Focus

Lecture 2: Alternative Semantics

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1 Association with focus: the phenomenon

Focus-sensitive particles in English

- *Only* gives rise to different truth-conditions with different foci.

(1) a. I **only** saw [American]$_F$ cars yesterday.
⇒ I did not see Japanese cars yesterday.
⇏ I did not see American cars the day before yesterday.

b. I **only** saw American cars [yesterday]$_F$.
⇏ I did not see Japanese cars yesterday.
⇒ I did not see American cars the day before yesterday.

- *Even* gives rise to different presuppositions with different foci.

(2) a. I **even** saw [American]$_F$ cars yesterday
'It's more noteworthy to see American cars than cars of other countries.'

b. I **even** saw American cars [yesterday]$_F$.
'It's more noteworthy to see American cars yesterday than on other days.

Every language seems to have such particles/constructions. Many languages have multiple ways, and they are usually not completely synonymous.

- Exclusive particles in English: *only, just, merely,* etc.
- Exclusive particles in French: *seulement, ne...que,* etc.
- Exclusive particles in Japanese: *-dake, -nomi, -shika...nai,* etc.
- Scalar particles in Japanese: *-(de)mo, -(de)sae,* etc.
- Scalar particles in Italian: *anche, addritura,* etc.

For now, we'll focus on *only* and *even* in English. Let's review some facts about them first.

1.1 Forward and backward association

- When preceding the subject, *only* must associate with the subject or a subpart of the subject.

(3) a. Only [rich linguists]$_F$ live here.
b. Only [rich]$_F$ linguists live here.
c. *Only rich linguists live [here]$_F$.
d. *Only rich linguists [live]$_F$ here.

In the pre-VP position, *only* must associate with the VP or a sub-part of the VP.

(4) a. *[Rich linguists]$_F$ only live here.
b. *[Rich]$_F$ linguists only live here.
c. Rich linguists only live [here]$_F$.
d. Rich linguists only [live]$_F$ here.

Nominal *only* can associate backwards (but not *just*):

(5) a. Left turn only
b. Residents only

- Pre-subject *even* has to associate with the subject or a part of it, similarly to *only*.

(6) a. Even [rich linguists]$_F$ live here.
b. Even [rich]$_F$ linguists live here.
c. *Even rich linguists are live [here]$_F$.
d. *Even rich linguists [live]$_F$ here.

But pre-VP *even* can associate with a preceding focus, unlike *only* (Jackendoff 1972, Erlewine 2018).

(7) a. [Rich linguists]$_F$ even live here.
b. [Rich]$_F$ linguists even live here.
c. Rich linguists only live [here]$_F$.
d. Rich linguists only [live]$_F$ here.

Erlewine 2018 points out that it's not the surface order but c-command in the derivation that matters based on the following contrast between raising and control.

(8) a. A [professor]$_F$ seems to even be at the party.
b. *A [professor]$_F$ wants to even be at the party. (Erlewine 2018: p. 174)

Erlewine proposes that what looks like backward association actually is forward association with a trace of the focused phrase.

1.2 Scope

Only takes scope and its scope is independent of focus.

(9) You are allowed to talk **only** to [rich]$_F$ linguists.

a. $\Diamond$(talk to rich linguists) $\wedge$ $\neg\Diamond$(talk to poor linguists)
b. $\Diamond$(talk to rich linguists $\wedge$ $\neg$talk to poor linguists)

Pre-VP *only* does not give rise to scope ambiguity (McCawley 1996).

(10) You are allowed to **only** talk to [rich]$_F$ linguists.
a. ~~$\Diamond$(talk to rich linguists) $\wedge$ $\neg\Diamond$(talk to poor linguists)~~
b. $\Diamond$(talk to rich linguists $\wedge$ $\neg$talk to poor linguists)

(11) You are **only** allowed to talk to [rich]$_F$ linguists.
a. $\Diamond$(talk to rich linguists) $\wedge$ $\neg\Diamond$(talk to poor linguists)
b. ~~$\Diamond$(talk to rich linguists $\wedge$ $\neg$talk to poor linguists)~~

Even similarly takes scope, but there's some theoretical debate about the scope of *even* (Wilkinson 1996, Lahiri 1998, Nakanishi 2008, 2012, Crnič 2011).

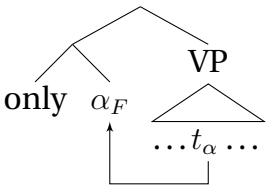
2 Movement theory of focus association

Only can associate with all sorts of constituents.

(12) a. The philosopher only gave flowers to [$_{DP}$ the linguist]$_F$.
b. The philosopher only [$_{VP}$ gave flowers to the linguist]$_F$.
c. He only [$_{V}$ downloaded]$_F$ my dissertation.
d. There are only flowers [$_{PP}$ behind the house]$_F$.
e. There are only flowers [$_{P}$ behind]$_F$ the house.
f. She only said [$_{CP}$ that it is raining outside]$_F$.

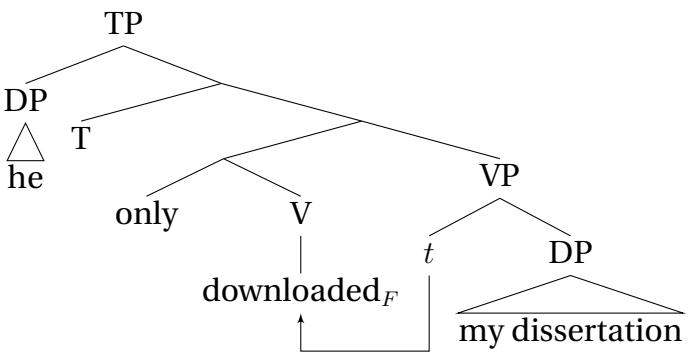
A possible idea is that association with focus involves movement (as discussed, and rejected, by Anderson 1972, Rooth 1985: §2.2). A modern rendition of this idea involves covert movement in the following manner.

(13)



The semantics of *only* roughly says: α is the only thing that makes the VP true when put into the trace position.

(14)



However, association with focus is island-*in*sensitive (Anderson 1972, Jackendoff 1972, Rooth 1985).

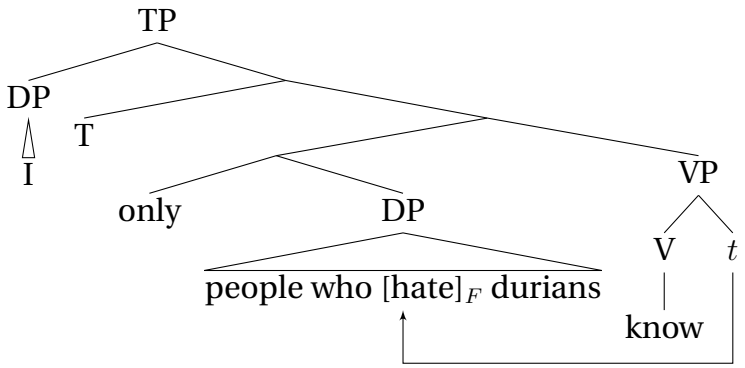
(15) a. I only know people who [hate]$_F$ durians.
b. I only ate an apple, before [Gump]$_F$ did.
c. I will only go to Thailand, if [Chris]$_F$ does.

(16) a. Dr. Svenson only rejected the proposal that [John]$_F$ submitted.
b. Dr. Svenson will only complain if [Bill]$_F$ doesn't finish his job.
(Rooth 1996: §4.2)

(17) a. You can do lots of things with bananas; I even know a guy who [smokes]$_F$ them.
b. John even has the idea that [he]$_F$ is tall for a Watusi. (Anderson 1972: p. 897)

Rooth 1985 proposes an *in-situ* theory of association with focus (see also Rooth 1992, 1996). More recently, the movement theory has revived with the idea that cases involving islands involve pied-piping (Krifka 2006, Wagner 2006, Erlewine & Kotek 2014, 2018a,b).

(18)



We'll discuss this idea later.

3 Roothian Alternative Semantics

Rooth 1985, 1992 develops a bi-dimensional semantics for focus, where each grammatical expression α is assigned two denotations:

- **Ordinary semantic value**: $[\![\alpha]\!]_o$
- **Focus semantic value**: $[\![\alpha]\!]_f$

3.1 Ordinary semantic value (a quick review)

The ordinary semantic value is the usual denotation (in intensional semantics).
We will ignore plurality, tense, aspect. We will also put aside presuppositions for now.

(19) a. $[\![\texttt{swooned}]\!]_o = \lambda w_s.\lambda x_e.\ x$ swooned in w
b. $[\![\texttt{respects}]\!]_o = \lambda w_s.\lambda y_e.\lambda x_e.\ x$ respects y in w

(20) a. $[\![\texttt{turtle}]\!]_o = \lambda w_s.\lambda x_e.\ x$ is a turtle in w
b. $[\![\texttt{a}]\!]_o = \lambda w_s.\lambda P_{\langle e,t\rangle}.\lambda Q_{\langle e,t\rangle}.\ |\{\, x \mid P(x) = 1 \,\} \cap \{\, x \mid Q(x) = 1 \,\}| \geqslant 1$

(21) a. $[\![\texttt{Patrick}]\!]_o$ is a rigid designator.
b. $f \in D_{\langle s,e\rangle}$ is a *rigid designator* iff for all $w, w' \in D_s$, $f(w) = f(w')$.

(22) *Extensional Functional Application*:
If α a constituent made up of β and γ such that $[\![\beta]\!]_o \in D_{\langle s,\langle\sigma,\tau\rangle\rangle}$ and $[\![\gamma]\!]_o \in D_{\langle s,\sigma\rangle}$, then

$$[\![\alpha]\!]_o = \lambda w_s.\, [\![\beta]\!]_o(w)([\![\gamma]\!]_o(w))$$

F-marking has no effect on the ordinary semantic value: $[\![\alpha_F]\!]_o = [\![\alpha]\!]_o$.

3.2 Focus semantic value

The core intuition behind Alternative Semantics is that the function of focus (or more specifically, F-marking) is *to introduce alternatives*.
The focus semantic value of an F-marked constituent is the set of all candidate alternatives to it (including itself).
Generally, if $[\![\alpha]\!]_o \in D_\tau$, then $[\![\alpha]\!]_f \subseteq D_\tau$.

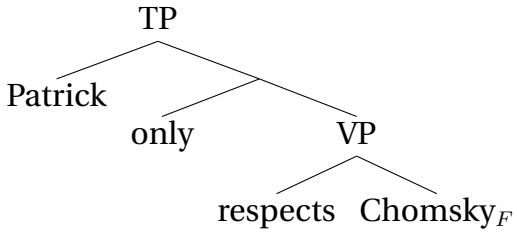
- If α is F-marked, $[\![\alpha]\!]_f = D_\tau$
- If α is not F-marked and α is a terminal node, then $[\![\alpha]\!]_f = \{\, [\![\alpha]\!]_o \,\}$
- If α is not F-marked and is not a terminal node, then the following rule applies

  (23) *Point-wise Extensional Functional Application*:
  If α a constituent made up of β and γ such that $[\![\beta]\!]_o \in D_{\langle s,\langle\sigma,\tau\rangle\rangle}$ and $[\![\gamma]\!]_o \in D_{\langle s,\sigma\rangle}$, then

$$[\![\alpha]\!]_f = \{\, \lambda w_s.\, b(w)(c(w)) \mid b \in [\![\beta]\!]_f \text{ and } c \in [\![\gamma]\!]_f \,\}$$

3.3 First attempt

(24)



- $[\![\texttt{Chomsky}_F]\!]_f = D_{\langle s,e\rangle}$
- $\left[\!\!\left[\begin{array}{c} \texttt{respects} \quad \texttt{Chomsky}_F \end{array} \right]\!\!\right]_f$

$$\begin{aligned} &= \{\, \lambda w_s.f(w)(g(w)) \mid f \in [\![\texttt{respects}]\!]_f \text{ and } g \in [\![\texttt{Chomsky}_F]\!]_f \,\} \\ &= \{\, \lambda w_s.f(w)(g(w)) \mid f \in \{\, [\![\texttt{respects}]\!]_o \,\} \text{ and } g \in D_{\langle s,e\rangle} \,\} \\ &= \{\, \lambda w_s.[\![\texttt{respects}]\!]_o(w)(g(w)) \mid g \in D_{\langle s,e\rangle} \,\} \\ &= \{\, \lambda w_s.\lambda x_e.\, x \text{ respects } y \text{ in } w \mid y \in D_e \,\} \end{aligned}$$

Only should take the focus semantic value of the VP and assert that its ordinary semantic value is the only true one among the alternatives.

(25) a. $\left[\!\!\left[\begin{array}{c} \texttt{only} \quad \texttt{VP} \end{array} \right]\!\!\right]_o = \lambda w_s.\lambda x_e.\, \left[\begin{array}{l} [\![\texttt{VP}]\!]_o(w)(x) = 1 \text{ and} \\ \text{for each } f \in [\![\texttt{VP}]\!]_f, \text{ if } f \neq [\![\texttt{VP}]\!]_o, \text{ then } f(w)(x) = 0 \end{array} \right]$

b. $\left[\!\left[\begin{array}{c} \diagup\diagdown \\ \texttt{only}\ \ \texttt{VP} \end{array} \right]\!\right]_f = \left\{ \left[\!\left[\begin{array}{c} \diagup\diagdown \\ \texttt{only}\ \ \texttt{VP} \end{array} \right]\!\right]_o \right\}$

(26) $\left[\!\left[\begin{array}{c} \texttt{Patrick} \quad \diagup\diagdown \\ \qquad\quad \texttt{only} \quad \diagup\diagdown \\ \qquad\qquad\quad \texttt{respects}\ \ \texttt{Chomsky}_F \end{array} \right]\!\right]_o$

$$= \lambda w_s. \left[\begin{array}{l} [\![\texttt{Patrick}]\!]_o(w) \text{ respects } [\![\texttt{Chomsky}]\!]_o(w) \text{ in } w \text{ and} \\ \text{for each } f \in \left[\!\left[\begin{array}{c} \diagup\diagdown \\ \texttt{respects}\ \ \texttt{Chomsky}_F \end{array} \right]\!\right]_f, \\ \quad \text{if } f \neq \left[\!\left[\begin{array}{c} \diagup\diagdown \\ \texttt{respects}\ \ \texttt{Chomsky}_F \end{array} \right]\!\right]_o, \text{ then } f(w)([\![\texttt{Patrick}]\!]_o(w)) = 0 \end{array} \right]$$

$$= \lambda w_s. \left[\begin{array}{l} [\![\texttt{Patrick}]\!]_o(w) \text{ respects } [\![\texttt{Chomsky}]\!]_o(w) \text{ in } w \text{ and} \\ \text{for each } f \in \{\, \lambda w_s.\lambda x_e.\ x \text{ respects } y \text{ in } w \mid y \in D_e \,\}, \\ \quad \text{if } f \neq \left[\!\left[\begin{array}{c} \diagup\diagdown \\ \texttt{respects}\ \ \texttt{Chomsky}_F \end{array} \right]\!\right]_o, \text{ then } f(w)([\![\texttt{Patrick}]\!]_o(w)) = 0 \end{array} \right]$$

$$= \lambda w_s. \left[\begin{array}{l} [\![\texttt{Patrick}]\!]_o(w) \text{ respects } [\![\texttt{Chomsky}]\!]_o(w) \text{ in } w \text{ and for each } x \in D_e, \\ \quad \text{if } x \neq [\![\texttt{Chomsky}]\!]_o(w), \text{ then } [\![\texttt{Patrick}]\!]_o(w) \text{ does not respect } x \text{ in } w \end{array} \right]$$

3.4 Contextual restriction

The truth-conditions we derived are too strong (in most contexts).

(27) There are many great linguists alive, but Patrick only respects [Chomsky]$_F$.

This entails that Patrick does not respect other contemporary linguists, but does not necessarily entail that he doesn't respect other people (dead linguists and non-linguists), e.g., Nicolas Cage.

The same point can be made by the following example.

(28) Patrick only [swam]$_F$.

(29) $\left[\!\left[\begin{array}{c} \texttt{Patrick} \quad \diagup\diagdown \\ \qquad\quad \texttt{only}\ \ \texttt{swam}_F \end{array} \right]\!\right]_o$

$$= \lambda w_s. \left[\begin{array}{l} [\![\texttt{Patrick}]\!](w) \text{ swam in } w \text{ and} \\ \text{for each } f \in [\![\texttt{swam}_F]\!]_f, \text{ if } f \neq [\![\texttt{swam}_F]\!]_o, \text{ then } f(w)([\![\texttt{Patrick}]\!](w)) = 0 \end{array} \right]$$

$$= \lambda w_s. \left[\begin{array}{l} [\![\texttt{Patrick}]\!](w) \text{ swam in } w \text{ and} \\ \text{for each } f \in D_{\langle s,\langle e,t\rangle\rangle}, \text{ if } f \neq [\![\texttt{swam}_F]\!]_o, \text{ then } f(w)([\![\texttt{Patrick}]\!](w)) = 0 \end{array} \right]$$

This means that 'swam' is the only property that is true of Patrick in w, entailing that Patrick did not breathe in w, did not exist in w, is not identical to himself, etc. That's perhaps a possible reading (though it cannot be true), but there's clearly a weaker reading that doesn't entail these things.

Only quantifies only over 'contextually relevant' alternatives. Rooth 1985 proposes to capture this with a free variable C.

- Let us assume that each occurrence of *only* comes with a (phonologically silent) free variable C.
- C is interpreted via an assignment function g (just like free pronouns).

(30) a. $\left[\!\left[\begin{array}{c} \text{VP} \\ \text{only}\ \ \text{C} \end{array} \right]\!\right]^g_o = \lambda w_s.\lambda x_e.$ $\left[\begin{array}{l} [\![\text{VP}]\!]^g_o(w)(x) = 1 \text{ and} \\ \text{for each } f \in [\![\text{VP}]\!]^g_f \cap g(\text{C}), \\ \quad \text{if } f \neq [\![\text{VP}]\!]^g_o, \text{ then } f(w)(x) = 0 \end{array} \right]$

b. $\left[\!\left[\begin{array}{c} \text{VP} \\ \text{only}\ \ \text{C} \end{array} \right]\!\right]^g_f = \left\{ \left[\!\left[\begin{array}{c} \text{VP} \\ \text{only}\ \ \text{C} \end{array} \right]\!\right]^g_o \right\}$

- Assignment function g is the common device for assigning values to free variables and for binding variables. The pragmatics of g (not stated here) ensures that it assigns only 'contextually salient' values to all free variables.

3.5 The squiggle operator

The value of C has to be further constrained. In particular, pre-VP *only* would have no truth-conditional effect, if

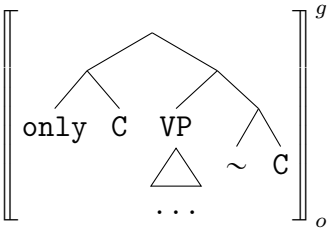
- C were empty; or
- C only contained the ordinary semantic value of the VP.

These restrictions are presuppositional in nature (as can be demonstrated by projection tests; data omitted here).
It is reasonable to assume that the presuppositional restrictions on C come from a general principle that avoids triviality: Whenever *only* is used, its semantic contribution should not be vacuous, so C must contain at least one alternative that can be negated.

- But when Rooth developed his theory, there was no explicitly formulated theory of this kind (and even today; Klinedinst & Sudo 2024 is perhaps the only attempt).
- So he postulates an operator, $\sim$, which introduces the presuppositional restrictions.

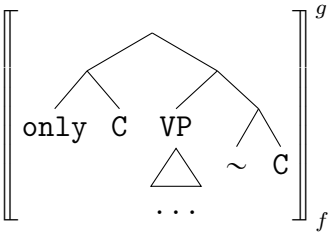
(31) '$\sim$ C' attaches to a constituent XP and triggers the following presuppositions (with respect to g)
a. $g(\text{C}) \subseteq [\![\text{XP}]\!]^g_f$
b. $[\![\text{XP}]\!]^g_o \in g(\text{C})$
c. $|g(\text{C})| > 1$

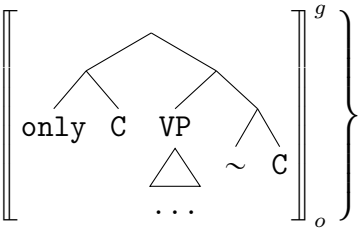
With this we will reanalyze (pre-VP) *only* as follows. (We will ignore the presuppositions triggered in VP and its alternatives here):

(32) a. $[\![$ 

$]\!]^g_o$

$= \lambda w_s.\lambda x_e\colon\ g(\texttt{C}) \subseteq [\![\texttt{VP}]\!]^g_f$ and $[\![\texttt{VP}]\!]^g_o \in g(\texttt{C})$ and $|g(\texttt{C})| > 1$. $\left[\begin{array}{l} [\![\texttt{VP}]\!]^g_o(w)(x) = 1 \text{ and} \\ \text{for each } f \in g(\texttt{C}), \\ \quad \text{if } f \neq [\![\texttt{VP}]\!]^g_o, \\ \quad \text{then } f(w)(x) = 0 \end{array}\right]$

b. $[\![$ 

$]\!]^g_f = \left\{ [\![\right.$ 

$\left.]\!]^g_o \right\}$

Rooth remarks (in Rooth 1985: p. 62ff, Rooth 1992: §9, Rooth 1996) that the most ideal theory should not stipulate (31) (and that's is in the intuition we pursue in Klinedinst & Sudo 2024). Acknowledging this, he chooses the best option available (at that time) where the only stipulation regarding focus is (31), i.e., only ~ accesses focus semantic values.

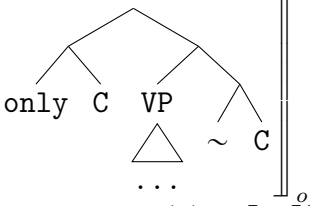
3.6 Prejacent presupposition

A final refinement we will consider here has to do with the 'prejacent', the phrase that *only* is attached to. It is often considered that it is presupposed to be true (of the pronounced arguments), rather than asserted to be true.

Evidence comes from projection under negation (Horn 1969).

(33) a. Patrick only [swam]$_F$.
b. Patrick didn't only [swim]$_F$.

To incorporate the prejacent presupposition, we will revise (32a) as follows.

(34) $[\![$ 

$]\!]^g_o$

$= \lambda w_s.\lambda x_e\colon\ g(\texttt{C}) \subseteq [\![\texttt{VP}]\!]^g_f$ and $[\![\texttt{VP}]\!]^g_o \in g(\texttt{C})$ and $|g(\texttt{C})| > 1$ and $[\![\texttt{VP}]\!]^g_o(w)(x) = 1$.
for each $f \in g(\texttt{C})$, if $f \neq [\![\texttt{VP}]\!]^g_o$, then $f(w)(x) = 0$

Sometimes the truth of the prejacent is new information, but this could be analyzed as a case of presupposition accommodation.

(35) A: Who has read your dissertation?
B: Only [Patrick]$_F$ has.

There is further controversy about the prejacent presupposition in the current literature (see Beaver & Clark 2008, Ippolito 2008, von Fintel & Iatridou 2007, Alonso-Ovalle & Hirsch 2022, Crnič 2024, 2025: Ch. 9). We might come back to this debate later (if there's time).

4 Remarks on intensionality

The above fragment contains no intensional operator, but it is crucial that the alternatives are alternatives to the intensions of the prejacent, rather than its extension.
To see why they have to be intensions, consider the following example.

(36) Katie only [downloaded]$_F$ the book.

The inference we want to obtain here is: Katie didn't open the book, Katie didn't read the book, Katie didn't finish the book, Katie didn't understand the book, ...
To simplify the following discussion, let's just assume that the referent of *the book* is B.

- **Context 1**: Katie downloaded B, opened it, and read the first few paragraphs.
- Our intensional theory correctly renders (36) false, as long as $g(\mathtt{C})$ contains alternatives like $\lambda w_s.\lambda x_e.\ x$ opened B in w.

However, if the alternatives are extensions, we will make the wrong prediction. Suppose:

- **Context 2**: Same as Context 1 but also that only Katie has B, so other (relevant) people haven't downloaded B or opened B.
- In our intensional theory, (36) will be false with the same alternatives as before.
- What if the alternatives are extensional? Assume that the evaluation world w is the world of Context 2.
  - The extension of the prejacent VP is: $\lambda x_e.\ x$ downloaded B (in w)
  - The extension of 'opened B' is: $\lambda x_e.\ x$ opened B (in w)
  - But these two are the same function! They both map Katie, and only Katie, to 1.
  - In Context 2, there would be still an extensional alternative that *only* can negate, e.g., $\lambda x_e.\ x$ finished B (in w), which maps everyone to 0, so *only* is not vacuous.
  - So with
$$g(\mathtt{C}) = \left\{ \begin{array}{l} \lambda x_e.\ x \text{ read } B \text{ (in } w), \\ \lambda x_e.\ x \text{ opened } B \text{ (in } w), \\ \lambda x_e.\ x \text{ finished } B \text{ (in } w) \end{array} \right\}$$
    (36) is predicted to be true, contrary to fact.
- Notice that the prediction of the extensional theory is that the truth of (36) should depend on what other people did. If there is one more person who downloaded B, then $\lambda x_e.\ x$ opened B (in w) should become negatable, so the sentence is now (correctly) predicted to be false. It is clear that this prediction is not correct. The truth of (36) does not depend on what other people did.

The problem of extensional alternatives is that they do not (always) vary enough. An extreme case of the problem arises with sentential focus.

(37) What is true (among the claims) is only [that we disagree]$_F$.

If we take the extension of the embedded sentence, it's a truth value (e.g., 1). Then its alternative will be the other truth-value (e.g., 0). It is clear that the intuitive meaning involves

propositions as alternatives (although, as Zimmermann 2017 points out, it needs to be ensured that propositions vary enough; see also Kadmon 2001: §15.1).

But intensions might vary too much in some cases (see Beaver & Clark 2008: §4.6.1).

(38) (Context: Richard is Head of Department)
Patrick only emailed [the Head of Department]$_F$.

Notice that *the Head of Department* and *Richard* have distinct intensions. The latter is a rigid designator, the former is not, and correspondingly, the following functions count as distinct alternatives. Let r be the referent of *Richard*.

(39) a. $\lambda w_s.\lambda x_e.\ x$ emailed in w the Head of Department in w
b. $\lambda w_s.\lambda x_e.\ x$ emailed r in w

Our denotation of *only* so far negates all the alternatives in $\mathtt{C}$ that are distinct from the prejacent, so if both functions in (39) are in $\mathtt{C}$, we'll derive a contradiction in the above scenario. There are two (mutually compatible) ways to address this problem.

- **Pragmatics of** $\mathtt{C}$: We can try to postulate pragmatic constraints on what values of $\mathtt{C}$ are admissible. E.g., we can assume that a speaker must not intend a contradiction, so $\mathtt{C}$ should not contain both of (39) in the given scenario.
- **Exclusion criteria**: We can try to restrict what *only* ends up negating. In our current formulation, it negates everything that is distinct from the prejacent (we omit the presuppositions):

  (40) $\lambda w_s.\lambda x_e\colon [\dots]$. for each $f \in g(\mathtt{C})$, if $f \neq [\![\mathtt{VP}]\!]^g_o$, then $f(w)(x) = 0$

  Instead of negating all alternatives distinct from the prejacent, we can just negate the ones that are not entailed by the prejacent.

  (41) $\lambda w_s.\lambda x_e\colon [\dots]$. for each $f \in g(\mathtt{C})$,
  if $[\![\mathtt{VP}]\!]^g_o(w')(x) = 1$ and $f(w')(x) = 0$ for some w', then $f(w)(x) = 0$

  This only checks *logical* consistency with the truth of the prejacent, but for our example above, we need to check *contextual* consistency. We need to somehow relativize the entire semantics to the conversational common ground *qua* a set of possible worlds, or the *context set* c (cf. Stalnaker 1978). Putting aside the formal details, it will look like (42).

  (42) $\lambda w_s.\lambda x_e\colon [\dots]$. for each $f \in g(\mathtt{C})$,
  if $[\![\mathtt{VP}]\!]^g_o(w')(x) = 1$ and $f(w')(x) = 0$ for some $w' \in c$, then $f(w)(x) = 0$

  We can take one more step and make sure that multiple negated alternatives won't be contextually inconsistent with the truth of the prejacent, and also that the negated alternatives will not cause contextual inconsistency between them. That'll amount to what Fox 2007 calls Innocent Exclusion. The innocently excludable set of alternatives, given $g(\mathtt{C})$, prejacent $[\![\mathtt{VP}]\!]_o$, subject x, and context set c, is the common members of the maximal excludable sets of alternatives, which in turn are sets of alternatives whose negations are collectively contextually consistent with the truth of the prejacent.

  (43) $\lambda w_s.\lambda x_e\colon [\dots]$. for each $f \in \mathrm{IE}(g(\mathtt{C}), [\![\mathtt{VP}]\!]^g_o, x, c)$, $f(w)(x) = 0$

a. $\mathrm{IE}(g(\mathtt{C}), [\![\mathtt{VP}]\!]^g_o, x, c) \coloneqq \bigcap \max \mathrm{E}(g(\mathtt{C}), [\![\mathtt{VP}]\!]^g_o, x, c)$

b. $\mathrm{E}(g(\mathtt{C}), [\![\mathtt{VP}]\!]^g_o, x, c) \coloneqq \left\{ A \subseteq g(\mathtt{C}) \;\middle|\; \begin{array}{l} \text{for some } w' \in c,\ [\![\mathtt{VP}]\!]^g_o(w')(x) = 1 \text{ and} \\ \text{for each } f \in A,\ f(w')(x) = 0 \end{array} \right\}$

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