Modeling progress towards completion: Causal models and the imperfective paradox

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Causal models: from the specific to the general

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- licensed by a salient model of local causal relationships (e.g., lexical causatives; Bar-Asher Siegal & Boneh 2020)
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- type-level models can be faulty (when based on false beliefs) or 'gappy', leading to contrasts with token instances

Token- vs. Type causal statement

- **A causal model** provides the set of causal relations between **variables**, as such it can be "translated" to a set of claims that specify which **properties** are causally related. Such **statements of general instance of causation** state general causal relarity or law. They provide generalizations actual cconcerning causal relations among variables.

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- **A statement of a singular instance of causation** is a claim about an **actual causal relation**, which obtains between particular events. They are about actual cause and effect, and not about those properties or types in virtue of which actual and possible instances are causally related. From the perspective of the causal model they rely on variables having or changing specific values at particular places and times.

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- On the other hand, causal models can be taken as a representation of some nomological relation among properties. In this approach token-causation statements are true in virtue of these nomological relations. Thus, causal claims are true within a model, a causal model (cf. Tooley 1987; Hoover 2001). The truth conditions of a singular instance of causation (a token-causation) are accordingly provided in terms of type-causal relations.

Causal models: the general vs. the specific

Abilities: (cf. Nadathur 2019)

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- this explains **imperfective paradox** effects from progressives of accomplishments

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The relationship between an accomplishment predicate and the associated endpoint often manifests as a **culmination entailment**, as in the English simple past:

(1) a. Maya wrote a book. → *A complete book came into being.*

b. Benny ran a marathon.
→ *Benny traversed the complete race path.*

Accomplishments and endpoints: standard view

Culmination entailments are usually explained as follows:

(i) an eventuality in the denotation of (uninflected) accomplishment predicate P **includes the culmination** as well as the process

(ii) viewpoint aspect instantiates a P-eventuality w.r.t. reference time; English PST is analyzed as an 'included' **perfective** (cf. Klein 1994)

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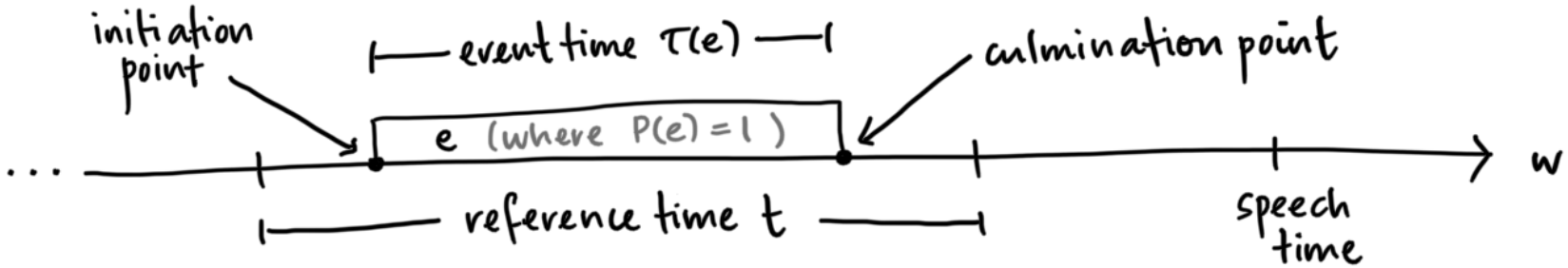
Consequently:
Since instantiating $e \in [\![P]\!]$ also realizes a P-culmination in w, $\text{PFV}(P)$ is predicted to give rise to a culmination entailment



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These assumptions lead to the **imperfective paradox:**

(Dowty 1979; partitive puzzle, Bach 1986)

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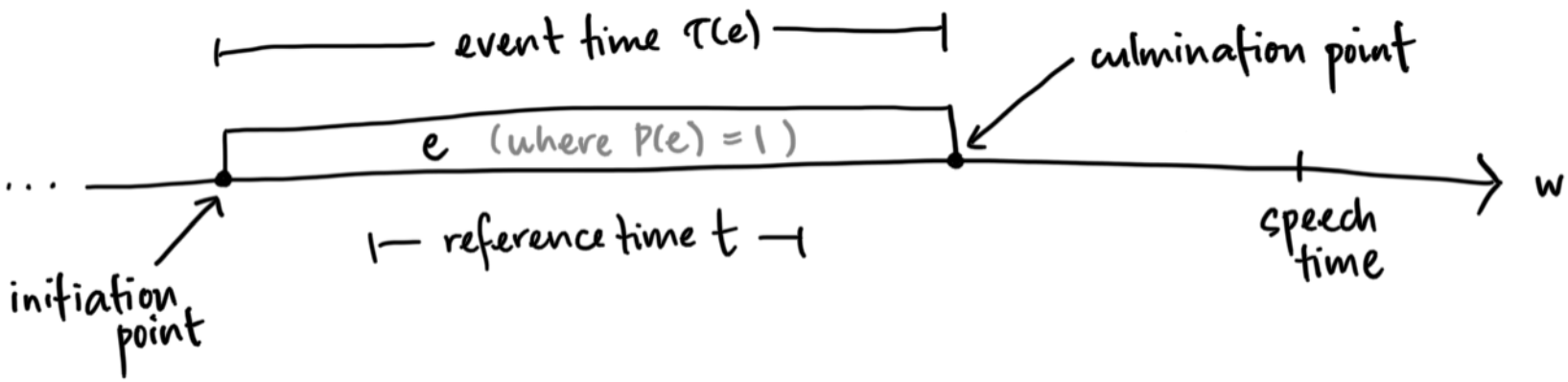
- but if $e \in [\![P]\!]$ necessarily culminates, instantiation in w via PROG still gives rise to a culmination entailment



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- **crucially:** distinctions between model idealizations and actuality allow for 'paradox' effects

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- the model also specifies sufficient sets for **non-culmination**

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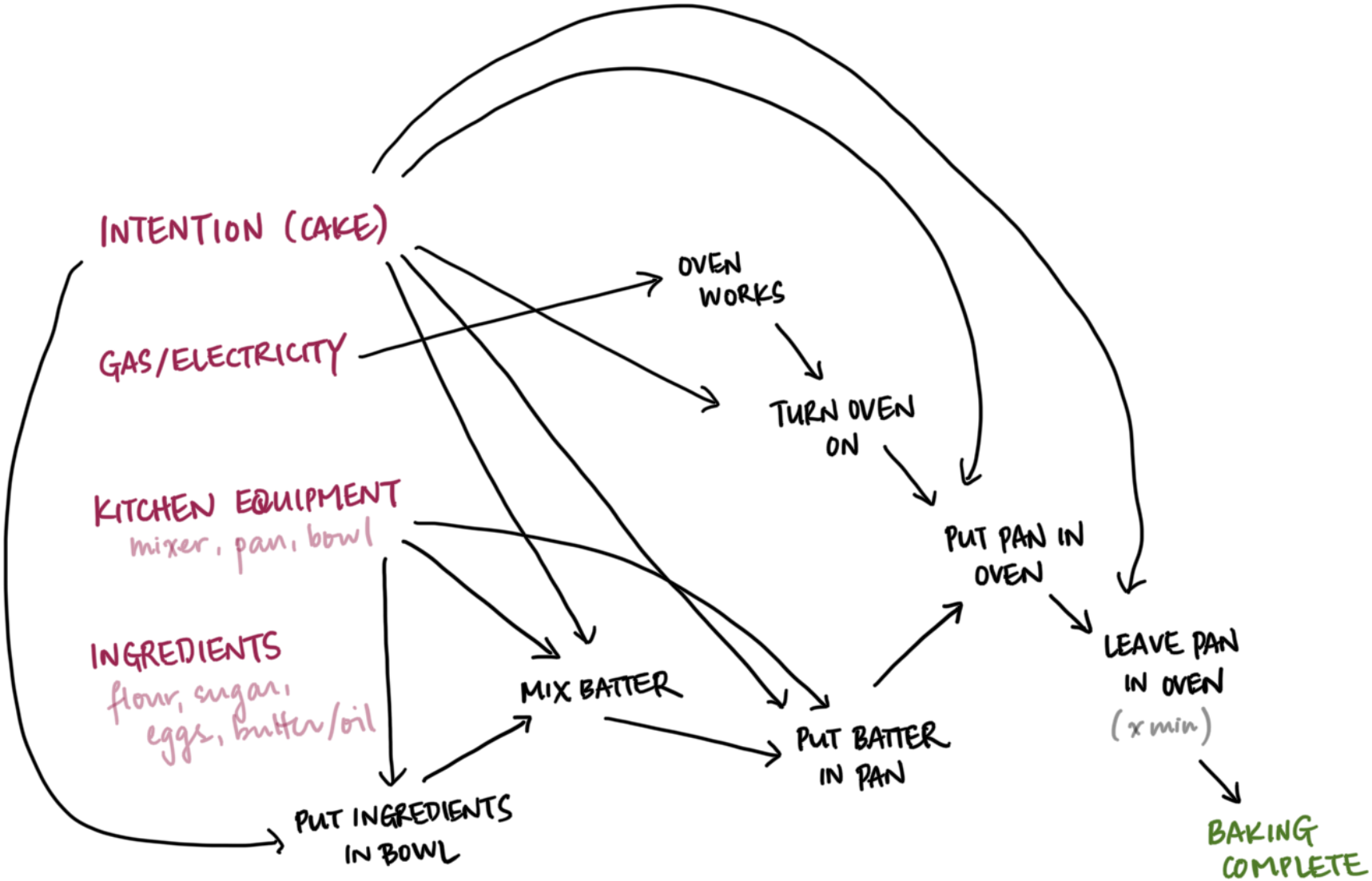
- use of P presupposes existence of a model: i.e., that, as far as the speaker knows, **there is a way to complete** P
- the model links certain conditions/steps to one another and to the realization of P's culmination, C
- a **process** for P is a set of jointly sufficient conditions for C
- the model also specifies sufficient sets for **non-culmination**

Truth conditions for PROGs of accomplishments
An actual course of events counts as an in-progress P-eventuality iff:

1. it satisfies at least one condition which is part of a sufficient set for C, according to the model
2. no sufficient set for $\neg C$ is satisfied at reference time

A model for cake-baking



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The view from causal models:
Intuitions about the possibility of culmination are actually intuitions about the structure of the model, not what happens in a specific instance (type vs. token)

Impossible tasks and intensional PROG

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Prediction from intensional PROG:
PROGs of impossible tasks are **false**, since they are not completed in any normal worlds

Local vs. global impossibility

Intensional PROG makes the same prediction for tasks that are only **'locally' impossible**:

(6) **The un(der)trained runner** (cf. Szabó 2008)

Amateur runner Benny signs up for an ultramarathon. He cannot complete it because he lacks the training and endurance, but he starts with the other runners anyway. The first few miles go well, but at the halfway point he collapses from exhaustion.

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Observation: what matters is not a circumstantial completion possibility in the local context, but instead that Benny's actions up to the point of collapse are part of *what one does* to run an ultramarathon (cf. Varasdi 2014)

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   - **NB:** it's predictable that his endurance will run out, but Benny can *and crucially did* make progress in the race until the collapse

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More generally: the type/token relationship allows us to explain otherwise confusing data about when/where the evalution-world completion possibilities matter

Another illustration: unlikely events

Unlikely events:

(7) Henrietta was crossing a minefield.

(8) **The sailing competition** (cf. Bonomi 1997)

An international association organizes a sailing competition to circumnavigate the globe. After a selection process, 100 boats are admitted, and they all set sail from the same point. A few days later, a spokesman says:

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- mutually exclusive progressives can both be true

(10) a. Henrietta was crossing the street.
b. Henrietta was walking to her death (as it turned out).

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  - the model backgrounds acquisition activities (preconditions for process steps); cake-baking begins when a process step is taken

(NB: futurate uses of PROG might have weaker prerequisites)

Getting started: underdetermination of data

(12) **The multicity problem** (Bonomi 1997)

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- (for non-agentive accomplishments: a parallel to intention comes from unmeasured forces)

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Progressives of accomplishments require causal knowledge but are **not themselves causal statements** (they do not predicate causation):

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- but the approach is stronger than a pure existential: a completion pathway in the type model represents a class or bundle of worlds (or, a generalization over token instances)