Kinds, Properties and Atelicity

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Durative/pluractional modifiers (D-Mods) and the classical data set on atelicity.

States and activities

a. John ran/pushed a cart/ was in the cellar for an hour (/until 3…)

Achievements

b. i. * John found a mistake/some mistakes for an hour

ii. * Some pets died for weeks, until a vaccine became available

Compositional aspectual shifts

c. i. John found mistakes in that paper for quite a while

ii. Pets simply died for weeks, until a vaccine became available

Two families of approaches.

Approach 1: The quantificational take.

i. John run for an hour

ii. For any (relevant) subinterval i of a 1-hour interval, John was running at i

[Mittwoch (1977), Dowty (1979), Moltman (1991), Deo and Pinango (2011), Champollion (2013),…]

a. Pros:

- It naturally and directly explains why D-Mods are restricted to properties of events with the subinterval property.

b. Cons:

iii. A mouse was killed every day

iv. * A mouse was killed for days.

- Why are the scope options of Durative/Pluractional quantifiers so different from those of D- quantifiers?

Two families of approaches.

Approach 2: The 'measure out' take.

i. John run for an hour

ii. There is an event of John running that lasts at least an hour.
D-Mods are restricted to properties of events with a certain feature: cumulativity, having proper parts, incrementality…
[Krifka (1998), Kratzer (2007),Landman and Rothstein (2012a,b), Champollion (2016), …]

a. Pros:

- It supposedly derives peculiar scope distributions on grounds that predicates of events involving quantified DPs (e.g. *killing a mosquito*) come out as lacking the relevant property (e.g., they come out as being quantized – and hence telic).

b. Cons:

- How explanatory?
- How well do the various attempts at defining atelicity work?

The problem with atelicity.

a. λe.John killed$_w$(e) some mosquitos (*for an hour)
b. λe.John killed$_w$(e) mosquitos (for an hour)

- Can you imagine an event that satisfies (a) but not (b)? Or viceversa?

- Is there any way to distinguish between (a) vs. (b) without 'painting them of different colors'?

What's at stake.

a. The 'proper' characterization of Atelicity

b. Key aspects of the theory of scope for Adverbial quantifiers vs. Determiner quantifiers.

c. The architecture of event semantics and the division of labor between event and interval oriented quantification.

What's at stake.

a. The 'proper' characterization of Atelicity

b. Key aspects of the theory of scope for Adverbial quantifiers vs. Determiner quantifiers.

c. The architecture of event semantics and the division of labor between event and interval oriented quantification.

I'm optimistic that the pieces of the puzzle are on the verge of fitting…

Dissecting the quantificational approach:

D-Mods as universal quantifiers.

John was on the roof/ran for an hour

$\exists$ t [$PAST_n(t) \wedge \underline{1_H(t) \wedge \forall\ t' \subset t \rightarrow}\ \exists e$ [$\tau(e) \underline{\subseteq}\ t' \wedge AG_w(e)(j) \wedge run_w(e)$]]

TENSE D/PM Main clause

Dowty (1979)

The quantificational approach:
A 'base line' theory of *for(α)(P)*.

interval

$\lambda\alpha\ \lambda P$

vP/TP

$\lambda t\ [\ \alpha(t) \wedge \forall\ t'\ [\ t' \subseteq t \rightarrow P(t')]]$

Interval Modifier
High attachment

a property of intervals true at an α-long interval t if P is true at all t's subintervals

$\lambda e[\alpha(\tau(e)) \wedge \forall\ t'[t' \subseteq \tau(e) \rightarrow \exists e'[\ \tau(e') \subseteq t' \wedge P_w\ (e') \wedge \cup_w\ (P, e)]]$

Event Modifier
Low attachment

a property of events true of e with running time α if e is the sum of P-subevents true at all of e's subintervals

The quantificational approach:
A 'base line' theory of *for(α)(P)*.

interval

$\lambda\alpha\ \lambda P$ vP/TP

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Event Modifier
Low attachment

a property of events true of e with running time α if e is the sum of P-subevents true at all of e's subintervals

Sum operation: $\cup_w\ (P, e) \leftrightarrow_{DF} e = \cup\ \lambda e'\ [P_w\ (e') \wedge \tau(e') \subseteq \tau(e)]$

The quantificational approach: Some consequences.

- As mentioned before, the quantificational approach explains directly and straightforwardly why D-Mods are deviant with properties that lack the subinterval property: it requires *P-for an hour* to be true also at all of its (relevant) subintervals

- This works straightforwardly for states (which if true of i, are uniformly true of its subintervals, arguably down to instants)

But it raises the 'minimal parts' issue for activities…

The quantificational approach:
Some consequences.

- Solution: relativize the choice of subintervals to contextually salient 'covers' as with plural predication

[Moltman (1991),Deo and Pinango 2011; but cf. also Schwarzschild (1996) and Champollion (2013,2016)]

$$\lambda\alpha\ \lambda P \left[\begin{array}{l} \lambda t\ [\ \alpha(t) \wedge \forall\ t'\ [\ t' \subseteq t \rightarrow P(t')]] \quad \textbf{Interval Mod} \\ \\ \lambda e[\alpha(\tau(e)) \wedge \forall\ t'[\ t' \subseteq \tau(e) \rightarrow \exists e'[\ \tau(e') \subseteq t' \wedge P_w(e') \\ \wedge \cup_w (P, e)]] \quad \textbf{Event Modifier} \end{array} \right.$$

The quantificational approach: Some consequences.

- Solution: the subevents quantified over must distribute throughout the cells of a contextually salient and pragmatically determined cover of the relevant interval

[Deo and Pinango 2011; but cf. also Schwarzschild (1996) and Champollion (2013,2016)]

$$\lambda\alpha\ \lambda P \left\{ \begin{array}{ll} \lambda t\ [\ \alpha(t) \wedge \forall\ t'\ [\Gamma(t',t) \rightarrow P(t')]] & \textbf{Interval Mod} \\ \lambda e[\alpha(\tau(e)) \wedge \forall\ t'[\Gamma(t',\tau(e)) \rightarrow \exists e'[\ \tau(e') \subseteq t' \wedge P_w(e') & \\ \wedge \cup_w (P, e)]] & \textbf{Event Modifier} \end{array} \right.$$

where $\Gamma(t',t) =_{df}$ t' is a cell in a cover Γ for t

The quantificational approach:
Some consequences.

$\lambda\alpha\ \lambda P$ {

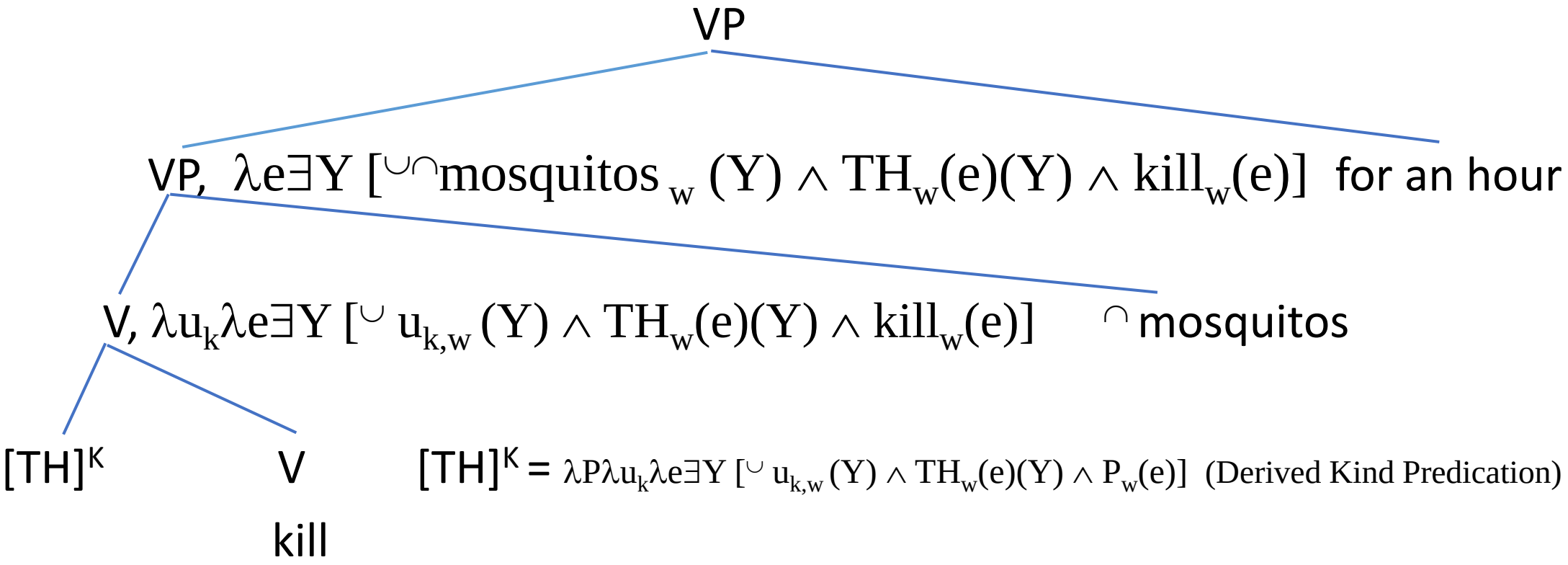
$\lambda t\ [\ \alpha(t) \wedge \forall\ t'\ [\Gamma\ (t',t) \rightarrow P(t')]]$ **Interval Mod**

$\lambda e[\alpha(\tau(e)) \wedge \forall\ t'[\Gamma(t',\tau(e)) \rightarrow \exists e'[\ \tau(e') \subseteq t' \wedge P_w(e') \wedge \cup_w (P, e)]]$ **Event Mod**

- E.g.: Make the cover 'incremental'. The initial cell must contain the onset of the action and each subsequent cell must contain a recognizable extension of it. So, an eating activity would need an initial cell large enough to contain a swallowing of some food, further cells should be large enough to contain recognizable extensions of the onset. 'Pauses' can be part of this process.
  [Landman and Rothstein (2013a,b), who advocate, however, a 'Measure out' Approach].

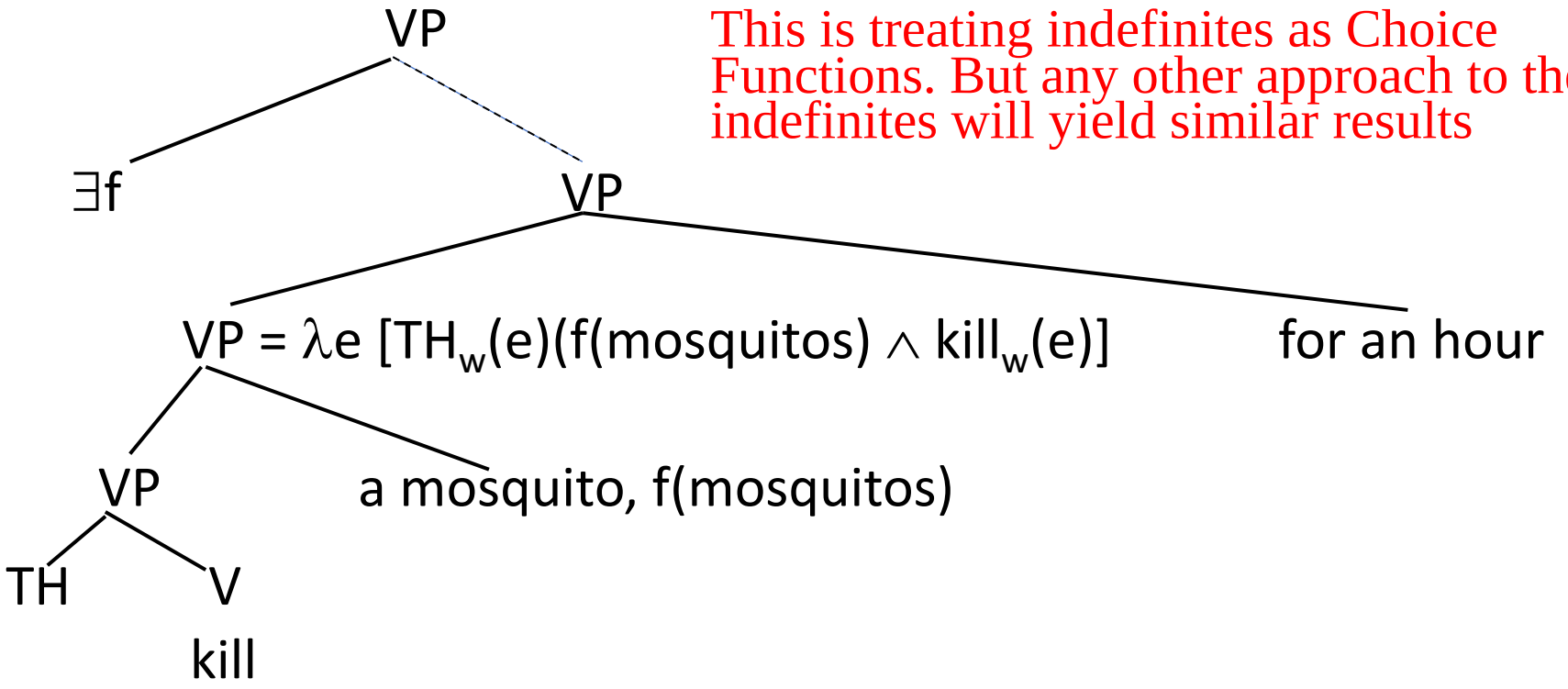
The quantificational approach: Consequences for Bare Arguments (BAs).

- Kinds drive an 'ultra narrow' existential construal



The quantificational approach:
BAs vs. existential DPs.

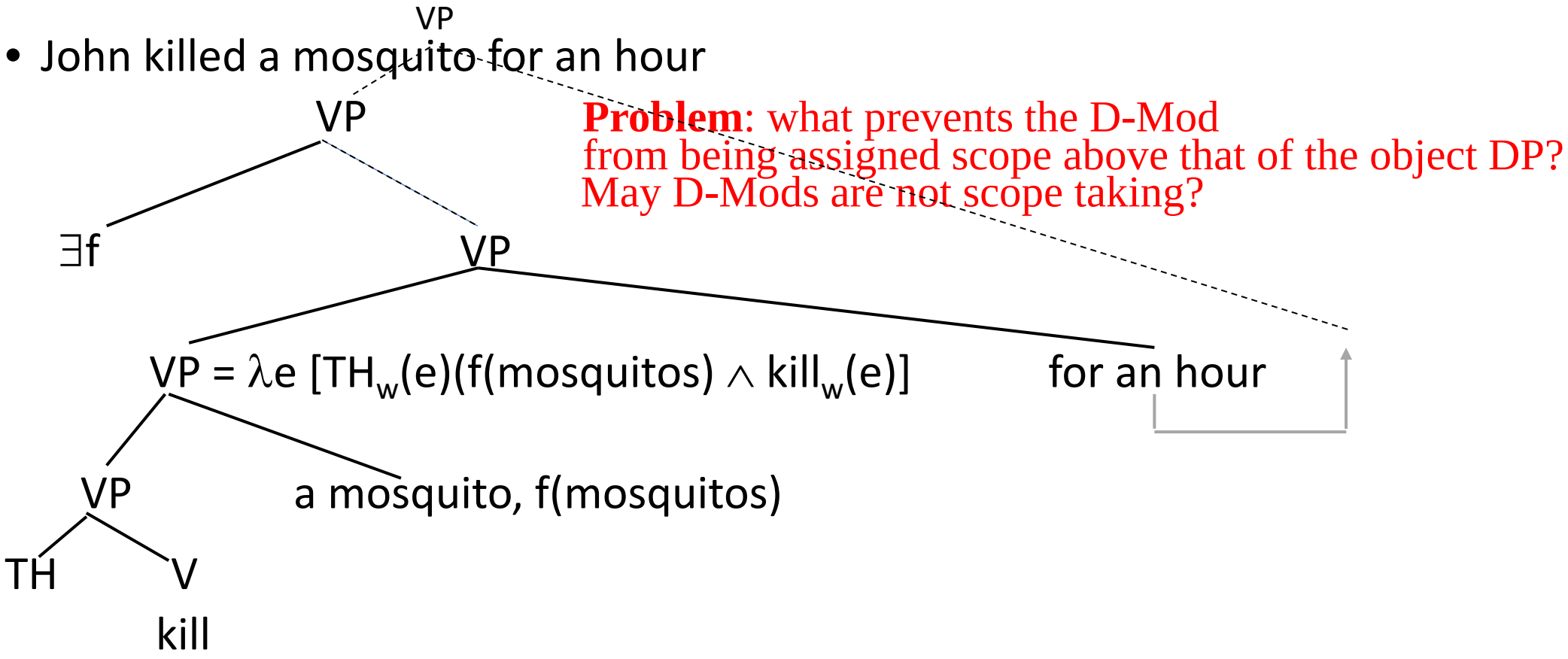
- John killed a mosquito for an hour



This is treating indefinites as Choice Functions. But any other approach to the scope of indefinites will yield similar results

The quantificational approach:
The ‘inverse scope’ problem.

- John killed a mosquito for an hour



Problem: what prevents the D-Mod from being assigned scope above that of the object DP? May D-Mods are not scope taking?

The quantificational approach:

D-Mods ARE scope taking!

Case 1: Negation and DE quantifiers.

- D-Mods are able to take scope over negation and DE quantifiers.

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. But then I did **Throughout > NEG**

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.

- All of the above have natural readings of the **Throughout > Neg-Q** form.

E.g.: (b.iii) = On every raid t during my first week it holds true that I shot down fewer than six drones at t.

The quantificational approach:

D-Mods ARE scope taking!

Case 2: Quantifier interpolation.

When an overt universal quantifier intervenes between a DP and a D-Mod, wide scope construal of the latter becomes possible.

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. Context
   i.? We built a snowman for a week — Deo and Pinango (2011)
   ii. We built a snowman for many years
   iii. This bike carried a kid for 10 years — Landman and Rothstein (2009)

Cases (c) are probably just a covert version of cases (a)-(b):

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

The quantificational approach:

Balance on the scope of D-Mods.

Wide scope construals of D-Mods are systematically possible:
- with Negation/Downward Entailing Qs and
- when a universal Q is interpolated.

So understanding why this option is banned in *John killed a mosquito for an hour* (and the likes of it) becomes particularly pressing.

In absence of a robust account for why *for an hour* cannot outscope *a mosquito*, one might want to go for a 'measure-out' approach to D-Mods.

The quantificational approach:

An economy constraint (Bassa Vanrell 2017).

Scoping of durative adverbs is not allowed if it leads to logically weaker interpretations.

i. John killed a mosquito for an hour $\Rightarrow$
[…$\exists$x mosquito (x) …$\forall$t$\in$1h …]

Assigning wide scope to *for an hour* in (i) would yield (ii), which is logically weaker than (i):

ii. $\forall$t$\in$1h […$\exists$x mosquito (x) … …] DISALLOWED

Similar bans against weakening have been proposed for exhaustification/implicature calculation. As alleged for all such constraints, this economy principle is 'blind' to world-knowledge based contradictions (cf. Magri 2009).

The quantificational approach:

An economy constraint (Bassa Vanrell 2017)

The negation facts follow:

NEG > Throughout/ADV BASE (W)

i. $\neg\exists$e [……$\exists$x mosquito (x)… $\forall$t$\in$1h …]

Throughout/ADV > NEG DERIVED (S)

ii. $\forall$t$\in$1h $\neg\exists$e […$\exists$x mosquito (x)…]

(ii) is stronger than (i); hence, scoping is allowed.

The quantificational approach:
Q-interpolation.

- Temporal quantifiers like *every day* are propositional/interval oriented DPs, not event oriented modifiers.

- Thus, they *must* sit in a high region of the clause, past the ∃-closure of events.

- This means that durative modifiers also have to be construed as proposition/interval oriented, *if* they are to outscope them

- And outscope they must, to prevent a *logical* contradiction.

The quantificational approach:

Q-interpolation.

Informal derivation:
first step (type driven):

i. John killed a mosquito every day for a week
ii. [every day$_1$ [$\exists$x mosquito(x) … $\forall t_2 \in$ one week $t_2 \subseteq t_1 \wedge$ …]

If we leave at that we get the interpretation:

iii. for every day t_1 [we must find a partition of t_1 in weeks such that …]

This is a contradiction: days cannot be partitioned in weeks. Arguably, it's a *logical* one, as it is based merely on quantifiers and measure phrases.
Hence, in this instance scoping out the D-Mod *is* allowed.
Second step:
iv. for a one-week t_2 [for every day t_1 in t_2, [John killed a mosquito at t_1]]

The quantificational approach:
Why are D- Modifiers subject to economy, while ordinary DP are not?

i. I found a mushroom every time I went to that spot
ii. * I found a mushroom for a month

- Speculation: D-Mods are more complicated than ordinary DPs in having two related but distinct variants, one event oriented, the other interval oriented. Scoping them involves shifting types, a relatively costly option. Economy intervenes to compensate for such extra cost.
  No such 'compensation' is needed for ordinary DPs.

The quantificational approach:

Balance.

- The Quantificational approach requires a formal constraint on the scope of D-Mods. We seem to have a simple one, based on Bassa Vanrell's proposal, that directly predicts a set of rather intricate facts (like the differential behavior of DE vs non DE DPs in the scope of D-Mods and the impact of quantifier interpolation – things that don't come easy on 'measure out' approaches).

- The Quantificational approach to D-Mods explains their restriction to activities/states without forcing us to a highly specific characterization of what they are, i.e. of what 'atelicity' (or 'homogeneity') for verb classes is.
  This might be a welcome deflationary approach to the problem.

Further problems and developments:

A problem with definites.

a. I killed the mosquitos in that room for a week

b. I killed the mosquitos in that room every day for a week

c. The mosquitos in that room $\Rightarrow \iota x[MR_{w,t}(x)]$

Interpretation for (a):

i. $\exists e\,[1W(\tau(e)) \wedge \forall\ \underline{\mathbf{t'}}\ [t' \subseteq \tau(e) \rightarrow \exists e'[\ \tau(e') \subseteq t' \wedge$

$TH_w(e')(\iota x[MR_{w,\ \tau(e)/\underline{t'}}(x)]) \wedge kill_w(e')]$

$\wedge \cup_w (\lambda w \lambda t \lambda e' TH_w(e')(\iota x[MR_{w,t}(x)]) \wedge kill_w(e')]\ ,\ e)]]$

Further problems and developments:

A problem with definites.

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The definite cannot be anaphoric to the universally bound time interval in (a); but it can in (b). How do we get this?

Further problems and developments:

A second problem with definites.

Bar Lev (2020) on ‘homogeneity:’ Low ∃ + exhaustification.

a. I killed ∃ the mosquitos in that room (*for a week)

b. I killed mosquitos in that room (for a week)

Both (a) and (b) wind up having a ‘low’ existential Q that will fall within the scope of the D-Mod.

[Cf. Chierchia (2022)]

A possible solution to the problem of definites:

The 'same participant' constraint.

Properties of events in the scope of a D-Mod must have the same participants.

a. for an hour (P_w) = λe. e lasts one hour and for each temporal cell of a salient cover of its running time, there is an event e' in P_w *with the same participants as those in every other cell of the interval* 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 $P_w(e) = 1$, $\theta(e)$ is defined.

A possible solution to the problem of definites:

The ‘same participant’ constraint.

Properties of events in the scope of a D-Mod must have the same participants.

a. I killed the mosquitos in that room for a week
b. I killed the mosquitos in that room every day for a week

In (a), *for a week* is event-orient: The same participant constraint applies; whence the deviance.
In (b), because of Q-interpolation, *for a week* is interval oriented: The same participant constraint doesn’t apply; whence its acceptability.

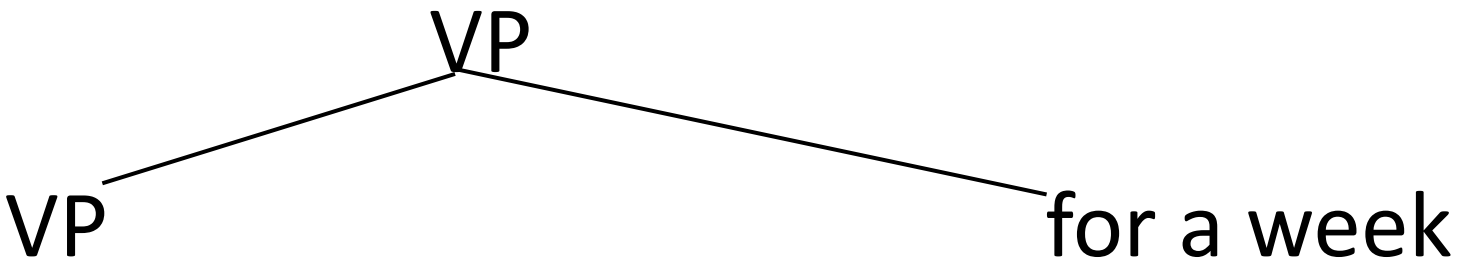
A possible solution to the problem of definites:

The ‘same participant’ constraint.

A possibly dire consequence for BAs

a. I killed mosquitos in that room for a week

b.



$\lambda e \exists Y [{}^{\cup}\cap \text{mosquitos}_w (Y) \wedge TH_w(e)(Y) \wedge kill_w(e)]$

In (a), we are dealing with an event oriented property. *Same Participant* should kick in, making (a) deviant…

The fix we got for definites messes up our approach to BAs….

Incorporating a feature of the 'measure out' approach.

Kinds as direct Theta-role bearers

a. This morning at the pond, I fed geese (in violation of the law).

b. $\exists e[AG_w(e)(I) \wedge TH_{KEP,w}(e)(\cap geese) \wedge feed_w(e)]$

- Conditions on kind predication:

(i) Exemplification (E):

$TH_{KEP,w}(e)(\cap geese) \rightarrow \exists e' \exists X\ [e' \subseteq e \wedge {}^{\cup}\cap geese_w(X) \wedge TH_w(e')(X)]$

$TH_{KEP,w}(e)(k)$ entails that instances of k are killed.

(ii) Progressivity (P):

$TH_{KEP,w}(e)(\cap geese) \rightarrow \forall w'[I_w(w') \wedge \exists X\ geese_{w'}(X) \wedge \exists e'\ C_{w'}(e)(e') \wedge TH_{w'}(e')(X)$

$I_w(w')$ = w' is inertial for w; $C_w(e)(e')$ = e' is a continuation of e in w.

$TH_{KEP,w}(e)(k)$ entails that 'left to its own devices' e would go on.

Cf. Landman and Rothstein (2013a,b), Chierchia (2022)

Incorporating a feature of the 'measure out' approach.

Kinds as direct Theta-role bearers: Plural Ks

a. This morning at the pond, I fed geese (in violation of the law).

- Conditions on kind predication:

(i) Exemplification (E):

$TH_{KEP,w}(e)(\cap geese) \rightarrow \exists e' \exists X\ [e' \subseteq e \wedge {}^{\cup}\cap geese_w(X) \wedge TH_w(e')(X)]$

$TH_{KEP,w}(e)(k)$ entails that instances of k are involved.

(ii) Progressivity (P):

$TH_{KEP,w}(e)(\cap geese) \rightarrow \forall w'[I_w(w') \wedge \exists X\ geese_{w'}(X) \wedge \exists e'\ C_{w'}(e)(e') \wedge TH_{w'}(e')(X)$

$I_w(w')$ = w' is inertial for w; $C_w(e)(e')$ = e' is a continuation of e in w.

$TH_{KEP,w}(e)(k)$ entails that 'left to its own devices' e would go on.

(iii) Antitotality: $TH_{KP,w}(e)(\cap geese)$ suggests that while the kind *is* involved as such, it is NOT involved as a whole.

- (An implicature triggered by the contrast with *singular* kind predication…)

Incorporating a feature of the 'measure out' approach.

Kinds as direct Theta-role bearers: Singular Ks

- Episodic singular kind predication

i. The dog evolved from the wolf
ii. I finally could see the Maremma Shepherd at work in Siena
iii. The rabbit arrived in Australia with the first immigrants (*for a few years) vs.
iv. Rabbits arrived in Australia with the first immigrants for a few years
v. I studied the Eastern Gorilla in its natural habitat for two months.

- Taxonomic/Singular Kinds: Group oriented ('Impure' Atoms/Pluralities-as-one) [Krifka et al. (1995), Dayal 2004]
- Plural Kinds: Plurality oriented (Plural individuals/'Pluralities-as-many')

vi. $\exists e[AG_w(e)(I) \wedge \mathbf{TH_{K,w}(e)(} \cap^{\mathbf{T}}\mathbf{Maremma\ shepherd)} \wedge saw_w(e)]$ $\Leftarrow$ (ii)

- No exemplification, just extensionalization:
  $TH_{K,w}(e)(\cap^{T}\text{Maremma dog}) \rightarrow TH_{K',w}(e)(\uparrow\cup\text{Maremma shepherd})$
- No (inherent) progressivity
- Whole kind involvement/momentousness/representative specimen predication

Incorporating a feature of the 'measure out' approach.

Kinds as direct Theta-role bearers: Balance.

a. for 1H($\lambda w \lambda e TH_w(e)(\cap mosquitos_w) \wedge kill_w(e)$)

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 $\lambda e TH_w(e)(\cap mosquitos_w) \wedge kill_w(e)$ *with the same participants as those in every other cell of the cover* and e is the sum of all such events e'.

- The 'same participant' requirement is easily met, as it merely requires that the same kind be involved throughout.
- By using the idea that kinds are direct bearers of theta roles, we can maintain a simple and predictive account of D-Mods.
- The key is in Direct Kind Predication: Inherently progressive with plural kinds, variably progressive with Singular/Taxonomic ones.

A(n almost) prediction:

Italian vs. French ‘partitive’ articles.

What happens to languages that do not have a ‘direct’ way to refer to kinds?

In the Romance Languages the distribution of BAs is

- positionally restricted (Italian, Spanish, …) or
- (essentially) unattested (French).

For kind-talk, these languages use the definite article:

a. i. *(I) cani discendono dai lupi
   ii. *(Les) chiens ont évolué à partir des loups
   ‘Dogs evolved from wolves’

An almost prediction:

Italian vs. French ‘partitive’ articles.

But the definite article cannot be used in episodic environments with D-Mods (just like in English):

b. i. * J'ai tué les moustiques pendant une heure
ii. * Ho ucciso le zanzare per un’ora
I killed the mosquitos for an hour

An almost prediction:

Italian vs. French ‘partitive’ articles.

With D-Mods, Italian does allow bare arguments, while French resorts to a weak, cumulative indefinite, the so called ‘partitive’ determiner.

Interestingly, Italian and French share such a determiner, but with slightly different properties.

c. The partitive determiner

i. Italian: di + DEF D ii. French: de + DEF D

Semantically: ‘∃’, restricted to plural and mass.

Incompatible with kind-level predicates

An almost prediction:

Italian vs. French ‘partitive’ articles.

The partitive article behaves in opposite ways in the two languages with respect to D-Mods.

d. i. Ieri sera ho ucciso (*delle) zanzare per un’ora, prima di addormentarmi
   ii. La nuit dernière, j'ai tué *(des) moustiques pendant une heure avant de m'endormir
   Last night, I have killed some mosquitos for an hour before falling asleep.
   iii. (*Dei) soldati valorosi sono caduti per mesi, prima della vittoria
   iv. *(De) braves soldats sont tombés pendant des mois avant la victoire.
   Brave soldiers fell for months before victory

An almost prediction:

Italian vs. French 'partitive' articles: Analysis

- French (basically) disallows BAs. However, *des* acts as a 'Property Predication' marker with which French employs TH_{PEP} a property level counterpart of TH_{KEP}.
- **That this is an option is no surprise given the one-one correspondence between (plural) kinds and (cumulative) properties.**
- Just like we have defined a kind oriented variant θ_{KEP} of a thematic relation θ, we might expect there to be an isomorphic property oriented one θ_{PEP}.
- Italian allows BAs (in a more restricted way than English), either with a kind oriented interpretation (and then its analysis is just like English) or with property oriented one (and then the analysis it's just like French).
  (cf. Gonzales and Mihoc 2018, for a precursor)

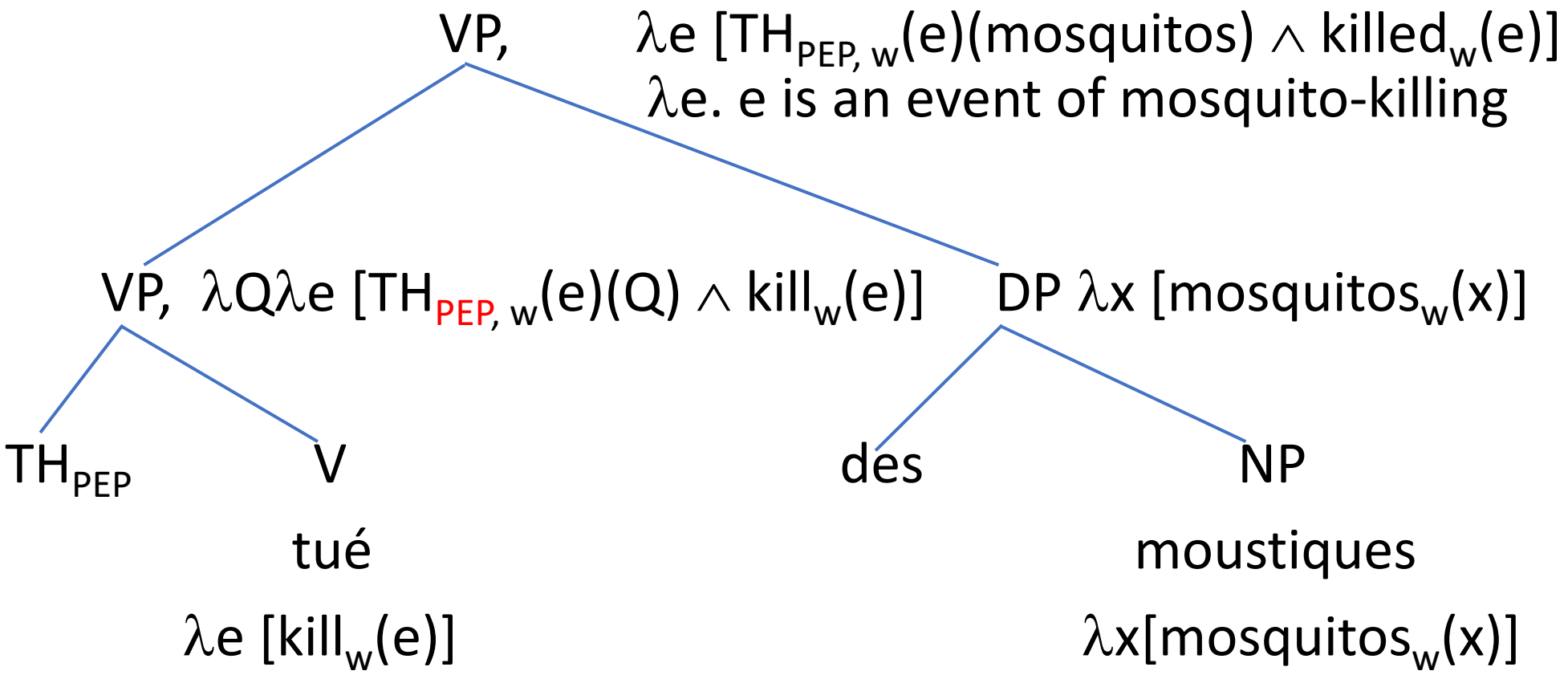
An almost prediction:

Italian vs. French 'partitive' articles: Analysis

- French (basically) disallows BAs. However, *des* acts as a 'Property Predication' marker and French employs TH_{PEP} a property level counterpart of TH_{KEP} in connection with it.
- **That this should be an option is no surprise given the one-one correspondence between (plural) kinds and (cumulative) properties.**
- Just like we have defined a kind oriented variant θ_{KEP} of a thematic relation θ, we might expect there to be an isomorphic property oriented one θ_{PEP}.
- Italian allows BAs (in a more restricted way than English), either with a kind oriented interpretation (and then the analysis is just like English) or with property oriented one (and then the analysis is just like French).
- **The key is that D-Mods rely on semantically *unquantified* arguments (kinds or properties) as direct bearers of thematic roles.**

An almost prediction:

Italian vs. French ‘partitive’ articles: Example



Summary:

Towards a universal theory of D-Mods.

a. D-Mods are universal quantifiers.
b. They exist in two related variants:
   event-oriented vs interval-oriented.
c. The event-oriented version of a D-Mod is subject to a
   'same protagonist' constraint.
d. Scope shifting operations on D-Mods are subject to an
   economy constraint: do not weaken! (Bassa Vanrell 2017).
e. Kinds (and properties) can be direct bearers of thematic
   roles, subject to general semantic conditions, and 'channel'
   the interpretation of D-Mods.

Consequences:

Towards a universal theory of of D-Mods.

a. A notoriously complex constellation of scope distributions may finally be yielding?

b. Without having to commit to a specific characterization of atelicity.

c. 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 in kind predication) rather than purely mereological ones (like cumulativity) that seem to have trouble in cutting the pie the right way.

Further developments/applications/things to explore:

Towards a universal theory of of D-Mods.

a. Transitive/intransitive alternations:

i. John ate (atelic) ii. John ate a sandwich (telic)

iii. * John devoured iv. John devoured a sandwich

Is kind-predication covertly at play in, e.g. (i)?

b. Incorporation:

How different/similar are the property oriented (Dayal 2011) and the kind oriented (Sag 2022) forms of incorporation to those we just observed?

And I…

Thank you

For an hour …(of your time)