Lecture 9: Tense and grammatical aspect

Elizabeth Coppock

Introduction to Semantics · EGG 2019

Outline

Two notions of context

- **discourse context**: the information established in the discourse so far, including the facts and the discourse referents (a 'file' in Heim's sense)
- **context of utterance**: who is speaking, to whom, where, when, etc.

Same meaning or different meaning?

Same meaning or different meaning?

Same content

Same character

May 11, 2010:

I am turning 30 today.

May 12, 2010:

I am turning 30 today.

Indexical

indexical: "a word whose referent is dependent on the context of use, which provides a rule which determines the referent in terms of certain aspects of the context" (Kaplan, 1977, 490).

Examples: *I*, *my*, *you*, *that*, *this*, *here*, *now*, *tomorrow*, *yesterday*, *actual*, and *present*.

Context of utterance

The **context of utterance** determines who is speaking, to whom, when, where, and in what possible world.

$c = \langle sp, ad, t, loc, w \rangle$

Indexicals in a Kaplanian (or Kaplan-esque) framework

$I \rightsquigarrow \text{i}$ $\qquad$ $[\![\text{i}]\!]^{M,g,c} = sp(c)$

$you \rightsquigarrow \text{u}$ $\qquad$ $[\![\text{u}]\!]^{M,g,c} = ad(c)$

$now \rightsquigarrow \text{n}$ $\qquad$ $[\![\text{now}]\!]^{M,g,c} = t(c)$

$here \rightsquigarrow \text{here}$ $\qquad$ $[\![\text{here}]\!]^{M,g,c} = loc(c)$

Content

The **content** of a sentence is the proposition that is expressed after the reference of all of the indexicals has been fixed by the context of utterance.

Fixing g and c, the content of ϕ can be defined as:

$$\{M : [\![\phi]\!]^{M,g,c} = 1\}$$

Content

The **content** of a sentence is the proposition that is expressed after the reference of all of the indexicals has been fixed by the context of utterance.

Fixing g and c, the content of ϕ can be defined as:

$$\{M : \llbracket \phi \rrbracket^{M,g,c} = 1\}$$

The way Kaplan (1989) really defines it is closer to:

$$\{w : \llbracket \phi \rrbracket^{M,g,c,w} = 1\}$$

where $M = \langle D, I, W, C \rangle$ is an intensional model.

Character

The **character** of a sentence is that aspect of its meaning that is the same across different contexts of use.

Formalizable as a function from contexts of utterance to contents. Fixing g, the character is that f such that:

$$f(c) = \{M : [\![\phi]\!]^{M,g,c} = 1\}$$

Kaplan's picture

character + context = content

An alternative theory

Alternative theory: indexicals as disguised definite descriptions:

$I \rightsquigarrow \iota x . \text{Speaker}(x)$
$you \rightsquigarrow \iota x . \text{Addressee}(x)$

No need to posit a separate context of utterance.

I ≠ the person speaking

(1)   a.   If I were male, I would not be speaking right now.
      b.   If the person speaking were male, I would not be speaking right now.

I ≠ the person speaking

    (1)   a.   If I were male, I would not be speaking right now.
             b.   If the person speaking were male, I would not be speaking right now.

    (2)   a.   If Liz were male, Liz would not be speaking right now.
             b.   If the person speaking were male, Liz would not be speaking right now.

I ≠ the person speaking

(1)   a.   If I were male, I would not be speaking right now.
       b.   If the person speaking were male, I would not be speaking right now.

(2)   a.   If Liz were male, Liz would not be speaking right now.
       b.   If the person speaking were male, Liz would not be speaking right now.

(3)   a.   Ed wishes that I were male.
       b.   Ed wishes that the person speaking were male.

I ≠ the person speaking

(1) a. If I were male, I would not be speaking right now.
    b. If the person speaking were male, I would not be speaking right now.

(2) a. If Liz were male, Liz would not be speaking right now.
    b. If the person speaking were male, Liz would not be speaking right now.

(3) a. Ed wishes that I were male.
    b. Ed wishes that the person speaking were male.

(4) Ed wishes that Liz were male.

(cf. Kaplan 1977)

Kaplan (1977)

- Indexicals, like proper names, are **directly referential**: they refer to the same individual in every possible world.
- They do not look in a world to see who is the speaker there and then refer to that person.
- They directly pick out an element of the context of utterance.
- Definite descriptions like *the speaker*, in contrast, may refer to different individuals in different worlds.
- Indexicals have descriptive content, but it is part of their *character*, not their *content*.

Kaplan's conclusion

We need to add **context of utterance** as a parameter according to which we determine the semantic value of linguistic expressions:

$$\llbracket \alpha \rrbracket^{M,g,c} = ...$$

Outline

Tense: An important form of indexicality

A particularly important form of token-reflexive [indexical] symbol is found in the tenses of verbs. The tenses determine time with reference to the time point of the act of speech, i.e., of the token uttered.

(Reichenbach, 1947)

Question

What kind of meaning does 'tense morphology' (in English) have?

Tense/aspect forms

(5)	a.	Ann dances.	[simple present]
	b.	Ann danced.	[simple past]
	c.	Ann will dance.	[simple future]

(6)	a.	Ann is dancing.	[present progressive]
	b.	Ann was dancing.	[past progressive]
	c.	Ann will be dancing.	[future progressive]

(7)	a.	Ann has danced.	[present perfect]
	b.	Ann had danced.	[past perfect]
	c.	Ann will have danced.	[future perfect]

(8)	a.	Ann has been dancing.	[present perfect progressive]
	b.	Ann had been dancing.	[past perfect progressive]
	c.	Ann will have been dancing.	[future perfect prog.]

Perfect vs. (im)perfective

The English progressive expresses IMPERFECTIVE ASPECT.

Note: PERFECTIVE is totally different from PERFECT.

Perfect vs. (im)perfective

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Note: PERFECTIVE is totally different from PERFECT.

	PERFECTIVE	IMPERFECTIVE
PERFECT	*I have danced*	*I have been dancing*
NON-PERFECT	*I danced*	*I was dancing*

Perfect vs. (im)perfective

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Note: PERFECTIVE is totally different from PERFECT.

	PERFECTIVE	IMPERFECTIVE
PERFECT	*I have danced*	*I have been dancing*
NON-PERFECT	*I danced*	*I was dancing*

... although there is a historical trajectory:

RESULTATIVE ≫ PERFECT ≫ PERFECTIVE
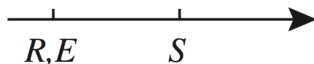
Reichenbach on simple past vs. past perfect

Past Perfect

I had seen John
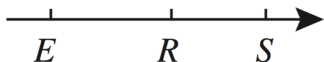
Simple Past

I saw John

E = event time
R = reference time
S = speech time

Reference time

Reference time (a.k.a. **topic time**): the time that the sentence is 'about'.

Can be explicit:

(9)   At 3pm, my father { was / had been } smoking.
       (R = 3pm)

(10)   When I was in the room, Dave { ate / had eaten } a
       cookie.
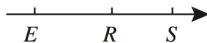   (R = the time I was in the room)

Or implicit:

(11)   (I smell smoke.) Were you smoking?
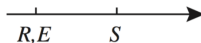   (R = time within recent past)

Past and present perfect

Past Perfect — I had seen John — E   R   S
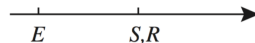
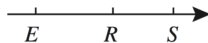Simple Past — I saw John — R,E   S

Present Perfect — I have seen John — E   S,R

Past and present perfect
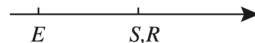
Perfect: $E < R$
Past: $R < S$

Examples

(12) Philip ceased to think of her a moment after he had settled down in his carriage.

(13) In 1678 the whole face of things had changed... Then commenced the reflux of public opinion.

(14) How unfortunate!

    a.   Now that John tells me this I have mailed the letter.

    b. #Now that John tells me this I mailed the letter.

Present and future

Present	Simple Future	Future Perfect
I see John	I shall see John	I shall have seen John
S,R,E	S,R E	S E R

Perfect: $E < R$
Past: $R < S$

Present and future

Present	Simple Future	Future Perfect
I see John	I shall see John	I shall have seen John
S,R,E	S,R E	S E R
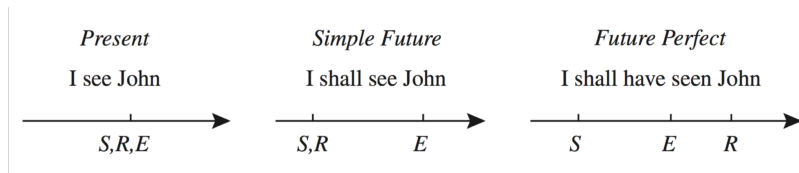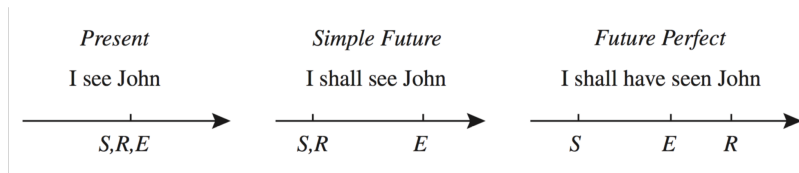
Perfect: $E < R$
Past: $R < S$
Present: $R = S$

Present and future

Present	*Simple Future*	*Future Perfect*
I see John	I shall see John	I shall have seen John
S,R,E	S,R E	S E R
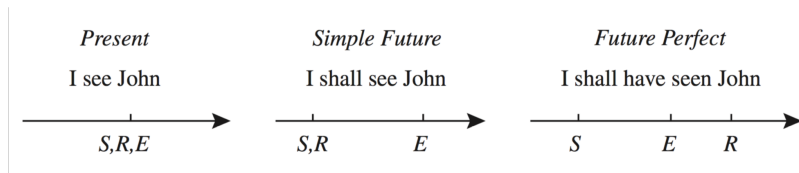
Perfect: $E < R$
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Present: $R = S$
Future:

Present and future

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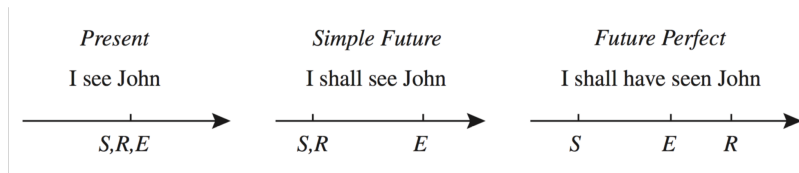
Perfect: $E < R$
Past: $R < S$
Present: $R = S$
Future: Why both $R = S$ and $S < R$?

Reichenbach was worried about sentences like:

(15)   I shall see John now.

Present and future

Present	Simple Future	Future Perfect
I see John	I shall see John	I shall have seen John
S,R,E	S,R E	S E R
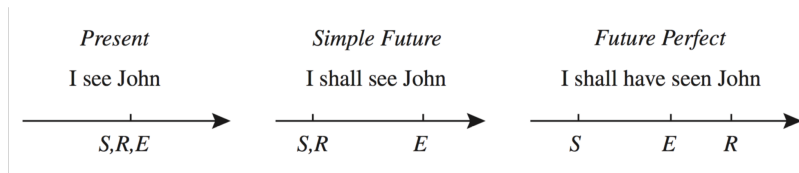
Perfect: $E < R$
Past: $R < S$
Present: $R = S$
Future: $S < R$ (if future is a tense...)

Generalization

- Tense relates event time E and reference time R.
- Perfect says that E is before R.

Complication: Other uses of the English perfect

(16)   a.   Ed has put the cake in the oven.   **resultative**
       b.   Ed has visited Korea many times.   **existential**
       c.   Ed has lived in Korea for 3 years.   **universal**
       d. #Ed has iced the cake. He then sneezed.   **eventive**

(examples from Condoravdi and Deo, 'Aspect shifts in Indo-Aryan and trajectories of semantic change'.)

Reichenbach's 'extended tenses'

Past, Perfect, Extended
I had been seeing John
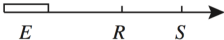
Simple Past, Extended
I was seeing John
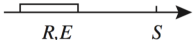
Present Perfect, Extended
I have been seeing John

Present, Extended
I am seeing John
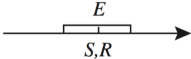
Simple Future, Extented
I shall be seeing John
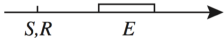
Future Perfect, Extended
I shall have been seeing John
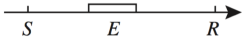
Imperfective (Klein, 1994): $R \subseteq E$

Toward a formal analysis

Is R existentially quantified or free?

Outline

Tense logic (Arthur Prior)

$$\llbracket \text{POTUS(obama)} \rrbracket^{M,g,t_1} = 1$$

$$\llbracket \text{POTUS(obama)} \rrbracket^{M,g,t_2} = 0$$

Temporal models

A **temporal model** for a language L is then a quadruple

$$\langle D, I, T, < \rangle$$

such that

- D is a set of individuals
- T is a set of times
- $<$ is the 'earlier than' relation among the times
- I is an interpretation function which maps the non-logical constants to appropriate denotations at the various times.

Interpretations in temporal models

Let $D = \{a, b, c\}$.

$I(t_1, \text{john}) = b$ $I(t_2, \text{john}) = b$ $I(t_3, \text{john}) = b$

$I(t_1, \text{mary}) = a$ $I(t_2, \text{mary}) = a$ $I(t_3, \text{mary}) = a$

$I(t_1, \text{Happy}) = \{a, b, c\}$ $I(t_2, \text{Happy}) = \{a, b\}$ $I(t_3, \text{Happy}) = \{c\}$

Future and past operators

Syntax:

- If ϕ is a formula, then $\mathbf{F}\phi$ is a formula.
- If ϕ is a formula, then $\mathbf{P}\phi$ is a formula.

Semantics:

- $[\![\mathbf{F}\phi]\!]^{M,g,t} = 1$ iff $[\![\phi]\!]^{M,g,t'} = 1$ for some t' such that $t < t'$.
- $[\![\mathbf{P}\phi]\!]^{M,g,t} = 1$ iff $[\![\phi]\!]^{M,g,t'} = 1$ for some t' such that $t' < t$.

Infinite combinations possible

FPϕ –'Susan will have seen the report'

PFψ – 'A child was born that would become the ruler of the world'

PPPPPPPPψ – ?

Observation

The Priorian past operator is an **existential theory** of tense:

$\mathbf{P}\phi$ says that at *some* time in the past, ϕ held.

Shortcomings of the Priorian theory of tense

1. Tenses tend to be indexical
2. Tenses determine times in cooperation with other elements
3. Tenses are anaphoric
4. Tense interacts with aspect

(Kamp & Reyle, 1993; Cable, 2008)

Tenses tend to be indexical

(17)   a.   Fred told me that Mary is present.

         b.   Fred told me that Mary was present.

(18)   a.   It was predicted that the Messiah will come.

         b.   It was predicted that the Messiah would come.

(Kamp & Reyle, 1993)

Explicit quantificaiton over times

- *at some time*
- *when...*
- *there was a time when..*
- *there will be a time when...*

Temporal modifiers

(19)   John called **on Sunday**.

Anaphoricity: Partee's (1973) example

You've just baked some cookies, and are on the way over to your friend's house. You realize mid-journey that you left the oven on. Then you say:

(20)   Oh no! I didn't turn off the stove!

Anaphoricity: Partee's (1973) example

You've just baked some cookies, and are on the way over to your friend's house. You realize mid-journey that you left the oven on. Then you say:

(20)   Oh no! I didn't turn off the stove!

- ▸ NOT > PAST:
  It is not the case that there is a time in the past when I turned off the stove.
- ▸ PAST > NOT:
  There is a time in the past when I didn't turn off the stove.

Anaphoricity: Partee's (1973) example

You've just baked some cookies, and are on the way over to your friend's house. You realize mid-journey that you left the oven on. Then you say:

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- ▸ NOT > PAST:
  It is not the case that there is a time in the past when I turned off the stove.
- ▸ PAST > NOT:
  There is a time in the past when I didn't turn off the stove.

Neither one is right!

Referential theory of tense

Partee (1973), in 'Some structural analogies between pronouns and tenses': The past tense is like a pronoun, referring to a particular salient time.

And like pronouns, tenses can be anaphoric and bound!

(21)   Susan called. John immediately left the room.

(22)   Whenever Susan called, John immediately left the room.

Interactions between tense and aspect

(23)   (When I was in the room,) Dave ate the cookie.
       (perfective)

(24)   (When I was in the room,) Dave was eating the cookie.
       (imperfective)

$\Rightarrow$ the event described is not always in the past (Klein, 1994).

Tense and grammatical aspect

- grammatical aspect*: relates reference time to event time
- tense: relates reference time to speech time

Tense and grammatical aspect

- grammatical aspect*: relates reference time to event time
- tense: relates reference time to speech time

*Note the distinction between two things called 'aspect':

Lexical aspect / **situation aspect** / **aktionsart** / **internal aspect** / **aspectual class** / **situation type**:
- types of situations that natural language VPs can describe
- accomplishments, achievements, activities, etc...

Grammatical aspect / **viewpoint aspect** / **perspective point**:
- link between eventualities and tense
- perfect, imperfective (~progressive) vs. perfective

Outline

Toward a theory of tense and aspect

Assumptions:

- E, R and S are time **intervals**.
- past: $R < S$
- perfective aspect: $E \subseteq R$
- imperfective aspect: $R \subseteq E$

Models

$$M = \langle D, I, T, <, \subseteq \rangle$$

where

- ▸ D is the domain of individuals D
- ▸ I is an interpretation function assigning semantic values to each of the non-logical constants in the language
- ▸ T is a set of times
- ▸ $<$ is a precedence relation among times
- ▸ $\subseteq$ is a containment relation among times

Types

- e is a type (individuals)
- t is a type (truth values)

Types

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- t is a type (truth values)
- i is a type (times)

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- If σ and τ are types, then so is $\langle \sigma, \tau \rangle$.

Types

- e is a type (individuals)
- t is a type (truth values)
- i is a type (times)
- If σ and τ are types, then so is $\langle \sigma, \tau \rangle$.
- Nothing else is a type.

Precedence operator

Syntax rule: Precedence operator

If α and β are expressions of type i, then,

$$\alpha < \beta$$

is a formula.

Semantic rule: Precedence operator

Semantics:

$$\llbracket \alpha < \beta \rrbracket^{M,g,c} = \begin{cases} 1 & \text{if } \llbracket \alpha \rrbracket^{M,g,c} < \llbracket \beta \rrbracket^{M,g,c} \\ 0 & \text{otherwise} \end{cases}$$

(where $<$ is determined by M)

Inclusion operator

Semantic rule: Inclusion operator

If α and β are expressions of type i, then, $\alpha \subseteq \beta$ is a formula.

Semantic rule: Inclusion operator

$$[\![\alpha \subseteq \beta]\!]^{M,g,c} = \begin{cases} 1 & \text{if } [\![\alpha]\!]^{M,g,c} \subseteq [\![\beta]\!]^{M,g,c} \\ 0 & \text{otherwise} \end{cases}$$

(where $\subseteq$ is determined by M)

A referential theory of past tense

First pass:

(25) $\text{PAST}_n \rightsquigarrow t_n$

A referential theory of past tense

First pass:

(25) $\text{PAST}_n \rightsquigarrow t_n$

Constraining reference time so that it precedes speech time:

(26) $\text{PAST}_n \rightsquigarrow \iota t . \left[t = t_n \wedge t_n < \text{now} \right]$

Syntactic assumptions (Kratzer, 1998)

t: the type of truth values
i: the type of times
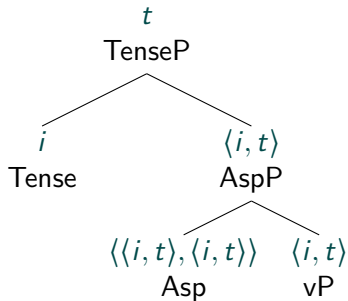
Verbal predicates

(27)   *dance* $\rightsquigarrow \lambda x . \lambda t . \text{Dance}(t, x)$

$$\lambda t . \text{Dance}(t, \text{a})$$
$$\langle i, t \rangle$$

a $\lambda x . \lambda t . \text{Dance}(t, x)$
e $\langle e, \langle i, t \rangle \rangle$
| |
Ann   *dance*
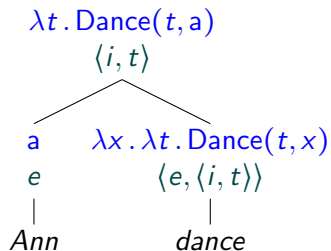
Perfective and imperfective

(28) PERF $\rightsquigarrow \lambda P_{\langle i,t\rangle} . \lambda t . \exists t' . [t' \subseteq t \wedge P(t')]$

(29) IMP $\rightsquigarrow \lambda P_{\langle i,t\rangle} . \lambda t . \exists t' . [t \subseteq t' \wedge P(t')]$

Perfective and imperfective

(28) PERF $\leadsto \lambda P_{\langle i,t \rangle} . \lambda t . \exists t' . [t' \subseteq t \wedge P(t')]$

(29) IMP $\leadsto \lambda P_{\langle i,t \rangle} . \lambda t . \exists t' . [t \subseteq t' \wedge P(t')]$

Derivation for *Ann danced*

TenseP

$\exists t'.[t' \subseteq [\iota t.[t = t_n \wedge t_n < \text{now}]] \wedge \text{Dance}(t', a)]$

t

Tense

$\iota t.[t = t_n \wedge t_n < \text{now}]$

$\langle\langle i, t\rangle, t\rangle$

|

PAST_n

AspP

$\lambda t.\exists t'.[t' \subseteq t \wedge \text{Dance}(t', a)]$

$\langle i, t\rangle$

Asp

$\lambda P_{\langle i, t\rangle}.\lambda t.\exists t'.[t' \subseteq t \wedge P(t')]$

$\langle\langle i, t\rangle, \langle i, t\rangle\rangle$

|

PERF

vP

$\lambda t.\text{Dance}(t, a)$

$\langle i, t\rangle$

Ann dance
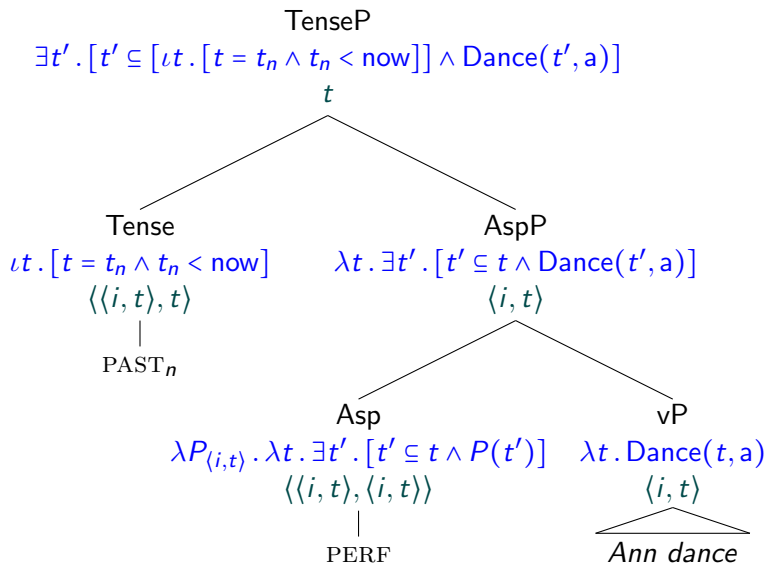
Derivation for *Ann was dancing*
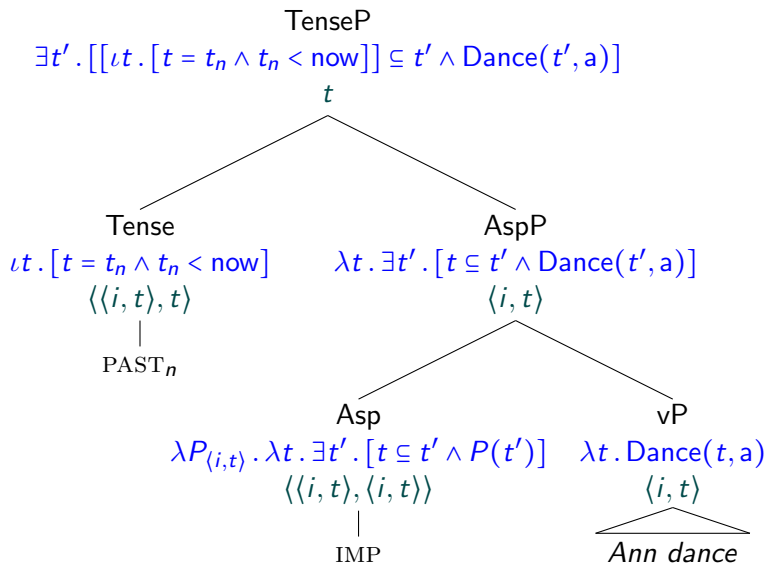
TenseP
$\exists t' . \big[[\iota t . [t = t_n \wedge t_n < \text{now}]] \subseteq t' \wedge \text{Dance}(t', \text{a}) \big]$
t

Tense
$\iota t . [t = t_n \wedge t_n < \text{now}]$
$\langle\langle i, t\rangle, t\rangle$

PAST_n

AspP
$\lambda t . \exists t' . [t \subseteq t' \wedge \text{Dance}(t', \text{a})]$
$\langle i, t\rangle$

Asp
$\lambda P_{\langle i, t\rangle} . \lambda t . \exists t' . [t \subseteq t' \wedge P(t')]$
$\langle\langle i, t\rangle, \langle i, t\rangle\rangle$

IMP

vP
$\lambda t . \text{Dance}(t, \text{a})$
$\langle i, t\rangle$

Ann dance

Problem: Imperfective paradox / Toxic entailment

(30)   a.   John was crossing the street.
        b.   *Doesn't entail:* John crossed the street.

(31)   John was crossing the street when he was struck by lightning.

Two approaches:

- ▶ modal approach: inertia worlds (e.g. Dowty 1979)
- ▶ partial event realization (e.g. Parsons 1990)

Problem: Imperfective paradox / Toxic entailment

(30)   a.   John was crossing the street.

         b.   *Doesn't entail:* John crossed the street.

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Two approaches:

- modal approach: inertia worlds (e.g. Dowty 1979)
- partial event realization (e.g. Parsons 1990)

See Serge's slides from Lectures 5 and 6 especially!

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