

## Questions at the interface

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### 1 Overview

- Today: some empirical consequences of the [Karttunen 1977/Heim 2000](#) analyses of questions, which we explored in some detail last week.
- As we'll see, this semantics seems to force everything above  $C^\circ$  to be interpreted in an important sense "outside" the question. We'll see, following a great deal of literature, that these predictions are problematic.
- We'll see some ways to remedy the situation. We'll talk about reconstruction. We'll also see how reintroducing [Hamblin 1973](#) into the mix offers a helping hand.
- Following [Dayal to appear](#), we'll relate this state of affairs to the general phenomenon of *wh* on islands. And then to indefinites. And maybe focus.
- The question we will leave ourselves with: what are we doing with the Karttunen apparatus, anyway? Is it idle at this point? Does Hamblin's original theory already offer an adequate theory of the syntax-semantics interface? Is there any need to complicate it further?

### 2 Pied piping

- Constituent questions can involve fronting of a phrase which properly dominates the *wh* word. This phenomenon is known as **pied-piping**:
  - (1) Whose book did you read?
- What is the meaning of *whose book*? Let's try something along the lines of *someone's book*, inspired by [Karttunen 1977](#) and [Heim 2000](#):

$$\lambda P. \exists x. \text{person}(x) \wedge \exists y. y = \text{the-book-of-}x \wedge P(y)$$

- Problem: quantifying this expression into the proto-question (as we saw last week) predicts that the resulting question is one "about" books, rather

than authors! The following set contains propositions of the form "you read *y*", where *y* is a book by somebody.

$$\lambda p. \exists x. \text{person}(x) \wedge \exists y. y = \text{the-book-of-}x \wedge p = \text{read}(\text{you}, y)$$

- The issue, in a nutshell. The scopal approach says that a proto-question is introduced by  $C^\circ$ . Thus, anything above  $C^\circ$  cannot (at least given the tools we have to work with thusfar) figure in the meaning of the question.
- Also an issue with relative clauses, though we will not examine this issue in any detail (see [Sternefeld 2001](#) for some relevant discussion):
  - (2) A semanticist **whose book** I love was at the conference.
- A different kind of movement would help. The world variable of *book* gets bound inside the proto-question. Therefore, the propositions returned are of the form "I read *x*'s book", correctly:

$$\begin{aligned} \llbracket \text{Op}_i \text{ who}_j [C^\circ t_i] \text{ you read } t_j \text{'s book} \rrbracket \\ = \lambda p. \exists x. p = \text{read}(\text{you}, \text{the-book-of-}x) \end{aligned}$$

Exercise: calculate for yourself that this yields this denotation, under the [Heim 2000](#) approach to the [Karttunen 1977](#) semantics.

- Of course, this sort of movement is not ok overtly. This suggests that the possessive is in such cases a reasonably strong island.
  - (3) \*Whose<sub>*i*</sub> did you read *t<sub>i</sub>* book?
  - (4) \*Who<sub>*i*</sub> did you read *t<sub>i</sub>*'s book?

But even allowing this movement wouldn't not help us, at least not without a significant reorganization of the semantics we've been working with: the structures we're interpreting just **have** *book* above  $C^\circ$ , i.e. outside the proto-question!

- Issue only gets more acute with multiple *wh*, as below. The proto-question analysis forces both *wh*'s to be above  $C^\circ$  (and thus external to the proto-question). Harder to see in English (could just be moving *whose* out of the object), but a problem in multiple-*wh*-fronting languages.
  - (5) Whose teacher assigned whose book?
- So what are the ways forward? Let's look at a couple and then zoom out.

### 3 Reconstruction?

- One alternative is reconstruction. Though the whole *wh* has moved at surface structure, at LF the nominal reconstructs to within the scope of the proto-question. This gives us exactly the right sort of object to interpret (below is a copy-theory-esque implementation):

Op<sub>*i*</sub> who ~~'s book~~ [C° *t<sub>i</sub>*] you read <who's book>

- Reconstruction's certainly a possible analysis of such cases. But no fooling ourselves: it's a syntactic solution to what's arguably a semantic problem—that is, the syntax is cleaning up the semantics's(??) mess. Wouldn't it be better if our semantics for questions just worked out of the box, and didn't need to be amended in this way?
- Moreover, there's reason to think reconstruction is in some ways not general enough to deal with the full range of pied piping constructions that we would like. In particular: LF pied piping.
- Notice, for example, how reconstruction relates to some of the issues we've been considering in earlier classes, particularly vis a vis exceptionally scoping indefinites. Suppose QR out of tensed clauses is impossible, covert pied piping can move an island. See below:
- Configuration:
  - (6) a. [CP [TP ... < ... wh ... >]]
  - b. [CP wh<sub>*i*</sub> [TP ... < ... *t<sub>i</sub>* ... >]]
  - c. [CP < ... wh ... ><sub>*j*</sub> [TP ... *t<sub>j</sub>* ]]
- Similarly, Nishigauchi: Japanese questions out of islands due to *covert* pied piping of the island. As it turns out, his semantics doesn't work (von Stechow 1996), for reasons related to the issues with pied piping noted above. von Stechow proposes supplementing LF pied-piping with post-LF reconstruction(!).
- NB: Binding reconstruction would be needed as well. But that is perfectly feasible.
- As should be clear, covert movement plus reconstruction is basically indistinguishable from exceptional QR. That is, it must be supplemented with rules about what reconstructs when and why.

### 4 Sternefeld

- Sternefeld 2001: pied-piping can be solved by using *choice functions*, plus Hamblin alternatives (plus some Karttunen 1977-esque magic) to interpret questions.
- Crucially, on this analysis the choice function is what is existentially closed and quantified into the question. This means that proto-question formation actually happens at *CP*, and true question formation *above* *CP*, in some other functional layer.

$$\lambda p. \exists f. p = \text{read}(\text{you}, f(\{\text{book-by-}x : \text{human}(x)\}))$$

- Here's an implementation (not Sternefeld's, precisely, but in the same spirit). Suppose that *who* denotes a set of individuals, à la Hamblin, which can be compositionally integrated via point-wise (i.e. set-friendly) functional application. Moreover, suppose that  $\llbracket C^\circ \rrbracket$  is semantically vacuous, and that question formation is triggered by another, higher functional head:

$$\begin{aligned} \llbracket \text{who} \rrbracket &:= \{x : \text{person}(x)\} & \llbracket C^\circ \rrbracket &:= \lambda p. p \\ \llbracket \exists_i^? X \rrbracket^g &:= \lambda p. \exists f \in \text{CH}. p = \llbracket X \rrbracket^{[f/i]} \end{aligned}$$

- Next, a minimal modification of the LF we were working with before:

$$\exists_i^? [f_i [\text{who's book}]]_j C^\circ \text{ you read } t_j \text{'s book}$$

Clearly, the theory extends to other cases, e.g. covert pied-piping.

- Well, ok. But why even bother with choice functions and Karttunen? That's a rather rich idea of what's happening in such cases (Karttunen, CFs, PFA!), and the additional apparatus seems explanatorily idle. At this point, all he's using them for is to get sets. But if you have point-wise functional application, you have sets already!<sup>1</sup>

<sup>1</sup> I suppose I should mention here that it is actually not clear to me that/why Sternefeld even needs point-wise functional application. Presumably, the alternatives introduced by the *wh* word could be combined with a choice function *immediately*, in which event only regular functional application would be necessary. Hagstrom 1998 mentions cases where he thinks we need the choice function to be non-adjacent to the alternative generator, but it doesn't seem to me that's what Sternefeld has in mind.

- Does it need to be combined with covert *wh* movement? On the one hand, as we noted in an earlier class, the following must be interpreted as requesting info about *actual* linguists and philosophers, which suggests that the fronted *wh* marks the scope of the in situ *wh*:

(7) Which linguist wants to marry which philosopher?

- On the other, you'll remember that Reinhart proposed intensional choice functions for such cases, so perhaps Sternefeld can leave in situ *wh* in situ.
- But this should remind us: choice functions are a bag of worms (and as we'll see next week, the point-wise Hamblin approach has some of the same worms(?)).

## 5 Hagstrom

- Hagstrom 1998 (Ch. 5) focuses on Japanese. To warm up for his analysis, we begin with a usage of *-ka* we did not consider earlier:

(8) Dare-ka-ga kita.  
'Someone came.'

- Hagstrom proposes modeling *-ka* as an existential quantifier over choice functions:

$$\llbracket \text{-ka} \rrbracket := \lambda p. \lambda w. \exists f. p(f)(w)$$

Like any quantifier, it needs to QR. In the indefinite case, its trace discharges the alternatives generated by *dare*, which is bound by the moved *-ka*.

- In questions, *-ka* undergoes head movement to  $C^\circ$ . Doesn't c-command its trace (because: head movement), so Hagstrom proposes a special meaning for  $C^\circ$ :

$$\llbracket C^\circ \rrbracket := \lambda Q. \lambda P. \lambda p. Q(\lambda f. P(f) = p)$$

- Composing with *-ka*:

$$\llbracket C^\circ \rrbracket(\llbracket \text{ka} \rrbracket) = \lambda P. \lambda p. \llbracket \text{ka} \rrbracket(\lambda f. P(f) = p)$$

- Since interrogative  $C^\circ$  is required and triggers overt *ka* movement, tells us why different positions have different forces.

- How about islands?

(9) Kimi-wa <dare-ga kai-ta hon-o> yomi-masi-ta **ka**?  
(Nishigauchi 1990:40)

- Hagstrom proposes that *-ka* starts off as a sister of the *island* before undergoing head movement (his reasons for this have to do with some intricate data vis a vis islands that I won't go into). Use point-wise composition to percolate alternatives up to the trace of *ka*
- A kind of pied piping, with a reasonable semantics. In common with Sternefeld, combines Hamblin-type alternative percolation with a means to discharge the alternatives introduced by question words/indefinites.
- How about multiple *wh*? Might want *-ka* to be an unselective choice function binder. But Hagstrom, it turns out, has other things in mind (see the final chapters of the dissertation).

## 6 Theories

- So Hamblin is back in the mix. Gets island-insensitivity, seems like an important part of the story with pied piping. However, characterized by non-negotiable unselectivity. Problematic for English indefinites, *wh*-triangle.
- It seems as if choice functions might be one way to ameliorate some of these difficulties. Notice, however, that we now have two theoretical constructs devoted, in a way, to exceptional scope phenomena. Moreover, recall that
- And how about Karttunen/Heim/Schwarz? Though beholden to islands and under some pressure form pied-piping, don't come with all the baggage of in situ interpretation.
- Onward...

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