers

In this subsection, I present Bassa Vanrell's view on scope economy and show how her approach (with a few minor touches) provides us with a good basis to understand the behavior of Dur-Mods. Bassa Vanrell suggests that scope shifting operation for Dur-Mods are *not* allowed if they lead to logically weaker interpretations. In their base position, the respective scope of the object vs. a Dur-Mod is as in (13a); scope shifting results in the reading in (13b):

(13) Do not weaken: Scope Shifting operations for Dur-Mods are only licensed if they

do not lead to proper weakening.

- a. John killed a mosquito for an hour $\Rightarrow$ [... $\exists x$ mosquito (x) ... $\forall t \in 1h$...]
- b. for an hour₂ [John killed a mosquito t_2] $\Rightarrow \forall t \in 1h$ [... $\exists x$ mosquito (x) ...]

The construal in (13b) is properly entailed by (13a), and hence, according to Bassa Vanrell's proposal, disallowed. Similar bans against weakening have been proposed for exhaustification/implicature calculation. As alleged for all such applications, this economy principle is 'blind' to world-knowledge based contradictions (cf. Magri 2009). Hence the implausibility of the reading in (13a) does not warrant scope shifting.

This scope constraint immediately accounts for the possibility of scope shifting in the scope of negation or a DE quantifier, for in such a case, assigning wide scope to Dur-Mods leads to logical strengthening:

- (14) Scope shifting under negation
- a. John didn't kill a mosquito for an hour
 - b. NEG > Throughout/ADV Base Position (Weak)
 $\neg \exists e [\dots \exists x \text{ mosquito } (x) \dots \forall t \in 1h \dots]$
 - c. Throughout/ADV > NEG Derived Position (Strong)
 $\forall t \in 1h \neg \exists e [\dots \exists x \text{ mosquito } (x) \dots]$

Turning next to the case of quantifier interpolation, D-quantifiers like *every day* are propositional/interval oriented, not event oriented modifiers. As such they must get scope in a high region of the clause, passed the level of $\exists$ -closure of the event-argument. It follows that Dur-Mods must get, in turn, high scope, if they are to outscope D-quantifiers. And outscope the latter, they must if a *logical* contradiction is to be avoided. Let me illustrate this through an informal derivation of (15a). Notice that while describing an odd situation, (15a) is perfectly grammatical:

- (15) a. John killed a mosquito every day for a week
- b. $[\text{every day}_1 [\exists x \text{ mosquito}(x) \dots \exists t \text{ 1-week}(t) \wedge t \subseteq t_1 \wedge \forall t' [\Gamma(t', t) \rightarrow \dots]]$
 = For every day t_1 , there is a one-week period t included in t_1 such that ...
 - c. $\exists t [\text{1-week}(t) \wedge \forall t' [\Gamma(t', t) \rightarrow \text{every day } t_1 [t_1 \subseteq t' \rightarrow \exists x \text{ mosquito}(x) \dots]]$
 = There is a one week interval t such that for every day in a partition of t ,...

First, we assign scope to *every day*, as that is a propositional (interval oriented) D-quantifier. This move by itself would require partitioning days into weeks, which is a logical impossibility (the contradictory step is highlighted in boldface in (15b)). Scoping out the Dur-Mod restores consistency, as (15c) illustrates. While scope economy is blind to world knowledge, it is not blind to logicity and logical contradictions. This explains how wide scope construal for Dur-Mods becomes possible when a suitable universal temporal quantifier is interpolated.

It remains to be understood why Dur-Mods should be subject to this form of scope economy,⁵ while ordinary D-quantifiers are not. The problem is underscored by minimal pairs like the following:

- (16) a. I kept going to that spot for a month. I found a mushroom each time I went.
 b. * I found a mushroom for a month

The second sentence in (16a) is perfect under the wide scope construal of *each time I went*. And if scoping of the Dur-Mod was allowed in (16b), (16a-b) would be contextually equivalent. But (16b) is deviant, because of scope economy. Why are Dur-Mods subject to a constraint that doesn't affect D-quantifiers (like *each time I*

⁵ I'm borrowing the term 'scope economy' from Fox (1995). My use of the term is related to but different from his; as mentioned in the text, my use here is more related the constraint on, e.g., implicature calculation discussed in e.g. Chierchia et al (2012).

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went)? I have only speculations to offer in this connection, albeit hopefully not too implausible ones. Clearly, Dur-Mods are inherently more complex than plain D-quantifiers. In particular, Dur-Mods come in two variants, as modifiers of properties of events and as modifiers of properties of intervals. So scope shifting operations, besides syntactic movement, involve a shift in logical types, arguably a computationally costly move. Scope economy on Dur-Mods can be viewed as a way to compensate for this extra cost, by limiting scope shifting to cases where it leads to strengthening (i.e. it ‘adds’ information) and/or it avoids logical contradictions. No such compensation is needed for the simpler case of D-quantifiers, where scope shifting does not lead to type shifting.

Taking stock, the Quantificational approach to Dur-Mods requires a formal constraint on their scope. Bassa Vanrell proposes one that seems simple and predictive of a rather intricate set of scope facts, like the different behavior of DE vs non DE DPs in the scope of Dur-Mods, and the effects of the interpolation of universal interval quantifiers (like *every day*, etc.). These are all consequences that are impossible or not easy to get from the Measure out approach. So, at the very least, this economy constraint is a highly compact description of a rich set of facts. Moreover, the Quantificational approach explains the effect of Dur-Mods on action classes (i.e. the differential behavior of states and activities with respect to achievements) without forcing us to an excessively precise characterization of the concept of (a)telicity, which turns out to be rather elusive. This seems to me to constitute a welcome ‘deflationary’ approach to the semantics of Dur-Mods.

3 Further developments: the role of kinds in characterizing (a)telicity

While the Quantificational approach to Dur-Mods, constrained by scope economy, starts looking quite good, a closer inspection at definites in the scope of Dur-Mods unveils a problem that will lead us to incorporate into the Quantificational approach a key feature of (certain versions of) the Measure out approach, namely the idea that kinds and properties can be direct bearers of thematic roles.

3.1 Durative modifiers of properties of events require ‘same participants’

To see what definites in the scope of Dur-Mods bring up, consider the near minimal pair in (17).

- (17) a. * I killed the mosquitos in that room for a week
b. I killed the mosquitos in that room every day for a week

Sentence (17a) produces the usual deviance of achievements in the scope of Dur-Mods. Sentence (17b), on the other hand is grammatical, even if it describes a ‘weird’ state of affairs. Let us assume, as is standard, that definite descriptions like *the mosquitos* are anchored to a world/time coordinate, say as in (18a). There are two candidates for the value of the definite’s world/time coordinate in the case at hand (namely (17a)) and they are illustrated in (18b):

- (18) a. The mosquitos in that room $\Rightarrow \iota x[\text{MR}_{w,t}(x)]$
 b. $\exists e [1W(\tau(e)) \wedge \forall \mathbf{t}' [\mathbf{t}' \subseteq \tau(e) \rightarrow \exists e' [\tau(e') \subseteq \mathbf{t}' \wedge$
 $\text{TH}_w(e')(\iota x[\text{MR}_{w, \tau(e)/\mathbf{t}'}(x)]) \wedge \text{kill}_w(e')]$
 $\wedge \cup_w (\lambda w \lambda t \lambda e' \text{TH}_w(e')(\iota x[\text{MR}_{w,t}(x)]) \wedge \text{kill}_w(e'))], e)]$
 c. ‘There is some event e which lasts one week and is the sum of events of killing the mosquitos in that room’

Formula (18b) is the interpretation of (17a) on the basis of the semantics developed in Section 2. An informal paraphrasis is provided in (18c). The problem is how to resolve the reference of the definite description *the mosquitos in that room*. There are two candidates for the time at which the description should be anchored. One is the whole week-long event. Under this resolution the definite description will fail to have a reference, for there is no set of mosquitos that is in the room for the whole week (as they are being systematically killed by yours truly). On this construal, sentence (17a), being built around an improper description, comes out truth-valueless. This is a good result, for sentence (17a) is indeed deviant. However, there is also a second plausible way to resolve the description, which is by anchoring it to the time slot of each cell in the relevant (daily) partition of the week-long mosquito massacre. I.e. the description would be something like for each day t , *the mosquitos in that room at t* . Under this resolution, which is precisely what we do want for (17b), sentence (17a) should be perfectly fine: it ought to have a reading according to which for each daily cell t of the salient partition of a one week long interval, I killed the mosquitos in the room at t . So, the problem is what can possibly block this ‘local’ construal of definites (corresponding to the solid line in (18b)) in the scope of Dur-Mods, especially in view of the fact that the construal in question becomes clearly available in the minimally different (17b).

This problem is part of a more general one, having to do with the homogeneity of definites. In his proposal on homogeneity, Bar Lev (2021) argues that definites come with a *low* existential quantifier over members of the plural individual associated with the description, as schematically illustrated in (19).

- (19) a. I killed $\exists$ the mosquitos in that room (*for an hour)
 b. I killed $\exists$ mosquitos in that room (for an hour)

If Bar Lev is on the right track, definites in upward entailing contexts start out having a relatively ‘weak’ $\exists$ -reading, which then gets strengthened to $\forall$ via a process of exhaustification. Be that as it may, the problem from the present perspective is that both (19a) (under Bar Lev’s proposal) and (19b) (under our proposal) come with a low existential quantifier that falls under the scope of the

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Dur-Mod, and this should yield an equally acceptable reading for both, contrary to fact.

In Chierchia (2022), I propose to address these multiple problems in terms of a ‘same participant’ constraint. The chief idea is that Dur-Mods require a distribution across covers which should keep the participants of the relevant subevents constant across the cells of the cover. The definition of Dur-Mods thus emended amounts to a simple modification of our original one, which I present it here in a semi-formal way:

- (20) The same participant constraint.
- a. for an hour $(P_w) = \lambda e. P_w(e)$ and e lasts one hour and for each temporal cell of a salient cover of $\tau(e)$, there is an event e' in P_w *with the same participants as those in every other cell of $\tau(e)$* and e is the sum of all such events e' .
 - b. Two P-events e and e' have the same participants relative to P in w iff:
 - i. For any core thematic role θ which is necessarily defined relative to P , $\theta_w(e) = \theta_w(e')$.
Where:
 - ii. A theta role θ is necessarily defined relative to P iff for any world w and any event e such that $P_w(e) = 1$, $\theta_w(e)$ is defined.

This slight (?) modification of the semantics of Dur-Mods solves, I think, the problem of definites and explains the contrast between (17a) and (17b). In (17a) the Dur-Mod is attached low, i.e. it is a modifier of properties of events. Hence the same protagonist condition kicks in and forces a reading where the same mosquitos have to recur throughout the cells of the cover, which results in deviance with non iterable achievements. On the other hand, in (17b), the presence of the interpolated quantifier *every day*, forces the Dur-Mod to get wide scope and to be construed as a modifier of properties of intervals. The notion of ‘same protagonist’ does not apply to intervals, for which, in fact, it doesn’t make any sense (time intervals do not have protagonists). This allows switching to a ‘local’ resolution of the description, with different mosquitos across the cells, which results in a plausible reading. In other words, the interval oriented (high scope) version of Dur-Mods does not (and could not) require sameness of participants. As it turns out a solution based on the same idea has been advocated in Champollion, Bledin and Li (2017), whose proposal exploits rather elegantly dynamic plural logic.⁶

⁶ Thanks to Simon Charlow and to Lucas Champollion for pointing this out to me. I regret having become aware of Champollion’s et al. proposal so late in the game. Conceptually the main difference between Champollion et al. and the present approach lies in the key role that kinds and properties play in the latter, but not in the former. Empirically, this difference seems crucial in addressing crosslinguistic variation between, e.g., English vs. French, as we will see in Section 4 (Champollion et al are aware of the relevance of such variation data for the analysis of Dur-Mods, cf. fn.1 in their paper). A further area

While this looks like a step in the right direction, it has a potentially dire consequence for our treatment of bare argument so far. Let me illustrate:

- (21) a. I killed mosquitos in that room for a week
 b. $[_{VP} [_{VP} \lambda e TH^K(e)(\cap \text{mosquitos})]$ for a week]
 c. $[_{VP} [_{VP} \lambda e \exists Y [^{\cup} \cap \text{mosquitos}_w(Y) \wedge TH_w(e)(Y) \wedge \text{kill}_w(e)]]]$ for a week]

Sentence (21a) is grammatical, as plugging a bare plural in object position induces the usual shift in aspectual classes that make the VP in (21a), atelic. Now, we have been assuming that bare plurals are uniformly kind denoting and that when fed as argument to a verb, the relevant thematic/applicative head introduces on the flight, so to speak, an existential quantifier over instances of the kind, so that (21b) comes out logically equivalent to (21c). In our original set up, this guaranteed that the existential quantifier thus introduced had narrow scope with respect to the Dur-Mod, which resulted in a plausible reading. But now, ‘same protagonist’ kicks in. And it requires the same mosquitos to be killed over and over... The solution to the problem of definites destabilizes our approach to bare plurals. The problem lies in the fact that the kind-argument drives the semantic composition but in the end, as it were, disappears: it’s as if *for an hour* modifies the property *killing some mosquitos*. This is what we need to correct... We are almost there.

3.2. Kinds as direct bearers of thematic roles

The proposal I would like to make is that when we predicate something of a kind, the kind as such is the bearer of the relevant thematic role. When we say, e.g., *I fed geese this morning during my walk around the pond*, it is the geese-kind as such to be the theme of that particular feeding event. Under what conditions are we willing to say that a (plural) kind⁷ is the bearer of a thematic role in an episodic predication? I think that this happens under three conditions, namely (i) exemplification (the kind oriented event must have parts that involve instantiations of the kind), (ii) progressivity (‘left to its own devices’, a kind oriented event would continue) and (iii) antitotality (i.e. while the whole kind is in some sense involved there is no suggestion that *all* instances of the kind are involved).⁸

where the two approaches make different predictions concerns the data involving negation and DE quantifiers pointed out in (11). However, exploring more fully the differences between the two approaches will have to be deferred to another occasion.

⁷ The specification ‘plural’ is necessary. As we will see shortly, the conditions on singular kind predication (as in *the horse arrived in the Americas with Columbus* -- cf. Krifka et al 1995) are different from those on plural kind predication.

⁸ The first two conditions are taken from or inspired by Landman and Rothstein (2012a,b). *Exemplification* is taken from them (although I am not sure whether they would regard the instantiating events as *parts of* the kind oriented one); *progressivity* is inspired by their notion of incrementality, which however, is developed here as a modal, rather than as a mereological notion.

(22) Conditions on (plural) kind predication

- a. i. I fed geese
ii. $\exists e[AG_w(e)(I) \wedge TH_{KEP,w}(e)(\cap geese) \wedge feed_w(e)]$
- b. Exemplification:
 $TH_{KEP,w}(e)(\cap geese) \rightarrow \exists e' \exists X [e' \subseteq e \wedge \cup \cap geese_w(X) \wedge TH_w(e')(X)]$
I.e., $TH_{KEP,w}(e)(k)$ entails that e has parts in which instances of k are fed.
- c. Progressivity:
 $TH_{KEP,w}(e)(\cap geese) \rightarrow \forall w' [I_w(w') \rightarrow \exists X geese_{w'}(X) \wedge \exists e' C_{w'}(e)(e') \wedge TH_{w'}(e')(X)]$
where $I_w(w') = w'$ is inertial for w ;
 $C_w(e)(e') = e'$ is a continuation of e in w .
I.e., $TH_{KEP,w}(e)(k)$ entails that in absence of external factors, e would tend to go on.
- d. Antitotality: $TH_{KEP,w}(e)(\cap geese)$ suggests that while the kind *is* involved as such, NOT all of its instances are.

First, I use the subscripts *KEP* on TH (and other θ -roles) as a reminder that kinds are being involved (*K*) and also as a mnemonic of what is special about (plural) kind predication, namely that it is exemplified (*E*) and progressive (*P*). Each such condition can be viewed as an axiom on kind-involvement. In particular, *x fed geese* it true when the verifying event might well have continued, or is conceived as prolongable, a notion that I spell out in modal terms, using notions borrowed by the analysis of the progressive (cf., e.g., Dowty 1979, Landman 1992). Antitotality, which I state here only informally, is an implicature triggered presumably by the contrast with singular kind predication that has, I think different properties, to which I now briefly turn.

A sampling of singular kind predication is the following:

(23) Singular kind predication

- a. The dog evolved from the wolf.
- b. I finally saw the Maremma Shepherd in a breeding farm near Siena.
- c. The rabbit arrived in Australia with the first immigrants
(*for a few years). vs.
- d. Rabbits arrived in Australia with the first immigrants for a few years
- e. I studied the Eastern Gorilla in its natural habitat for two months.

It has been argued in the literature, that singular kinds (often also called ‘taxonomic’ kinds) are to plural kinds what groups are to pluralities. Groups are viewed as ‘impure’ atoms, i.e. singularities that come with different associated

pluralities in different worlds.⁹ The sentences in (23) constitute episodic predications involving taxonomic kinds. For example, we can represent the semantics of, say, (23b) as:

$$(24) \quad \exists e[AG_w(e)(I) \wedge TH_{TK,w}(e)(\cap^T \text{Maremma shepherd}) \wedge saw_w(e)]$$

I'm assuming here the ' $\cap^T$ ' maps singular properties into the corresponding taxonomic kind, much like ' $\cap$ ' maps plural properties into the corresponding plural kind. And the subscript TK on TH in (24) is a reminder that we are dealing with an eventuality whose TH in w is a taxonomic kind. While this is not the place for delving into the details of the relation between plural and singular kinds, it is clear the conditions under which we are willing to regard taxonomic kind predication as true are quite different from those involving plural kinds. For, e.g., (23b)/(24) to be the case, I must have seen some sample of that particular breed sufficiently representative of the whole kind for me to become acquainted with the kind through that sample. In some sense, that event has to be 'momentous enough' to concern indirectly the Maremma shepherd breed as a whole. Similar considerations apply to the other examples in (23). Notice, moreover, that taxonomic kind predication may or *may not* create an atelic predicate: compare (23c), which is deviant with a Dur-Mod vs. (23e). Also the contrast between (23c) and (23d) is worth underscoring, as it forms a minimal pair: plural kinds, unlike singular ones, unfailingly create atelicity. This means that taxonomic kind predication in English is NOT subject to the inherent progressivity that seems to characterize plural kind predication.

Keeping in mind these caveats about the differences between plural kind vs. taxonomic kind predication, it should be clear why the assumption that kinds are direct bearers of theta roles makes our approach to Dur-Mods fall into place. I illustrate the consequences of this move (which involves abandoning Derived Kind Predication in its original form) by means of example (25), where I give the function/argument structure of 'kill mosquitos for an hour', along with its informal paraphrasis:

- (25) a. for $1H(\lambda w \lambda e TH_w(e)(\cap \text{mosquitos}_w) \wedge kill_w(e))$
 b. λe . the running time of e is at least one hour and for each cell of a temporal cover of e there is a subevent e' of e in
 $\lambda e TH_w(e)(\cap \text{mosquitos}_w)$
 $\wedge kill_w(e)$ *with the same participants as those in every other cell of the cover* and e is the sum of all such events e' .

⁹ On the notion of 'group' and 'impure atom', see, e.g., Landman (1989), or Schwarzschild (1996) a.o.. On how it relates to the concept of singular kind, see Krifka et al. (1995), Chierchia (1998) and especially Dayal (2004).

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Since the theme of the event is the kind, the same participant condition is easily met.

We need, however, to add one final amendment to (plural) kind predication. It was observed already in Carlson (1977) that kind predication cannot be purely kind oriented: it *has to* introduce object level variables that are clearly syntactically and semantically active. Relevant examples are of the following sort (from Chierchia 2022):

- (26) a. This morning, dugongs_i were letting themselves_i die, because they were trapped.
 b. I saw cats O_i that t_i were chasing their_i tails.
 c. In the garden, foxes_i are trying [PRO_i to free themselves]
 d. $\lambda x \exists e [AG(e)(x) \wedge TH(e)(x) \wedge \text{let-die}(e)](\cap \text{dugongs})$
 $= \exists e [AG(e)(\cap \text{dugongs}) \wedge TH(e)(\cap \text{dugongs}) \wedge \text{let-die}(e)]$

In (26a) the bare plural *dugongs* antecedes a reflexive; in (26b) the bare plural antecedes a relative clause operator and in (26c) it antecedes PRO. Reflexives, relative clause operators and PRO are all elements that require a syntactically projected antecedent. If we had only kind-level arguments the logical form of, e.g., (26a) would have to be something like (26d). But those truth conditions are not right for (26a). Our previous DKP based problem had no such problem.¹⁰ What we need to do is blend that approach with the current take that kinds are the primary bearers of theta roles in kind predication. Event semantics enables us to do so quite easily. In what follows I illustrate the main idea by means of an example (taken again from Chierchia 2022):

- (27) a. i. Birds are chirping
 ii. $\exists e [AG_{KEP}(e)(\cap \text{birds}) \wedge \exists Y [\cup \cap \text{birds}(Y) \wedge \exists e' e' \leq e \wedge AG(e')(Y) \wedge \text{chirp}(e')] \wedge \text{chirp}(e)]$
 b. $AG_{KEP} = \lambda P \lambda x_K \lambda e [AG(e)(x_K) \wedge \exists Y [\cup x_K(Y) \wedge \exists e' e' \leq e \wedge AG(e')(Y) \wedge P(e')] \wedge P(e)]$

Basically, whenever we feed a kind level argument into a predicate, we also introduce variables/discourse referents over instances of the kind, which can then be used to bind pronouns and operators of various sorts, as the case may be. The definition of thematic applicative heads that enables us to do so is illustrated in (27b). It is fully general. With this final adjustment, the treatment of Dur-Mods appears to finally fall into place.¹¹

¹⁰ This problem remains unaddressed in e.g. Landman and Rothstein (2012 a,b).

¹¹ I refer to Chierchia (2022) for details of the formalization. There, I show how this approach preserves the correct treatment of negation and DE quantifiers, and how the same protagonist constraint keeps delivering the right results with definites and other quantifiers under the modification in (26).

4. Properties as direct bearers of thematic roles

Sortal properties (of the type associated with common nouns) and kinds bear a ‘deep’ semantic relation to each other: plural properties correspond to plural kinds; and maybe singular properties correspond to singular kinds. According to Chierchia (1998) such correspondence is, in fact, an isomorphism. Kinds and properties differ in semantic types, but they can otherwise be viewed as coding the same information. Properties are true or false of individuals at a world, kinds have or fail to have individuals as their instances at a world. This means that their semantics is close enough for the role of the one to be taken on by the other, when needs be. The properties/kinds correspondence can be exploited to understand language variation in argument formation. Some languages are much more restricted than others in their use of bare arguments and in the way they refer to kinds. Such languages may recruit properties to do the ‘same stuff’ as kinds. In the present section, I illustrate this claim through differences in bare argument formation between Italian, French and English. Generally speaking, in the Romance languages bare arguments are either positionally restricted (roughly, to the complement position of lexical heads) as in Italian or Spanish, or pretty much banned as in French. For explicit ‘kind talk’ these languages typically use the definite plural article:

- (28) a. *(I) cani discendono dai lupi
 The dogs descend from the wolves ‘dogs descend from wolves’
 b. *(Les) chiens ont évolué à partir des loups
 The dogs have evolved starting from the wolves
 ‘Dogs evolved from wolves’

However, use of the plural definite is deviant in the scope of Dur-Mods, just like in English.

- (29) a. * J’ai tué les moustiques pendant une heure
 I killed the mosquitos for an hour
 b. * Ho ucciso le zanzare per un’ora
 (I) killed the mosquitos for an hour

This shows that use of definites for kind reference seems to be limited to the argument position of kind-level predicates, in these languages. What do these languages do, then, when it comes to expressing a-telic kind predication in the scope of Dur-Mods? Italian and French differ in interesting ways in this respect. Italian does use bare plurals in such cases, while French resorts to ‘a partitive determiner’ formed by the preposition *de* ‘of’ followed by the definite D + NP. Italian has essentially the same determiner (*di* ‘of’ followed by definite D + NP), which is, however, banned under durative modifiers. For lack of a better choice,

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I'll gloss the Italian and French partitive articles as 'some'. The relevant data is the following :

- (30) a. Ieri sera ho ucciso (*delle) zanzare per un'ora, prima di
addormentarmi.
Yesterday evening (I) killed (some) mosquitos for an hour
before falling asleep
b. La nuit dernière, j'ai tué *(des) moustiques pendant une heure
avant de m'endormir
The night last, I killed (some) mosquitos for an hour

In other contexts, the partitive article in both languages expresses indefiniteness (i.e. what would normally be represented as an existential quantifier). While displaying some preference for narrow scope construal, the partitive article also enters into scope interactions with other scope bearing elements like negation, allows generic uses, and is restricted to plurals and mass terms.¹² The question is what is going on? What are the parameters that kick in? Is it possible to account for this type of variation within the frame of the approach to Dur-Mods that we have been developing? Usually one can learn a lot from related languages that show minimal but highly systematic differences such as those in (30).

The case of Italian might be relatively easy to handle. For starters, one might essentially maintain that Italian is like English in allowing bare arguments as devices for kind reference, albeit in a more restricted way than English. While English allows covert kind formation via '∩' in any position, Italian only allows for it in restricted positions. This means that the analysis of, say, (30a) can proceed in a way which is fully parallel to English: a kind argument is fed into the object position of a predicate and the Dur-Mod follows the same semantic path as English.¹³ The French case is more interesting as it uses an article for a type of predication that is articleless in both English and Italian. Maybe what is going on is that French allows uses of 'de + Def NP' as a 'property predication marker', i.e. as marker of the circumstance that *the property as such* is taken as the bearer of the thematic role. Perhaps, the easiest way to show what I am proposing is through an example that illustrates in (31b) a possible derivation for (31a):

- (31) a. J'ai [VP tué *(des) moustiques pendant une heure]
I have killed some mosquitos for an hour

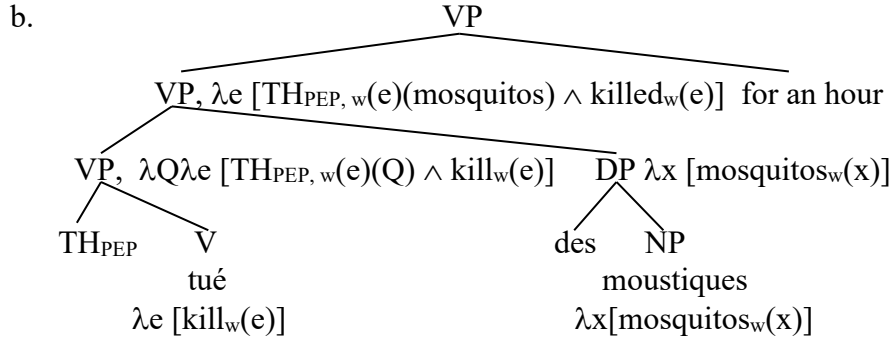
¹² See, e.g., Chierchia (1997) for a possible analysis of partitives.

¹³ This claim is highly controversial. I have always thought that data like (a), which are undisputed, constitute evidence in favor of the claim that bare arguments in Italian can be kind denoting:

(a) Insegnanti davvero dediti sono praticamente estinti

Teachers really dedicated are practically extinct. 'Dedicated teachers are virtually extinct'

But see, e.g. Longobardi (2001) for an different view. As a matter of fact, however, the point I am making here is kind of neutral with respect to whether bare plurals in Italian are kind denoting or not. Cf. fn 14 for reasons why this is so.



$$\text{c. } \exists e[\text{AG}(e)(I) \wedge \text{for an hour}(\lambda e'[\text{TH}_{\text{PEP}, w}(e')(\text{mosquitos}) \wedge \text{killed}_w(e')])(e)]$$

First, *des moustiques* ‘some mosquitos’ is interpreted in (31) predicatively as a property, in line with the fact that indefinites admit of predicative interpretations. Second, French allows with this particular determiner a mode of combination TH_{PEP} parallel to TH_{KEP} used with kinds in English. The applicative head TH_{PEP} is *property oriented*, i.e., it allows the theme of the event of mosquito-killing to be the property *mosquitos* itself (the first subscript P on TH is a mnemonic for that). The conditions under which (cumulative) properties of this sort are construed as bearers of thematic roles is otherwise fully parallel to how kinds are treated in English: events with properties as their ‘participants’ have to be ‘exemplified’ (E) i.e. there have to be subevents of the main event involving entities of which the property in question is true, and they have to have a progressive meaning (the second P -subscript), i.e. the relevant event, tends to continue in inertial worlds. The reason why TH_{PEP} is allowed only with this particular weak indefinite marker *des* (as opposed to some other D-like element like say, *quelques*) is maybe because *des* is the weakest / least marked plural indefinite D in the language. For any applicative head θ , the restriction of θ_{PEP} to *des* would have to be coded as a form of agreement: *Des* with this property oriented argumental reading is only licensed by thematic heads with the appropriate semantics illustrated in (31). Using properties as bearers of thematic roles allows to overcome the same protagonist constraint, much like kinds do. The final (simplified) logical form for (31a) is (31c).¹⁴

The present proposal for French, which has a direct precursor in Gonzales and Mihoc (2018), is related to two other lines of inquiry one finds in the literature on argument formation. First, it bears some resemblance (and is partly inspired by) the operation ‘Restrict’ proposed in Chung and Ladusaw (2003) for the treatment of, e.g., the determiner *he* in Maori. According to Chung and Ladusaw, such determiner is interpreted predicatively (i.e. *he* + NP is property denoting) and the

¹⁴ An alternative analysis of Italian could be that bare arguments in Italian are property denoting and combine with verbs in episodic contexts via θ_{PEP} . In other words, where French uses *des* under Dur-Mods, Italian uses bare arguments, but with the same interpretation. Whether one goes for this alternative analysis of Italian or not is going to depend on how the issues in fn. 13 are settled.

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combination with the verb involves plugging in a narrow scope existential quantifier over instances of the property. Instead of an automatic narrow scope quantifier, we propose to take the property as direct bearer of the relevant role, which makes the partitive article work under Dur-Mods. Chung and Ladusaw do not probe the effects of their proposal for durative modification in Maori.

The second line of inquiry that comes to mind has to do with Incorporation and Pseudoincorporation (PI), as studied in, e.g., Dayal (2011). In particular, the semantics proposed here for French *des* is similar to the semantics for PI in Dayal (2011, 39b), where the property associated with the incorporating NP is viewed as directly saturating/reducing the adicity of the predicate. But there remain many differences between French *des* and Hindi Pseudoincorporation (PI) that one needs to think about. For example, PI is subject to ‘name-worthiness’ i.e. the V + NP complex has to form an activity which is somehow perceived as unitary and ‘common enough’ to be worthy of a special label. No such constraint is operative on French *des*. Moreover, Hindi PI applies to both singular and plural NPs, while *des* only combines with plural (or mass). The two constructions share the fact that properties are involved as bearer of thematic roles and that *plural* PI, like French *des*, systematically patterns as atelic under Dur-Mods.

The important generalization to bear in mind in this connection is that languages seem to systematically choose kind denoting or property denoting arguments (i.e. arguments that lack any inherent quantificational force) for the purposes of creating a-telicity under Dur-Mods. Or, in slightly different words, Dur-Mods rely on semantically *unquantified* arguments (kinds or properties) as direct bearers of thematic roles to do their job.

5 Summary and concluding remarks

To summarize, we have proposed a new blend of the two main existing approaches to Dur-Mods, based on the following key points:

- (32) a. Dur-Mods are universal quantifiers.
- b. They exist in two related variants: event-oriented vs interval-oriented.
- c. The event-oriented version of a Dur-Mod is subject to a ‘same protagonist’ constraint. The interval-oriented one is not.
- d. Scope shifting operations on Dur-Mods are subject to an economy constraint: do not weaken! (Bassa Vanrell 2017), which can be overridden only to avoid *logical* contradictions.
- e. Kinds (and properties) can be direct bearers of thematic roles, subject to general semantic conditions (like ‘progressivity’), and ‘channel’ the interpretation of Dur-Mods.

Point (32a) is the signature claim of the Quantificational approach; point (32b) the signature claim of (some versions of) the Measure out approach, like, e.g. Landman

and Rothstein (2012a,b). A considerable array of scope facts seem to fall into place, in ways that in their full generality do not seem to follow from other available approaches. They include:

- (33)
- a. Capacity of Dur-Mods to outscope (i) Negation / DE quantifiers and (ii) covert or overt universal D-quantifiers (like *every day/a day*), without also outscoping Upward Entailing quantifiers and definites (or other non monotonic DPs).
 - b. Deviance of Dur-Mods cooccurring with upward entailing quantifiers or definites in argument position.
 - c. The importance of context in determining the granularity of covers that Dur-Mods quantify over.
 - d. Capacity of kinds and property denoting nominals to yield a ‘progressive’ reading in the scope of Dur-Mods, while also setting up, at least for English bare plurals or French des-indefinites, object level variables/discourse markers for anteceding various sorts of anaphoric elements.

A fairly complex array of facts may be beginning to make sense in a way that stands a chance at holding water vis-à-vis further crosslinguistic investigations. The present approach, in fact, paves the way to exploring with new tools other key issues relevant to the characterization of (a)telicity and the role of durative modification in detecting and diagnosing it properly. They include, for example, the differences between *eating* and *eating something* (cf. Mittwoch 1982), where the former is likely to involve covert kind predication and the contrasts between property incorporation (Dayal 2011) and *singular* kind incorporation, as in the analysis of Turkish developed by Sag (2022).

I regard it as an advantage of the present proposal that this progress is happening without having to commit to an overly specific characterization of (a)telicity. But if such a characterization is wanted/desired/necessary (for other purposes), kind and property predication points in the direction of a *modal* approach (as embodied in the ‘progressivity’ constraint on kind predication) rather than going towards purely mereological/algebraic ones (like cumulativity/quantization, etc.) that seem to keep running into trouble in cutting the pie the right way.

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