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LEXICAL ASPECT  
AND  
GRAMMATICAL ASPECT

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## Main goals

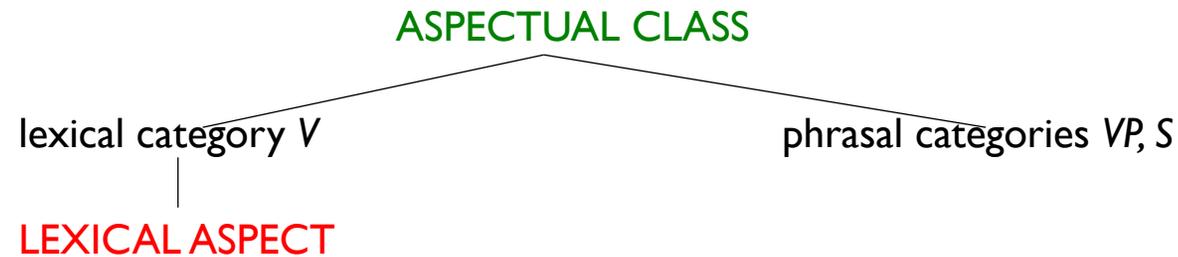
- (1) Empirical grounding for lexical aspect, i.e., the classification of verbs into aspectual classes.
- (2) Theoretical grounding of lexical aspect, aspectual classes, in the theory of classical extensional mereology (CEM).
- (3) Semantics of perfective aspect

- **LEXICAL ASPECT** concerns the classification of verbs—taken as *lexical items*—into **aspectual classes** (aka **eventuality types**, a term used in event semantics (see further below); “eventuality” in the sense of Bach 1981)
- **Aspectual class** of a verb is “the Aristotelian class to which the basic verb belongs” (Dowty 1979, p.52)
  - originating in Aristotle, made known in the philosophy of mind and action through the work of Ryle (1949), Vendler (1957), Kenny (1963), and introduced into linguistics by Dowty (1979).
  - Different taxonomies proposed. Some salient examples:
    - *state, activity, accomplishment, achievement* Vendler 1957
    - *state, activity, accomplishment, achievement, semelfactive* Smith 1991/97
    - *state, process, event* Mourelatos 1978, Vlach 1981, Bach 1981, Parsons 1985
- Related distinctions originating in philological studies (also related to the study of **Aktionsart**, German: ‘manner of action’):
  - *telic / atelic* (Garey 1957)
  - *terminative / ateterminative* (Maslov 1959)
  - *nondurative / durative* (Verkuyl 1972); *terminative / durative* (Verkuyl 1989)

- ASPECTUAL CLASS versus ASPECTUAL FORM (Dowty 1979)
  - ASPECTUAL CLASS is a semantic class to which Vs, VPs and Ss can be assigned, based on certain correlated semantic and grammatical properties they have.
  - ASPECTUAL FORM is determined by the particular aspect marker(s) the V occurs with in a given sentence, e.g., “inflectional affixes, tenses, or other syntactic “frames” that verbs can acquire (*aspect markers*) distinguishing “different ways of viewing the internal temporal constituency of a situation” (Comrie 1976, p.3)” (Dowty 1979, p.52)  
In other words, by ASPECTUAL FORM Dowty refers to “grammatical aspect”.

- Questions:

What is the relationship between ASPECTUAL CLASS and ASPECTUAL FORM (= grammatical aspect)? What is meant by “grammatical” in this context (see also Bach 2004)?



- **ASPECTUAL CLASS** subsumes **LEXICAL ASPECT** as a special case:
  - VPs and Ss (and nominalizations based on Vs, according to some) are also categorized into aspectual classes,
  - lexical aspect is reserved for the classification of Vs—taken as *lexical items*—into aspectual classes.
- Some arguments:
  - The aspectual class of a V may differ from the aspectual class of a phrase it projects or into which it is integrated.
  - Many agree that lexical meanings (the kinds of meanings and semantic relations that we find expressed word-internally) and those we find expressed at the phrasal level (driven by syntactic-semantic relations from phrase grammar) are not exactly the same (e.g., Bach 1983, 1994, 2002; Carlson 2004).

- Foundational assumptions:
  - Members of the lexical category  $V$  can be classified into aspectual classes based on certain semantic properties, which are
    - (i) tied to the way in which they describe various states of affairs, and
    - (ii) correlated with certain grammatical properties they have.
  - Such aspectually relevant semantic properties are crucial to structuring of the lexical semantic representation of  $V$ s.
- Main question:

What are the appropriate aspectually relevant semantic properties (and relations among them) that motivate a taxonomy of aspectual classes (best fitting natural language data)?

Specific questions: e.g.,

- What is the appropriate empirical evidence (like grammatical tests) for motivating the existence of aspectual properties, their nature, number and relations among them?
- What is the appropriate empirical evidence for determining a  $V$ 's aspectual class?

## Main question: What are the appropriate aspectual semantic properties ?

- Point of departure: Vendler's (1957) four aspectual classes, which are based on different relations to the intervals and time points at which their members hold: "time schemata presupposed by various verbs" (ibid., p. 143).
  - **STATES** (*know*) and **ACHIEVEMENTS** (*arrive, notice, hit*) involve *time instants*, but only achievements "occur at a single moment" (Vendler 1957, p. 147), at "a unique and indivisible time instant" (ibid., p. 155), while states hold at *any* instant during the interval at which they are true (ibid., p. 149).
  - **ACTIVITIES** (*run*) and **ACCOMPLISHMENTS** (*walk a mile*) describe situations that hold over *periods of time*, they "go on in time" (ibid., p. 144), "consist of **successive phases** following one another in time" (ibid.) (i.e., what intuitively qualifies as running or walking a mile takes up a certain sufficiently large interval, it cannot be judged as such by one snapshot at a single moment of time). Only accomplishments proceed toward a **terminus**, which, according to Vendler (1957, p. 149), means that such time periods are unique and definite.
- Two basic aspectually relevant semantic properties
  - (i) **successive phases**
  - (ii) **terminus**

- Two semantic properties distinguish Vendler's (1957) four aspectual classes (Filip 2012)

	SUCCESSIVE PHASES	TERMINUS
STATE	—	—
ACHIEVEMENT	—	+
ACTIVITY	+	—
ACCOMPLISHMENT	+	+

- These two aspectually relevant semantic properties are correlated with several linguistic tests for the identification of aspectual classes. Among these, two tests are of key importance:
  - unproblematic, fully acceptable in the progressive construction
  - modification by *in  $\alpha$  time* (or *for  $\alpha$  time*).

	PROGRESSIVE	<i>in <math>\alpha</math> time adverbial</i>
STATE	? John was knowing French.	? John knew French in many years.
ACHIEVEMENT	? John was missing the train.	John spotted the plane in 5 seconds.
ACTIVITY	John was running.	? John ran in one hour.
ACCOMPLISHMENT	John was writing his thesis.	John ran a mile in four minutes.

- Two semantic properties distinguish Vendler's (1957) four aspectual classes

	SUCCESSIVE PHASES	TERMINUS
STATE	—	—
ACHIEVEMENT	—	+
ACTIVITY	+	—
ACCOMPLISHMENT	+	+

- Two key grammatical properties

	PROG	<i>in <math>\alpha</math> time adverbial</i>
STATE	—	—
ACHIEVEMENT	—	+
ACTIVITY	+	—
ACCOMPLISHMENT	+	+

- NOTE:

- The semantic and formal (grammatical) properties cut across the stative/episodic distinction, traditionally of key importance in linguistic studies. This highlights the following insight:

**[-PROG]** (incompatibility with the progressive) does NOT indicate **[+state]**, achievements are incompatible with the progressive (more precisely, some achievements are odd in the progressive, unless they receive special interpretations, see below).

- The typology is too narrow. It was developed in the context of the philosophy of mind and action with a focus on action (verbs), and hence agentivity and causation, which are orthogonal to lexical aspect/aspectual classes (see Mourelatos 1978/81; mereological theories of aspect see e.g., Filip 1993/99; 2011, 2012).

- Two semantic properties distinguish Vendler's (1957) four aspectual classes

	SUCCESSIVE PHASES	TERMINUS	HOMOGENEITY
STATE	—	—	NA
ACHIEVEMENT	—	+	NA
ACTIVITY	+	—	+
ACCOMPLISHMENT	+	+	—

- Two key grammatical properties

	PROG	<i>in α time adverbial</i>
STATE	—	—
ACHIEVEMENT	—	+
ACTIVITY	+	—
ACCOMPLISHMENT	+	+

- The property of  $[\pm\text{TERMINUS}]$ , and  $[\pm\text{HOMOGENEITY}]$ , which follows from it, separate ACTIVITY from ACCOMPLISHMENT predicates.
- This becomes evident in their differential behavior with the *in α time adverbial* and *for α time adverbial*.

ACCOMPLISHMENT: *John ran a mile ? for four minutes / in four minutes.*

ACTIVITY: *John ran for an hour / ? in an hour.\**

ACTIVITY: If *John ran for an hour* is true, then John ran also during shorter intervals of that hour.

Only ACTIVITIES like “running and its kind go on in time in a **homogeneous** way; any part of the process is of the same nature as the whole” (Vendler 1957, p. 146).

[see next slide]

ACCOMPLISHMENT: If *John ran a mile in four minutes* is true, then John did not run a mile within any subinterval(s) of those four minutes.

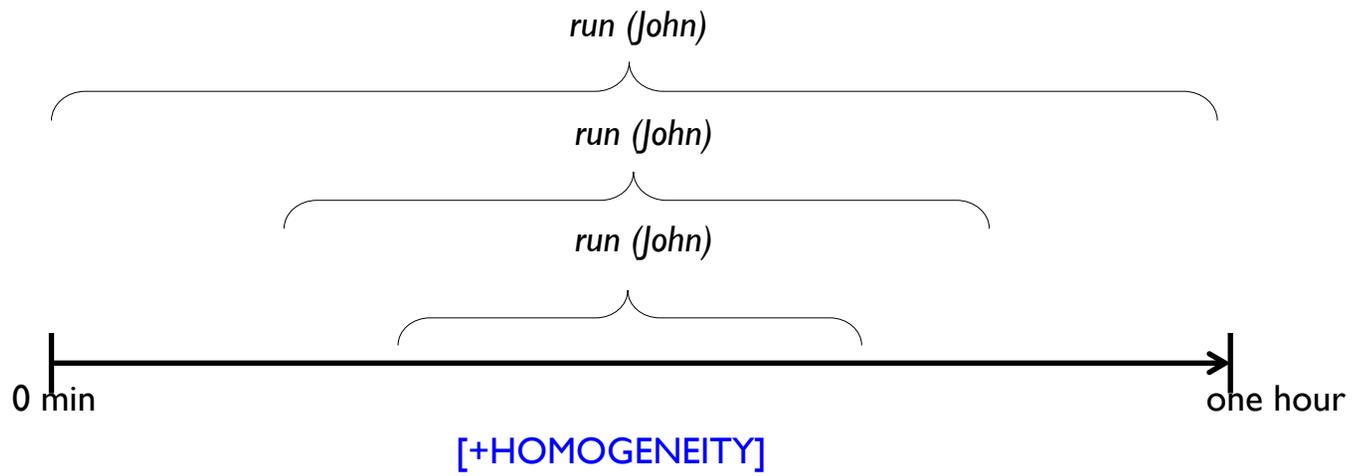
ACCOMPLISHMENTS predicates describe situations that “proceed toward a **terminus** which is logically necessary to their being what they are. Somehow this climax casts its shadow backward, giving a new color to all that went before” (Vendler 1957, p. 146).

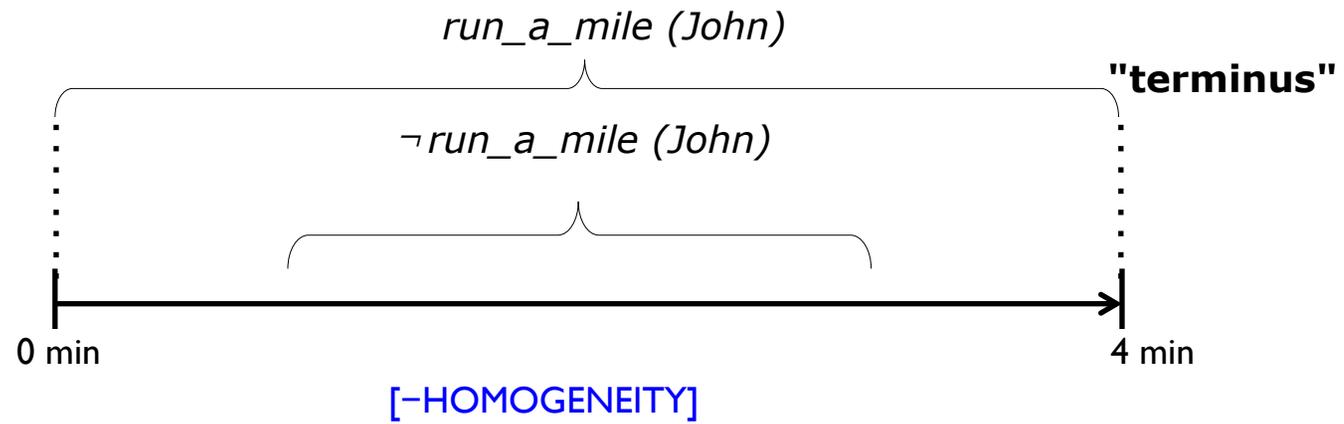
But this means that the **successive phases** preceding the terminus cannot be alike: none of the successive phases is such that they involve the terminus, the phases can be distinguished one from another based on their “distance” from the terminus.

ACCOMPLISHMENT predicates lack the homogeneity property.

[see next slide]

\* shifted “onset after one hour” reading irrelevant for this test.





- entailments:

1. [+TERMINUS] → [-HOMOGENEITY] ≈ grammatical property: *in / \*for α time adverbial*
2. [-TERMINUS] → [+HOMOGENEITY] ≈ grammatical property: *\*in / for α time adverbial*

In Vendler's (1957) system, the property of homogeneity seems to be only relevant to [+successive phase] predicates, and its presence/absence is a direct consequence of whether they entail a terminus or not.

- Landman and Rothstein (2010, 2012)
  - ACTIVITIES and also STATES are **homogeneous**
  - the **subinterval property** of ACTIVITIES (Bennett & Partee 1972/78) is an appropriate interpretation of homogeneity of STATES predicates.

## Imperfective Paradox - Partitive Puzzle

Key evidence for the [±TERMINUS] and [±HOMOGENEITY] property

- Only ACTIVITIES sanction the inference ***x (has/had (already))  $\phi$ -ed*** from the progressive ***x is/was  $\phi$ -ing*** (Kenny 1963). ACCOMPLISHMENTS do not, giving rise to the Imperfective Paradox or Partitive Puzzle.
- (1) ACTIVITY: From *John is running* WE CAN INFER *John has run/ran*. [next slide]
  - (2) ACCOMPLISHMENT: From *John is running a mile* WE CANNOT INFER *John has run/ran a mile*. [ns]

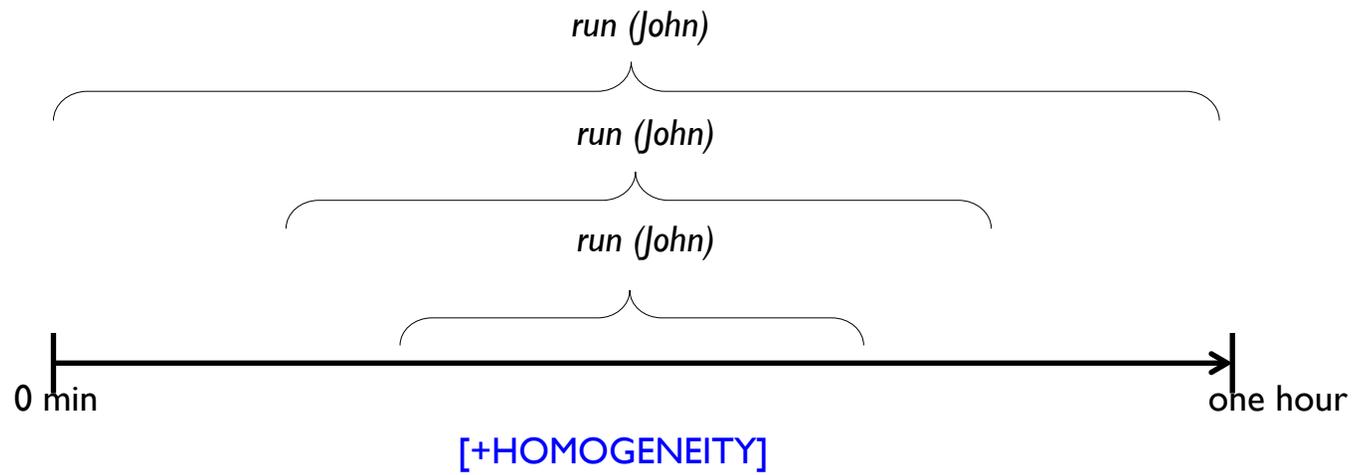
**Imperfective Paradox** (Dowty 1977): *John is running a mile* might be true (at a given world and time) even if John's running is permanently interrupted, and consequently, the corresponding non-progressive sentence *John has run/ran a mile* is false.

Generally, a progressive sentence with a base telic *P* is true at a given time even if the corresponding non-progressive sentence is false and never can be true.

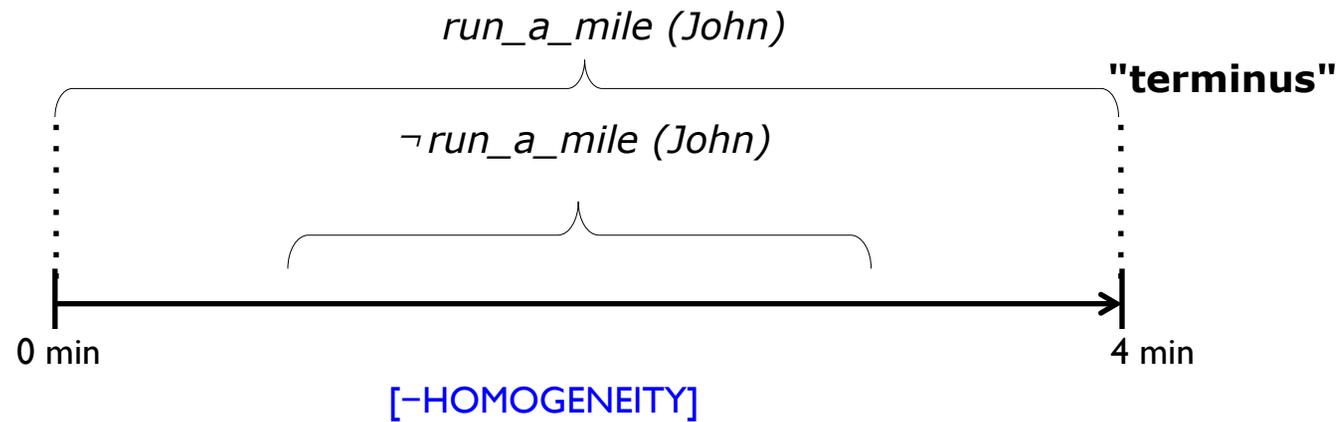
Alternative formulation:

**Partitive Puzzle** (Bach 1986): *John is running a mile* might be true even if only a PART of what counts as a WHOLE eventuality of running a mile by John takes place.

UNSOLVED PUZZLE: What is the appropriate semantic analysis of sentences exhibiting the imperfective paradox/partitive puzzle? (many proposed answers)



ACTIVITY : From *John is running* WE CAN INFER *John has run/ran*.



ACCOMPLISHMENT: From *John is running a mile* WE CANNOT INFER *John has run/ran a mile*.

- Two semantic properties distinguish Vendler's (1957) four aspectual classes

	SUCCESSIVE PHASES	TERMINUS
STATE	—	—
ACHIEVEMENT	—	+
ACTIVITY	+	—
ACCOMPLISHMENT	+	+

- Two key grammatical properties

	PROG	<i>in <math>\alpha</math> time adverbial</i>
STATE	—	—
ACHIEVEMENT	—	+
ACTIVITY	+	—
ACCOMPLISHMENT	+	+

The PROG test serves to make the first fundamental cut among aspectual classes.

- Vendler's claim: STATE and ACHIEVEMENT verbs do not occur in the progressive.

Reason: A sentence in the progressive (his "continuous tense") indicates that a situation is "going on".

- Therefore, the progressive requires [+successive phases] verbs, i.e., verbs describing situations that are temporally extended with distinguishable phases "going on".
- Achievement verbs describe instantaneous situations, so lack the temporal extent component, while state verbs lack the dynamic phases component.

PROBLEM: Most STATES and ACHIEVEMENTS can be used in the progressive, albeit with various degrees of acceptability and with special interpretations.

## **Reappraising PROG in English - A Grammatical Property for the First Cut among Aspectual Classes**

- One of the main reasons for setting up the Aristotelian aspectual classes originally was to motivate the acceptability and interpretation of English sentences in the progressive aspect (see Bach 1981, 1986).<sup>1</sup>
- Contrary to Vendler (1957), most STATES and ACHIEVEMENTS can be used in the progressive with various degrees of acceptability, and possibly also with special interpretations.
- This is now well-known, but more importantly, their interaction with the progressive raises a number of difficult questions about their analyses and division into finer-grained aspectual subclasses.

<sup>1</sup>See the foundational studies of Vendler (1957), Kenny (1963), Verkuyl (1972), Dowty (1972, 1977, 1979), Bennett and Partee (1972), Taylor (1977), Vlach (1981), Mourelatos (1978/81).

## Reappraising PROG in English - A Grammatical Property for the First Cut among Aspectual Classes

- Intuitively, the meaning of the English progressive *PROG(P)* is to assert that a part, one of the “successive phases” (Vendler 1957) or a “stage” (Landman 1992, 2008), of a *P*-eventuality is “in progress” at a particular time. The notion of a “successive phases” or “stage” (the use Landman’s term) presupposes that the *P*-eventuality is both dynamic and temporally extended.

Consequently, the *PROG* operator requires that its argument *P* satisfy two requirements:

- (i) [+ temporal extent]
- (ii) [+dynamicity]

- The felicitous application of *PROG* to a *STATE-P* depends on the ease with which that *STATE-P* can be construed as dynamic (dynamicity requirement of *PROG* is satisfied), while its felicitous application to an *ACHIEVEMENT-P* depends on the ease with which it can be construed as endowed with a temporal extent (temporal extent requirement of *PROG* is satisfied).

<sup>1</sup>See the foundational studies of Vendler (1957), Kenny (1963), Verkuyl (1972), Dowty (1972, 1977, 1979), Bennett and Partee (1972), Taylor (1977), Vlach (1981), Mourelatos (1978/81).

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## **STATE predicates in the PROG construction in English**

? John is knowing the answer.

? John is believing that the earth is flat.

? John's house is sitting at the top of the hill

? John is being in London.

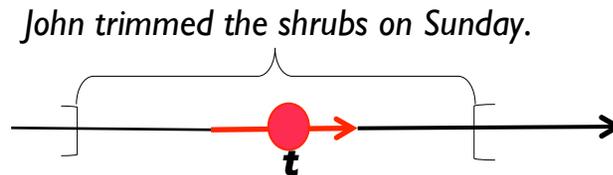
Bach 1981

Bach and Chao 2012

## Towards a solution: Taylor (1977)

? *John is knowing the answer.*

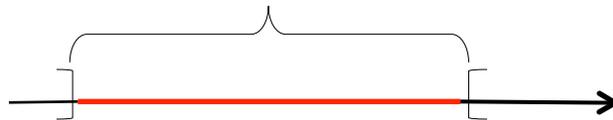
- The main function of the progressive is to mark “the presence of time  $t$  (typically a moment) which, *though not itself a time of application of the tensed [non-progressive, HF] verb*, occurs within a more inclusive time which is a period of the verb’s application” (Taylor 1977, p.206).



*John was trimming the shrubs at 10 a.m. on Sunday.*

- This distinction is not useful for **STATE** Vs like *know, believe, love*, because they are true of their arguments at both a longer interval and any particular moment and any subinterval within that interval. Therefore, they are odd when used in the progressive (Taylor 1977, p.206).

*I: John knows the answer*, where  $I$  is some long period of John’s life



- Gricean principle of economy (see also Dowty 1979, p. 167): If it is true that *John knows the answer*, then he knows the answer at this moment, as he does at 9 a.m. today and at any moment of time or interval of his existence. So *John is knowing the answer* is odd, because it fails to provide any useful information.

**PROBLEM:** This pragmatic account fails to motivate the whole range of data (see also Dowty 1979).

## STATE predicates in the PROG construction in English

- (1) a. Mary is living in London.  
 b. I'm understanding you but I'm not believing you. Bach 1981  
 c. I'm really loving the play. Bach 1981
- (2) a. I am understanding more about quantum mechanics as each day goes by. Comrie 1976  
 b. John is resembling his father more and more as each day goes by. Zucchi 1998  
 c. ? John is knowing the answer.  
 c' John is knowing all the answers to test questions more and more often. Binnick 1991  
 d. ? John is believing that the earth is flat. Bach 1981  
 d' John is believing more and more in his abilities.
- (3) ? John's house is sitting at the top of the hill. / John is sitting at the top of the hill.
- (4) a. ?The motor is being noisy. / The person next to me is being noisy. Zucchi 1998  
 b. John is being a hero by standing still and refusing to budge. Dowty 1979
- (5) ? John is being in London. Bach and Chao 2012
- QUESTION: Why do state predicates like *love*, *understand*, *resemble*, *know* as well as *sit*, *stand* and *lie* sometimes allow the progressive, and under which conditions precisely, but state predicates like *be noisy* do not allow it as readily, and why do some state predicates like *be in London* prohibit it?

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## STATE predicates in the PROG construction in English

- When used in the progressive, Vs denoting STATES are acceptable to the extent that they can be coerced into an interpretation roughly involving a **contingent or temporary manifestation** of nontemporary or “atemporal” a state they describe in their non-progressive form, (some dynamic process or voluntary activity), possibly enforced by overt **degree adverbials**; and in some cases such coerced interpretations are also sanctioned by the added component of **agentivity, volition or controllability** (hence animacy).
- (1) a. **Mary is living in London.**  
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- (5) **? John is being in London.** Bach and Chao 2012

## Subdividing STATE predicates based on PROG in English

- 3 classes of STATIVES (Dowty 1979, p.180):
  - (i) momentary stage-level predicates (“stage-level” Carlson 1977): *be on the table, be asleep*
  - (ii) object-level predicates (“object-level” Carlson 1977): *know, like, be intelligent*
  - (iii) interval statives: the *sit-stand-lie* class
- (i) Stage-level and (ii) object-level stative predicates can be true at moments, and are true at an interval *I* iff they are true at all moments within that interval (Dowty 1979, p.180).
- Most resistant to any kind of reconstrual as an activity or a process:
  - Locative *be*, as in *be on the table, be in London* (SLP) (Bach and Chao 2012)
  - combinations of *be* + ADJ/NP (*be asleep*), if they cannot be interpreted agentively as *behaving/acting in a way* described by the ADJ or NP.
- Although STATE predicates are taken to be “aspectually simple and unproblematic” (Dowty 1979:71), they are difficult to fit into appropriate aspectual classes, which shows that their semantic and ontological status is significantly more puzzling than that of most non-state predicates, and their relation to temporal notions is often unclear (Bach 1981, Carlson 1977, Chierchia 1995, Comrie 1976, Fernald 2000, for example).

## STATE predicates in the PROG construction in English

- QUESTION: Why do state predicates like *live, understand, love, resemble, know, believe* as well as *sit, stand* and *lie* sometimes allow the progressive, and under which conditions precisely, but state predicates like *be noisy* do not allow it as readily, and why do some state predicates like *be in London* prohibit it?
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  - (4)
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## Subdividing ACHIEVEMENT predicates based on PROG in English

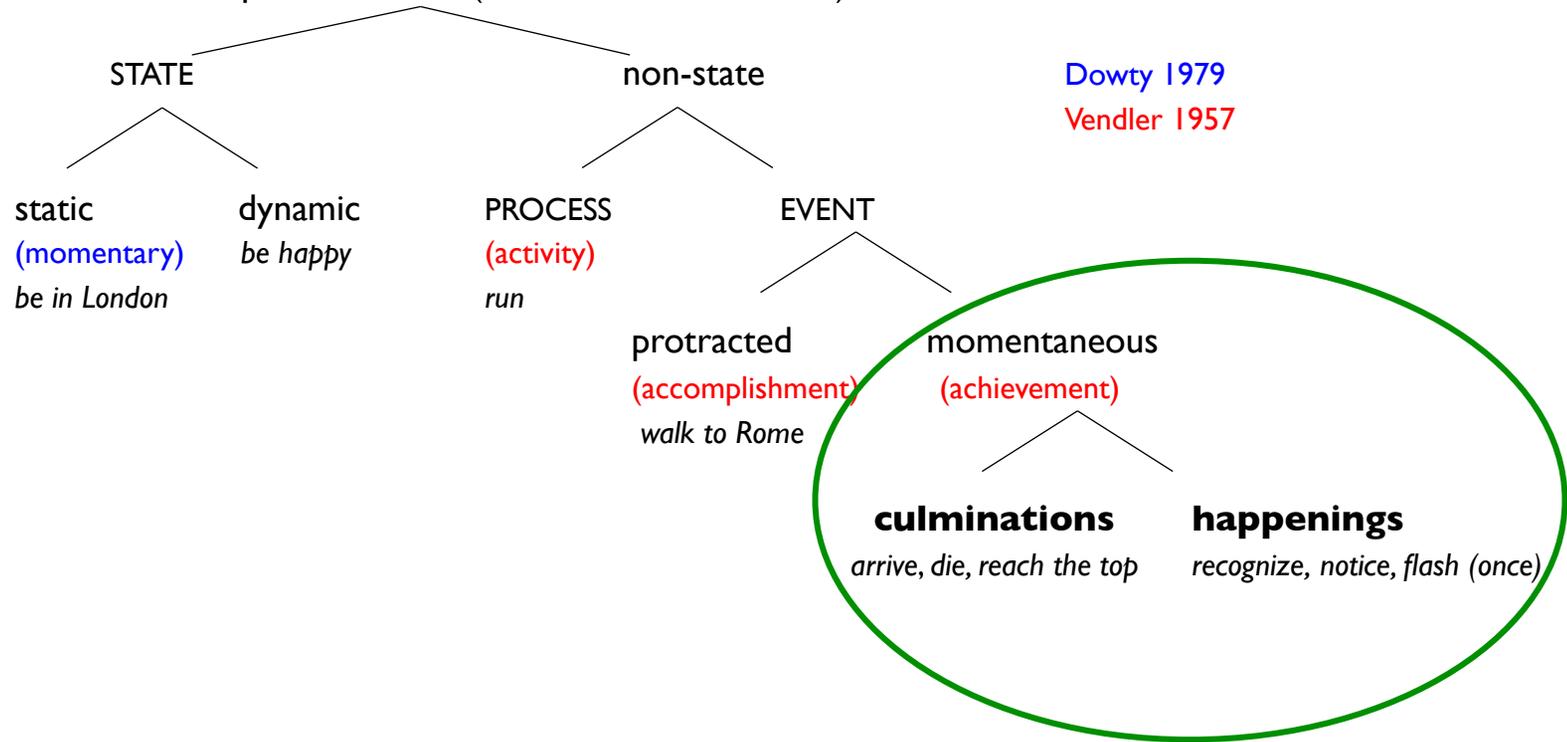
- Only achievement predicates describe events that “occur at a single moment” (Vendler 1957, p. 147), “a unique and indivisible time instant” (ibid. p. 155).
- Unifying grammatical property of ACHIEVEMENTS: straightforwardly compatible with punctually locating expression like the *at  $\alpha$  time adverbial*.

STATE	? <i>John was intelligent at 9 p.m.</i>	odd for pragmatic reasons*
ACTIVITY	? <i>John ran at 9 p.m.</i>	OK if construed as “started running”
ACCOMPLISHMENT	? <i>John composed a symphony at 9 p.m.</i>	excluding magic, fiction, etc.
ACHIEVEMENT	<i>John arrived / won / reached to the top / died at 9 p.m.</i> <i>John noticed that it was dark at 9 p.m.</i> <i>John knocked at my door at 9 p.m.</i> <i>The light flashed at 9 p.m.</i>	

\* Pragmatic motivation for the oddity of (1b) following a Gricean principle of economy: Given that *John was intelligent* is true at any moment during some large period of his existence, and possibly all, the time-point ADV *at 9 p.m.* contributes a meaning component that is not informative.

## Subdividing ACHIEVEMENT predicates based on PROG in English

Bach 1986: Aspectual classes (aka "EVENTUALITY TYPES")



2 classes based on two main interpretation patterns

## Subdividing ACHIEVEMENT predicates based on PROG in English

(I) **CULMINATION** (Bach 1986): *reach the top, arrive, die*

- felicitous in the progressive
- naturally no iterative interpretation with a singular Theme argument, a singular situation “in progress” (shared property with accomplishments):
  - a. *John was arriving / winning / reaching to the top / dying.*  
*John was arriving* understood as having a preparatory process recognizable as a stage “in progress” and possibly culminating in an arrival, and that can be modified by agent-oriented adverbs:
  - b. *John deliberately arrived exactly at 9:05 p.m.*
- induces the **imperfective paradox**:
  - c. *The train was arriving at the station.*
    - can be continued without a contradiction with the denial of the culmination  
*... but it split in two for an unknown reason and crashed.*
    - does not entail  
*The train (had already) arrived at the station.*

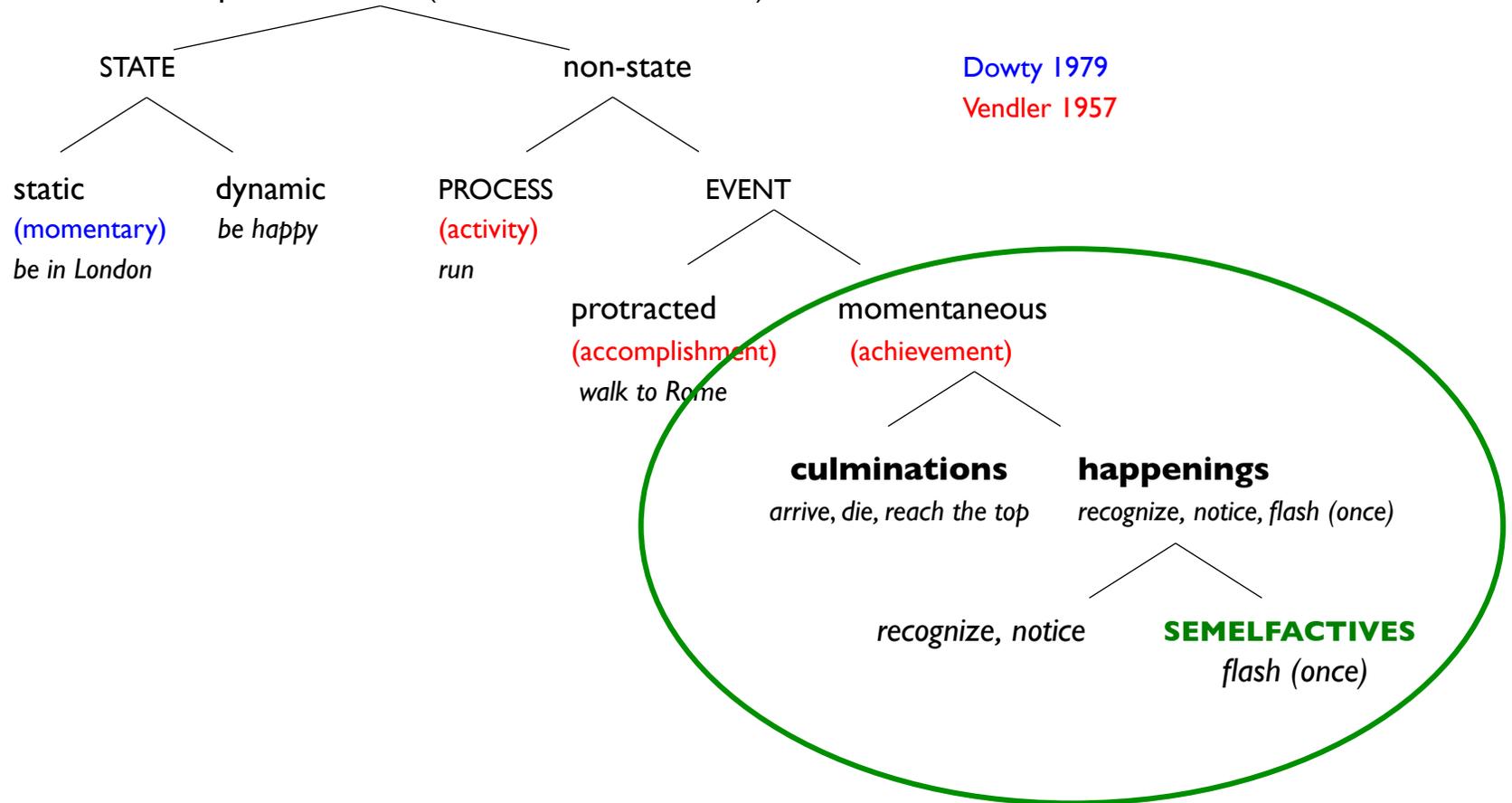
## Subdividing ACHIEVEMENT predicates based on PROG in English

### (2) HAPPENING (Bach 1986): *recognize, notice, flash (once)*

- infelicitous in the progressive (a), unless a shift into a temporally extended construal (b-c):
  - a. ? *John is noticing that Mary has cut her hair.* (Rothstein 2004)
  - b. *John looked at his watch like he was noticing it for the first time.* “slow motion”
  - c. *John was knocking at my door.* multiplicity-of-subevents
  
- the imperfective paradox NOT induced in a “slow-motion” construal (Rothstein 2004):  
denial of the culmination IS odd or contradictory
  - d. # *The critic is noticing the new picture but she hasn’t noticed it yet.*
  
- *flash (once)* is a semelfactive verb; other examples of semelfactives: *snap, blink, hit* (“punctual occurrences”, in Mourelatos 1978/81), *knock, cough*

### Subdividing ACHIEVEMENT predicates based on PROG in English

Bach 1986: Aspectual classes (aka "EVENTUALITY TYPES")



## Subdividing ACHIEVEMENT predicates

3 classes of semelfactives

Criterion	CULMINATION <i>arrive, reach the top, die</i>	HAPPENING <i>recognize, notice</i>	SEMELFACTIVE <i>flash, knock, cough</i>
(1) felicitous in the progressive, under the unmarked interpretation of a singular situation “in progress” (patterns with accomplishments)	yes	no	no
(2) the acceptability in the progressive, improves under the “slow motion” construal	NA	yes	yes
(3) For all <i>x</i> , <i>x was V-ing</i> strongly suggests <i>x V-ed repeatedly</i> , whereby <i>x</i> is assigned to singular individuals	no	no	yes
(4) For all <i>x</i> , <i>x V-ed</i> , whereby <i>x</i> is assigned to singular individuals, can be naturally interpreted as <i>x V-ed once</i> or <i>x V-ed repeatedly</i>	no	no	yes
(5) <i>x V-ed in five minutes</i> enforces the “onset” reading of <i>x V-ed after five minutes</i> (also with <i>It took five minutes</i> )	no	yes	yes

## Subdividing ACHIEVEMENT predicates

- |     |              |   |                                     |
|-----|--------------|---|-------------------------------------|
| (1) | CULMINATION  | <i>The train was arriving.</i>                                      | imperfective paradox                |
| (2) | HAPPENING    | <i>Mary is finally noticing that John has shaved off his beard.</i> | “slow-motion” Rothstein 2004, p.    |
| (3) | SEMELFACTIVE | <i>John is knocking at my door.</i>                                 | series of knocks, repetitive        |
| (4) | CULMINATION  | <i>The train arrived.</i>   | one instance of arrival             |
|     | HAPPENING    | <i>Ashley noticed the spot.</i>                                     | one instance of noticing the spot   |
|     | SEMELFACTIVE | <i>Kelly blinked.</i>   | one blink or a series of blinks     |
| (5) | CULMINATION  | <i>The train arrived in 10 minutes.</i>                             | measure of e / time until e’s onset |
|     | HAPPENING    | <i>Ashley noticed the spot in 10 minutes.</i>                       | time until e’s onset                |
|     | SEMELFACTIVE | <i>Kelly blinked in 10 minutes.</i>                                 | time until e’s onset                |

## Subdividing ACHIEVEMENT predicates

- The application of aspectual tests to semelfactives

(i) iterated semelfactives pattern with activities

(ii) semelfactives versus achievements

- (i) **iterated semelfactives pattern with activities** (based on Levin 1999)

Grammatically/semantically, **iterated** semelfactive verbs pattern as activities, not as achievements. Semelfactives, like activities, are manner verbs, not result verbs.

Iterated semelfactives are indistinguishable from activities with respect to aspectual diagnostics.

— Both are straightforwardly compatible with the *for  $\alpha$  time adverbial*

- (1) a. ACTIVITY: Kelly danced for 10 minutes.  
b. SEMELFACTIVE: Kelly blinked for 10 minutes.

—Both fail to induce the imperfective paradox when used in the progressive, i.e., whenever *X is V-ing* is true, then *X V-ed* or *X has V-ed* is true.

- (2) a. ACTIVITY: If *Kelly is dancing* is T, then *Kelly (has) danced* is T.  
b. SEMELFACTIVE: If *Kelly is blinking* is T, then *Kelly (has) blinked* is T.

## Subdividing ACHIEVEMENT predicates

### (ii) Semelfactives versus achievements (based on Levin 2009)

— Semelfactives can naturally receive an interpretation where the relevant action is iterated, as well as one where the relevant action is performed only once.

#### (1) Kelly blinked. SEMELFACTIVE

can be understood to describe one blink or a series of blinks

In Russian the two interpretations require distinct verb forms; semelfactives contain the suffix *-nu-*, which is one reason that this class is recognized in the Russian literature on aspect.

#### (2) a. prygnut' (pf) 'jump once'                      b. prygat' (ipf) 'jump more than once'

— Achievements differ from semelfactives in not allowing iterated interpretations naturally.

#### (3) Ashley noticed the spot. ACHIEVEMENT/HAPPENING

can report on only one instance of noticing the spot and not on multiple instances.

— Semelfactives interpreted iteratively describe a single situation, while iterated accomplishments and culminations (a special case of achievements) are understood as describing multiple events.

- |        |                               |  |                         |
|--------|-------------------------------|--|-------------------------|
| (4) a. | Kelly blinked repeatedly.     | single event (with discrete subevents) | SEMELFACTIVE            |
| b.     | John arrived repeatedly late. | plurality of events                    | ACHIEVEMENT-CULMINATION |

## Subdividing ACHIEVEMENT predicates

### (ii) Semelfactives versus achievements (based on Levin 2009) (cont.)

#### ACHIEVEMENT

an “instantaneous change of state” **with an outcome of a new state**, e.g. *reach the top*, *win the race* (Dowty 1979, Smith 1991/2013, p.28)

#### SEMELFACTIVE

- an instantaneous event, e.g. *knock*, *cough*; semelfactives are atelic (Smith 1991/2013, p.28)
- ‘full-cycle resettable’ verbs, namely verbs which describe situations that end with the return to the initial state (Talmy 1985)

## ACHIEVEMENT predicates: many outstanding questions

- Question: What is the status of SEMELFACTIVES? Should they be subsumed under achievements, as a special case, or should they be viewed as an independent aspectual class?

Smith (1991/1997, p.20): A feature based classification of situation types

	static	telic	durative
STATE	+	-	+
ACTIVITY	-	-	+
ACCOMPLISHMENT	-	+	+
ACHIEVEMENT	-	+	-
<b>SEMELFACTIVE</b>	-	-	-

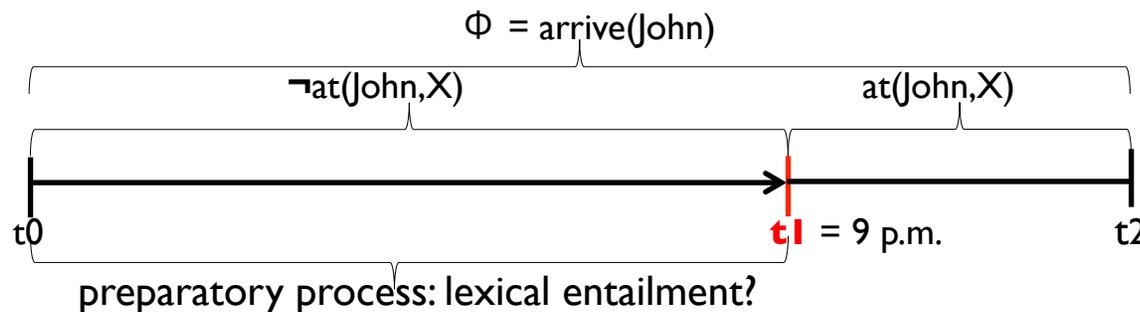
### SEMELFACTIVES

- atelic instantaneous predicates
- no preliminary stages, no resultant stages
- denote the simplest types of events

## ACHIEVEMENT predicates: many outstanding puzzles

### CULMINATION Puzzle (“culmination” in the sense of Bach 1981)

- All agree that achievement verbs like *arrive*, *reach (the top)* are telic since they denote a set of instantaneous events of changing from a situation of not being at place X to being at place X (outcome of a new state), and when that change is over, events they describe are over.
- What is conceived of as an instantaneous change from NOT being at X to being at X is preceded by a preparatory activity or process characterized by successive phases leading up to the end state, and which may be modified by agent-oriented adverbials (*deliberately*):



- (1) *John deliberately arrived exactly at 9 p.m.*  
 asserts that at all times before 9 p.m. John had not arrived at some place X, and at all times at or after 9 p.m. John had arrived at some place X.
- Question: Is the preparatory process a matter of lexical entailment of achievement verbs ?

## ACHIEVEMENT predicates: many outstanding puzzles

Question: Is the preparatory process a matter of lexical entailment of achievement verbs ?

- (1) LEXICAL ENTAILMENT: It is a meaning component in the lexical structure (entailment) of culmination-achievements like *arrive*. Argument: modification by means of agent-oriented adverbials (*deliberately*).
- (2) ASPECTUAL COERCION: It is a meaning component added to resolve a semantic type mismatch. For instance, Rothstein (2004, p.26) proposes that achievements like *arrive* only lexicalize the instantaneous change of state; the felicity of progressive achievements (*John was arriving at the station*) is due to a contextually licensed *shift* (coercion) triggered by the semantic type mismatch between the PROG input requirement ([+dynamic, +temporal\_extended] predicate) and the instantaneous achievement predicate. The mismatch is resolved by shifting from the semantically provided instantaneous change of state to the end state to the pragmatically provided *process* leading up to the end state:

FUNCTOR-ARGUMENT CLASH: [PROG [arrive(John)]]

COERCION: [PROG [CPROCESS [arrive(John)]]]

**C\_PROCESS** coercion operator: a function from sets of achievement eventualities onto sets of their associated preparatory processes.

- (3) Another solution in terms of a GRANULARITY-RELATIVE TEMPORAL TRACE:  
[Zsófia Gyarmathy, Achievements, durativity and scales, PhD Thesis Heinrich Heine University, 2015.](#)

## SUMMARY: Vendler's (1957) four aspectual classes (updated)

- Two semantic properties distinguish

	SUCCESSIVE PHASES	TERMINUS	HOMOGENEITY
STATE	—	—	NA
ACHIEVEMENT	—	+	NA
ACTIVITY	+	—	+
ACCOMPLISHMENT	+	+	—

- Key grammatical properties

	PROG	PROG singular e	PROG(P)→P	at [time-point] adv	in $\alpha$ time adv measure of e
STATE	+ / —	+	+	—	—
ACHIEVEMENT	+ / —	+ / —	+ / — (Imp.Paradox)	+	—
ACTIVITY	+	+	+	—	—
ACCOMPLISHMENT	+	+	— (Imp.Paradox)	—	+

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ACHIEVEMENT	+ / —	+ / —	+ / — (Imp.Paradox)	+	—
ACTIVITY	+	+	+	—	—
ACCOMPLISHMENT	+	+	— (Imp.Paradox)	—	+

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ACHIEVEMENT	+ / —	+ / —	+ / — (Imp.Paradox)	+	—
ACTIVITY	+	+	+	—	—
ACCOMPLISHMENT	+	+	— (Imp.Paradox)	—	+

## Mereological properties of aspectual classes

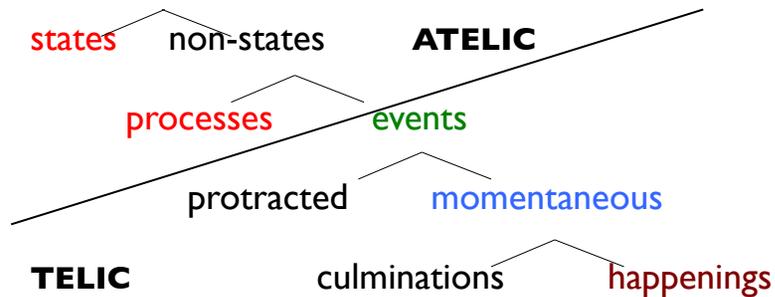
- ACTIVITY pattern with STATES: motivated in terms of their shared homogeneity property  
ACTIVITIES and also STATES are **homogeneous** (Landman & Rothstein 2010, 2012), but the **subinterval property** of ACTIVITIES (Bennett & Partee 1972/78) is an appropriate interpretation of only homogeneity of STATES predicates.

Bennett & Partee (1972) (see also Dowty, 1979, p. 334): An ACTIVITY predicate  $P$  holds at an interval  $t$ , and it also holds at every subinterval of  $t$ , all the way down to instants.

- STATE  $P$ s are homogeneous down to instants: STATE  $P$  has the subinterval property if whenever it holds of an interval, it holds for every subinterval of that state, including instants.  
STATE  $P$ s are strongly homogeneous.
- ACTIVITY  $P$  are homogeneous down to intervals of a certain minimal size (a weakened version of Bennett & Partee's subinterval property, see the discussion in Taylor 1977, Dowty 1979, Bach 1981): ACTIVITY  $P$  has the subinterval property if whenever it holds of an interval, it holds for all subintervals of that interval, excluding intervals too small to for an activity of type  $P$  to hold at.  
ACTIVITY  $P$  are weakly homogeneous.

## Mereological properties of aspectual classes

EVENTUALITIES (Bach 1986)



DISTINGUISHING PROPERTY:

strongly homogeneous

weakly homogeneous discrete atomicity (Krifka 2013)

change of state has no proper parts

event has no proper parts

STATES: *(be) intelligent, resemble x, own x, love x*

PROCESSES: *walk, push a cart, be mean (Agentive)*

EVENTS protracted: *build x, walk to Boston; recover* (see Krifka 2013)

culminations: *die, reach the top; arrive* (see Krifka 2013)

happenings: *flash once, recognize, notice*

### Mereological properties of aspectual classes

- Discrete Atomicity (Krifka 2013):
  - To be assumed for **telic** verbs:  
*recover* (accomplishment/protracted event), *arrive* (culmination), *drip* (happenings)
  - Not to be assumed for atelic verbs:  
*flow*, *walk*, *waltz* (activity/process)
- Key grammatical property: Counting constructions relying on atoms.

Cardinal count adverbials like *three times* are straightforwardly compatible with telic verbs, but not with atelic ones. Vague quantifiers like *a lot* select atelic verbs (Mourelatos 1978/81, Bach 1986)

- |     |    |  |        |
|-----|----|--|--------|
| (1) | a. | Vesuvius erupted three times.          | TELIC  |
|     | b. | John slept (*) three times last night. | ATELIC |
| (2) | a. | Vesuvius erupted (*) a lot.            | TELIC  |
|     | b. | John slept a lot last night.           | ATELIC |

Atomicity (Krifka 2013):

Clearly to be assumed for *recover*, *arrive*, *drip*.

Also to be assumed for *walk*, *waltz*: minimal parts (also Rothstein 2004; Landman & Rothstein 2012).

To be assumed for *flow* only if event ontology in general is atomic.

(Also, to be assumed for statives only if time is granular.)

## Mereological properties of aspectual classes

Strategies to change the aspectual (mereological) type: Shift and coercion

- Verkuyl (1972): achievement Vs may head atelic predicates when their arguments are bare plurals or mass. The relevant argument may even be the subject NP:

- (1) a. Tourists discovered this village all summer. ITERATIVITY  
b. Guests arrived at the hotel for some hours.

- Vendler (1957): State to happening/semelfactive coercion

- (2) And then I knew it!

- Dowty (1979:61): activity to accomplishment coercion

- (3) Today John swam [i.e., a certain distance] in an hour

- Negation: telic to atelic shift (Rothstein “Aspect”, in press)

- (4) a. #John ate an apple for a week.  
b. John didn't eat an apple for a week.

(not a complete list, just a few illustrative cases)

## Mereological properties of aspectual classes

The aspectual class of basic verbs (= lexical aspect) does not always determine the aspectual class of VPs and Ss into which they are integrated. Three different positions:

- (1) Aspectual classes concern VPs rather than Vs, so denying the relevance of lexical aspect (Verkuyl (1972, and elsewhere).
- (2) Lexical aspect and aspectual classes have no linguistic relevance, they constitute generalizations over classes of predicates that are not relevant to the grammar of natural languages (Borer 2005).

Emphasis on pragmatic and cognitive factors: the Aristotelian categorization “is not a categorization of verbs, it is not a categorization of sentences, but rather of the propositions conveyed by utterances, given particular background assumptions by speaker and/or hearer about the nature of the situations under discussion” (Dowty 1979, p.185). But this emphasis does not force us to deny the relevance of lexical aspect/aspectual classes.

- (3) Lexical aspect has linguistic relevance: aspectual class of a verb (= lexical aspect) constrains how the aspectual class assignment of the VP and S is determined.

Argument: When a given verb, a VP or a S changes its aspectual class in dependence on context, this change follows systematic patterns, and they are largely determined by the lexical aspect of their head verb (Krifka 1989, 1992, 1998; Filip 1993/99, and elsewhere; Rothstein (2004, 2008, 2012).

## Mereological properties of aspectual classes

		ATELIC <i>for ten minutes</i>	TELIC <i>in ten minutes</i>
(I) a.	John <b>ate</b> soup/apples	√	*
b.	John <b>ate</b> the soup	(√)	√
c.	John <b>ate</b> the/an apple	(*)	√
d.	John <b>ate</b> two apples	(*)	√

		ATELIC <i>for ten minutes</i>	TELIC <i>in ten minutes</i>
(I) a.	John <b>saw</b> soup/apples	√	*
b.	John <b>saw</b> the soup	√	*
c.	John <b>saw</b> the/an apple	√	*
d.	John <b>saw</b> two apples	√	*

Note: *in ten minutes* - inchoative interpretation irrelevant for this test

### Mereological properties of aspectual classes

Aspectual Composition(ality): Verkuyl 1972, Krifka 1986, Filip 1993/99

		ATELIC <i>for ten minutes</i>	TELIC <i>in ten minutes</i>
(I) a.	John ate soup/apples	√	*
b.	John ate the soup	(√)	√
c.	John ate the/an apple	(*)	√
d.	John ate two apples	(*)	√

Note: *in ten minutes* - inchoative interpretation irrelevant for this test

## Mereological approach to aspectual composition

Krifka 1986, 1989, 1992 (and elsewhere)

THEORETICAL BACKGROUND: event semantics with lattice structures, following proposals mainly in Link (1983, 1987) and Bach (1981, 1986)

### CENTRAL HYPOTHESIS:

- *Aspectual Composition* follows from the lexical semantics of certain episodic verbs: namely, it is mediated via the (Strictly) Incremental Theme thematic role, which may be associated with various syntactic positions.
- A part of the meaning of such episodic verbs is the entailment that there exists a homomorphism (a one-to-one mapping) between the part structure (lattice structure) of the denotation of their (Strictly) Incremental Theme argument and the part structure (lattice structure) associated with the event argument.

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## Mereological approach to aspectual composition (Krifka)

### TOOLS

- homomorphism and Incremental Theme
  - Krifka (1986, 1989, 1992): 'Successive Patient,' or 'Gradual Patient'
  - Dowty (1987, 1991): 'Incremental Theme'
- cumulative and quantized predicates
  - Krifka (ibid.)
  - represented by means of non-atomic vs. atomic lattice structures in the entity domain and the eventuality domain (following proposals in Bach 1986, Link 1987)

$$\text{CUMULATIVE}(P) \Leftrightarrow \forall x,y[P(x) \wedge P(y) \rightarrow P(x \oplus y)]$$

A predicate  $P$  is *cumulative* if and only if, whenever  $P$  applies to any  $x$  and  $y$ , it also applies to the sum of  $x$  and  $y$  (assuming that  $x$  and  $y$  to which  $P$  applies are two distinct entities).

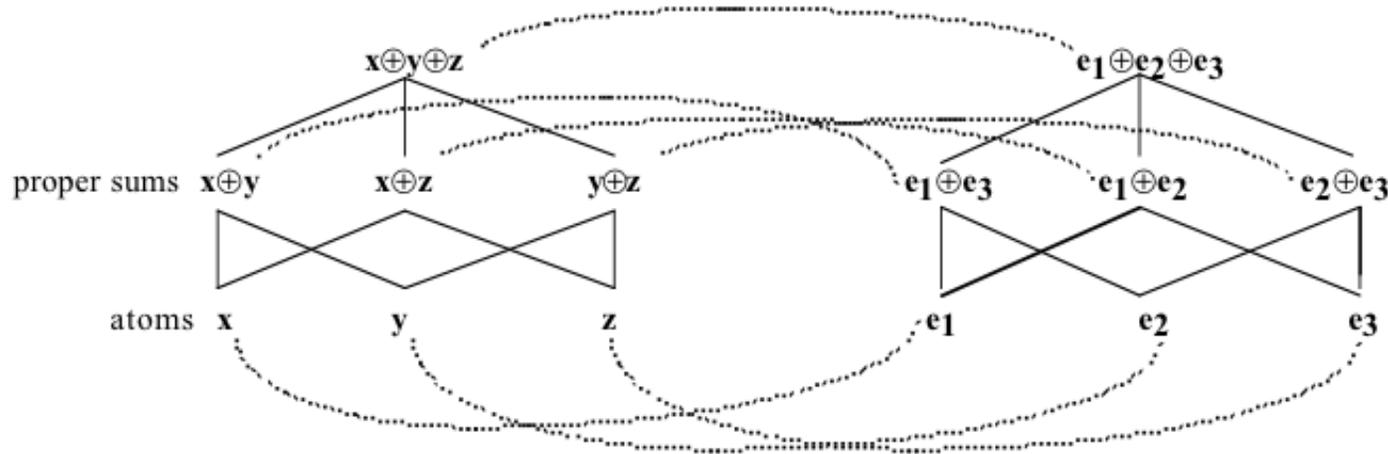
$$\text{QUA}(P) \Leftrightarrow \forall x,y[P(x) \wedge P(y) \rightarrow \neg y < x]$$

A predicate  $P$  is *quantized* iff whenever  $P$  applies to  $x$  and  $y$ ,  $y$  cannot be a proper part of  $x$ .

- extensive measure function
  - Krifka (ibid.)
  - derives quantized predicates from cumulative ones

## Mereological approach to aspectual composition (Krifka)

### OBJECT-EVENT HOMOMORPHISM



*eat three apples* (accomplishment, event-denoting, telic)

apple =  $\{x, y, z\}$

$e_1, e_2, e_3$ : events of eating of a single apple

' $\oplus$ ': mereological sum operation

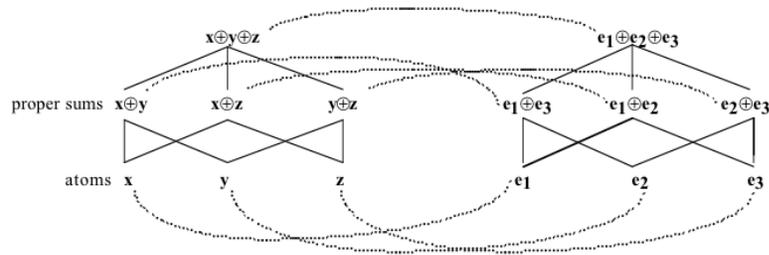
' $\leq$ ': mereological part relation:  $\forall x, y \in U [x \leq y \leftrightarrow x \oplus y = y]$

Homomorphism is a function, and it is structure-preserving.

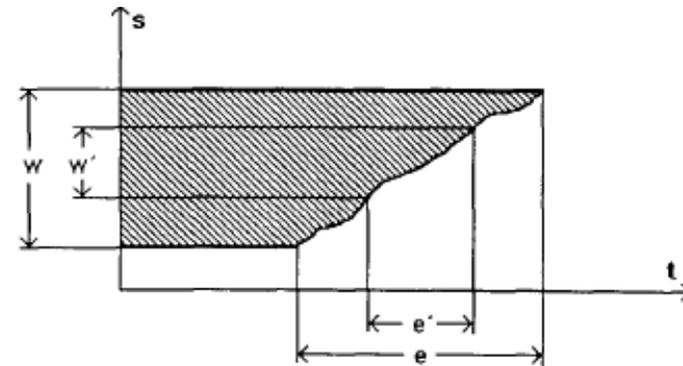
Mereological approach to aspectual composition (Krifka)

OBJECT-EVENT HOMOMORPHISM

object-event mapping



object-event mapping with an added temporal trace represented as a space-time diagram



- w: an apple
- e: event of eating of an apple

### Mereological approach to aspectual composition (Krifka)

- 3 aspectual classes of verbs (lexical aspect classes) (Krifka 2001, Filip 1993/99):
  - Vs like **run** (activity, process) are **cumulative**. If  $e_1$  is an event of running and  $e_2$  is an event of running, then their mereological sum,  $e_1 \oplus e_2$ , is an event of running.
  - Vs like **recover** (accomplishment, telic) are **quantized**. If  $e$  is an event of recovering, then no proper part of  $e$  is an event of recovering.
  - Vs like **eat, build, drink** are **incremental**: neither cumulative nor quantized. They entail a homomorphism between the lattice structure (part-whole structure) associated with the referent of their Incremental Theme argument and the lattice structure associated with their event argument.

#### Example:

The object thematic relation for *drink* is  $\{ \langle y, e \rangle \mid \text{DRINK}(x, y, e) \}$ , which gives us (for every interpretation of  $x$ ) the set of pairs  $\langle y, e \rangle$  such that  $y$  was drunk in the event  $e$  (by  $x$ ).

The thematic relation between  $y$  and  $e$  is characterized as a structure-preserving mapping between the parts (lattice structure) of  $y$  and the parts (lattice structure) of  $e$ .

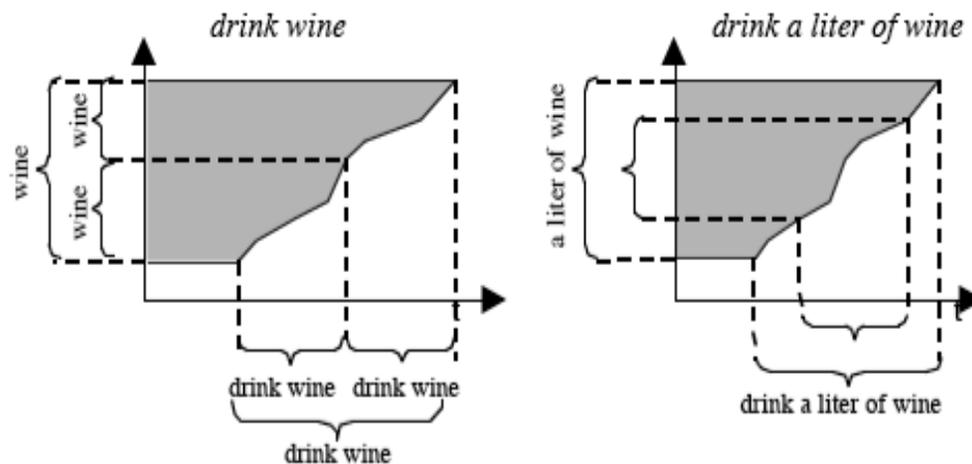
### Mereological approach to aspectual composition (Krifka)

- the **aspectual composition** directly follows the semantic composition of a sentence: namely, the way in which verbs normally combine with their arguments by applying compositional semantic rules to independently motivated syntactic structures:
  - **quantized Incremental Theme argument**  $\approx$  **quantized predication**
  - **cumulative Incremental Theme argument**  $\approx$  **cumulative predication**  
(in a singular predication, i.e., the existential closure over the event argument is not a plural quantification)

### Mereological approach to aspectual composition (Krifka)

- quantized argument *a liter of wine*  $\approx$  quantized (telic) predicate *drink a liter of wine*
- cumulative argument *wine*  $\approx$  cumulative (atelic) predicate *drink wine*

Space-time diagrams: Transfer of cumulativity and quantization properties (Krifka 2001)



- When a verb like *drink* combines with *a liter of wine*, its Incremental Theme argument, the object-event homomorphism establishes a mapping between the denotation of *a liter of wine* and the denotation of *drink a liter of wine*, and between subparts of that liter of wine and subevents of drinking subquantities from that liter of wine. Consequently, *a liter of wine* enforces the quantized (telic) interpretation of *drink a liter of wine*.
- In *drink wine*, the same object-event homomorphism entailed by *drink* ensures that *wine* enforces the cumulative (atelic) interpretation of *drink wine*.

## Mereological approach to aspectual composition (Krifka)

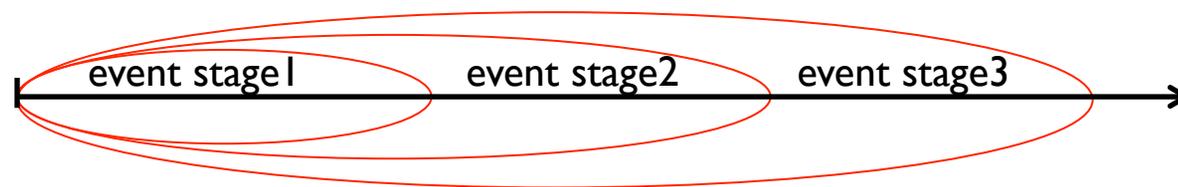
- Key insight: Events are measured (“delimited”) **indirectly** via objects (e.g., in *drink a glass of wine*, the quantity of wine in a glass measures the extent of drinking events). Events have no physical properties *per se* which can be measured directly, the size or contours of an event must be measured via its relation with some other entity, or property of some other entity.
- Problems:
  - (i) Incremental Themes that fail to be quantized and yet yield quantized (telic) predicates: e.g., *a sequence of numbers, a lot of numbers, a ribbon* (see L. Carlson 1981, Partee p.c. to Krifka, Mittwoch 1988, Dahl 1991, Moltmann 1991, White 1994, Zucchi & White 1996, Zucchi & White 2001, among others)
    - (1) a. John wrote a sequence of numbers *for* ten seconds / in ten seconds.
    - b. John drank at least three bottles of wine *\*for* an hour / in an hour.
  - (ii) Incremental Themes that are quantized but fail to guarantee the quantization (telicity) of predicates; a large class of VP’s with quantized Incremental Themes in English easily shift between telic and atelic interpretations, in dependence on context (see e.g., Partee 1999, Kratzer 2004):
    - (2) a. He read a book *in/for* an hour. Fillmore 1971 (in Dowty 1979, p.61)
    - b. Bill ate the apple bit by bit *for* ten minutes (and still didn’t finish it). Jackendoff 1996
    - c. She ate the sandwich *in* 5 minutes/ *for* 5 minutes. Hay et al 1999

### Telicity as maximization over event stages (Filip & Rothstein 2005, Filip 2008)

- (I) a. John wrote a sequence of numbers *for* ten seconds / in ten seconds.  
 b. John drank at least three bottles of wine *\*for* an hour / in an hour.
- $MAX_E$  is a monadic operator, such that  $MAX_E(\Sigma) \subset \Sigma$ , which maps sets of partially ordered events  $\Sigma$  onto sets of maximal events  $MAX_E(\Sigma)$ .  $MAX_E$  maximizes a set of events ordered by a scale induced by the lexical information constraining the (STRICTLY) INCREMENTAL THEME relation on that set of events.

Example: The VP *drink at least three bottles of wine* generates an ordering of events, in which an event of drinking of two bottles of wine can be viewed as “a more developed version” (Landman 1992, p.23) or STAGE of an event of drinking of one bottle of wine, and so on, with ‘smaller’ events constituting stages of ‘larger’ ones. The extent of each stage is indirectly MEASURED via the quantity of wine drunk during that stage.

When applied to such an ordering of event stages,  $MAX_E$  picks out the unique largest event at a given situation, hence the VP *drink at least three bottles of wine* is telic, relying on pragmatic inferences based on scalar implicatures (Horn 1972, Gazdar 1979, Levinson 1984), which are generally motivated by Grice’s first submaxim of Quantity (Grice 1967/75).



**A note on the STAGE-OF relation Landman (1992, 2008)**

For events:  $e1$  is a stage of  $e2$ :  $e1 \preceq e2$ .

If  $e1$  and  $e2$  are events and  $e1$  is a stage of  $e2$  then:

- i. Part of:  $e1 \leq e2$ ,  $e1$  is part of  $e2$  (and hence  $\tau(e1) \subseteq \tau(e2)$ ).
- ii. Cross-temporal identity:  $e1$  and  $e2$  share the same essence: they count intuitively as the same event or process at different times.
- iii. Kinesis:  $e1$  and  $e2$  are qualitatively distinguishable,  $e1$  is an earlier version of  $e2$ ,  $e1$  grows into  $e2$ .

### A note on the **STAGE-OF** relation Landman (1992, 2008)

**PROGRESSIVE** =

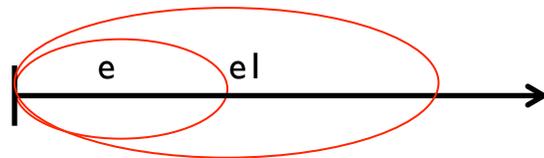
Landman 2008

$\lambda P \lambda e. \exists e' \in P: e \preceq_e e' \wedge \mathbf{CONTINUATION}(e, e')$

$e$  and  $e'$  are variables over eventualities

$P$  is a variable over sets of eventualities.

- *PROG* is a function from a set of eventualities  $P$  onto the set of all eventualities that are stages of some eventuality in  $P$ . A progressive sentence is true if a stage of an eventuality in  $P$  develops into an eventuality in  $P$  with a further modal constraint added.
- **CONTINUATION**( $e, e'$ ) means that if stage  $e$  of  $e'$  is realized in a world, then the minimal  $i$ -stage of  $e'$ ,  $e_m$ , that  $e$  is part of is realized in that world, and  $e'$  itself is realized in world where a reasonable amount of interruptions of the continuation process of  $e_m$  are discarded.



**A note on the STAGE-OF relation Landman (1992, 2008)**

The imperfective paradox (Dowty 1979) or the partitive puzzle (Bach 1986)

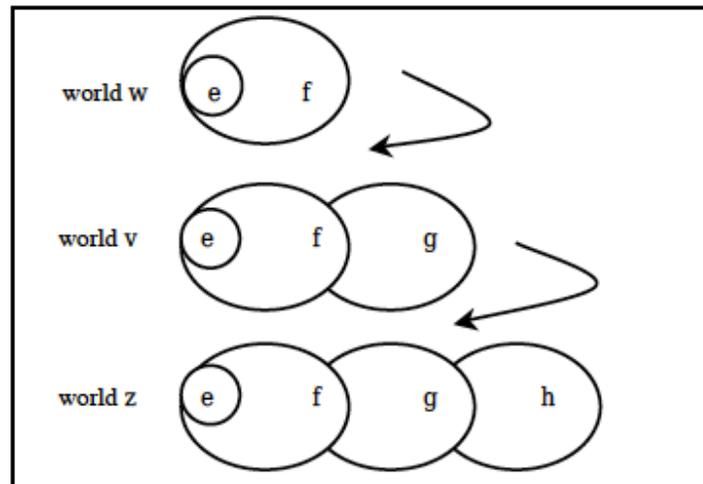
- (I) a. John was composing a symphony.  
b. John composed a symphony.

- What we assert in sentences like (Ia) is that there is an ongoing event, which may develop into an event of the kind denoted by (Ib).
- If John gets interrupted while composing a symphony, the event validating the assertion in (Ia) is not a stage of an actual event that leads to the composition of a whole symphony, expressed by (Ib); instead, it is merely a STAGE of a symphony-composing event in a world similar to ours.

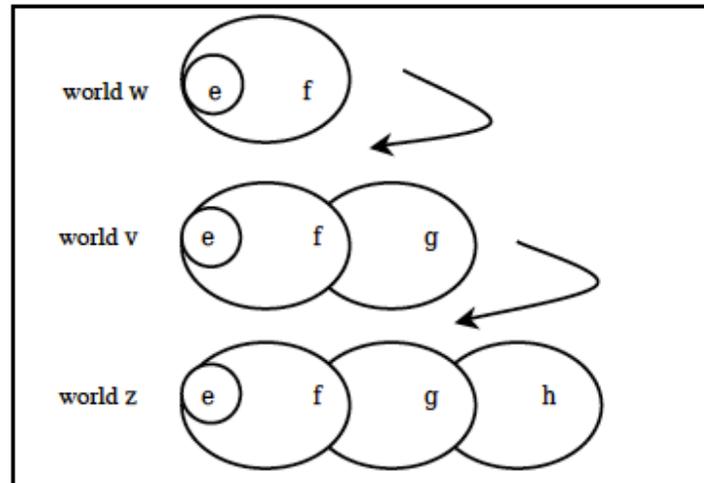
### A note on the STAGE-OF relation Landman (1992, 2008)

When evaluating a progressive sentence, one takes the event stage that warrants the assertion in the world of evaluation and follows this event stage through its development. If it **culminates** in the world of evaluation, then the sentence is true.

### Continuation Branch



If the event is interrupted before it can culminate, i.e. **it ceases to develop in the world of evaluation**, we jump to the closest world—which is like the world of evaluation, except that the event was not interrupted in this world—and follow through its development there. If there is another interruption, we jump to the next closest world and carry on following through the development of the event ... and so on.

**A note on the STAGE-OF relation Landman (1992, 2008)****Continuation Branch**

Eventually, either one finds that the original event stage **culminates**, in which case the sentence is true, or one decides that we are too far from the original world, in which case the sentence is false.

**Telicity as maximization over event stages (Filip & Rothstein 2005, Filip 2008)**

- Key insight: Telicity is grounded in the constraints on grammatical strategies for individuation of events.
- What counts as a maximal event in the denotation of a telic sentence in a given situation is derived from basic components of meaning that are directly related to the grammar of measurement and closely related scalar semantics.

### Perfectivity as maximization over event stages (Filip & Rothstein 2005, Filip 2008; Altshuler & Filip 2014)

- The maximization operator on events is at the intersection of telicity in Germanic languages and the semantics of the grammatical category of perfectivity.

This semantic analysis of *perfectivity* incorporates Landman's (1992, 2008) 'stage-of' relation, originally proposed for the analysis of the progressive operator (*PROG*) in English.

- The perfective (*PFV*) operator introduces a MAXIMAL STAGE requirement into the logical representation that is satisfied when event stages either
  - 'culminate' or
  - 'cease to develop' in the actual world.

(i) Maja s'ela<sup>PERF</sup> jabloko #desjat' minut / #no ne do konca.  
 Maya **PREF.ate** apple.ACC ten minutes / but not until end  
 'Maya ate up the apple #for ten minutes/#but not until the end.'

(ii) Maja po.guljala<sup>PERF</sup> v parke. Quantization Puzzle (Filip 2000, also Filip 1992)  
 Maya **PREF.walked** in park  
 'Maya walked in the park.'

(ii): the V has the formal PERF properties, but lacks the culmination requirement; therefore it is intractable in any semantic analysis of PERF predicates that uniformly treats them as denoting culminated or completed events.

**Perfectivity as maximization over event stages (Filip & Rothstein 2005, Filip 2008; Altshuler & Filip 2014)**

- The MAXIMAL STAGE requirement introduced by  $MAX_E$  is needed to account for predicates that lack the culmination requirement, but are formally PFV or exhibit the formal behavior of semantically quantized (telic) predicates (English):

Slavic languages (Filip 1992, 1993/99, 2000, 2008; Filip & Rothstein 2005), Hindi (Singh 1991, 1998; Arunachalam & Kothari 2010; Altshuler 2013), Japanese (Ikegami 1985), Karachay-Balkar (Tatevosov 2007), Malagasy (Travis 2000), Mandarin (Teng 1972, Soh & Kuo 2005, Koenig & Chief 2008), Punjabi (Raja 2003), St'át'imcets and Skwxwúmesh (Bar-el Davis & Matthewson 2005), Tagalog (Dell 1987); Tamil (Pederson 2007); Thai (Koenig & Muansuwan 2000), among others.

**Perfectivity as maximization over event stages (Filip & Rothstein 2005, Filip 2008; Altshuler & Filip 2014)**

Hindi

- (1) *mere pitaa-jii hamaare ghar aa-ye (#lekin hamaaraa ghar nahiiN DhoonD sake)*  
 my father our house **come-PFV** but our house not find could  
 ‘My father came to our house (#but was unable to find it)’ (Rajesh Bhatt, p.c.)
- (2) *maayaa-ne biskuT-ko khaa-yaa (#aur use ab-tak khaa rahii hai / par use puuraa nahiiin khaa-yaa)*  
 Maya-ERG cookie-ACC eat-PFV and it still eat PROG be.PRS but it finish not eat-PFV  
 ‘Maya ate the cookie (but did not finish it/#and is still eating it).’

**Perfectivity as maximization over event stages (Filip & Rothstein 2005, Filip 2008; Altshuler & Filip 2014)**

- The advantage of our proposal is that it allows for a unified analysis of perfectivity while at the same time taking into account the cross-linguistic differences, without the need of positing an additional aspectual class in the domain of grammatical aspect—viz. *neutral aspect* (Smith 1991/97), *non-completive perfective* (ter Meulen 1995), or *semi-perfective* (Koenig & Muansuwan 2000), among others.
- The outcome suggests that the ‘stage-of’relation underlies the semantics of different perfective members of grammatical aspect, not just the progressive.

END

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