Referential Dependence in Language and Mind

Lecture 2.

MSDRT: a Semantics for Attributions of Multiple Attitudes, with Referential Dependencies

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Time and Tense in DRT

- This is where we had to leave things last week:
- DRT is a framework for doing natural language semantics that belongs to the family of *Logical Form approaches*.
- A central feature of DRT is that it can assign Logical Forms to multi-sentence texts and other types of discourse.

  These Logical Forms are obtained *incrementally*:

  - Compute a *Preliminary Logical Form* K_{prel} for the next sentence S_i.
  - Resolve inter-sentential connections (presuppositions) using the *Discourse Context* K_{dis}. This turns K_{prel} into K
  - Merge K with K_{dis}.
- (N.B. A novel feature of DRT was its articulation and implementation of the principles governing the integration of Preliminary Logical Forms for sentences.)

Time and Tense in DRT

- I briefly went through the Logical Form (= DRS) construction for the second sentence of the two sentence 'discourse' in (9.a).

  (9.a) Joseph turned around. The man pulled a gun from his belt.

- We go through that construction once more, a little more slowly.
  We assume that the Logical Form for the 1st sentence has been constructed and that it has the form of the DRS in (1).

(1)

t	e	j
$t \prec n$	$e \subseteq t$	Joseph'(j)
e: turn-around'(j)		

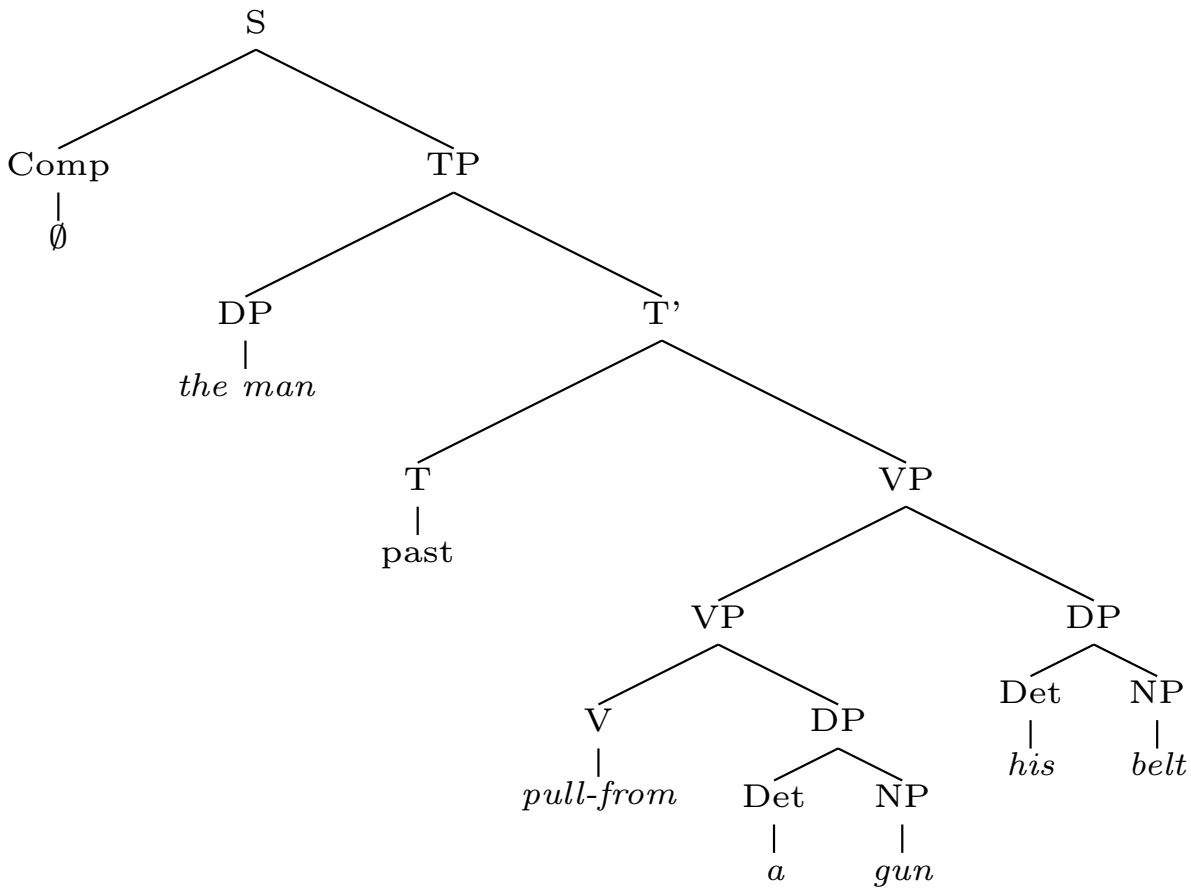
(1) is the *Discourse Context* for the preliminary representation we are going to construct for the second sentence.

(Note that the name *Joseph* is not treated as we treated the names *Mary* and *Paris*. The referent of *Joseph* is represented by the dref j. The predication 'Joseph'(j)' states that j represents the name's bearer.)

Time and Tense in DRT

- Assume the following syntactic structure (LF) for the second sentence.

(2)

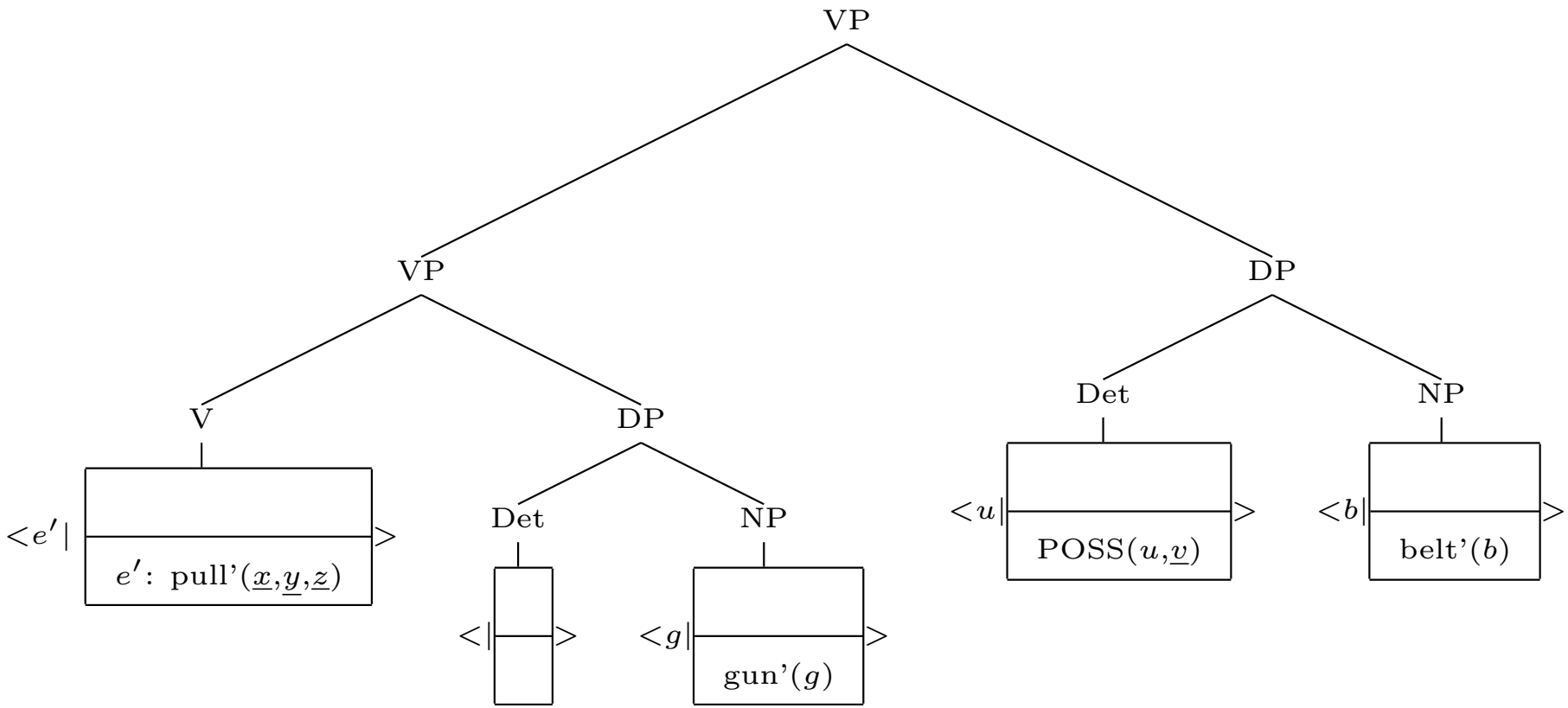


Time and Tense in DRT

- Logical Form Computation proceeds 'bottom up'.

  This turns the VP into the structure (3).

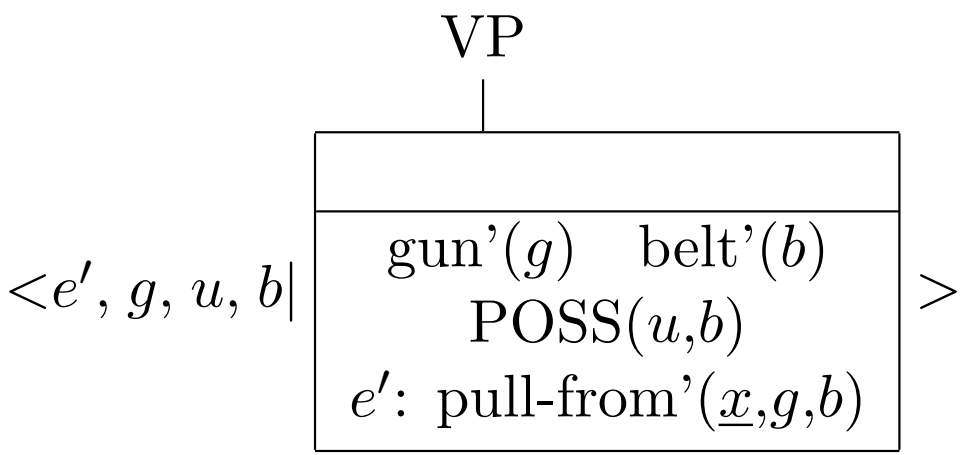
  (3)



Time and Tense in DRT

- Argument insertion of the 'referential arguments' g and b of the direct and indirect object representations into the corresponding argument slots $\underline{y}$ and $\underline{b}$ of the V representation gives:

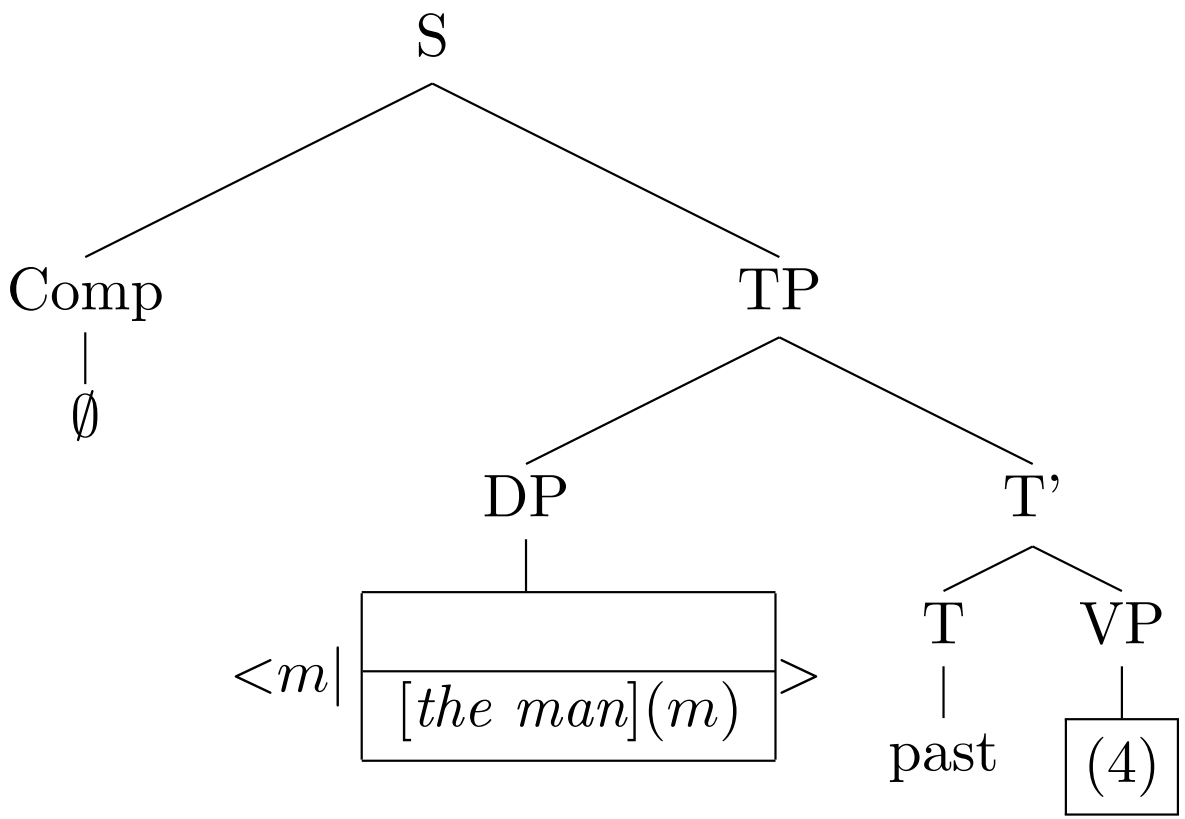
(4)



Time and Tense in DRT

- With a simplified treatment of the definite description in subject position this gives the abridged sentence tree in (5).

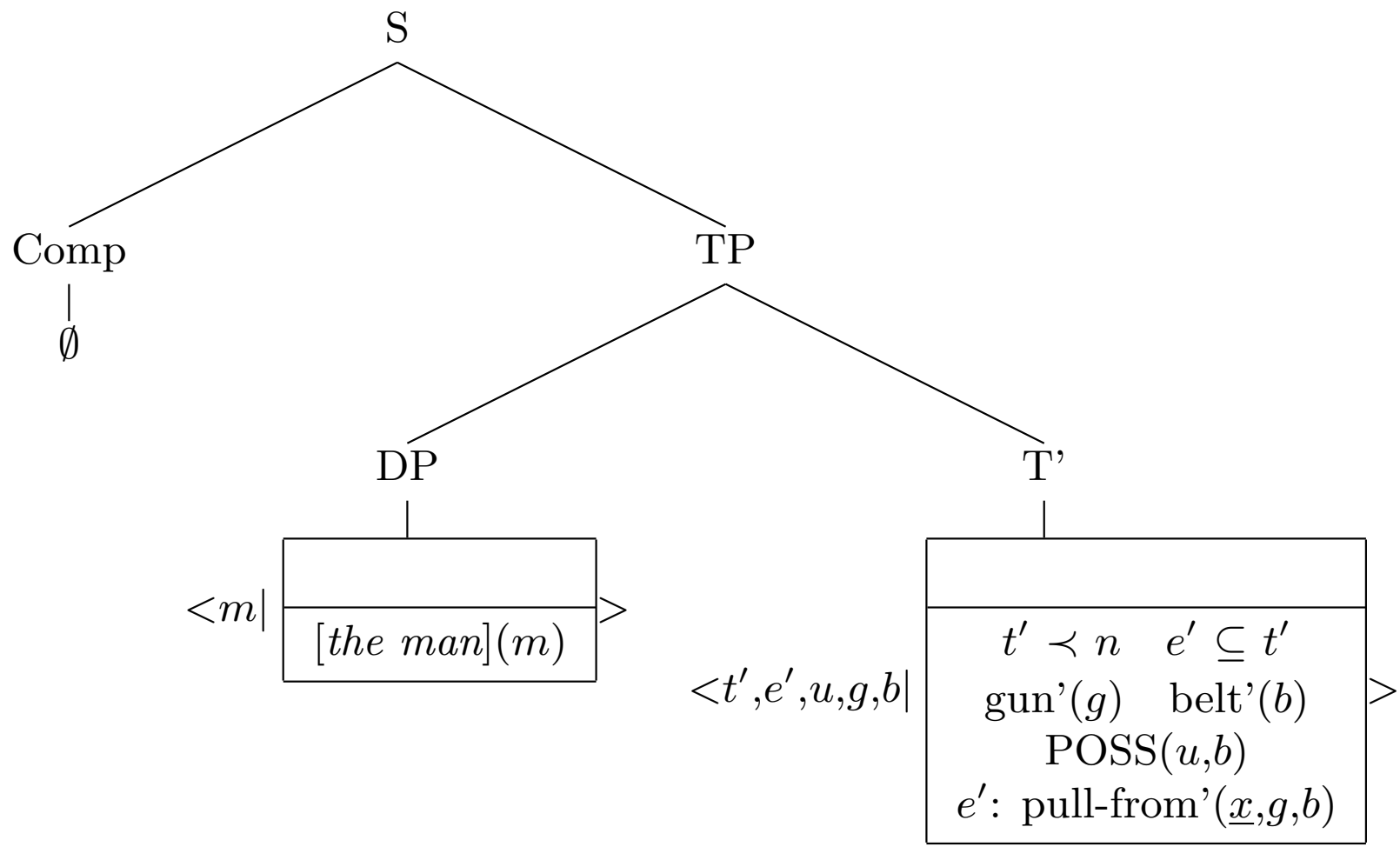
(5)



Time and Tense in DRT

- Combining the VP representation with the feature 'past' specified by T locates the event e' in the past of the utterance time n. The result is shown in (6).

(6)



Time and Tense in DRT

- The next two construction steps:

  (i) Insertion of the referential argument m of the subject DP into its slot $\underline{x}$:

  (ii) 'Existential closure', triggered by Comp:

  Transfer of the drefs in the store to the DRS on its right.

(7)

t' e' m g b u
$t' \prec n$ $e' \subseteq t'$
$[the\ man](m)$ gun'(g) belt'(b)
$u = m$
POSS(u,b)
e': pull-from'(m,g,b)

Time and Tense in DRT

- This gives most of what we need.

  But for our present purposes the most important part is missing:

  The DRS (7) doesn't say anything about how the event e' fits within the discourse context provided by the DRS (1) for the 1st sentence, repeated here:

(1)

t	e	j
$t \prec n$	$e \subseteq t$	Joseph'(j)
	e: turn-around'(j)	

- Intuitively it is clear what is missing:

  e' is understood as following e and that needs to be represented too.

Time and Tense in DRT

- One way to represent this is by adding to the DRS in (7) the Condition: '$e \prec e'$':

  This turns the DRS (7) of the second sentence into (8).

(8)

t' e' m g b u
$t' \prec n$ $e' \subseteq t'$
$[the\ man](m)$ gun'(g) belt'(b)
$u = m$
POSS(u,b)
e': pull-from'(m,g,b)
$e \prec e'$

But what *licenses* the adding of this Condition?

Time and Tense in DRT

- Before I tell you about DRT's answer to this question, first another observation, which also leads into the central concern of this series.
- Recall the two examples of M(ental) S(tate) D(escriptions) from MSDRT with which we started the lecture last week.

  The content DRSs of the propositional attitudes in these MSDs make no reference to time. Here, once more, is the first of them:

(1)
$$\left\{ \begin{array}{l} \left\langle BEL, \begin{array}{|c|}\hline x \\ \hline \text{gold-coin'}(x) \\ \text{lie-in-front-of'}(x,i) \\ \hline \end{array} \right\rangle \\ \left\langle DES, \begin{array}{|c|}\hline \\ \hline \text{have'}(i,x) \\ \hline \end{array} \right\rangle \\ \left\langle INT, \begin{array}{|c|}\hline \\ \hline \text{pick-up'}(i,x) \\ \hline \end{array} \right\rangle \end{array} \right\}$$

Time and Tense in DRT

- When these DRSs are replaced by DRSs in which temporal constituents are made explicit in the manner of those constructed above from tensed sentences, we get the MDS in (9).

(9)
$$\left\{ \left\langle BEL, \begin{array}{|c|}\hline x \quad s_1 \quad s_2 \\ \hline n \subseteq s_1 \quad n \subseteq s_2 \\ s_1\text{: gold-coin'}(x) \\ s_2\text{: lie-in-front-of'}(x,i) \\ \hline \end{array} \right\rangle, \left\langle DES, \begin{array}{|c|}\hline s_3 \\ \hline n \subseteq s_3 \\ s_3\text{: have'}(i,x) \\ \hline \end{array} \right\rangle, \left\langle INT, \begin{array}{|c|}\hline t \quad e \\ \hline n \prec t \quad e \subseteq t \\ e\text{: pick-up'}(i,x) \\ \hline \end{array} \right\rangle \right\}$$

Time and Tense in DRT

- In each of the three DRSs in (9) the time dref n represents the 'psychological now' of the agent A whose mental state is described by the MSD.

  So the states s_1, s_2 and s_3 occurring in the first two DRSs are states that hold for A at the time when she is in this mental state.

  And the event e of her going to the middle of the street is in the future for her at that time.

- In this MSD there are explicit representations of two times:
  - the time n of the mental state described by the MSD; and
  - the location time t of the event e that is part of the content of the Intention.

Time and Tense in DRT

- Later representations will also mention the time at which the attribution is made of mental states described by MSDs and in which the time of the attribution is different from the time of the state attributed.

- In general we thus need to distinguish between three kinds of times:

  - the time at which an agent A is in the described mental state;
  - the time at which the attribution of the described mental state is made; and
  - the location times of the eventualities represented in the content specifications of the Propositional Attitudes and descriptive contents of the Entity Representations given in the MSD.

Time and Tense in DRT

- We return to the question what licenses the addition of the sentence linking Condition '$e \prec e'$'.
- A simple answer to this question goes like this (Partee (1984)):
- In narrative discourses of English, sentences with Simple Past event verbs 'drive' the course of action 'forward':

  The event that such a sentence introduces into the discourse is understood as following the temporally last event introduced so far.
- English sentences with event verbs in the Past Progressive are different.

  They describe states, as do Simple Past sentences with state verbs.

  And the states they describe are understood as temporally surrounding the temporally last event thus far introduced.

Time and Tense in DRT

- The reality of natural language discourse is much more complicated.

  It requires a careful analysis of what constitutes a narrative text or passage, which pays attention to *discourse relations* as well as to he role of the different tense forms of English and other languages.

- Within the general setting of DRT such an account of discourse structure and text types was developed by Asher and Lascarides from the early nineties onwards (Lascarides & Asher (1993), Asher & Lascarides (2003), etc.).

  To go into this properly would take too much time away from our main theme. So let me simplify and summarize:

Time and Tense in DRT

1. Tense forms typically constrain the temporal relations between the eventualities described by their own sentences or clauses and those of neighboring clauses or sentences.

2. But what constraints a given tense form imposes on these relations depends on the discourse relations that are perceived to hold between those neighboring clauses and sentences.

3. Two of those discourse relations are *Narration* and *Background*

4. When S is a non-initial Simple Past Tense event sentence S and S stands to a preceding Past Tense event sentence S' in the relation of Narration, then the event e described by S temporally follows the event e' described by S'.

(This is just one of a number of similar rules that describe the cross-clausal effects of tense forms in combination with discourse relations.)

The rule under 4. licenses adding the Condition '$e \prec e'$' to the Logical Form of our example.

Time and Tense in DRT

- The need to account for the cross-clausal effects of tense forms was one of the principal reasons for the incremental Logical Form architecture of DRT. (Kamp (1981))

- Another original motive for this architecture was the explanation DRT wanted to give for an old observation about the French Passé Simple:

  The events introduced into a text by Passé Simple sentences are like temporal points.

- The crux of this explanation is that DRT's semantic representations of certain types of text generate their own time structures.

  It is in these time structures that the events introduced by Passé Simple sentences only last for a single instant.

- In the interest of time (as they say) I have had to cut this story.

  (The pages devoted to it are in the version of the slides that will be put on-line. For more see Kamp (1979) and Ch. 1 of the ms. 'Introduction to MSDRT' on the website for these Lectures.)

The Role of DRT in what follows

- In the remainder of these lectures DRT will play a background role, as the framework on which MSDRT is built and within which it is embedded.
- Time too will mostly remain in the background.

  But time will nevertheless be of great importance to the substance of what we will discuss.
- To repeat: When a belief or other propositional attitude is attributed to some agent, time plays a triple role:
  - As the time at which the attribution is made.
  - As the time at which the attributee is assumed to be in the mental state attributed to him or her.
  - As the times that figure in the content specifications of the attributed attitudes.

MSDRT and the Semantics of Attitude Reports

- We started in the first lecture with two MSDs for agent A walking along a street. (The first of these we just looked at again.)
- These MSDs didn't have anything directly to do with language.
- However, MSDRT was originally developed as part of a framework for natural language semantics.

  This application is largely responsible for the forms that MSDRT adopted for its MSDs.

MSDRT and the Semantics of Attitude Reports

- MSDRT treats attitude attributions as descriptions of the mental states of attributees.
- Terminology:

  I distinguish between *attitude attributions* and *attitude reports*.
- An *attitude report* is a speech act, which attributes propositional attitudes to agents.
- An *attitude attribution* can be either a speech act or a mental act.

MSDRT and the Semantics of Attitude Reports

- Today we look at the construction of Logical Forms for some simple attitude reports.

  These are given in (10)

(10) a. John believes that it is raining.

b. John believes that it was raining.

c. John believed that it was raining.

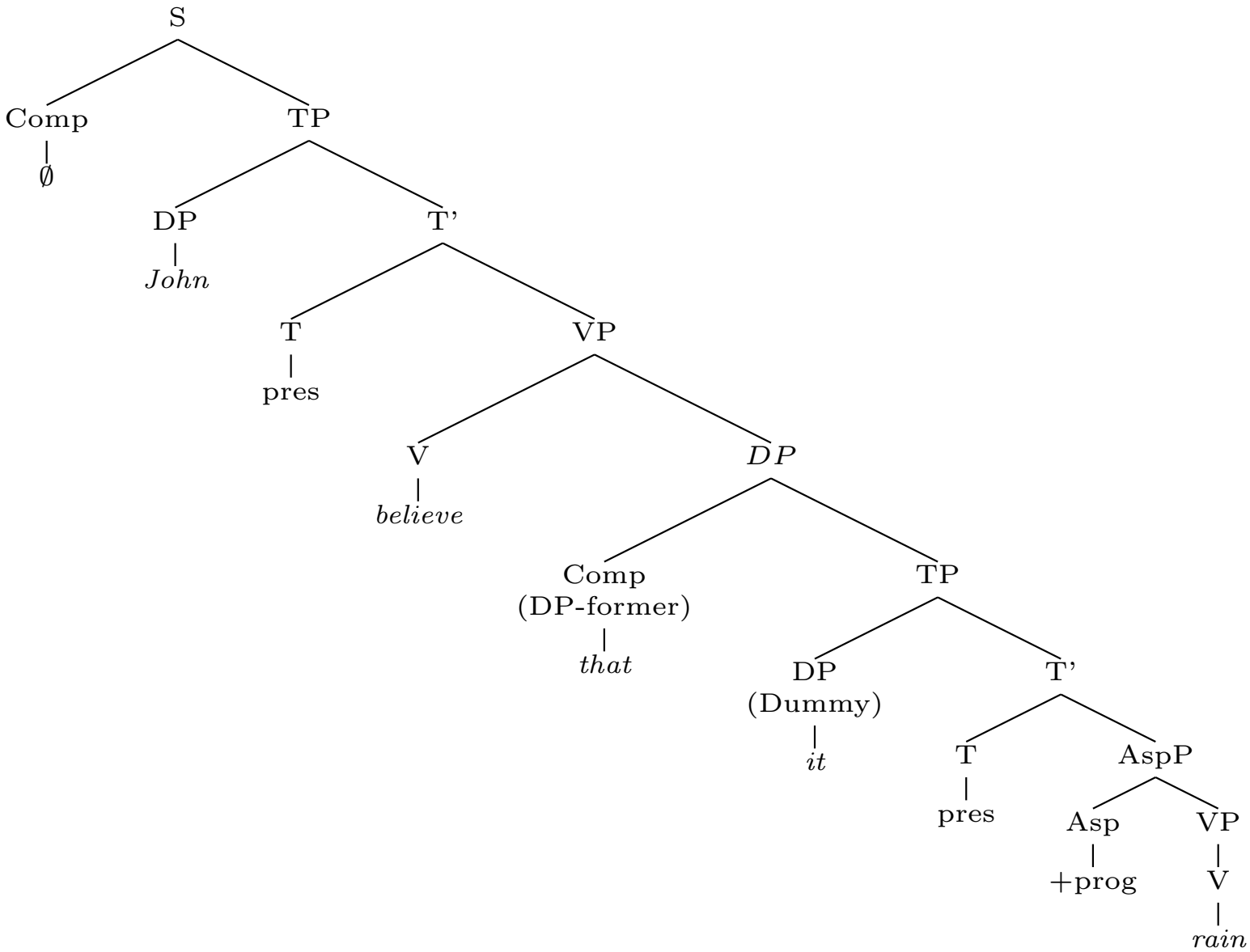
d. John believed that it is raining.

e. John believes that it is raining.
He hopes that it will stop raining.

- We start with the DRS construction for (10.a) and assume for it the syntactic structure in (11),

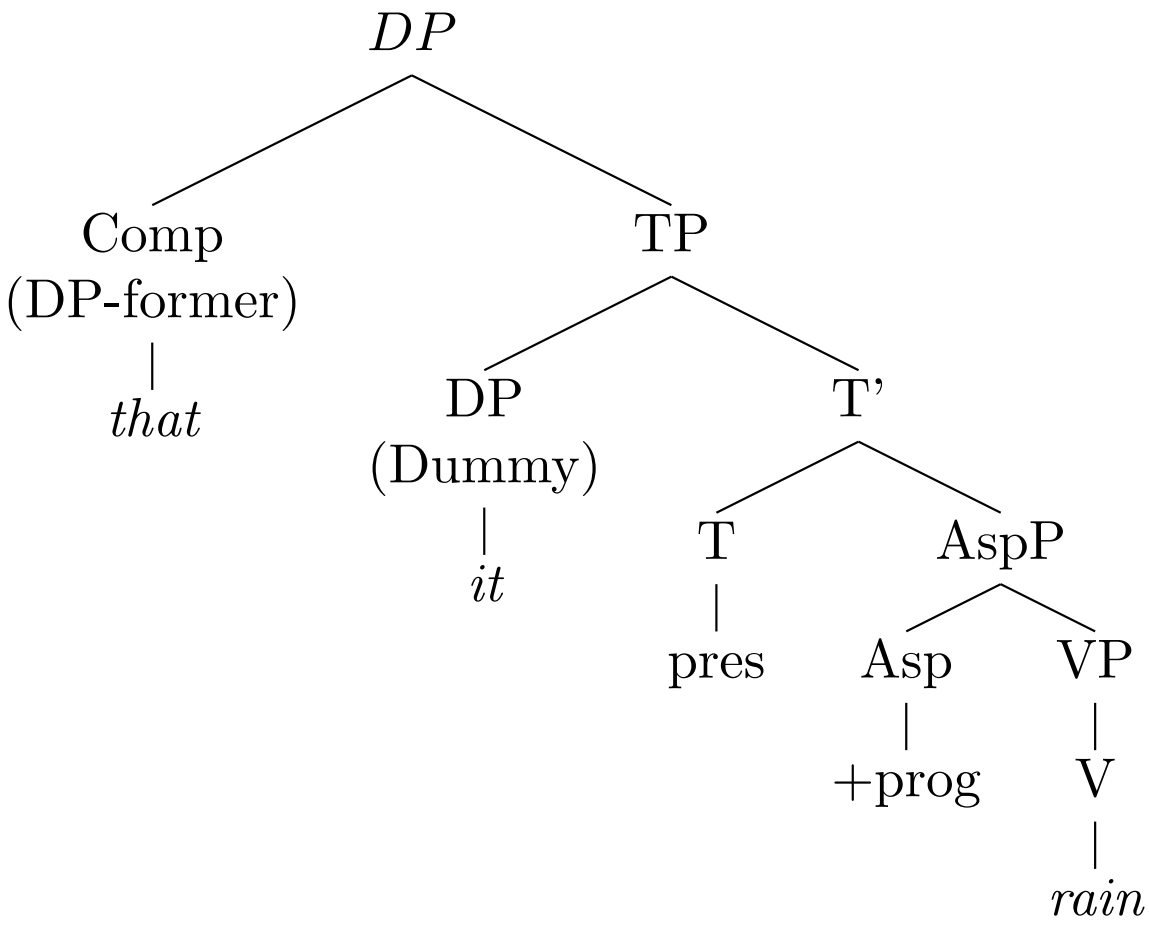
MSDRT and the Semantics of Attitude Reports

(11)



MSDRT and the Semantics of Attitude Reports

- Here once more the subtree whose top node is the upper DP



MSDRT and the Semantics of Attitude Reports

- Note the analysis of the attitude verb *believe* as a transitive verb.

  This is motivated by the well-formedness of sentences like 'She believes that too', 'Never believe anything he says.' and so on.

- We assume that 'complements' like *that it is raining* – phrases of the general form *that* + finite clause – are also DPs.

  (N.B. The constraints on the possible forms of the direct object DPs of *believe* are part of the syntactic definition of the English fragment L we choose to analyze the sentences we are looking at.

  We assume that L has been chosen and that its definition is in place, and also that with this definition comes a parser which delivers syntactic trees like the one shown above.)

MSDRT and the Semantics of Attitude Reports

- As in all our Logical Form constructions we proceed bottom up.
- Part of this construction is the computation of the Logical Form for the direct object DP of *believe*.

  This construction involves construction rules from DRT, like those we saw in the construction for 'The man pulled a gun from his belt.'

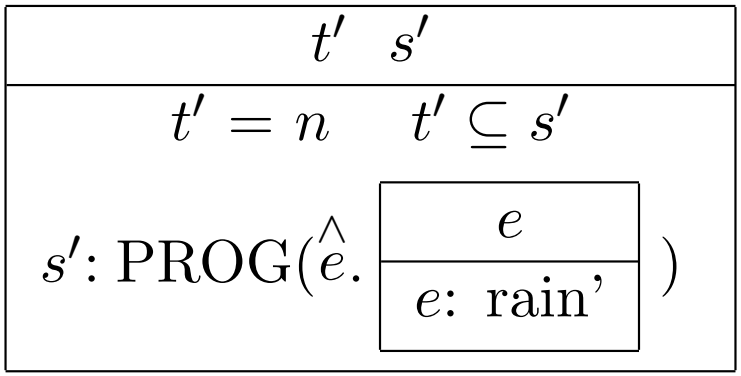
  Special about the clause *it is raining*:
  - *to rain* is a '0-place verb', which has an event as referential argument, but no further arguments; and
  - the Present Progressive transforms the representation of its syntactic complement into a representation with non-extensional truth conditions.

    (For details see Ch. 1 of *Introduction to MSDRT* on the website for these lectures, and *Notes Semantics: DRS Construction; University of Texas* which can be found on my personal website https://sites.google.com/view/hans-kamp/) (or else, go to my ims.University of Stuttgart website)

MSDRT and the Semantics of Attitude Reports

- Sparing you most of the details, I show the Logical Form that DRT allows us to construct for the *that*-complementing clause of the direct object DP in (12):

(12)



- Note: 'PROG' is a predicate of 'intensional event abstracts'.

's': PROG($\hat{e}$. e / e: rain')' means that s' is a state to the effect that a raining event is going on during its duration.

MSDRT and the Semantics of Attitude Reports

- The crucial step in the Logical Form construction for our sentence is combining the representation in (12) with the lexical semantics of the verb *believe*.

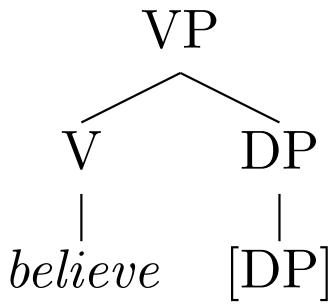
  The lexical semantics for *believe* is given by its *lexical entry*, which is shown on the next slide.

MSDRT and the Semantics of Attitude Reports

(13) (Lexical entry for *believe*)

	believe(V_{Att})	nom	acc
	s	$\underline{x}$	$\underline{[\mathrm{DP}]}$
Sel. Restr:	state description	agent	content

Sem.Repr:



$$\rightsquigarrow \quad \left\langle s \;\middle|\; \begin{array}{|l} \\ \hline s\colon\ Att\left(\underline{x}, \left\{\left\langle BEL, \underline{[\mathrm{DP}]}\right\rangle\right\}, \underline{links}\right) \\ \hline \end{array} \right\rangle$$

MSDRT and the Semantics of Attitude Reports

- This entry for *believe* incorporates one of the central features of MSDRT: the predicate *Att*.
- *Att* is a 4-place predicate, with the following constraints on its arguments:
  - The first argument must be a state dref;
  - The second argument must be a dref representing an agent (the attributee);
  - The third argument must be an MSD dref;
  - The fourth argument must be a set of *links*

    (More about these *links* later.)
- *Att* says of its 1st argument that it is a state to the effect that the agent in *Att*'s 2nd argument position is in a mental state described by the MSD in its 3rd argument position.

MSDRT and the Semantics of Attitude Reports

- *Att*, you could say, closes the circle between DRT and MSDRT.
- MSDRT is grounded in DRT in that it uses DRT's DRSs to represent contents of the Propositional Attitudes that occur as constituents of its MSDs.
- But by inserting MSDs into the 3rd argument slot of *Att* we make them constituents of DRS Conditions (of a new kind,, the so-called '*Att*-Conditions'.
- It is through these *Att*-Conditions that MSDRT extends DRT).
- These Conditions can be used as elements of the Condition Sets of DRSs.
- In this way the representations of attitude attributions can be combined with other kinds of information.

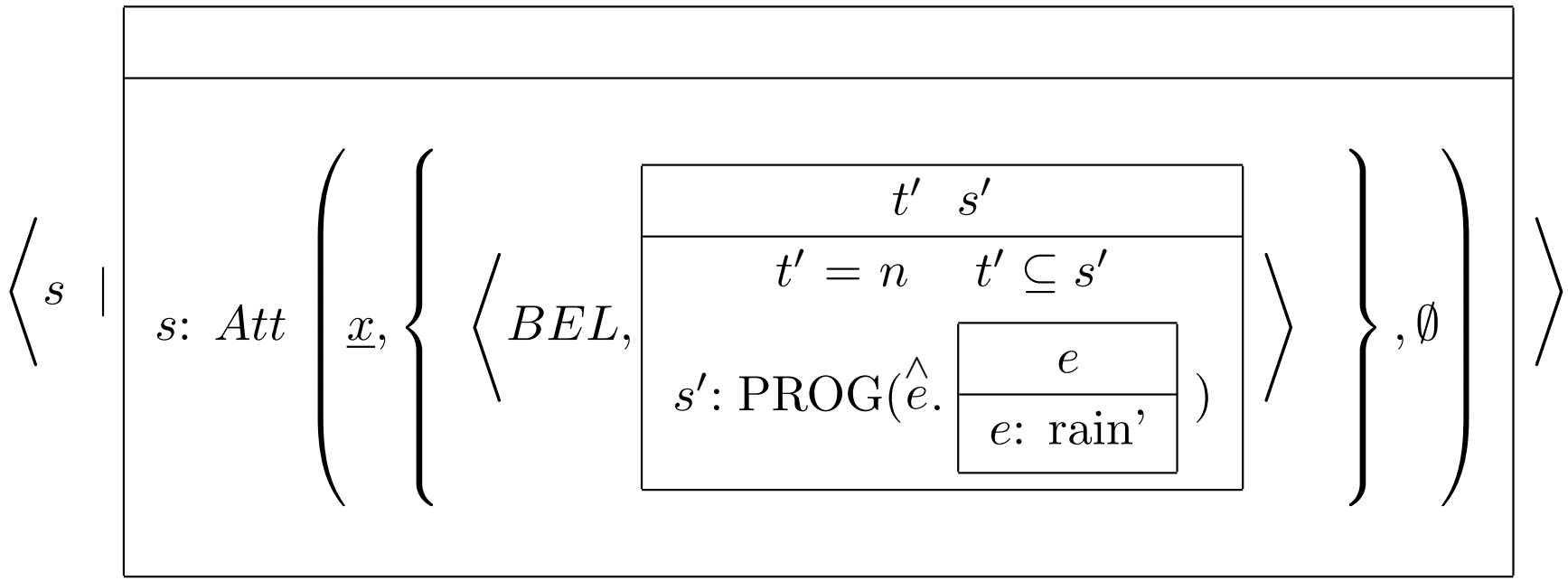
MSDRT and the Semantics of Attitude Reports

- Furthermore, *Att*-Conditions can also be included in the DRSs that specify the contents of Propositional Attitudes that are elements of MSDs.
- In this way it is possible to represent *iterated* attributions, like 'John believes that Bill thinks that it is raining' and so forth.
- This *recursion mechanism* confers upon the Logical Form languages of MSDRT much of its expressive power.

MSDRT and the Semantics of Attitude Reports

- Combining the lexical semantics of *believe* in (13) with the Logical Form of its direct object DP in (12) gives

(14)



MSDRT and the Semantics of Attitude Reports

- (14) is the representation of the upper VP node of the syntactic tree we assumed for our sentence 'John believes that it is raining'.

  The remainder of the construction is a matter of applying DRT.

  The tense feature is 'pres', which in the case before us means:

  - that the complement of T must be a state description, and
  - that the described state includes the time n representing the relevant 'now'.

- Here too the temporal location of the state is expressed with the help of a location time, for which we use the dref t.

  The DRS Conditions connecting s with n are: '$t = n$' and '$t \subseteq s$'.

  t gets added to the store.

MSDRT and the Semantics of Attitude Reports

- The next construction step fills the argument slot $\underline{x}$ for the subject of *believe* with the referential argument of the subject DP *John*.

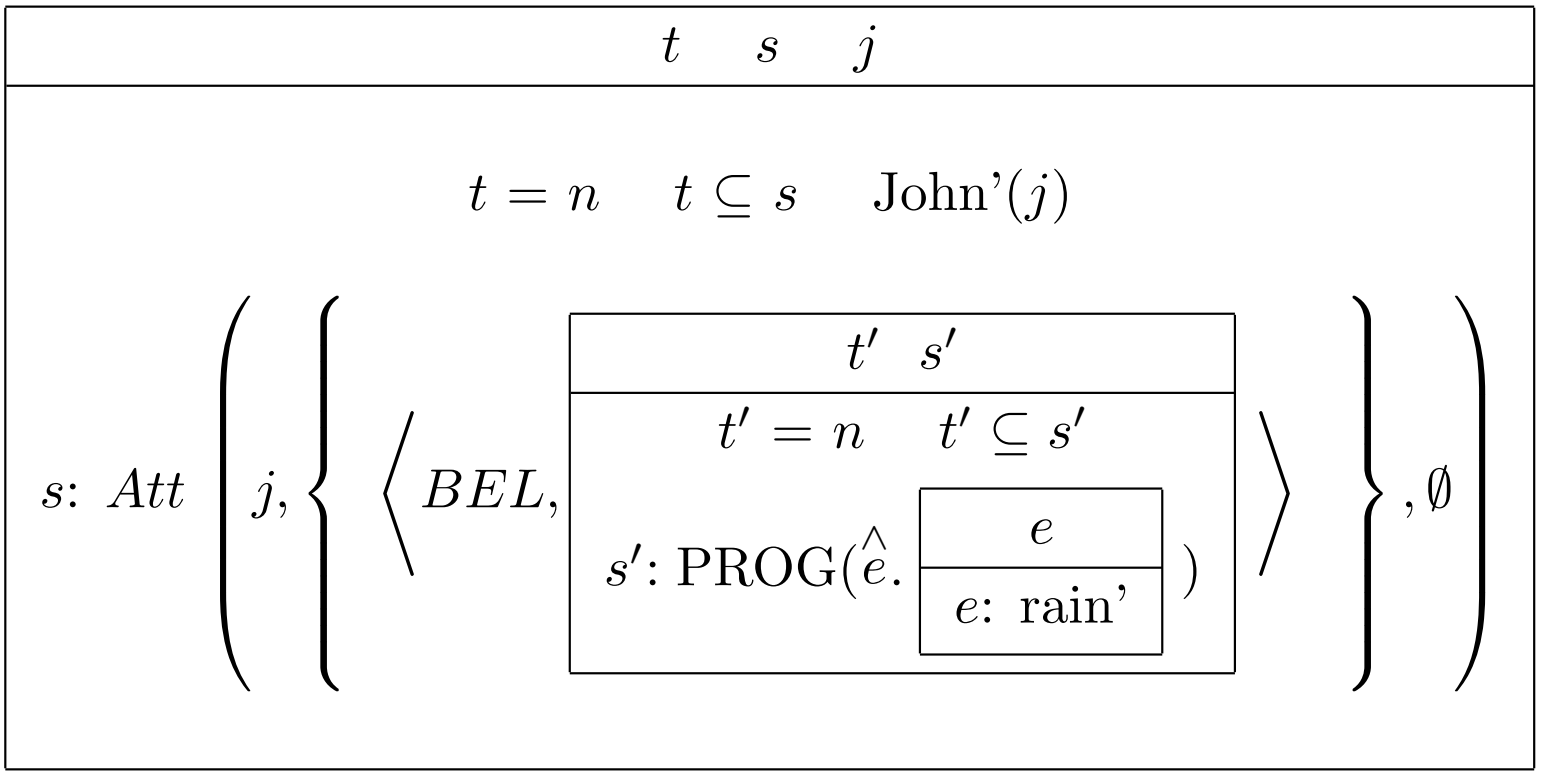
  We treat *John* the same way as *Joseph* earlier today, using j to represent John and 'John'(j)' to express that j represents the bearer of *John*.

- The final step, triggered by Comp, transfers the drefs in the store – t and s in this case – to the Universe of the DRS.

  The final result is the DRS shown on the next slide.

MSDRT and the Semantics of Attitude Reports

(15) ('John believes that it is raining.')



MSDRT and the Semantics of Attitude Reports

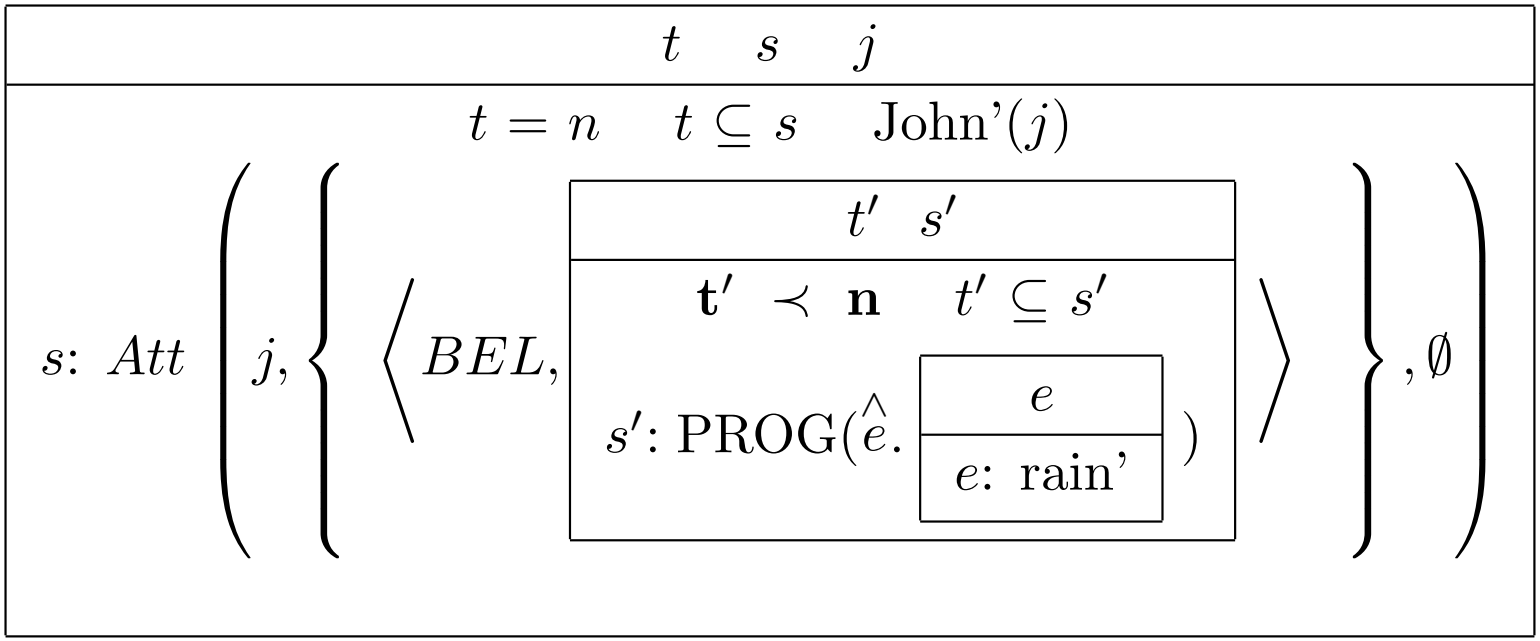
- This sentence is a case where the different times involved in attitude attributions – (i) the attribution time, (ii) the time of the attributed mental state and (iii) the time of the state s' of it raining – all coincide.
- But that is because of both tenses in (10.a) are instances of the Present Tense.
  - (10.a) John believes that it is raining.
  - (10.b) John believes that it was raining.
  - (10.c) John believed that it was raining.
  - (10.d) John believed that it is raining.

MSDRT and the Semantics of Attitude Reports

- For the three other sentences of the list on the last slide this is not so.

  For instance, it is easy to verify on the basis of what I have shown you so far that the Logical form for (10.b) is like this:

  (16) ('John believes that it was raining.')



MSDRT and the Semantics of Attitude Reports

- The Logical Forms for the last two of these four sentences, (10.c) and (10.d), also have a different time structure.

  But the time structures of these Logical Forms are not straightforwardly predicted from what has been said so far.

- (10.c) exemplifies the 'past-under-past' type of English attitude attributing sentences.

  When the complement of the matrix verb of such a sentence describes a state, then the dominant reading is that where this state temporally includes the eventuality described by the matrix verb.

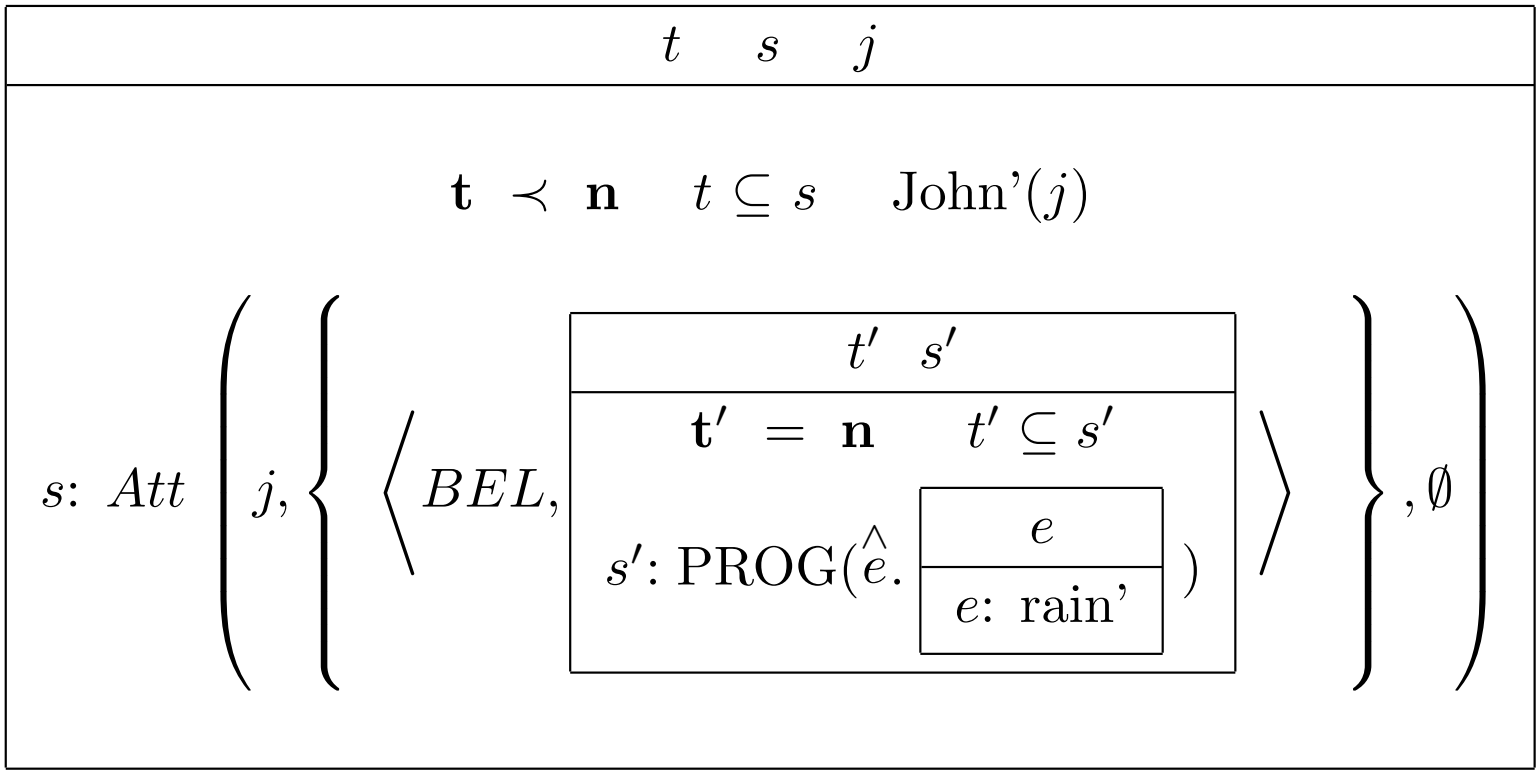
- For (10.c) this means the following:

  The state s of John being in a mental state described by the MSD in the 3rd slot of *Att* is temporally included in the 'content state' of the belief attributed to him.

MSDRT and the Semantics of Attitude Reports

- This interpretation is captured by the Logical Form shown below..

(17) ('John believed that it was raining.')



MSDRT and the Semantics of Attitude Reports

- That (17) expresses the desired truth conditions may not be immediately clear.
- That it does can be argued as follows:
- Throughout the duration of s John was in a mental state that fitted the description provided by the MSD of (17).

  (His mental state need not have been the same throughout this duration, but it must always have included a belief of the kind the MSD describes.)
- And that means that at each such time t'', John had a belief that it was raining at what was the present for him at that time t''.

MSDRT and the Semantics of Attitude Reports

- The last sentence, 'John believed that it is raining' (10.d), also has a meaning that cannot be predicted from a simple theory of the Simple Past tense and the Simple Present or Present Progressive tense.

  In English this tense pattern for simple attitude reporting sentences produces an effect known as *Double Access*:

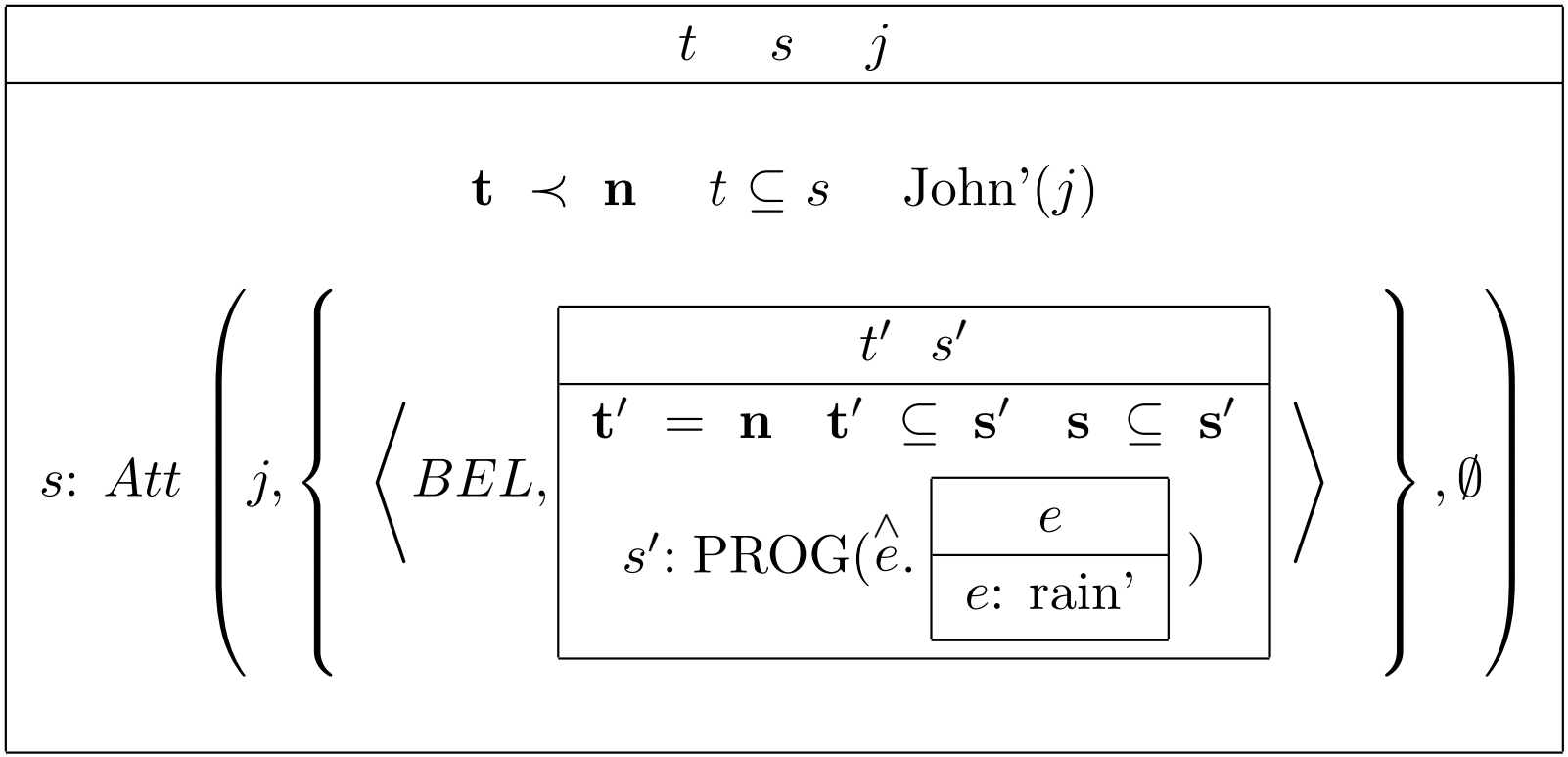
  The state described by the complement clause of the matrix verb must temporally include both (i) the time of the attributed mental state and (ii) the utterance time of the attitude report.

  (Why this should be so has been extensively discussed within the Tense and Aspect literature, but, I believe, still without a generally accepted solution. (Ogihara & Sharvit (2015)))

  For the Logical Form for (10.d) see the next slide.

MSDRT and the Semantics of Attitude Reports

(18) ('John believed that it is raining.')



MSDRT and the Semantics of Attitude Reports

- The semantics of the last two sentences, (10.c) and (10.d), has to do with the fact that English is a *Sequence of Tense* language.

  This is a property that English shares with French, German and many other European languages, but not with, for instance, Russian and other Slavonic languages, or with Japanese.

  In languages like the latter, simultaneity with the matrix verb is expressed by using the Present Tense in the complement clause.

- To arrive at the Logical Forms in (17) and (18), special rules are needed for the interpretation of the embedded Tense Forms.

  We won't discuss these any further.

Reports of Multiple Attitudes

- We now turn to the last item on our original list of attitude reports, (10.e), repeated here:

  (10.e) John believes that it is raining. He hopes that it will stop raining.

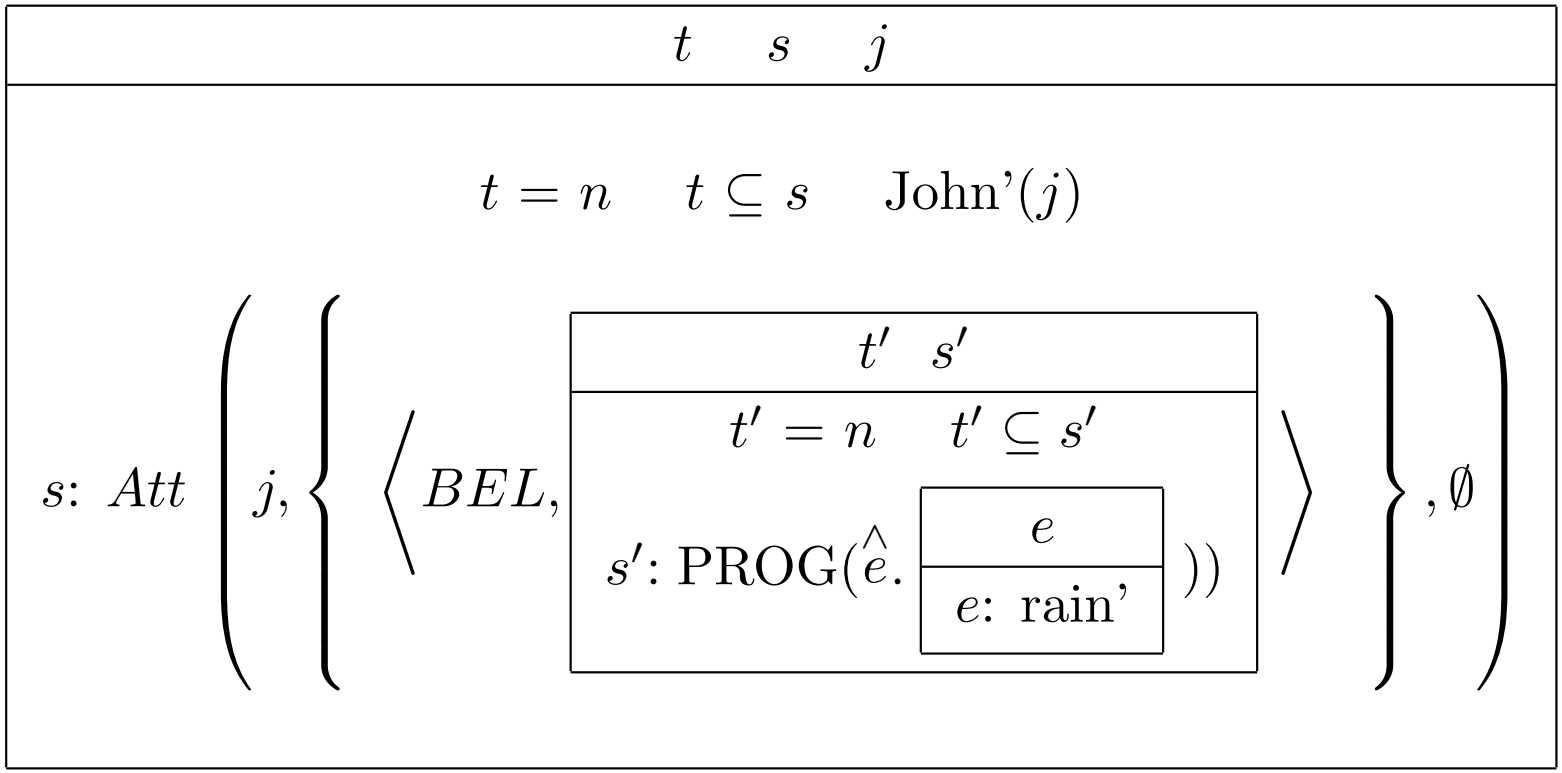
- It is for attitude attributions of this sort, which attribute more than one propositional attitudes to an agent, that MSDRT was originally designed for.

- We have gone through the Logical Form construction for the first sentence. We repeat the result, which will now be the discourse context in the Logical Form construction for the second sentence.

- The use we will make of this discourse context is specific to complex attitude reports.

Reports of Multiple Attitudes

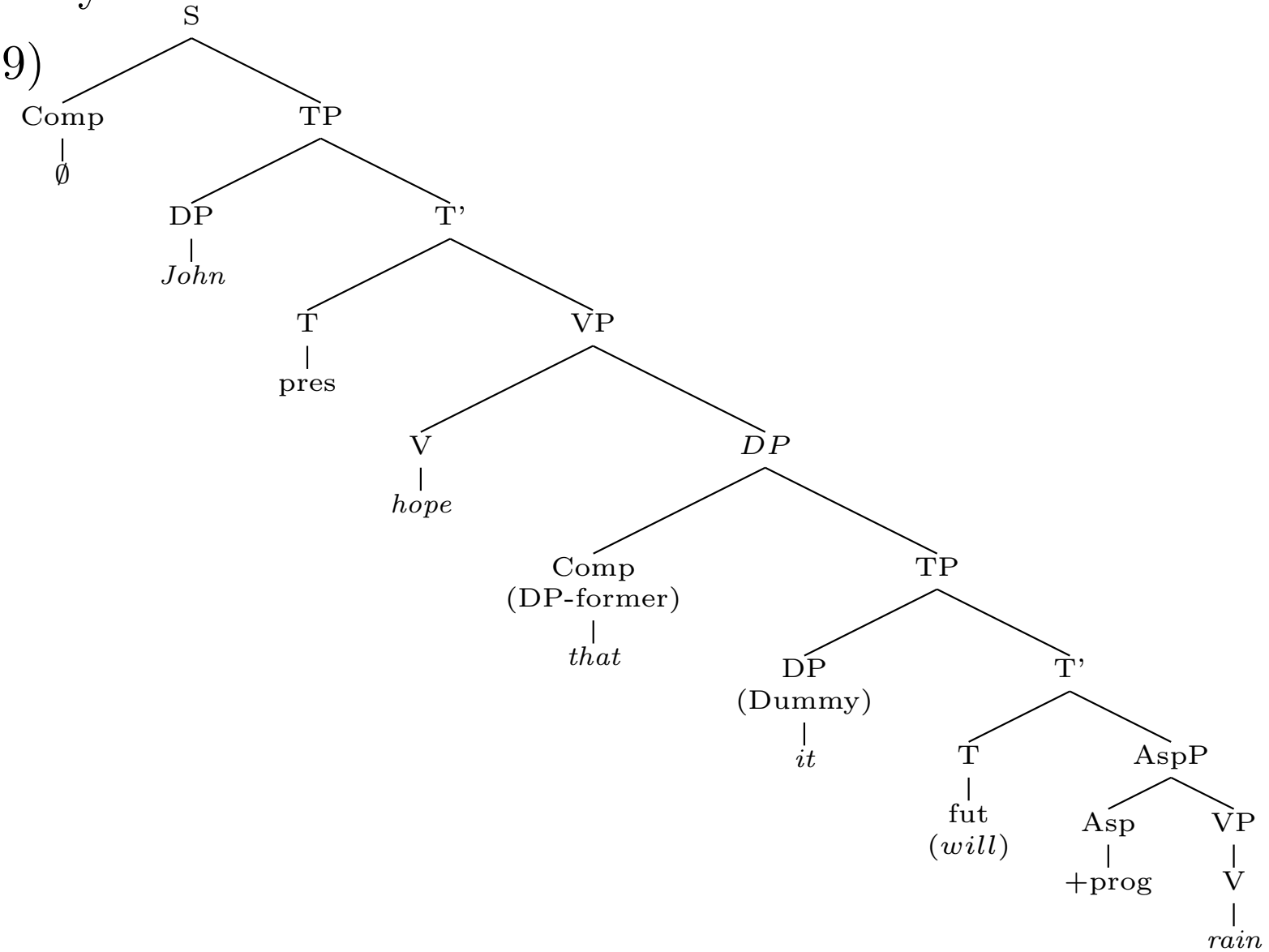
(15) ('John believes that it is raining.')



Reports of Multiple Attitudes

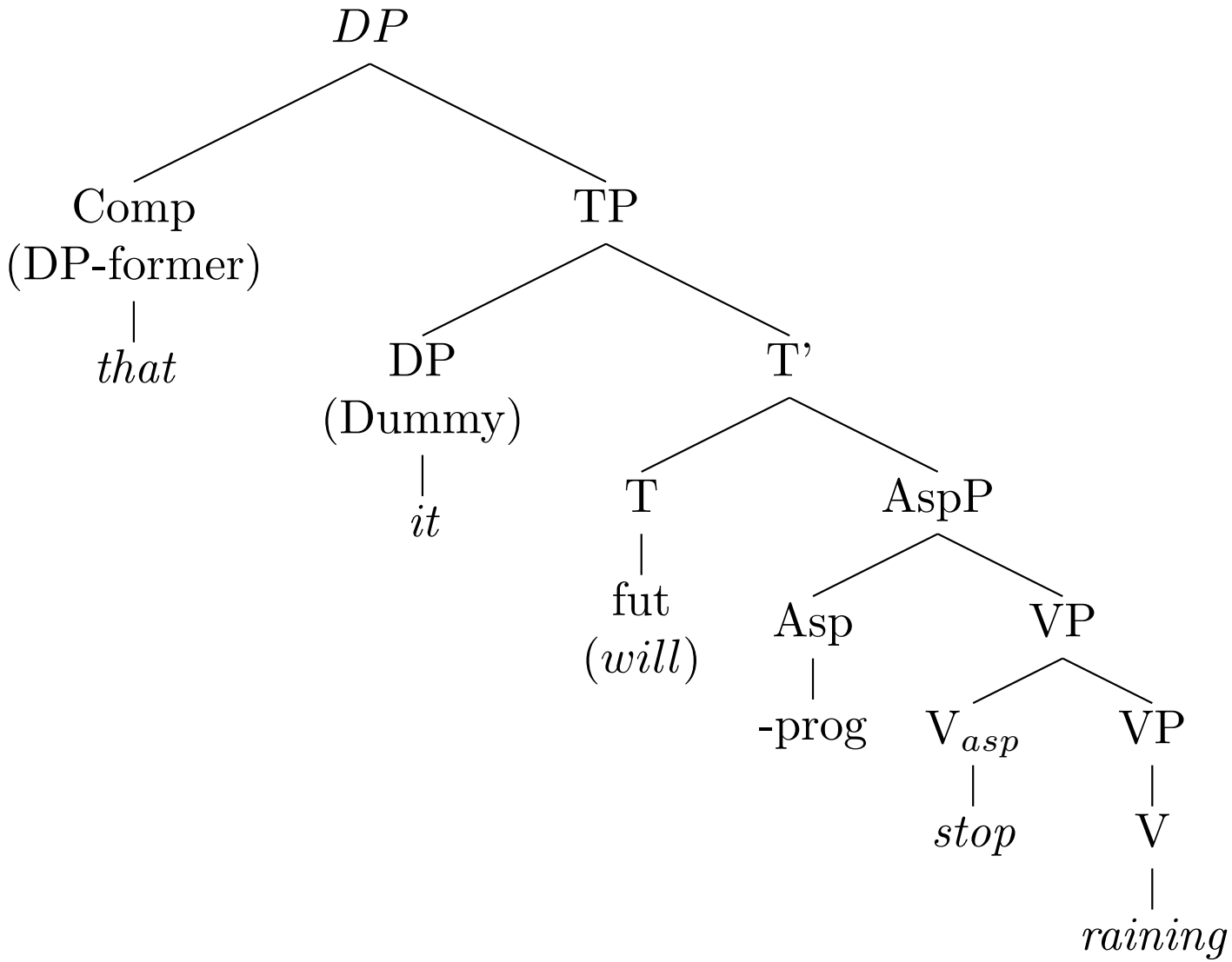
- The syntactic tree for the second sentence is like that for the first.

(19)



Reports of Multiple Attitudes

- Again: the subtree headed by the upper DP.



Reports of Multiple Attitudes

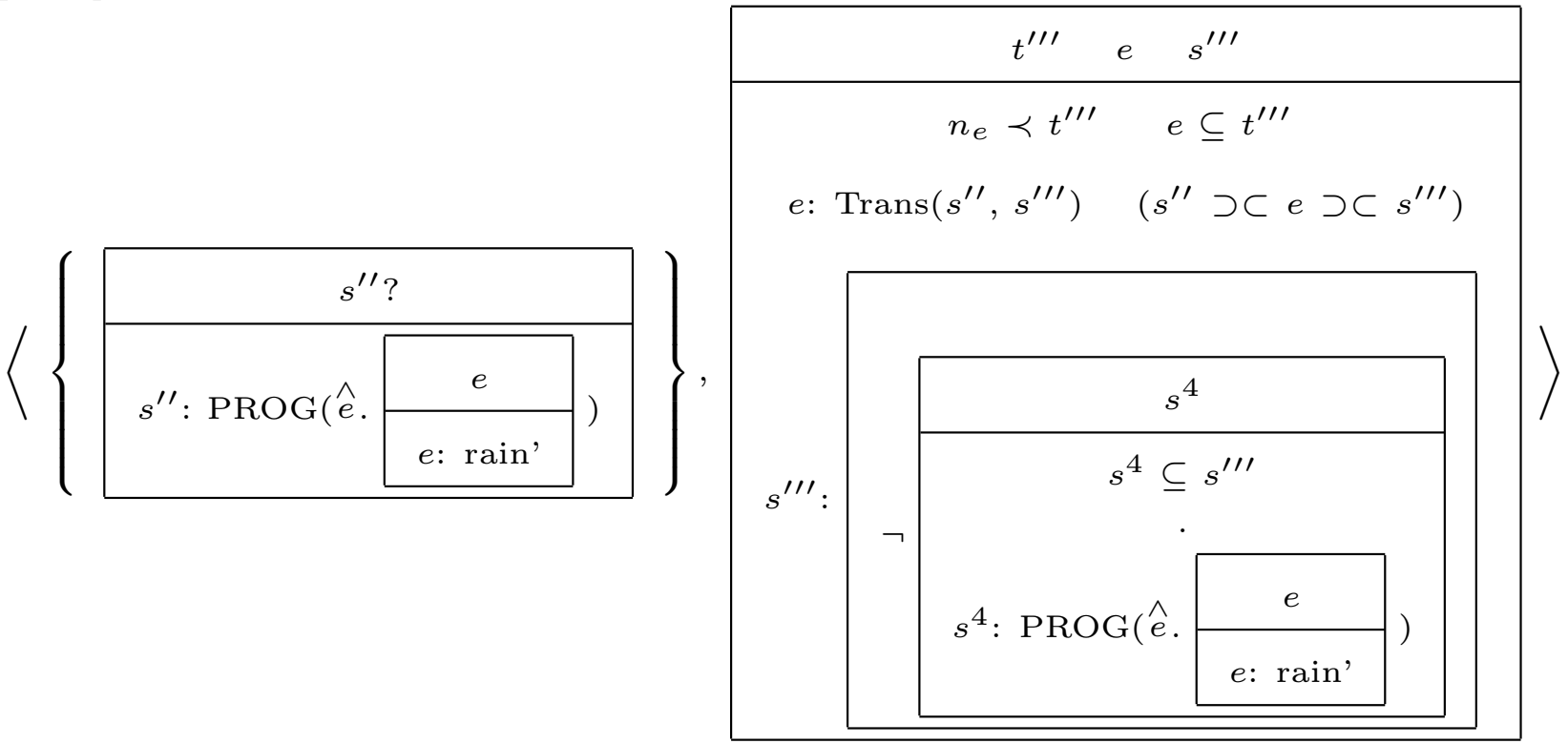
- For this second sentence the VP of the complement is *stop raining*. This phrase consists of the aspectual verb *stop* and its complement VP, which in this case consists of the single gerundival verb form *raining*.
- *stop* is a presupposition trigger. It presupposes that an eventuality of the type described by its complement went on for some time up to the time of the event e that is described by the VP headed by *stop*.
- The non-presuppositional contribution of *stop* is then that the event e terminates the presupposed eventuality.

  That is, the result state that e brings about is that the presupposed eventuality does not hold after e.

Reports of Multiple Attitudes

- DRT represents the VP *stop raining*, as consisting of the presupposition triggered by *stop* and the non-presupositional part that presupposes it, in the manner of (20).

(20) [DP] =



Reports of Multiple Attitudes

- We assume that the lexical entry for the verb *hope* is like that for *believe* in the following respect.
  - The result of combining *hope* with the representation of its complement DP is an *Att*-Condition in which the 3rd argument slot is filled with a singleton MSD;
  - the one member of this MSD is a Propositional Attitude with Mode Indicator $HOPE$;
  - The content specification of this Propositional Attitude is given by the complement DP of *hope*.

- (N.B. The entry given earlier for *believe* and the just informally described corresponding entry for *hope* says nothing about how these verbs differ in meaning. Here we set this important task aside.)

Reports of Multiple Attitudes

- With such an entry for *hope* we get as Logical Form for the upper VP node of the tree for the 2nd sentence in (19) the one shown in (21).

(21) $\left\langle s^5 \;\middle|\; \begin{array}{|l} \hline \\ \hline s^5\colon\ Att\ \left(\underline{x}, \left\{\langle HOPE, [(20)]\rangle\right\}, \emptyset\right) \\ \\ \hline \end{array} \right\rangle$

- In (21), [(20)] is the Logical Form of the complement DP of *hope*.

- But note one important difference with the Logical Form construction for the 1st sentence 'John believes that it is raining':

  The content specification [(20)] comes with the presupposition contributed by *stop*.

Reports of Multiple Attitudes

- What licenses this resolution of the presupposition?
- Intuitively the answer to this question seems clear:

  The resolution for this presupposition is provided by the belief described in the Logical Form of the 1st sentence of our two-sentence text.

  According to this Logical Form John believes that it is raining.

  John's hope expressed by the 2nd sentence is that an end will come to this state of rain that he believes to be obtaining currently.

- In other words, John's hope builds on his belief, in much the same way that in our first MSD the desire and the intention of the agent A depended referentially on her belief.

Reports of Multiple Attitudes

- How can this intuition be turned into a formal principle of presupposition resolution?
- To see more clearly how this can be done, let us complete the upper VP representation given in (21) into a preliminary representation for the second sentence as a whole.

  The remaining steps needed for this are by now familiar. (22) gives the result.

(22)
$$\left\langle \left\{ \begin{array}{|c|}\hline z? \\ \hline \mathrm{male}(z) \\ \hline \end{array} \right\}, \begin{array}{|c|}\hline t'' \quad s'' \\ \hline t'' = n \quad t'' \subseteq s'' \\ \\ s'' \colon\ Att\big(z, \{\langle HOPE, [(20)]\rangle\}, \emptyset\big) \\ \hline \end{array} \right\rangle$$

Reports of Multiple Attitudes

- Note that (22) has two representations of presuppositions:

  (i) the *he* presupposition that is shown in (22), and (ii) the *stop* presupposition inside [(20)].

- The *he* presupposition can be resolved to the dref j in the Logical Form (15) for the first sentence, following standard assumptions in DRT about accessibility of antecedents to pronouns.

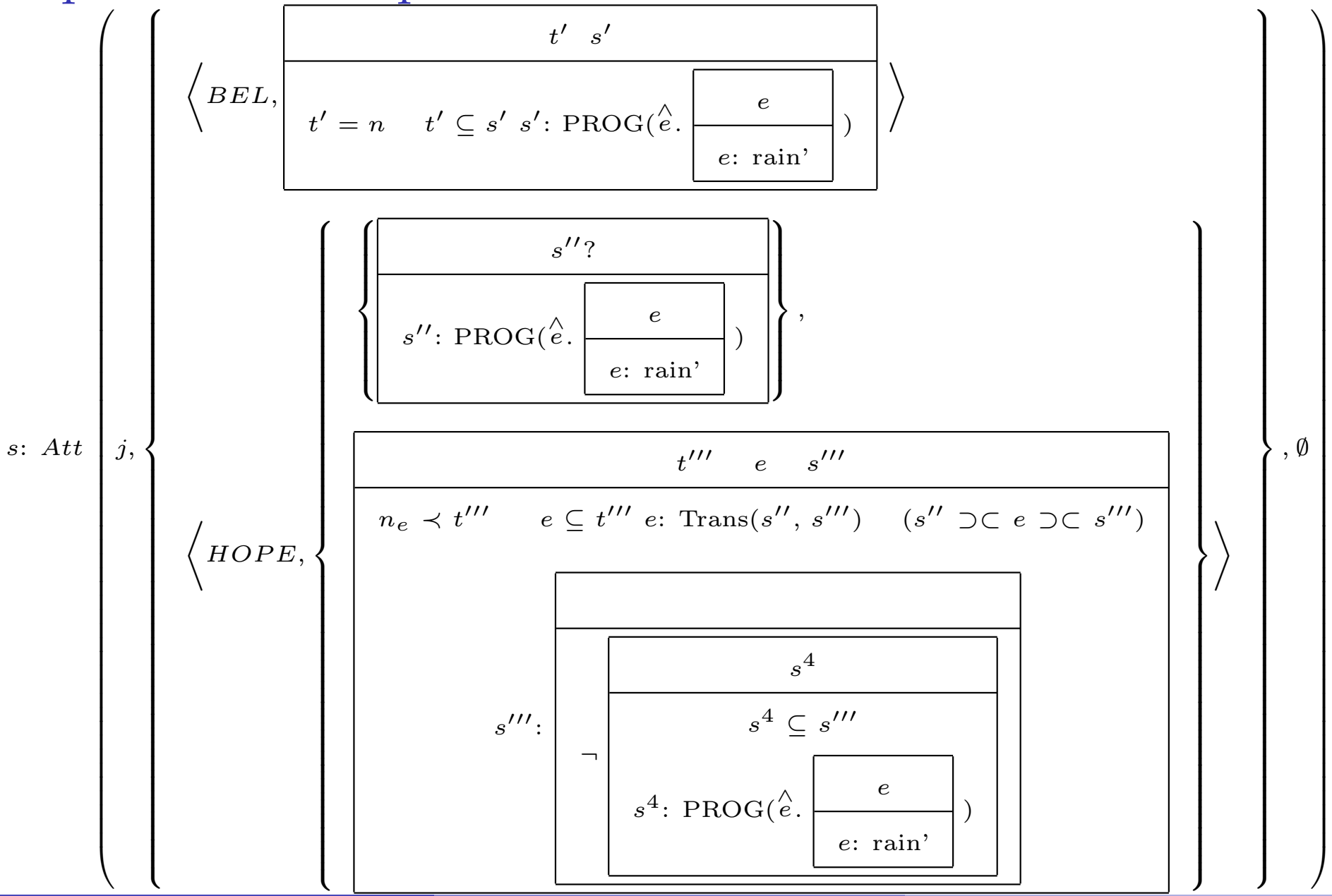
- But the information that we would like to use in order to resolve the *stop* presupposition is in an embedded position in (15).

  According to DRT's standard assumptions about accessibility, information in such a position is not available for resolving presuppositions triggered by a different sentence.

Reports of Multiple Attitudes

- Here is the principle that renders the content of John' belief in the discourse context available for resolution of the *stop* presupposition:
  - Both this belief and the hope whose content specification has the *stop* presupposition belong to MSDs that occur in the 3rd argument slots of *Att*-predications.
  - The agent of the 2nd *Att*-predication (call it: '*Att*-pred$_2$') is the same as that of the *Att*-predication whose MSD contains the belief (call it: '*Att*-pred$_1$').
  - Moreover, both the temporal location time of *Att*-pred$_1$ and that of *Att*-pred$_2$ are the utterance time n of the discourse (10.e) and thus coincide.
  - This means that '*Att*-pred$_1$' and '*Att*-pred$_2$' are partial descriptions of the same mental state.
  - We can therefore combine these two *Att*-predications into a single one, with a single MSD, as on the next slide

Reports of Multiple Attitudes



Reports of Multiple Attitudes

- We now need to rely on a further principle:

(23) Suppose an MSD contains the Propositional Attitudes

$\langle BEL, K_{BEL} \rangle$ and

$\langle HOPE, \langle \{K_{pres_1}, ..K_{pres_n}\}, K_{HOPE} \rangle \rangle$

Then K_{BEL} may be used in the resolution of the presupposition set $\{K_{pres_1}, ..K_{pres_n}\}$.

Reports of Multiple Attitudes

- The case before us requires a simple application of this principle.

  (i) The $HOPE$ constituent of the MSD has one presupposition, and

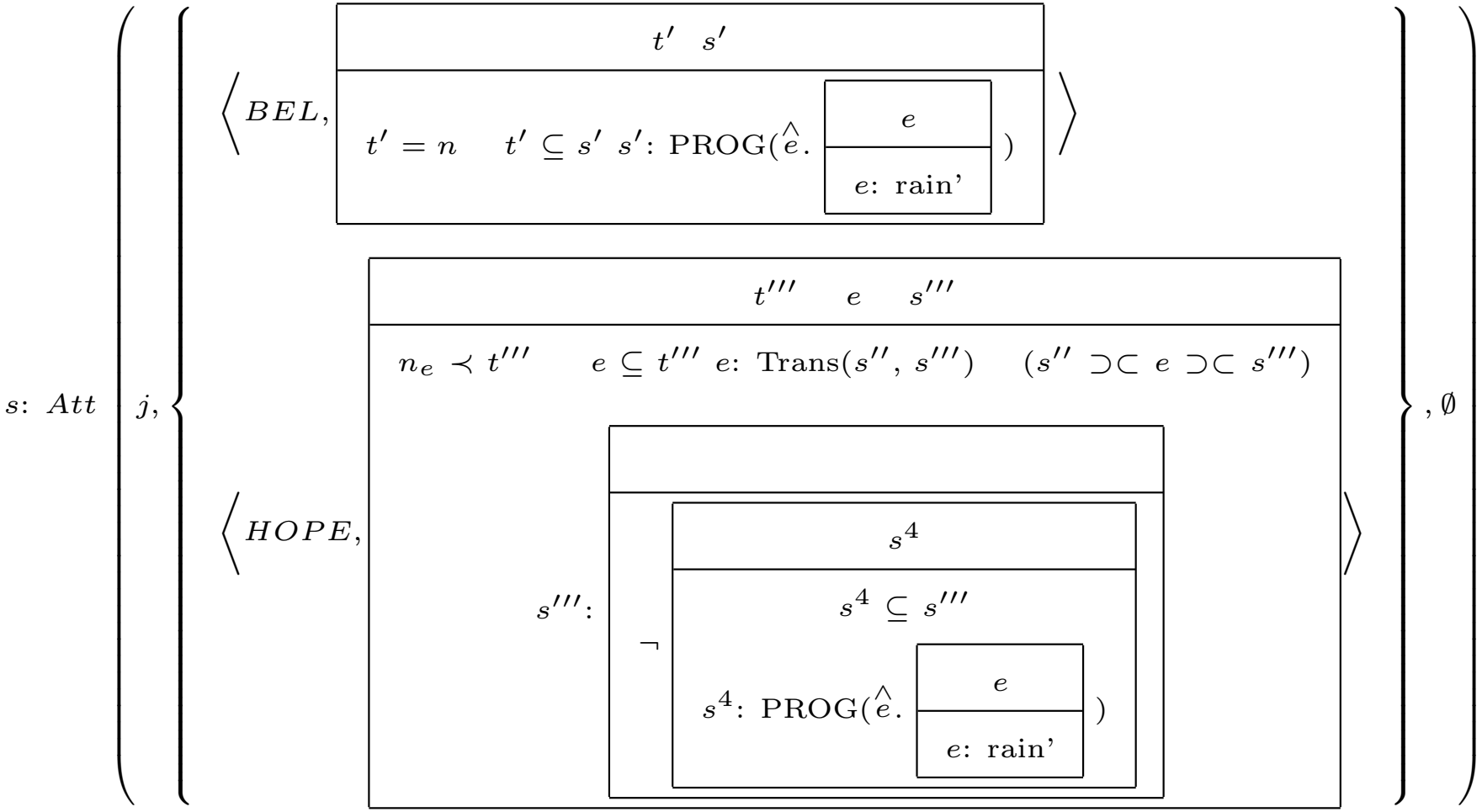
  (ii) This presupposition can be completely resolved using the content of the BEL constituent.

  (When s'' is resolved to s', then the Condition Set of the presupposition follows logically from the DRS K_{BEL}.)

Reports of Multiple Attitudes

- After resolution of the *stop* presupposition it can be removed from the representation and we get the *Att*-Condition in (24).

(24)



Reports of Multiple Attitudes

- We get the Logical form for the two-sentence discourse by substituting the *Att*-Condition of the last slide for that of the Logical Form (15) for the first sentence.

  (Unfortunately it isn't possible to get a legible version of this on a single slide.)

- The principle that the content of a BEL constituent of an MSD can be used in the resolution of presuppositions triggered within a HOPE constituent of the MSD is a special case of the *Attitudinal Hierarchy*.

- The Attitudinal Hierarchy articulates which Propositional Attitude contents can be used in the resolution of presuppositions of which other Propositional Attitudes that belong to the same mental state.

Reports of Multiple Attitudes

- The Attitudinal Hierarchy is formalized as the extension of a binary relation between Mode Indicators MOD, like BEL, DES, INT, $HOPE$ and so forth.
- That is, the Attitudinal Hierarchy is a set of pairs $<MOD_1,MOD_2>$.
- When a pair $<MOD_1,MOD_2>$ belongs to the Hierarchy, this means:
- The content K_1 of a constituent $<MOD_1,K_1>$ of an MDS is available for the resolution of presuppositions that are part of the content K_2 of a constituent $<MOD_2,K_2>$ of that MDS.
- Also: when $<MOD_1,MOD_2>$ belongs to the Hierarchy, then an entity introduced in K_1 can be reused in K_2.

  (Recall our very first MSD last week)

Reports of Multiple Attitudes

- Some examples of Mode Indicator pairs belonging to the Attitudinal Hierarchy:

  $<BEL,BEL>$, $<BEL,DES>$, $<BEL,INT>$, $<BEL,HOPE>$, $<DES,DES>$, $<DES,INT>$, $<INT,INT>$.

- But not, for instance: $<DES,BEL>$ or $<INT,BEL>$.

- Much about the Attitudinal Hierarchy is still unclear.

- And it is still uncertain whether the constraints are correctly described just in terms of the Mode Indicators involved.

Looking Ahead

- Lecture 3:
- Attitude reports with proper names.
- Attitude reports with a failing name: *Vulcan*
- Vicarious Anchors, and causal networks of vicariously linked Entity Representations
- Brief sketches of:

  (i) 'Double Vision' cases: *Hesperus* -*Phoshorus* etc.

  (ii) the Model Theory for the DRS-languages of MSDRT.

- Lecture 4:
- MSDRT and Fiction: The role of Entity Representation networks in an ontology and semantics of stories.

End of Second Lecture

THANK YOU

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