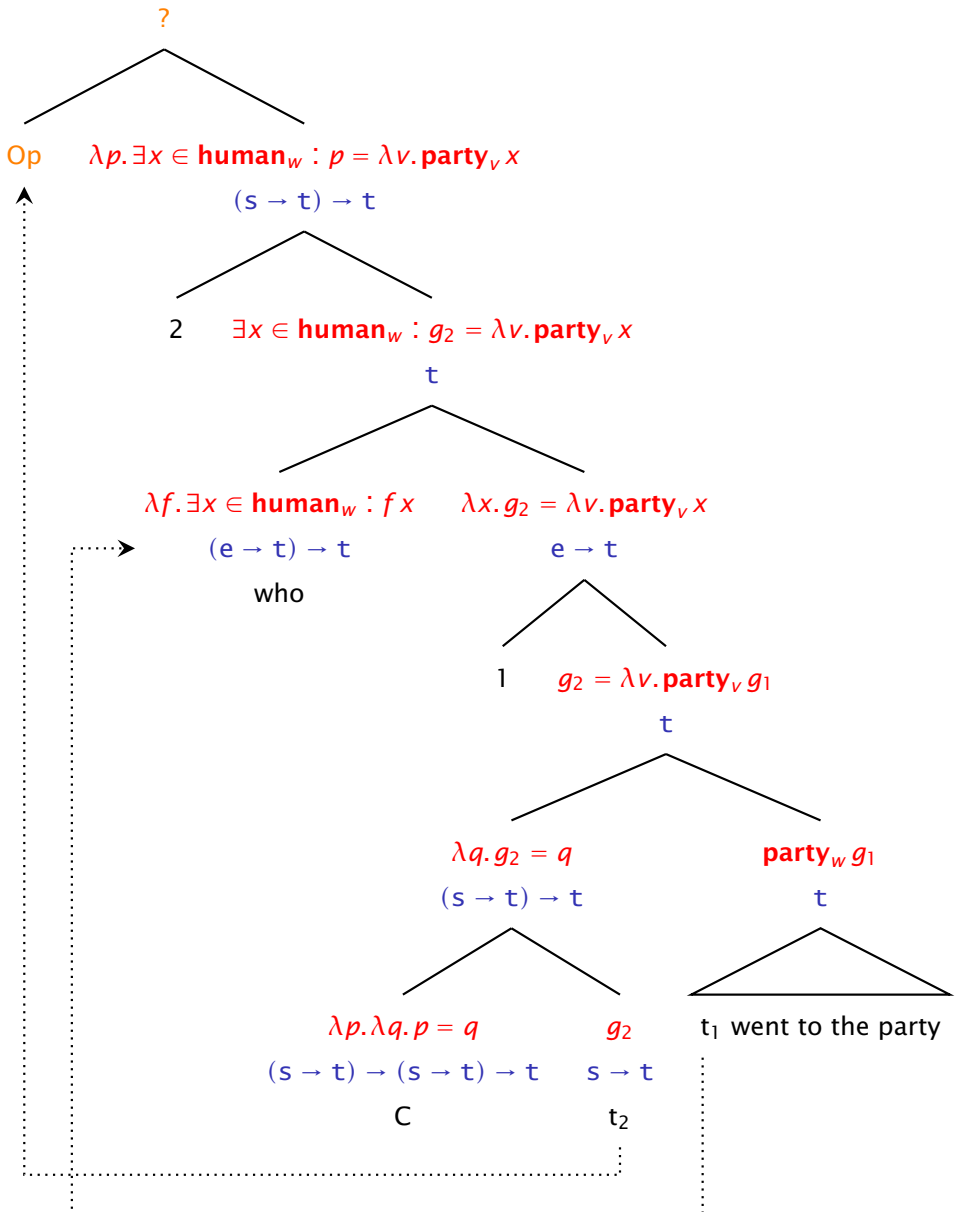
More on question composition

Semantics II

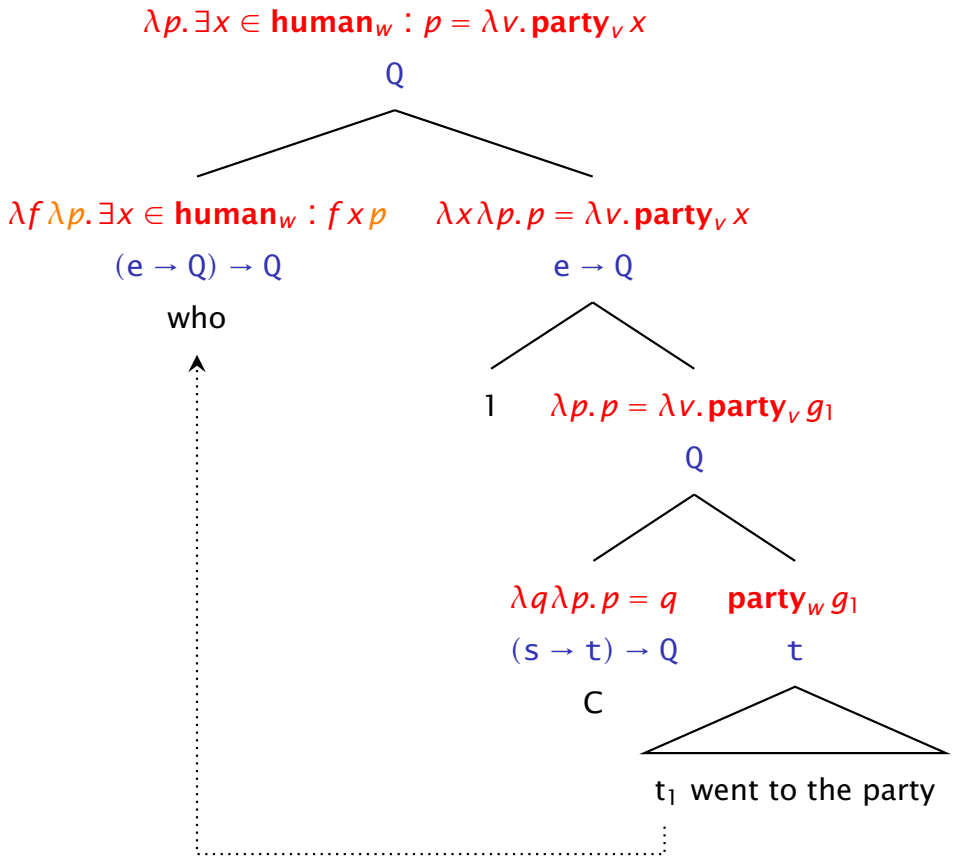
March 8, 2018

Approaches to question composition

The λ-operator approach (Heim 2011, Fox 2012)



The higher-order *wh* approach, $Q ::= (s \to t) \to t$



Summarized: two kinds of logical forms, $Q ::= (s \to t) \to t$

$$\left\{\begin{array}{l} \textbf{who} : (e \to t) \to t \\ \textbf{C} \quad : (s \to t) \to Q \end{array}\right.$$

$$\lambda p.\ \textbf{who}\,(\lambda x.\ \textbf{C}\,p\,(\underbrace{\textbf{left}\,x}_{s\to t}))$$

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(the “proto-question”)

Thinking about our frameworks

Both approaches should explain why question words are indefinite-like. There should be some common core to indefinites and *wh* words.

What forces wh movement? Semantics of the *wh* expression, or something else?

- Put another way: both approaches should explain why *wh* words cannot take scope under C. The nature of these explanations is different.

Keeping the last slide in mind

Can you define a mapping from a generalized quantifier to something that quantifies into questions — i.e., with the following type?

$$((\mathtt{e} \rightarrow \mathtt{t}) \rightarrow \mathtt{t}) \rightarrow (\mathtt{e} \rightarrow \mathtt{Q}) \rightarrow \mathtt{Q}$$

Would there be any empirical consequences of such a mapping?

Suppose we treated *wh* words as properties or sets of individuals — i.e., having base type $\mathtt{e} \rightarrow \mathtt{t}$ (Hamblin 1973). Can you define a mapping from this to a *wh*-quantifier?

$$(\mathtt{e} \rightarrow \mathtt{t}) \rightarrow (\mathtt{e} \rightarrow \mathtt{Q}) \rightarrow \mathtt{Q}$$

Would there be any empirical consequences of such a mapping, relative to the first?

Islands

Recall data from multiple *wh* constructions:

1. Who read what?
2. Who knows who read what?
3. Which linguist will be mad if we invite which philosopher?

Wh in situ langs often (though not always, cf. Dayal 1996) allow in situ *wh* to scope out of islands (e.g., Huang 1982, Nishigauchi 1990, Kratzer & Shimoyama 2002):

4. Taro-wa [[**dare**-ga katta] mochi]-o tabemasita ka?
   'Who is the *x* such that Taro ate rice cakes that *x* bought?'
5. Zhangsan kan-le [[**shei** xie de] shu]?
   'Who is the *x* such that Zhangsan read the book *x* wrote?'

Null operator? (Fox 2012)

The λ-operator approach to question composition may (depending on assumptions about how abstraction nodes are introduced) imply null operator movement. What kind of thing could be moving? Could it be associated with some kind of semantics?

$$\textbf{Ans} = \underbrace{\lambda Q \lambda w \lambda v . \forall p \in Q : p\,w = p\,v}_{\texttt{Q→s→s→t}}$$

Suppose $Q = [\![\text{who went to the party}]\!]$ and the actual humans are **a**, **b**, **c**. Then:

$$\lambda w \lambda v . \forall p \in \{\textbf{party}\,\textbf{a}, \textbf{party}\,\textbf{b}, \textbf{party}\,\textbf{c}\} : p\,w = p\,v$$

In other words, the equivalence relation on worlds that partitions them according to what they say about which humans went to the party:

$$\lambda w \lambda v . \forall x \in \textbf{human} : \textbf{party}_w\,x = \textbf{party}_v\,x$$

More on **Ans** operators

A moving **Ans** operator provides a nice way to rationalize the basic assumptions and requirements of the λ-operator approach to question composition.

There are reasons to like partition meanings (natural notion of question entailment, extension of an equivalence relation over worlds is a simple proposition). So in the end we may wish to generate them anyway. **Ans** is one way to do so.

Is this an *argument for* the λ-operator approach to question composition?

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Is this an *argument for* the λ-operator approach to question composition? Not even a little bit. The higher-order *wh* theory can also plop **Ans** on top.

- And recall: Groenendijk & Stokhof (1989) use **ToPart** + categorial questions.

Pied piping

Some basic data

Consider questions like the following:

6. Who's mother went to the party?
7. Who's mother was introduced to who's father?

(I like writing *who's* when I'm doing linguistics.)

How would you tend to answer these questions?

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8. Bob. (short answer) / Bob's mother went to the party. (long answer)
9. Mary's mother was introduced to Bill's father.

Could you answer (e.g.) (6) by specifying the mother: *Mary (went to the party)*?

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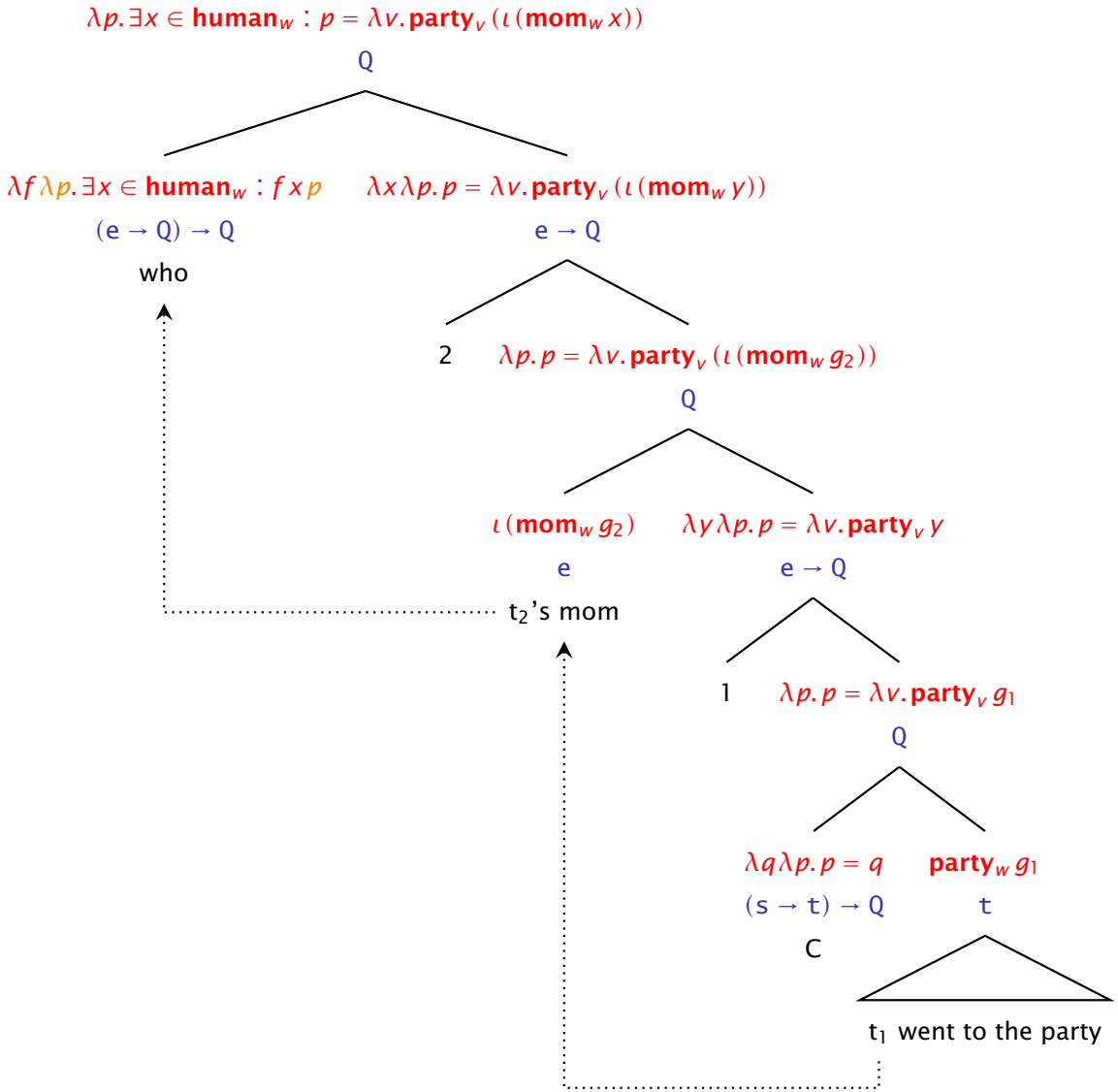
Could you answer (e.g.) (6) by specifying the mother: *Mary (went to the party)*? This option seems dispreferred, at least, and possibly impossible.

Let's do a tree (using higher-order *wh*)



Is this the right meaning?

Repeating the question meaning we derived on the last slide:

$$\lambda p.\exists x \in \mathbf{human}_w : p = \lambda v.\mathbf{party}_v\,(\iota\,(\mathbf{mom}_w\,x))$$

What kinds of answers does this allow?

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What kinds of answers does this allow? If John's mom is Mary, and Mary went to the party, then this requires us to answer the question with:

10. Mary (went to the party).

This isn't the right result: it at least *under-generates* with respect to the preferred answer, and plausibly *over-generates* an impossible answer. Instead we want:

$$\lambda p.\exists x \in \mathbf{human}_w : p = \lambda v.\mathbf{party}_v\,(\iota\,(\mathbf{mom}_v\,x))$$

Why was this forced on us?

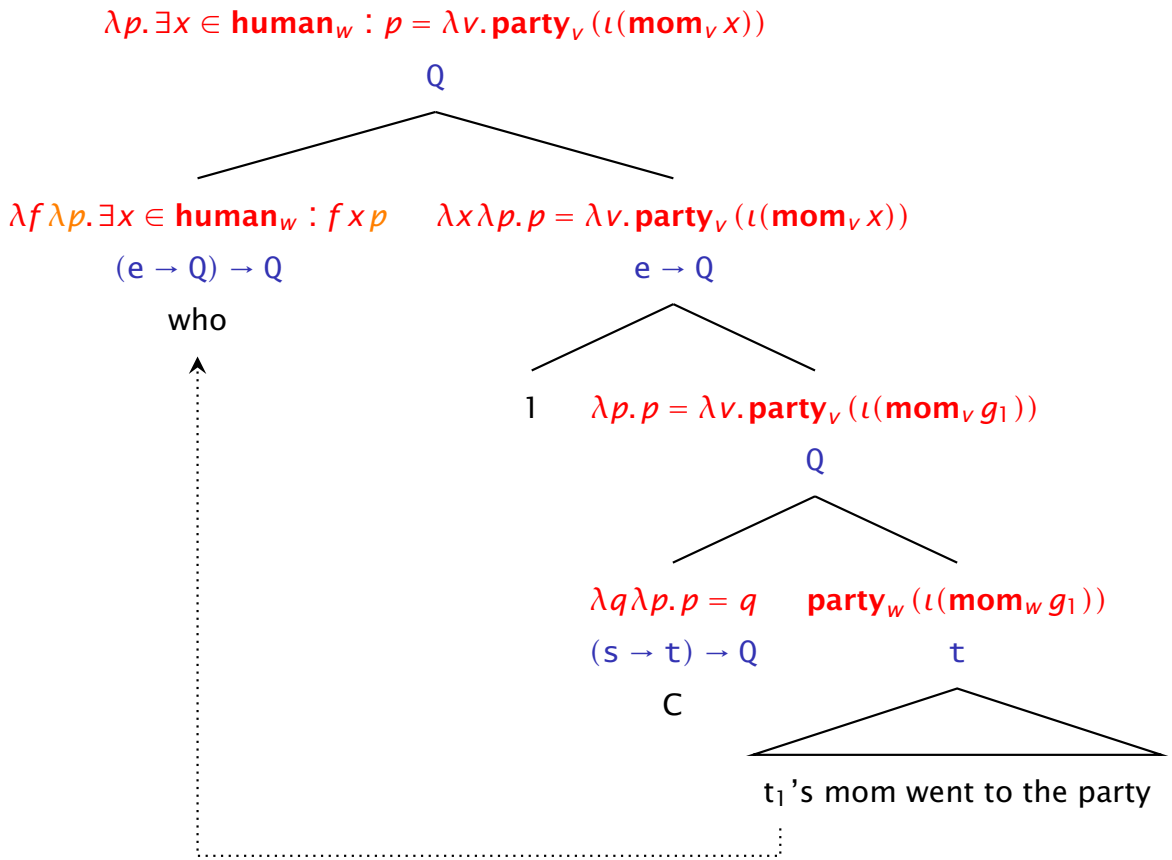
In English, we *know* that the *wh* phrase is scoping above C, i.e., above the proto-question, since the entire phrase has moved there, obligatorily:

11. %Who does John like _'s mother?

Because *wh* movement out of DP is impossible (for many speakers), *who's mother* is pied-piped, moving into the left periphery due to the requirements of *who*.

But once *'s mother* is in the left periphery, its value is fixed to *the world of evaluation*, rather than to the proto-question worlds, because it occurs above the stage in the derivation where IFA happens.

A good tree



This is the right interpretation, but it requires **partial reconstruction**, so that *'s mom* is interpreted inside the proto-question. Does this seem ok?

On partial reconstruction

The worry about helping ourselves to partial reconstruction is that it completely denudes the concept of island-hood (von Stechow 1996, Dayal 2016).

In general, what is to stop us from covertly moving an island, and then partially reconstructing everything except one of the things on the island?

It'd be as if we had moved non-reconstructed thing out of the island anyway!

Alternative semantics

Alternative semantics in two easy steps (Hamblin 1973)

First ingredient: all meanings are sets.

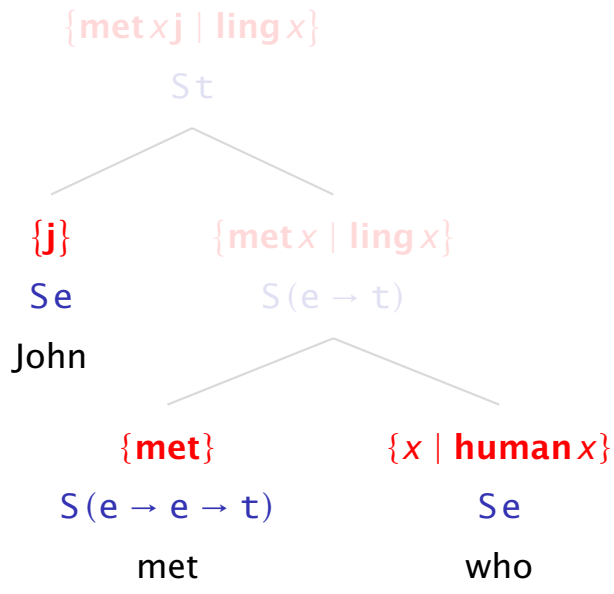
John : $\mathsf{S}\,\mathsf{e}$	met : $\mathsf{S}(\mathsf{e} \to \mathsf{e} \to \mathsf{t})$	who : $\mathsf{S}\,\mathsf{e}$
$[\![\text{John}]\!] = \{\mathbf{j}\}$	$[\![\text{met}]\!] = \{\mathbf{met}\}$	$[\![\text{who}]\!] = \{x \mid \mathbf{ling}\,x\}$

$$\mathsf{S}\,a ::= a \to \{\mathbb{T}, \mathbb{F}\}$$
$$\mathsf{t} ::= \mathsf{s} \to \{\mathbb{T}, \mathbb{F}\}$$

Second ingredient: meaning combination is *pointwise* functional application.

$$[\![A\ B]\!] = \{f\,x \mid f \in [\![A]\!], x \in [\![B]\!]\}$$

A simple example: alternatives without movement



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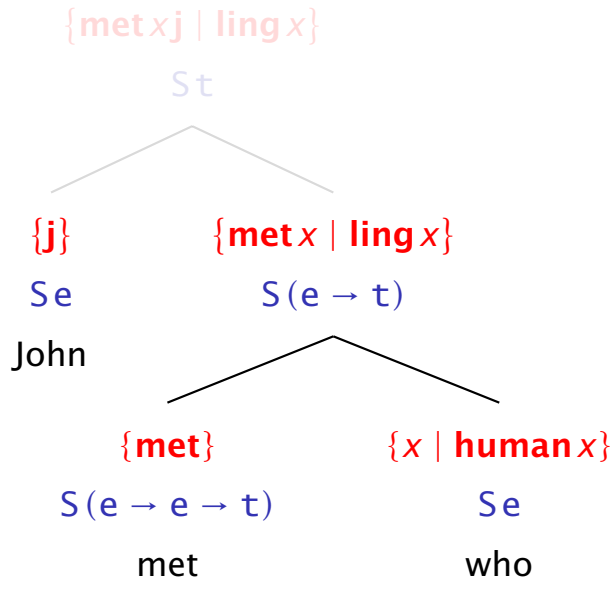

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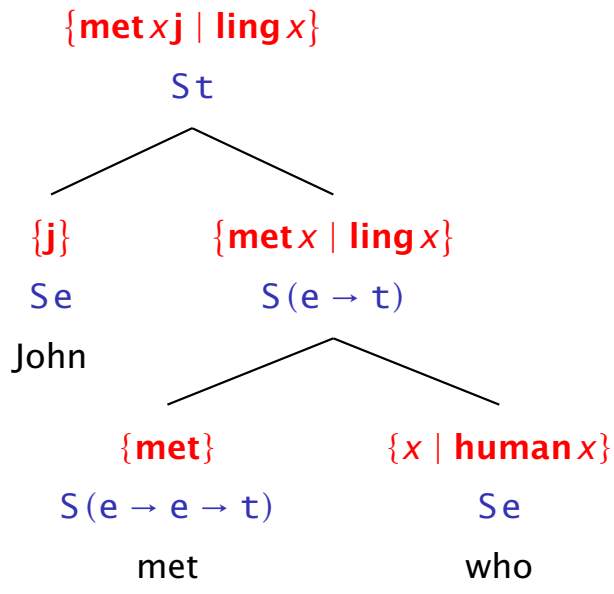

The basic intuition: do function application "inside the S".

Another possibility

Our old friend, who maps sets of individuals into things that scope over questions:

$$\textbf{Up} : \{\mathsf{e}\} \to (\mathsf{e} \to \mathsf{Q}) \to \mathsf{Q}$$

Assume that $[\![\text{who}]\!] = \{x \mid \textbf{human}\, x\}$, as in alternative semantics. Can you see how to build question meanings using **Up**, without pointwise functional application?

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