The scope of focus

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1 Today

- Focus! We'll look at two competing approaches to the semantics of focus and association with focus.
- The dialectic will be a familiar one: is association with focus a fundamentally scopal phenomenon, or should it be implemented with a pseudo-scope mechanism like alternative semantics?
- I don't aim to resolve this debate. In fact, Krifka (2006) gives a number of arguments that the dialectic should be resolved by *synthesizing* scopal and pseudo-scopal approaches to focus semantics.

2 Empirical domain

- Basic construction

  (1) a. I only introduced BÍLL to Sue.
  b. I only introduced Bill to SÚE.
  c. I only introduced BÍLL to SÚE.
  d. I only INTRODÚCED Bill to Sue.

- Basic facts: island constraints. For example, association with focus readily happens across complex NP and adjunct islands:

  (2) a. I only read the book ⟨that BÍLL wrote⟩.
  b. John will only be offended ⟨if we invite BÍLL⟩.

- Recall similar data from Japanese, wh in situ, and indefinites:

  (3) a. Taro-wa ⟨**dare-ga** katta mochi-o⟩ tabemasita **ka**?
  'Who$_x$ did Taro eat rice cakes that x bought?'
  b. Who will be offended ⟨if we invite which linguist⟩?
  c. John will be offended ⟨if we invite a famous philosopher of language⟩.

3 Two approaches to the semantics of focus

3.1 Structured meanings ('SM')

- Basic idea: focusing partitions a meaning into a pair of a focus F, and a background B. A couple examples — roughly, the meanings SM associates, respectively, with *BÍLL left* and *likes BÍLL*$_F$:

$$\langle \mathsf{Bill},\ \lambda x.\, \mathsf{left}(x)\rangle \qquad\qquad \langle \mathsf{Bill},\ \lambda y.\, \lambda x.\, \mathsf{likes}(x,y)\rangle$$

- Focus-sensitive operators take a pair as argument.[1]

$$[\![\text{only}]\!] := \lambda\langle F, B\rangle.\, \lambda x.\, \forall y \in \mathsf{Alt}(F).\, B(y)(x) \Rightarrow y = F$$

- Putting them together to give a meaning for *only likes BÍLL*:

$$[\![\text{only likes BÍLL}_{\text{F}}]\!] = \lambda x.\, \forall y \in \mathsf{Alt}(\mathsf{Bill}).\, \mathsf{likes}(x,y) \Rightarrow y = \mathsf{Bill}$$

  Given the (crucial) requirement that for any α, $\{\alpha\} \subset \mathsf{Alt}(\alpha)$, this is equivalent to $\lambda x.\, x$ likes Bill and nobody else (relevant).

- How to compositionally derive? Perhaps, assume some LF movement — perhaps driven by the F-feature on the focused expression (cf. languages like Hungarian with overt focus movement) — and then a pair-forming operator. See Figure 1, which relies on the following semantics for the pair-former:

$$[\![*]\!] := \lambda B.\, \lambda F.\, \langle B, F\rangle$$

- Putting these together, the meaning of this tree will be:

$$\langle \mathsf{Bill},\ \lambda y.\lambda x.\, \mathsf{likes}(x,y)\rangle$$

- Essential features: requires delineating an expression into its focus and background, i.e. scope. To separate these two in the semantics, need to separate them in the syntax (or, equivalently, in the semantics of scope-taking).[2]

[1] This is not really how Krifka (1991, 2006) deals with the compositional issue, but the differences are inessential for what we're concerned with today.

[2] There are, naturally, a number of ways to implement this. For example, we could have it that $[\![\text{BÍLL}_{\text{F}}]\!] = \lambda k.\, \langle \mathsf{Bill}, k\rangle$, and thereby dispense with $*$.

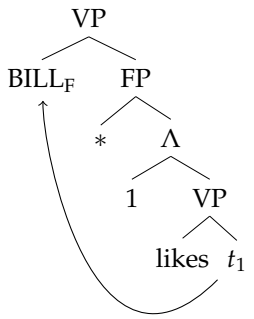

Figure 1: Deriving a structured meaning for *likes BÍLL$_F$*.

3.2 Alternative semantics ('AltS')

- In lieu of scoping, give a recursive characterization of the semantics of alternatives. The way this is standardly done: distinguish an expression's normal-semantic value from its focus-semantic value:

$$[\![exp]\!]^o \qquad [\![exp]\!]^f$$

- Equivalently, we can think in two dimensions, where the meaning of an expression *simpliciter* is just a pair of its standard meaning and its focus value (cf. Karttunen & Peters 1979):

$$[\![exp]\!] := \langle [\![exp]\!]^o, [\![exp]\!]^f \rangle$$

- How this goes (Rooth 1985, 1992, 1996). As a first step, the semantics of focusing is to invoke alternatives in the focus dimension:

$$[\![exp_F]\!]^f := \{x : x \in \mathsf{Alt}([\![exp]\!]^o)\}$$

  Or, more succinctly:

$$\mathsf{Alt}([\![exp]\!]^o)$$

- The meaning of unfocused *terminal* nodes τ is just a *singleton set* containing only the standard meaning of τ:

$$[\![\tau]\!]^f := \{[\![\tau]\!]^o\}$$

- The final step is to give a recursive characterization of the focus interpretation of branching nodes. This is simply the by-now familiar operation of point-wise (or Hamblin) functional application:

$$[\![X\ Y]\!]^f := \{x(y) : x \in [\![X]\!]^f \wedge y \in [\![Y]\!]^f\}$$

- Using these tools to derive a meaning for *likes BÍLL*:

$$[\![\text{likes BÍLL}_F]\!]^f = \{\lambda x.\, \lambda w.\, \mathsf{likes}_w(x, y) : y \in \mathsf{Alt}(\mathsf{Bill})\}$$

- A meaning for *only VP* (importantly, this semantics *must* be given syncategorematically; do you see why?):

$$[\![\text{only VP}]\!]^o := \lambda x.\, \lambda w.\, \{P : P \in [\![\text{VP}]\!]^f \wedge P(x)(w)\} = \{[\![\text{VP}]\!]^o\}$$

- Putting it together to derive a meaning for *only likes BÍLL*:

$$\begin{aligned}\lambda x.\, \lambda w.\, \{P : P \in [\![\text{likes BILL}_F]\!]^f \wedge P(x)(w)\} &= \{[\![\text{VP}]\!]^o\} \\ = \lambda x.\, \lambda w.\, \{y : y \in \mathsf{Alt}(\mathsf{Bill}) \wedge \mathsf{likes}_w(x, y)\} &= \{\mathsf{Bill}\}\end{aligned}$$

- Essential features: focus invokes alternatives, which are managed via an enriched notion of meaning and meaning composition.

4 Comparing the two

4.1 Similarities and differences

- Both theories two-dimensional, but what lives in those dimensions differs. In SM, the focus is distinguished, and a *scope* (alternatively, a *continuation*, cf. Barker 2002) lives in the second dimension. In AltS, the second dimension contains alternatives to the meaning in the first dimension — the focus is not distinguished.

- Two things to be aware of:

  1. As Krifka (2006) points out, Rooth's system needs to talk about the meaning of *only* intensionally. Consider what happens if we do not think about intensions. Suppose we're in a situation where John introduced Bill to Sue, and John introduced Sam to

Sue, and nobody else did either of those things. In this case, the two properties $\lambda x.\,\mathsf{intro}(x, \mathsf{Bill}, \mathsf{Sue})$ and $\lambda x.\,\mathsf{intro}(x, \mathsf{Sam}, \mathsf{Sue})$ are equivalent (both map John to True and everyone else to False). Yet the following is not true in this scenario:

(4) John only introduced BÍLL to Sue.

This doesn't hold for SM, which can be couched extensionally. Less clear is whether this provides any motivation for SM.

2. NB: both theories need to say that alternative generation is restricted in some way. A lovely example from Rooth (1992) (not least because of what it suggests about Rooth's reading habits):

(5) I only REÁD *The Recognitions*.

If alternative invocation were unrestricted, a reasonable alternative to $[\![\text{read}]\!]$ would be $\lambda x.\,\lambda y.\,x \neq y$. But then this sentence would be trivially false.

4.2 For SM

- Going intensional isn't enough for AltS. Sentence (6) should be *false* if we're considering integers (which can be negative). Yet the properties of being 3^2 and of being $(-3)^2$ are intensionally *indistinguishable*, at least if we assume that intensions are expressed in terms of possible worlds.

(6) Nine only is the square of THREE.

Of course, we know we need hyperintensions, or something like them, independently in order to think about problems of logical omniscience and so forth. Along these lines, notice that SM cannot derive reasonable truth conditions for the following without some hyperintensional oomph:

(7) A: John argued that the Pythagorean theorem is true.
B: No, he really only argued that $[3^2 + 4^2 = 5^2]_{\text{F}}$.

- Paycheck type examples — Krifka argues SM but not AltS can give an account of the following by creating a complex focus out of *BÍLL*$_F$ and *SÚE*$_F$:

(8) A: Did John introduce everyone to his neighbor?
B: No, he only introduced BÍLL$_{\text{F}}$ to SÚE$_{\text{F}}$.

I'm not so sure how much this data should move us. Consider that the relevant reading requires that the form of the second set of alternatives depends in a particular way on the first. This seems quite analogous to cases of *functional domain restriction* (cf. Szabolcsi 2010) — recalling that the domains of alternatives need to be restricted one way or another:

(9) Every boy ate every apple.

4.3 For Alts

- AltS is weaker than SM, as Rooth 1996; Krifka 2006 both note. In this sense, AltS is the more predictive theory: alternative sets can be reconstructed from structured meanings, *but not vice versa*:

$$\mathbf{ALT}(\langle F, B\rangle) := \{B(x) : x \in \mathsf{Alt}(F)\}$$

- AltS similarly places substantive constraints on the space of possible focus-sensitive lexical items that SM does not. For example, the following meaning is expressible in SM but not in AltS:

$$\begin{aligned}[\![\text{tolf}]\!] &:= \lambda\langle F, B\rangle.\,\lambda x.\,\mathsf{told}(x, F, B(F)) \\ &\approx\ x \text{ told } F \text{ that } B(F)\end{aligned}$$

- Bad prediction:

(10) a. I tolfed that BÍLL$_{\text{F}}$ resembles Sue.
≈ I told Bill that Bill resembles Sue.
b. I tolfed that Bill resembles SÚE$_{\text{F}}$.
≈ I told Sue that Bill resembles Sue.

- Most importantly for us: island-insensitivity is accounted for by AltS but not SM. That is, AltS is able to percolate alternatives without

true scope-taking. But SM will require the focus to take scope out of its island to associate with an island-external operator.

5 Associating with focus phrases ('AWFP')

5.1 Best of both worlds?

- Krifka suggests that we can get all the benefits of AltS, and none of the hassles, by *synthesizing* SM and AltS.
- The resulting theory looks like this: an AltS-style mechanism can percolate alternatives out of islands, but an SM-style mechanism is used to associate a *focus phrase* — which, importantly, can properly dominate the focused material — with any focus-sensitive operators.
- An example:

  John only [$_{\text{FocusP}}$ the book that MELVILLE wrote] [* [1 read t_1]]

- We can think of this mechanism as a kind of *focus pied piping*, analogous to LF pied piping (where the island itself moves, but the relevant thing on the island — say, a *wh* or indefinite — does not move out of the island).

5.2 Motivating the picture

- Short answers (Krifka's judgments):

  (11) Q: John introduced [the author of which novel] to Sue?
  A: *ULÝSSES

  "Deletion up to the FP can be naturally stated for the SM account, as the FP has a specific function in this theory." Granting this judgment (which I do not actually share — cf. also Nishigauchi 1990): how deep does this cut? A fairly standard analysis of short answers is in terms of focus fronting plus ellipsis. Therefore, it implies overt syntactic movement, which can be appealed to in order to explain an apparent island effect.

- Explicit contrasts:

  (12) *John didn't read the book that MÉLVILLE wrote, but HÁWTHORNE.
  cf. John didn't read the book that MÉLVILLE wrote, but the book that HÁWTHORNE wrote.

  Same worry as before. Maybe this case is elliptical, with a bit of focus fronting before deletion of the remnant. Again, constraints on *overt* movement can explain the observed contrast.

- Selective association outside islands (Rooth's example, Krifka's judgments):

  (13) We only$_1$ recovered the entries that MÁRILYN$_1$ made about John.
  *We also$_2$ only$_1$ recovered the entries SHE$_1$ made about BÓBBY$_2$.

  I agree with Rooth and disagree with Krifka about the judgment here. That is, I think (somewhat tentatively) that the starred reading here is in fact possible.

5.3 What determines the focus phrase?

- A naive version of Krifka's theory would seem to predict the following lacks an intensional reading:

  (14) John only said that someone BÍLL hates would be there.

  The reason: *only* must associate with the focus phrase *someone BÍLL hates*. But this requires the focus phrase to be interpreted outside the scope of *said*.

- Perhaps the focus phrase in this case is the entire complement *said that someone...*? But then this raises an important question: how is the focus phrase determined? Can it be as big as you like? In this case, don't many of Krifka's over-generation-style arguments against AltS apply here as well?
- That is, many of Krifka's arguments take the form of appealing to grammatical operations that refer directly to FP. But if FP can be as

big as you like, do we over-generate? (Genuinely unsure, need to noodle on this some more.)

6 Zooming out

- Remember Rooth:

> [T]he island-sensitivity of scope-bearing operators is quite diverse. Similar insensitivity to scope islands can be observed for indefinites, and for in situ *wh*.... The group of island-escaping operators does not appear to be an arbitrary one. As mentioned [earlier], there is a connection between the semantics of focus and the semantics of questions. Several existing theories of *wh* semantics (e.g. Karttunen 1977) make a different connection with indefinites, in that *wh* phrases themselves (as opposed to the question clauses they are embedded in) are given an existential semantics. This semantic similarity, together with the common insensitivity to scope islands, suggest that we should not be satisfied with a theory which treats focus as sui generis. We would like to replace the focus-specific definition with a theory in which focus is one of a family of island-insensitive operators which, roughly, use restricted variables to name families of propositions, open propositions, and/or their existential closures. It is not at all clear to me how this should be done.

- Does AWFP surrender this unified picture? Seems so.. Recall, for example, that selectivity outside islands is a hallmark of both questions and indefinites — and that data of this sort seems to hold even in languages like Japanese (Dayal 1996:98), where unselectivity has been argued to be a good fit for intervention-like phenomena:

(15) a. If ⟨a persuasive lawyer visits a relative of mine⟩, I'll inherit a huge house.
b. Who knows ⟨who read what⟩?
c. Dare-ga ⟨A-ga doko-de dare-o katta ka⟩ sitte-imasu ka?
'Who knows where A bought what?'

- The picture vis a vis focus is less clear empirically, though I tend to think that the evidence points in favor of selective association outside islands.

- Not that AltS does any better on this score. Indeed, AWFP's under-generation issues stem directly from its reliance on an AltS style mechanism for percolating alternatives outside of islands.

- The dialectic is thus a very familiar one... Movement or in situ? If movement, why island-insensitive? If in situ, why selectivity?

References

Barker, Chris. 2002. Continuations and the Nature of Quantification. *Natural Language Semantics* 10(3). 211–242. doi:10.1023/A:1022183511876.

Dayal, Veneeta. 1996. *Locality in Wh quantification*. Dordrecht: Springer Science+Business Media.

Hamblin, C. L. 1973. Questions in Montague English. *Foundations of Language* 10(1). 41–53.

Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1(1). 3–44. doi:10.1007/BF00351935.

Karttunen, Lauri & Stanley Peters. 1979. Conventional implicature. In Choon-Kyu Oh & David Dinneen (eds.), *Presupposition*, vol. 11 Syntax and Semantics, 1–56. New York: Academic Press.

Krifka, Manfred. 1991. A Compositional Semantics for Multiple Focus Constructions. In Steve Moore & Adam Wyner (eds.), *Proceedings of Semantics and Linguistic Theory 1*, 127–158. Ithaca, NY: Cornell University.

Krifka, Manfred. 2006. Association with Focus Phrases. In Valéria Molnár & Susanne Winkler (eds.), *The Architecture of Focus*, 105–136. Mouton de Gruyter.

Nishigauchi, Taisuke. 1990. *Quantification in the Theory of Grammar*. Dordrecht: Kluwer Academic Publishers. doi:10.1007/978-94-009-1972-3.

Rooth, Mats. 1985. *Association with Focus*: University of Massachusetts, Amherst Ph.D. thesis.

Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1(1). 75–116. doi:10.1007/BF02342617.

Rooth, Mats. 1996. Focus. In Shalom Lappin (ed.), *The Handbook of Contemporary Semantic Theory*, 271–298. Oxford: Blackwell.

Szabolcsi, Anna. 2010. *Quantification*. New York: Cambridge University Press.