Introduction to dynamic semantics

Session 2: Compositional discourse representation theory

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Outline

1 Recap

2 Problem

3 Compositional DRT

4 Practice

Recap

The “meaning” of a sentence is its potential to change the context.

w w w w

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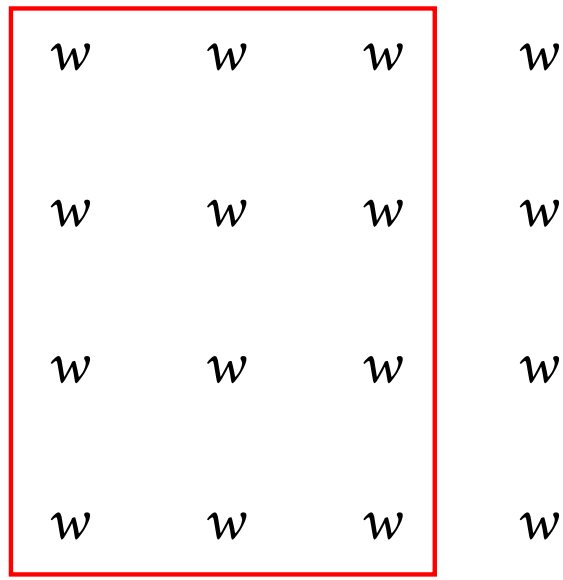

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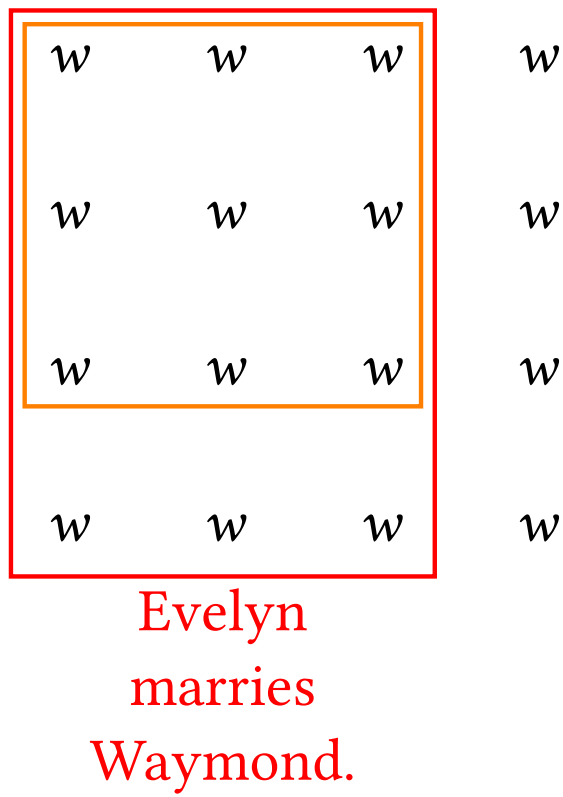

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Sentences introduce **discourse referents** and **conditions** on these drefs.

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(2) Evelyn owns a laundromat.

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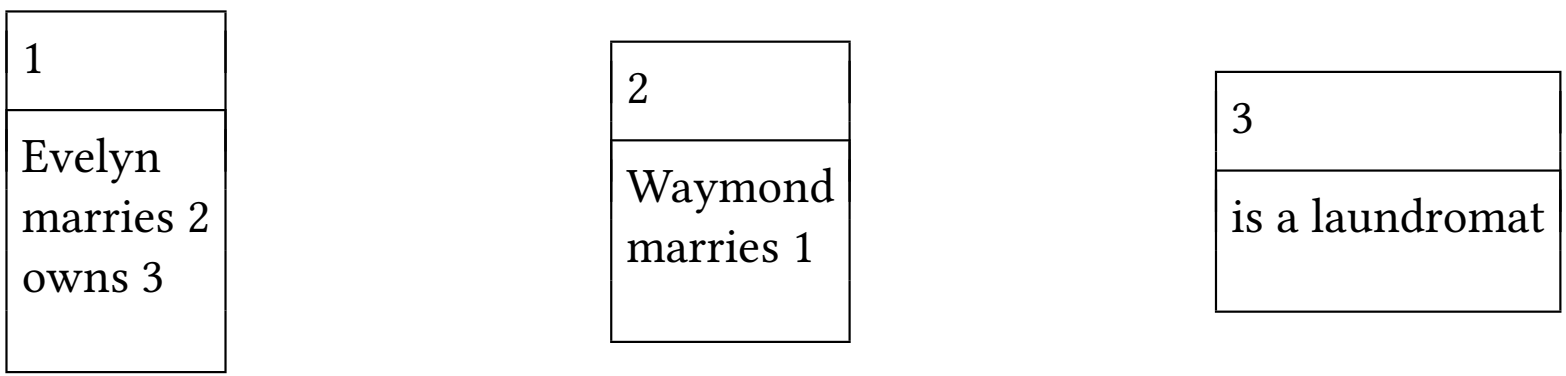

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The contribution of a sentence can be represented as a **discourse representation structure (DRS)**.

A DRS combines multiple cards into one.

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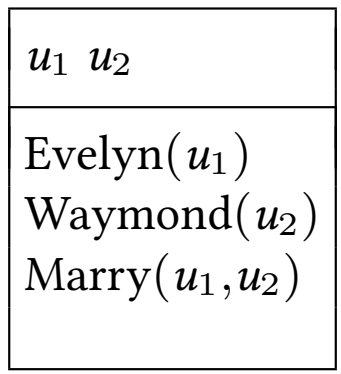

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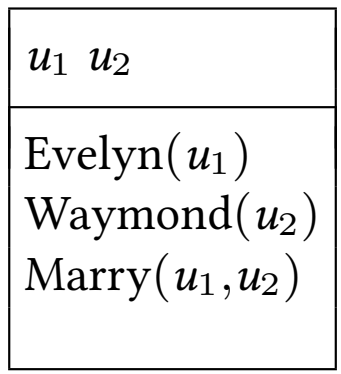

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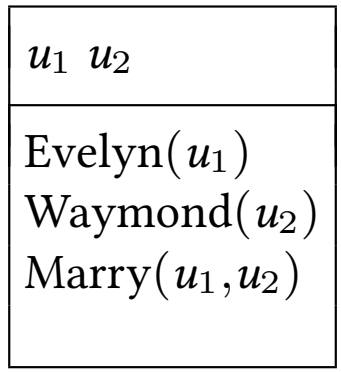

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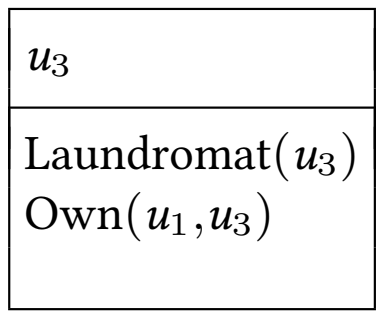

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DRSs can be combined using **dynamic conjunction** (;).

(5) Evelyn marries Waymond. Evelyn owns a laundromat.

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u_1 u_2
Evelyn(u_1) Waymond(u_2) Marry(u_1,u_2)

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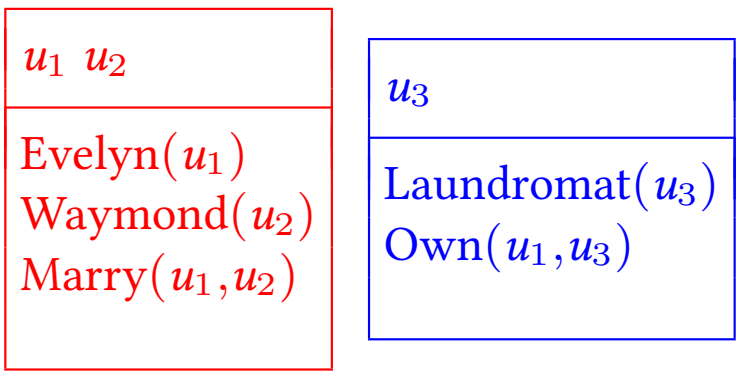

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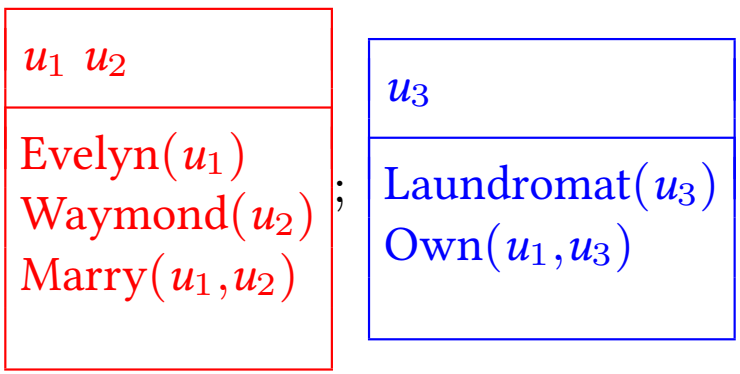

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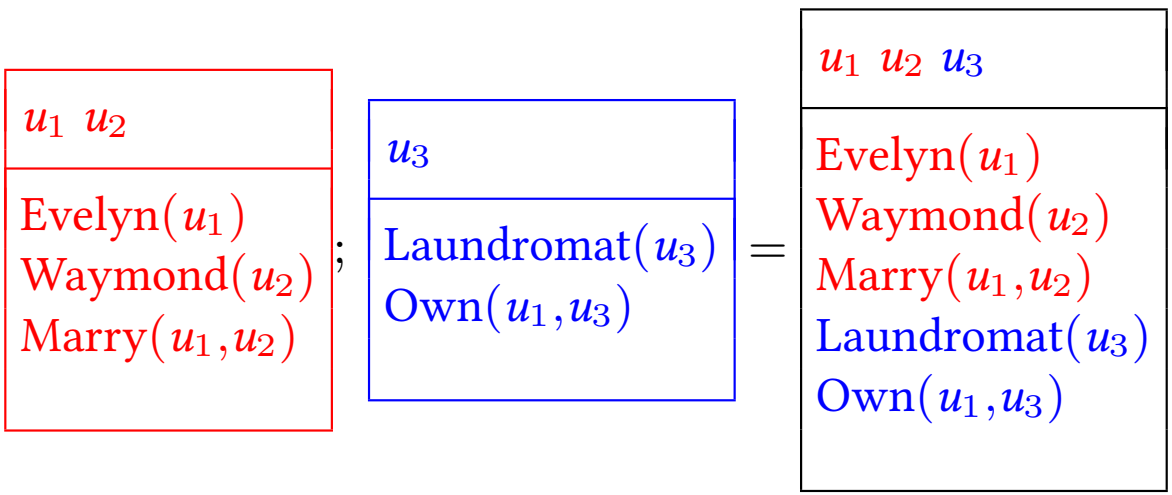
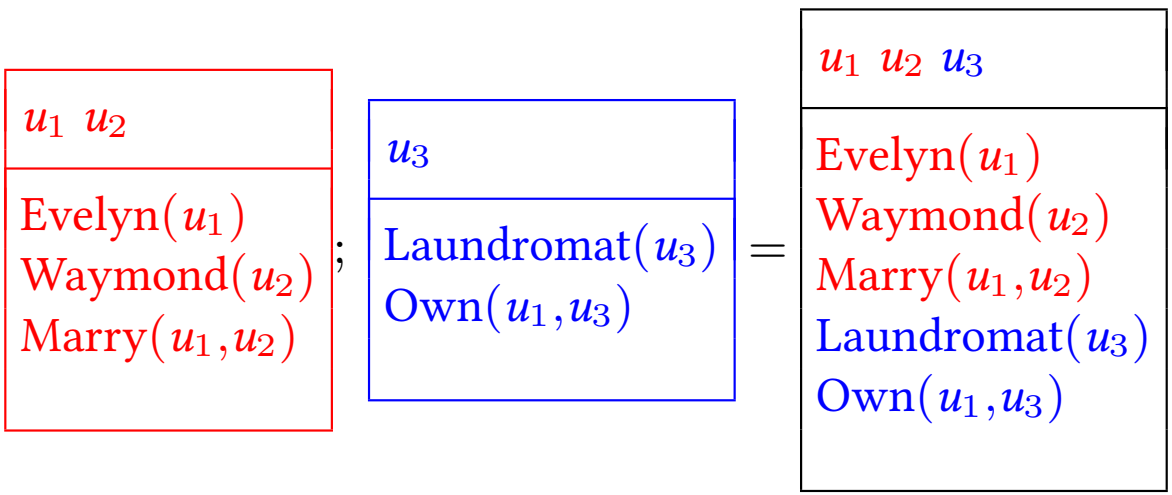


Recap

DRSs can handle **cross-sentential anaphora**.

(6) Evelyn$_1$ marries Waymond. She^1 owns a laundromat.



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2 Problem

3 Compositional DRT

4 Practice

Problem

Classical DRT is not compositional!

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Q: Why is this a problem?

Solutions

1. Forget about DRT and start over

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1. Forget about DRT and start over
   → e.g. Dynamic Predicate Logic (Groenendijk and Stokhof 1991)
2. Make DRT compositional
   → Compositional DRT (Muskens 1996)

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Compositional DRT

A sentence is a relation between an input state (i) and an output state (o).

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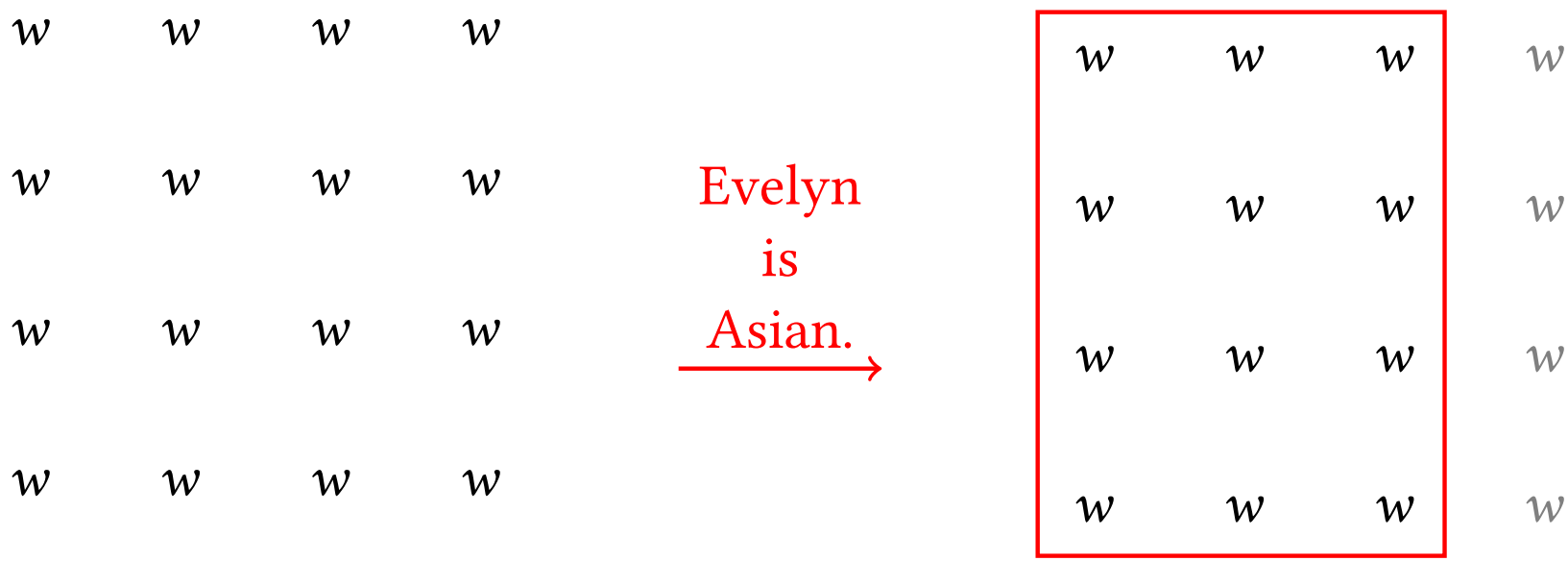
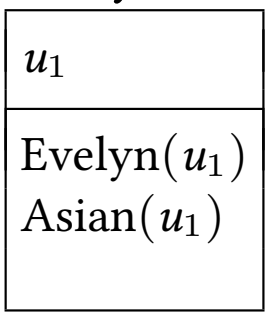


Compositional DRT

(7) Evelyn is Asian.



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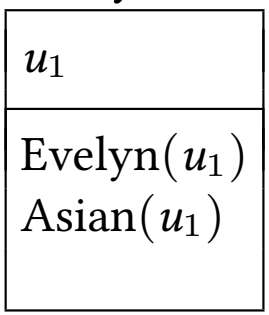

$=_{abbr} \lambda i \lambda o. \ldots$

Compositional DRT

(7) Evelyn is Asian.

u_1
Evelyn(u_1) Asian(u_1)

$=_{abbr} \lambda i \lambda o.\, i[u_1]o$

where:
$i[u_1]o =_{def} \forall u.u \neq u_1 \rightarrow \nu(i)(u) = \nu(o)(u)$
and $\nu(o)(u_1)$ maps dref u_1 in state o to an individual (here Evelyn)

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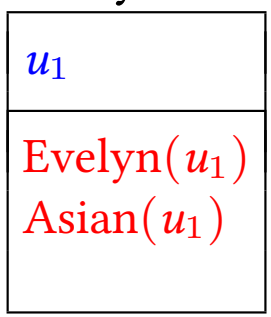

$=_{abbr} \lambda i \lambda o.\, i[u_1]o \wedge \text{Evelyn}(\nu(o)(u_1)) \wedge \text{Asian}(\nu(o)(u_1))$

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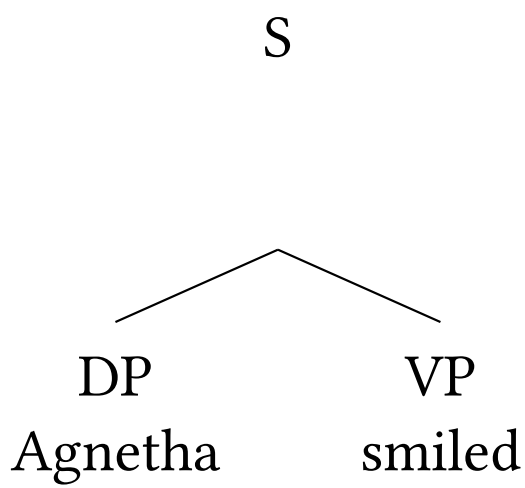

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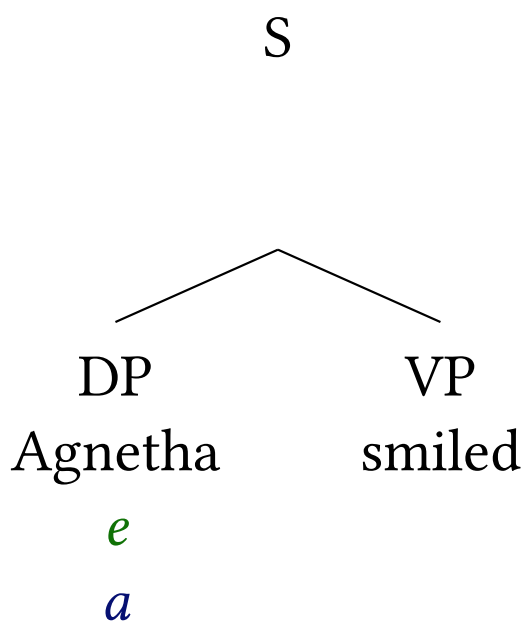

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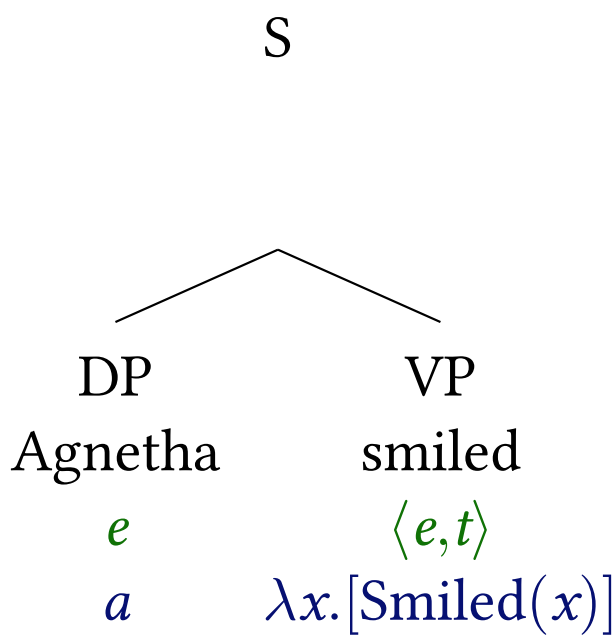

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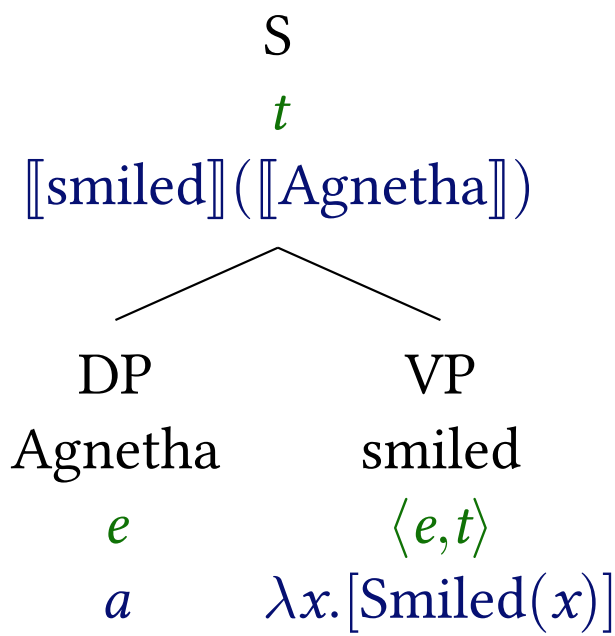

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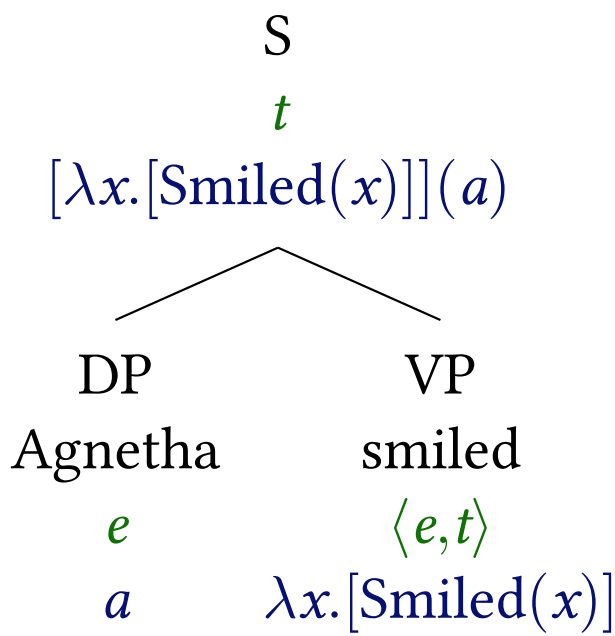

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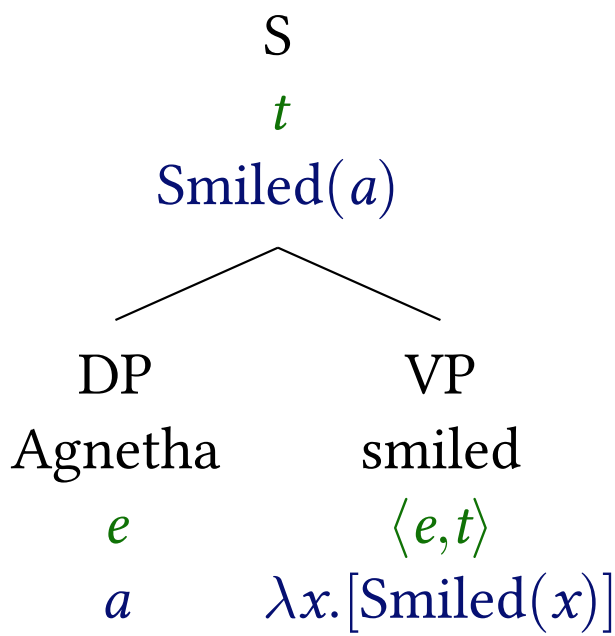

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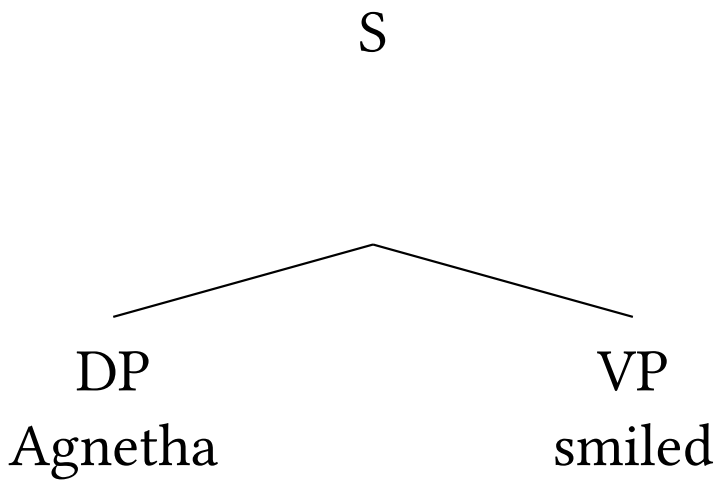

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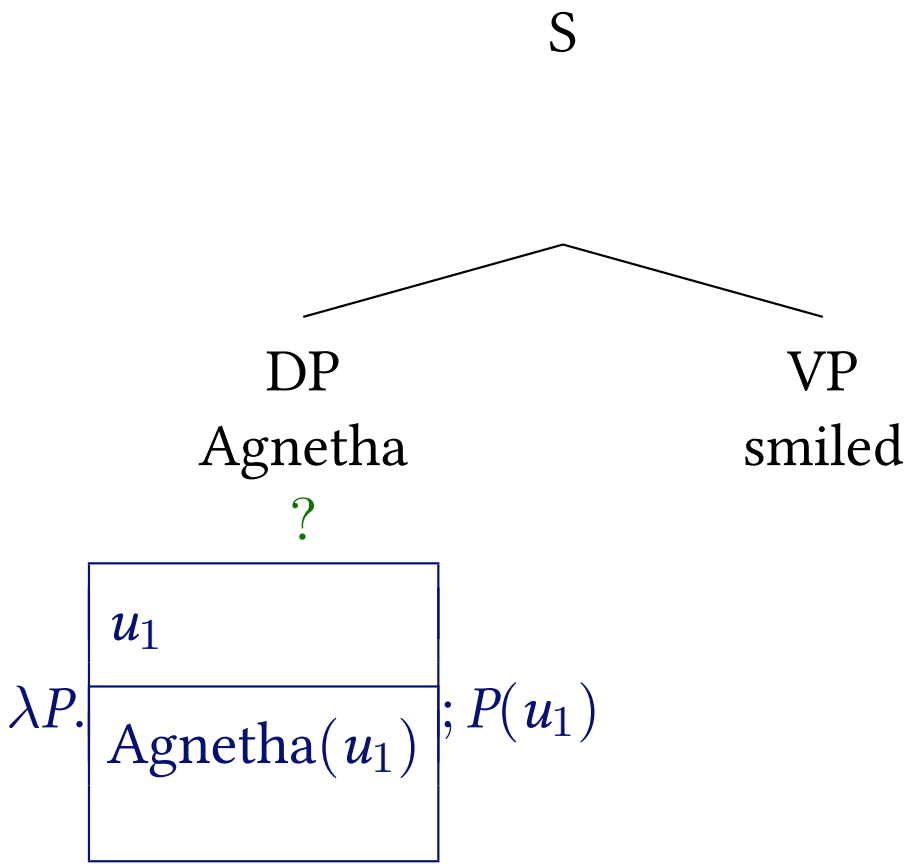

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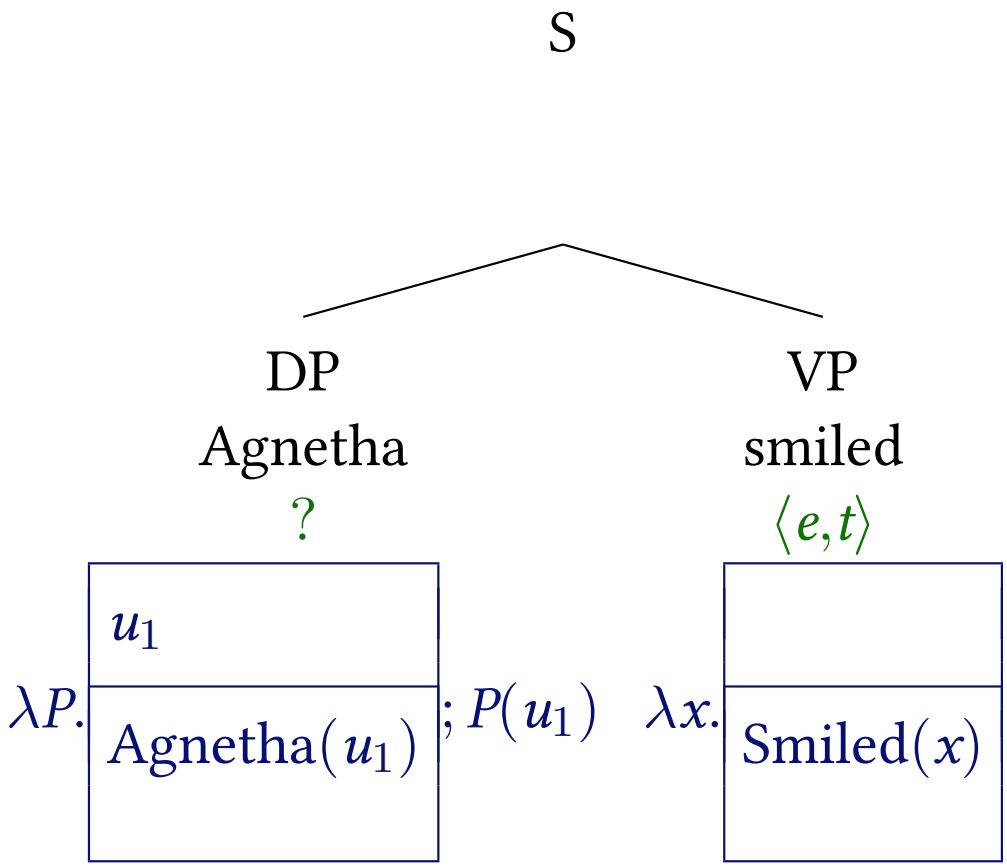

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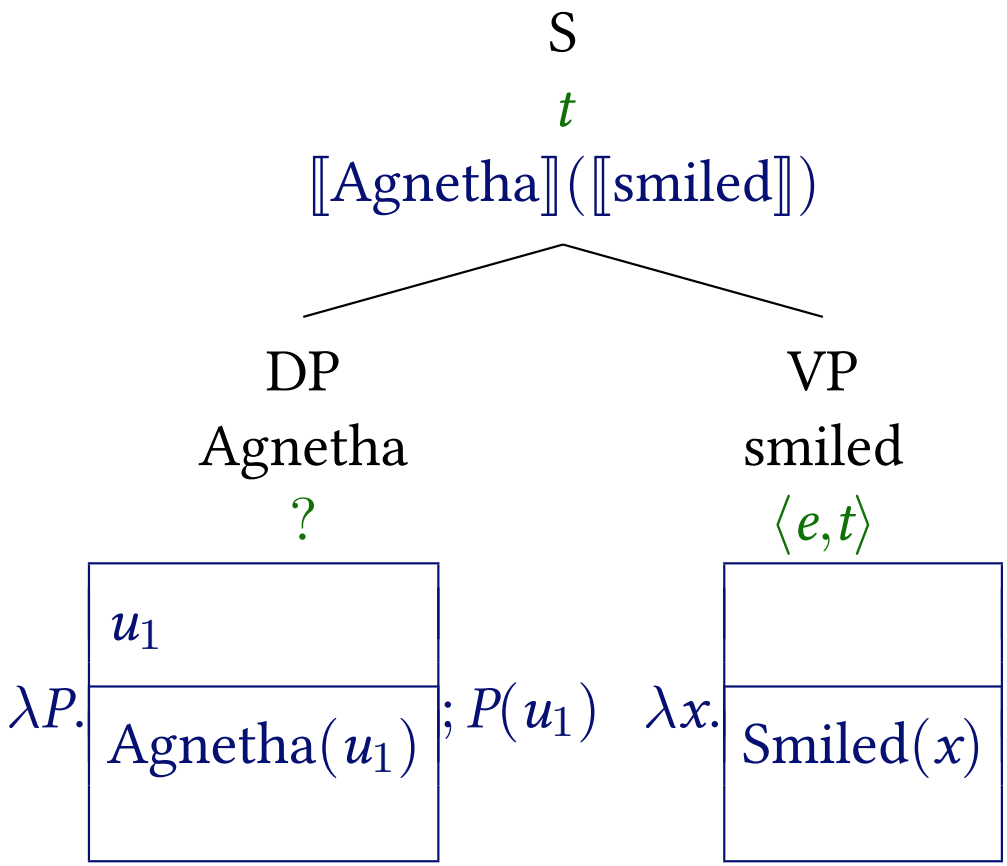

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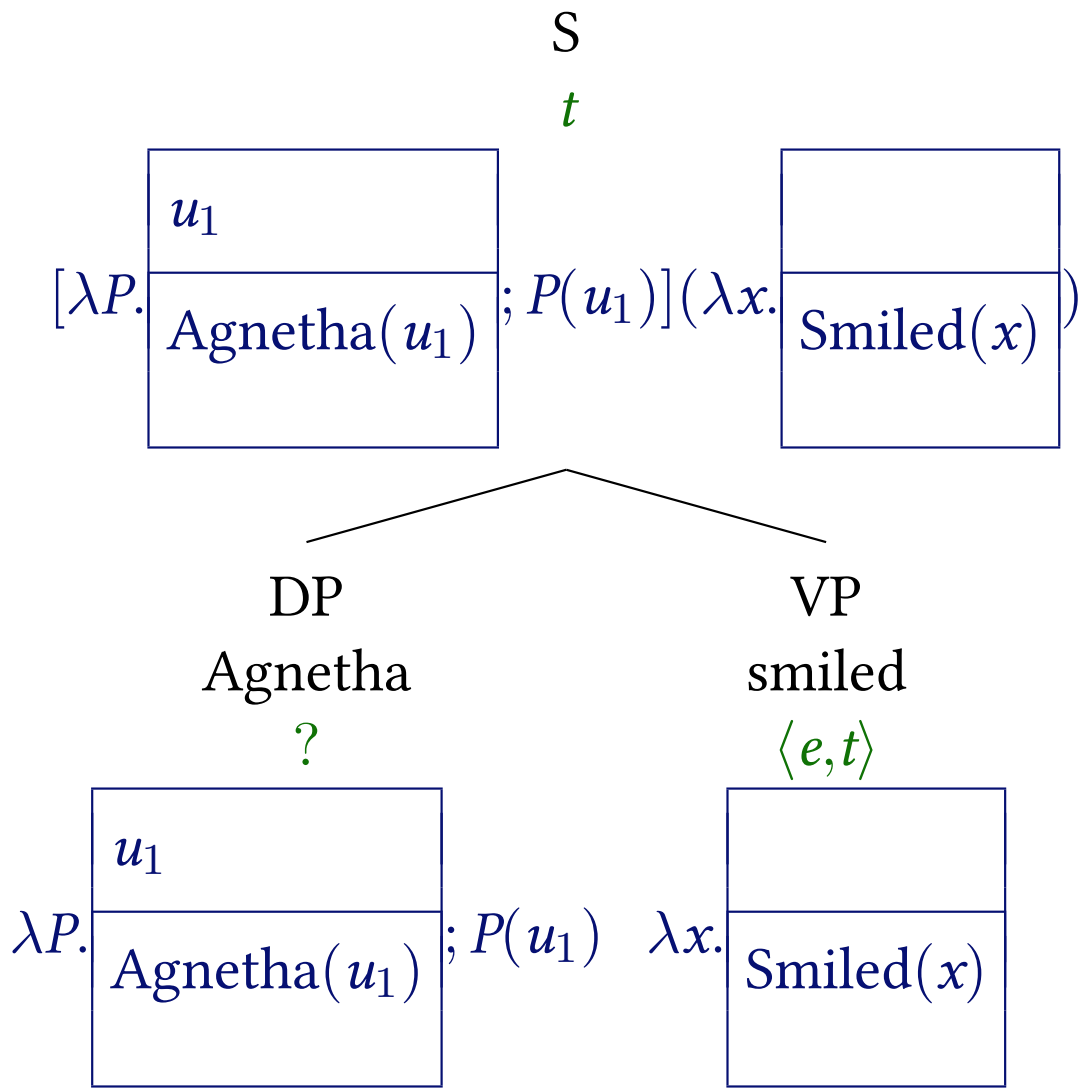

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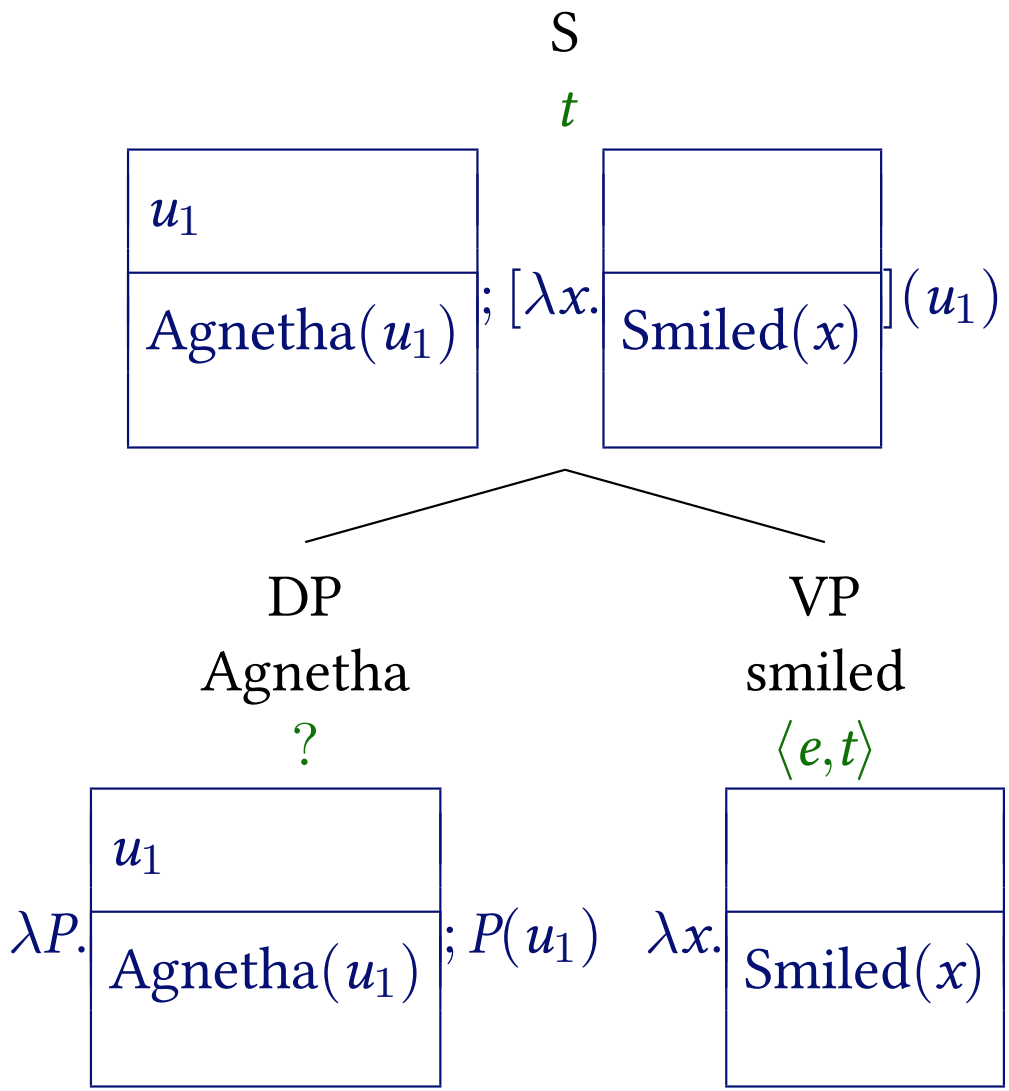

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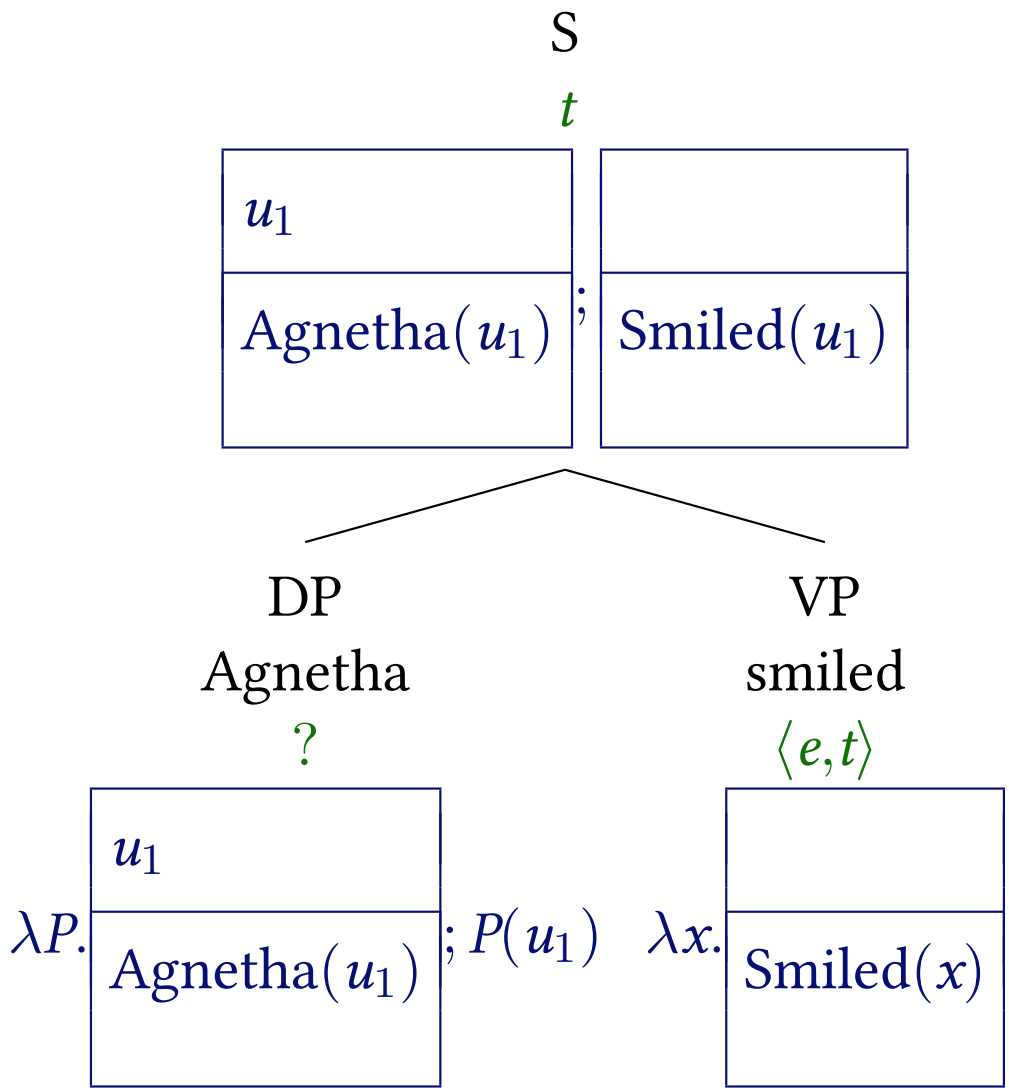

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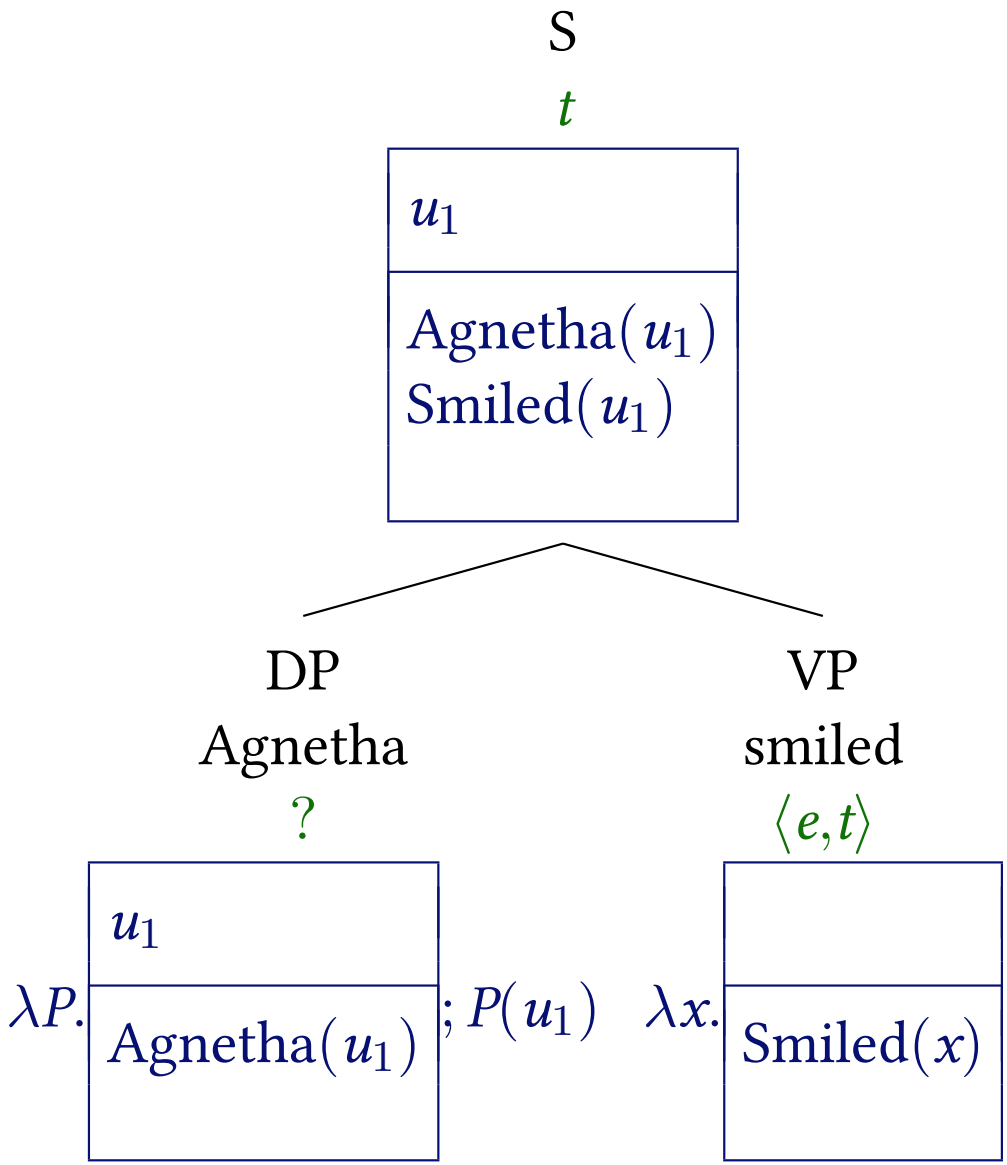


Activity 1: Predicate nouns

Give the derivation of the following sentence:

(8) Agnetha is a singer.

1. Draw a syntactic tree.
2. Give the translations for the terminal nodes.
   (Assume that *is* and *a* have "no meaning".)
3. Give the translations for the remaining nodes by applying Function Application.

Activity 2: Predicate adjectives

Give the derivation of the following sentence:

(9) Björn is kind.

1. Draw a syntactic tree.
2. Give the translations for the terminal nodes.
   (Assume that *is* has "no meaning".)
3. Give the translations for the remaining nodes by applying Function Application.

Activity 3: Transitive verbs

Give the derivation of the following sentence:

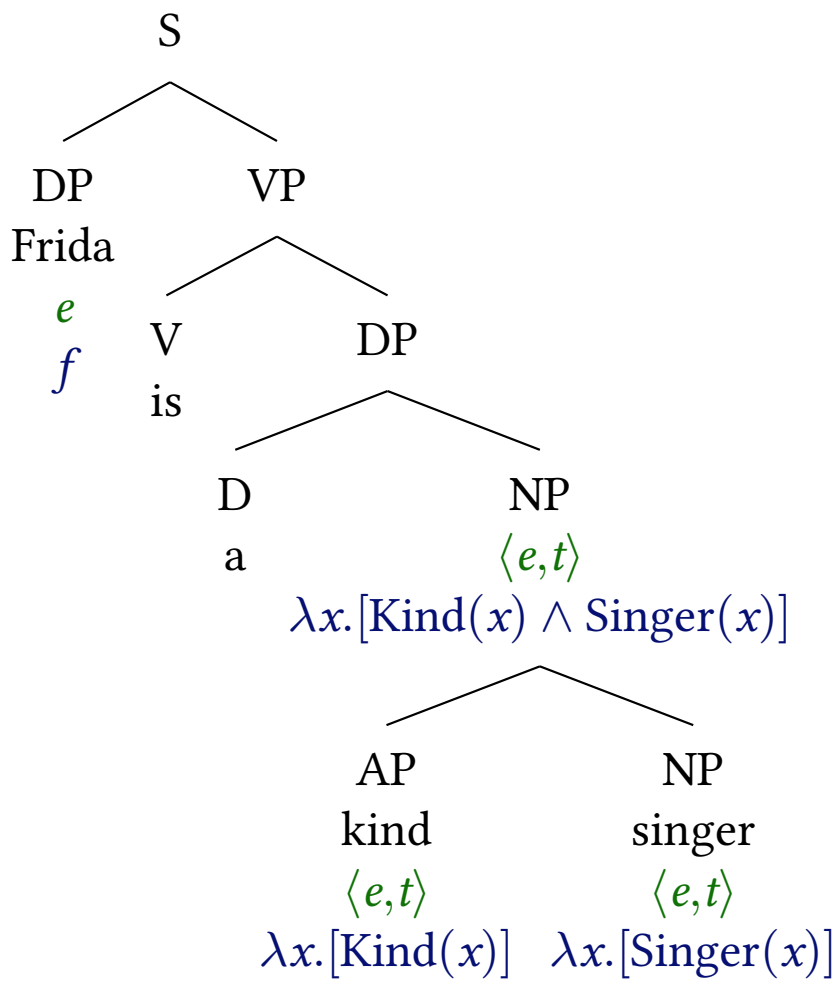
(10) Agnetha loved Björn.

1. Draw a syntactic tree.
2. Give the translations for the terminal nodes *Agnetha*, *loved* and *Björn*.
3. Give the translations for the remaining nodes by applying Function Application.

Composition rule 2: Predicate Modification

Example: Attributive adjectives

Frida is a kind singer.



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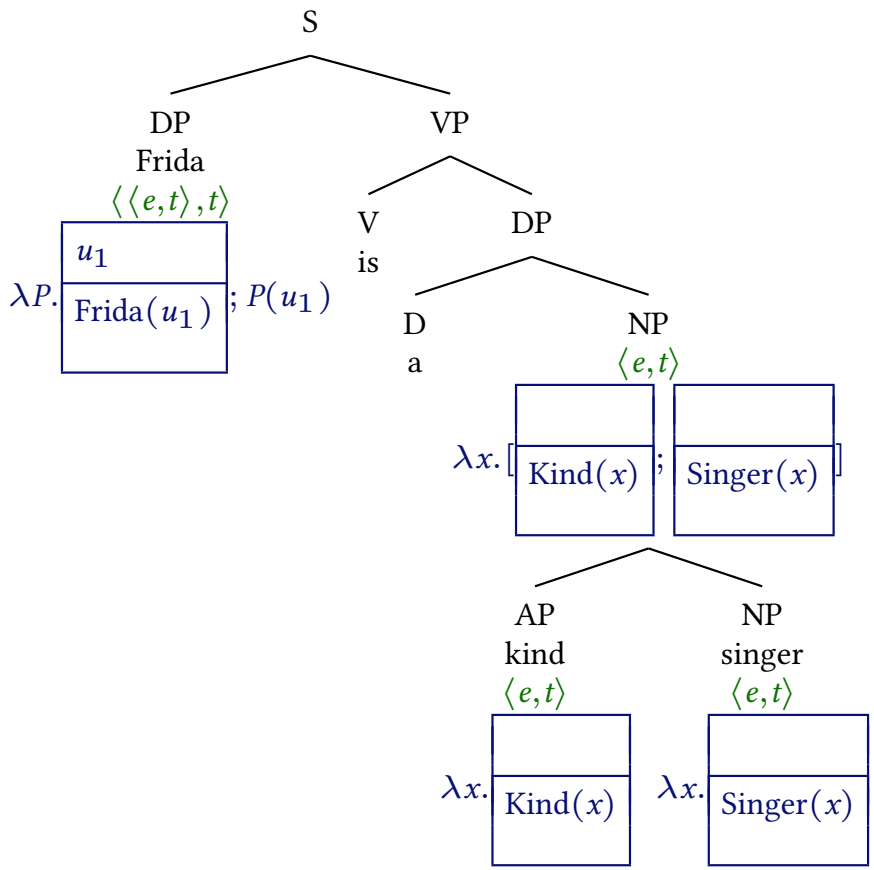


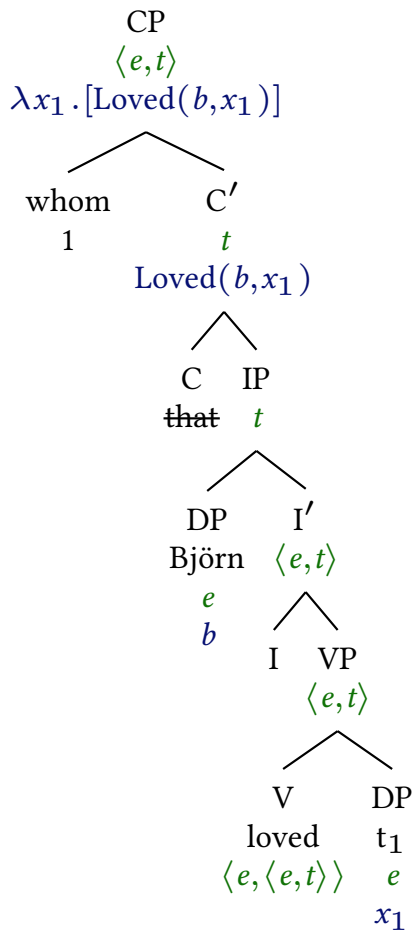
Activity 4: Attributive adjectives (continued)

Give the derivation of the following sentence:

(11) Frida is a kind singer.

Composition rule 3: Lambda Abstraction

whom Björn loved



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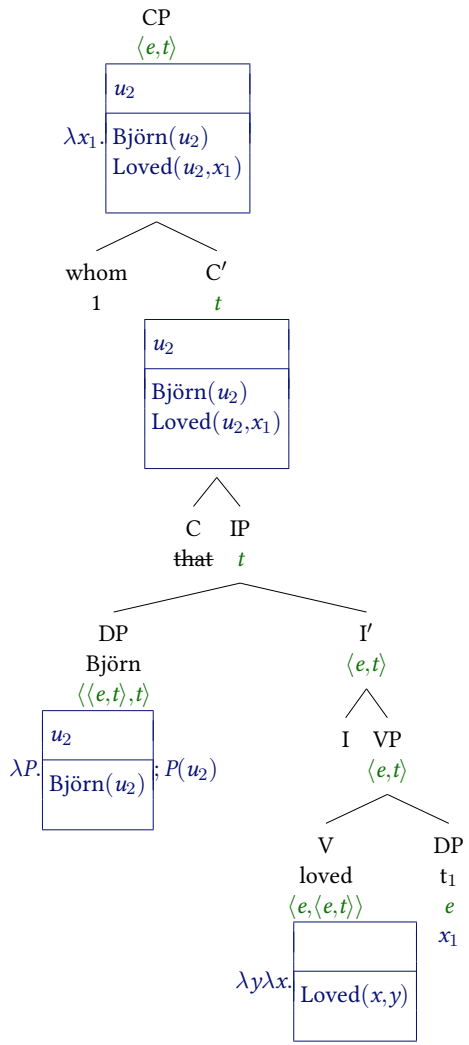

Activity 5: Lambda Abstraction

Give the derivation of the following sentences. Indicate the type of each node.

(12) Agnetha is a woman whom Bjorn loved.

(13) “Waterloo” is a song that Agnetha sang.

Summary

- Discourse representation theory can be made fully compositional.

References I

Groenendijk, Jeroen, and Martin Stokhof. 1991. Dynamic Predicate Logic. *Linguistics and Philosophy* 14:39–100.

Muskens, Reinhard. 1996. Combining Montague Semantics and Discourse Representation. *Linguistics and Philosophy* 19:143–186.

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