Focus semantics

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The plan

- The semantics of focus phenomena
  - Focus and its interactions with prosody, morphosyntax, and discourse
  - The semantics of focus particles (e.g. *only*, *also*, *even*) and their syntax
  - The nature of focus "alternatives" and the "Alternative Semantics" framework
  - The relationship of focus alternatives to other uses of "alternatives" in semantics/pragmatics

Through this class, you'll develop familiarity with foundational ideas and tools in this domain (with a primary application being investigating focus particles and constructions in a specific language) and be exposed to various open issues and questions.

1. Introduction, Alternative Semantics
2. Focus particle semantics
2. Focus particle syntax/semantics
4. The nature of alternatives
5. Focus and *wh* alternatives

Lecture notes:

`mitcho.com/teaching/dgfs2026/`

Introductions and survey

`pe.app/dgfsfocus`

1 Focus: An introduction

1.1 Effects of focus

(1) a. I introduced SUE to Mary.
b. I introduced Sue to MARY.

The sentences in (1) convey the same information, but seem to differ in "what is emphasized." We call the emphasized part the *focus*.

The choice of focus has clear, observable differences:

(2) *Who did you introduce to Mary?*
a. I introduced SUE to Mary.
b. #I introduced Sue to MARY.

(3) *Who did you introduce Sue to?*
a. #I introduced SUE to Mary.
b. I introduced Sue to MARY.

(4) Halliday (1967):
a. Dogs must be CARRIED.
b. DOGS must be carried. (cf "Shoes must be worn.")

(5) Rooth (1985):
a. MARY always takes John to the movies.
b. Mary always takes JOHN to the movies.

(6) Jackendoff (1972) citing a John Bowers (1969) manuscript:
a. Of the three men, John hates BILL the most.
b. Of the three men, JOHN hates Bill the most.

(7) Jackendoff (1972):
a. Maxwell didn't kill the judge with a silver HAMMER.
b. Maxwell didn't kill the JUDGE with a silver hammer.

(8) a. I only introduced SUE to Mary.
b. I only introduced Sue to MARY.

(9) "Focus indicates the presence of *alternatives* that are relevant for the interpretation of linguistic expressions." — Krifka 2008: 247

Notably, focus (in the sense used here) is not the same as "new information" (§1.4).

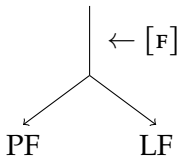
1.2 F-marking

Although focus is an information-structural notion (9), it affects prosody, (truth-conditional) semantics, and morphosyntax as well. This raises an architectural question: How do different modules of grammar make reference to focus?

> "I suggest the following way, which does minimal violence to the theory as a whole. One artificial construct is required: a syntactic marker F which can be associated with any node in the surface structure... Two systems of rules will make use of the marker F, one in the semantics and one in the phonology." — Jackendoff 1972: 240

An abstract feature underlying both pitch accent placement and focus interpretation goes back to at least "[+Prominent]" in Fischer 1968, discussed in Anderson 1972.
In modern terms, we might call F-marking a feature.

(10) **The inverted Y-model (Chomsky and Lasnik, 1977; Ladusaw, 1983; a.o.):**



In fact, consideration of focus played a large part in the motivation to abandon Deep Structure (Chomsky, 1970), where the Katz-Postal hypothesis claimed that sentence meaning was fully represented (Katz and Postal, 1964). See Jackendoff 1972: 229–236 for this history.

- I will use F-marking (subscript $[...]_F$) as a notational device to indicate the position of focus, i.e. the position over which relevant alternatives vary. Whether F-marking is a feature in the syntax or not is an open question (but see Branan and Erlewine, 2021).

1.3 Focus and prosody

The relationship between the position of focus and the position of prosodic prominence is indirect. We can determine the F-marked constituent through an utterance's semantics/pragmatics:

(11) *What did Mary eat this morning?*
Mary ate [a SANDWICH]$_F$.

(12) *What did Mary do this morning?*
Mary [ate a SANDWICH]$_F$.

(13) *Wait, what happened??*
[Mary ate a SANDWICH]$_F$!

(14) *Who ate a sandwich this morning?*
[MARY]$_F$ ate a sandwich.

- Notice that (11–13) can be pronounced identically, but vary in the logical position of focus. In contrast, the pitch accent in (14) clearly indicates that the subject is F-marked.

Although the relationship between focus and prosody is indirect, prosody still serves a function to communicate the position of focus.

- ► In English and many other languages, every F-marked constituent bears a pitch accent; see e.g. Selkirk 1984 §5.3.2.

  "the focus is the phrase containing the intonation center" — Chomsky 1970: 91

- The placement of the pitch accent within a focus is complicated. In many cases, pitch accent goes on the rightmost word in the focus, explaining the pitch accents in (13–14).
- Indefinites and pronouns avoid pitch accents:

  (15) *Wait, what happened??* [Mary ATE something]$_F$! (Bresnan, 1971: 258)

  Given material also often avoids pitch accents (see e.g. Schwarzschild, 1999; Wagner, 2006b, 2012).

There are in principle two ways to think of this mapping:

1. "Top-down": The logical focus bears an F-mark; a subpart of F bears an accent (Jackendoff, 1972, and many others).
2. "Bottom-up": Start with the position of main stress / prominence; consider possible candidates for logical focus compatible with that position (Selkirk, 1984; Reinhart, 2006, a.o.).

See Arregi 2016 for a succinct overview of the two approaches.

Some languages apparently have no prosodic cues which reflect F-marking. See e.g. Zerbian (2007) on Northern Sotho (Bantu):

> "The production study tested if Northern Sotho native speakers produce prosodic differences which are correlated to diverging focus structures... Question/answer-pairs that were controlled for different focus conditions were recorded from native speakers. A phonetic analysis of the data with respect to fundamental frequency and duration showed no systematic prosodic expression of focus. A follow-up perception study showed that the existing prosodic differences were not interpreted with respect to focus." (p. 75)

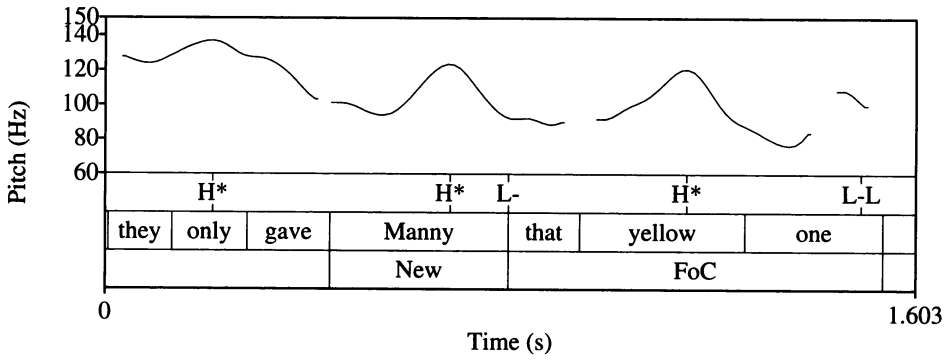
The position of focus may instead be indicated morphosyntactically; e.g. through the use of focus particles or movement, or by eliding/pronominalizing non-focused parts.

1.4 Focus vs new information

► It is important to emphasize that **focus is not the same as "new information,"** although they may often overlap.

(16) **New but not focused:** (Katz and Selkirk, 2011: 781)
The Red Sox had an exhibition game for charity, and they had special bright-colored uniforms made for the occasion. There were a lot of different colors; a couple of the jerseys were orange, one was purple. But they only gave [Manny] [that yellow one]. That was a lousy color.

- On the intended reading, which is supported by the context, *only* associates with *that yellow one*. *Manny* is discourse-new, but not focused.
- In their production study, focus and discourse-new constituents were both realized with falling (H*L) pitch accents.



(17) **Focused but not new:**
A. Who here only speaks [Spanish]$_F$?
B. [PABLO]$_F$ only speaks [Spanish]$_F$.

- *Pablo* in (17B) is the focus of the answer, and new. *Only* associates with the focus *Spanish*, but *Spanish* (in fact, all of *only speaks Spanish*) is less prosodically prominent.
- A focus that is given such as *Spanish* in (17B) is called a *second occurrence focus (SOF)*. In English, "SO focus is made prominent by greater duration and energy... but is usually not pitch-accented." (Beaver et al., 2007: 276)

► Focus, "new," and prosodic prominence can all come apart. We must consider the intended meaning and context of an utterance to determine the position of focus (F-marking), rather than just relying on intuitions regarding prominence in a language like English.

1.5 Focus particles

Much of these lectures will be concerned with *focus particles* like *only*, *even*, *also*.

(18) Alex { only / even / also } took [the TURTLE]$_F$ to school.

(19) Alex { only / even / also } took the turtle to [SCHOOL]$_F$.

These operators *quantify over alternatives which vary in the focused position*.

(20) **Analyzing (18):**
The sentence without the particle: Alex took [the TURTLE]$_F$ to school.
The *prejacent* sentence: Alex took the turtle to school.
Focused constituent: the turtle
Contextual alternatives to "turtle": the frog, the pig...
Alternative sentences: Alex took *the frog* to school, Alex took *the pig* to school...
(sentences based on the prejacent, but with the focus replaced by its alternatives)

Rough paraphrases for the meanings in (18):

(21) *only*:
a. the prejacent "Alex took the turtle to school" is true
b. all the alternative propositions ("Alex took the frog to school," "Alex took the pig to school"...) are false

(22) *even*:
a. the prejacent "Alex took the turtle to school" is true
b. the prejacent proposition "Alex took the turtle to school" was less likely than the alternative propositions, e.g. "Alex took the frog to school," "Alex took the pig to school"...

(23) *also*:
a. the prejacent "Alex took the turtle to school" is true
b. at least one of the alternative propositions ("Alex took the frog to school," "Alex took the pig to school"...) is true

Jackendoff (1972) and Rooth (1985) say that *only*, *even*, and *also* *"associate with (the) focus."* This dependency is often referred to as *Association With Focus*.

1.6 Alternative Semantics (Rooth, 1985, 1992)

What we want to capture is the following intuition:

(24) a. Mary *only* bought [the sandwich]$_{\text{F}}$.
$\forall x \in D_e$: Mary bought $x \rightarrow x =$ the sandwich
b. Mary *only* [bought]$_{\text{F}}$ the sandwich.
$\forall R \in D_{\langle e,\langle e,t\rangle\rangle}$: Mary R'ed the sandwich $\rightarrow R =$ buy

Focus particles appear to be able to quantify over different types of constituents.

- **Intuition:** The *only* in (24a–c) are the same, quantifying over propositions. *Only* presupposes the prejacent proposition and negates *a set of alternative propositions* (following Horn, 1969). Rooth (1985): Focus regulates the shape of this set of alternatives.

(25) **Alternative Semantics (Rooth, 1985, 1992):**
We keep track of *two dimensions* of meaning. For any syntactic object α, we compute:
a. the ordinary semantic value $[\![\alpha]\!]^{\text{o}}$; and
b. *the alternative set* $[\![\alpha]\!]^{\text{alt}}$ (or *focus semantic value*), the set of all ordinary semantic values obtained by substituting alternatives for any F-marked subparts of α.

(Rooth and much subsequent work uses $[\![\alpha]\!]^{\text{f}}$ for $[\![\alpha]\!]^{\text{alt}}$.)

(24a′) $[\![\text{Mary bought [the sandwich]}_{\text{F}}]\!]^{\text{o}} = {}^{\wedge}\text{Mary bought the sandwich}$ (prejacent)
$$[\![\text{Mary bought [the sandwich]}_{\text{F}}]\!]^{\text{alt}} = \left\{ \begin{array}{l} {}^{\wedge}\text{Mary bought the sandwich,} \\ {}^{\wedge}\text{Mary bought the pizza,} \\ {}^{\wedge}\text{Mary bought the salad,...} \end{array} \right\}$$

(24b′) $[\![\text{Mary [bought]}_{\text{F}} \text{ the sandwich}]\!]^{\text{o}} = {}^{\wedge}\text{Mary bought the sandwich}$
$$[\![\text{Mary [bought]}_{\text{F}} \text{ the sandwich}]\!]^{\text{alt}} = \left\{ \begin{array}{l} {}^{\wedge}\text{Mary bought the sandwich,} \\ {}^{\wedge}\text{Mary ate the sandwich,} \\ {}^{\wedge}\text{Mary sold the sandwich,...} \end{array} \right\}$$

($^{\wedge}$ is a shorthand for introducing an *intension*. Propositions are type $\langle s, t\rangle$, a function from a world to a truth value.)
Alternative Semantics provides a recursive procedure for computing these alternative sets, sometimes called *"pointwise" composition*:

(26) **A recursive procedure for computing alternative sets:**
If α (type τ) is F-marked: $[\![\alpha]\!]^{\text{alt}}$ = a subset of D_τ.
If α is not F-marked:

$$[\![\alpha]\!]^{\text{alt}} = \begin{cases} \{[\![\alpha]\!]^{o}\} & \text{if terminal node} \\ \left\{ b \circ g : b \in [\![\beta]\!]^{\text{alt}}, g \in [\![\gamma]\!]^{\text{alt}} \right\} & \text{if } \alpha \text{ has daughters } \beta, \gamma \end{cases}$$

where $\circ$ is the relevant composition rule, e.g. Functional Application.

In its simple usage for focus alternatives, (26) guarantees the following:

- If α does not contain a focus, $[\![\alpha]\!]^{\text{alt}} = \{[\![\alpha]\!]^{\text{o}}\}$.
- $[\![\alpha]\!]^{\text{o}} \in [\![\alpha]\!]^{\text{alt}}$, if they're both defined.

Here is a basic meaning for *only*, assuming it takes a sister p which is a proposition (type $\langle s, t \rangle$):

(27) $[\![\text{only}]\!]^{\text{o}} = \lambda p_{\langle s,t \rangle} \,.\, \lambda w_s \,.\, \forall q \in \mathit{Alt}\,(q \neq p \rightarrow \neg q(w))$

"All non-prejacent alternatives are false"

$\rightsquigarrow$ presupposition: $[\![\alpha]\!]^{\text{o}}\,(w)$ is true

Alt is the set of alternatives (here, a set of propositions), by default equal to the focus semantic value of its sister: $\mathit{Alt} = [\![\alpha]\!]^{\text{alt}}$ for [*only* α] . We will discuss *Alt* further in §4.
We can also use this basic approach to describe other focus particles, like *also* and *even*:

(28) $[\![\text{also}]\!]^{\text{o}} = \lambda p_{\langle s,t \rangle} \,.\, \lambda w_s \,.\, p(w)$

$\rightsquigarrow$ presupposition: $\exists q \in \mathit{Alt}\,[q \neq p \wedge q(w)]$

"A non-prejacent alternative is true"

(29) $[\![\text{even}]\!]^{\text{o}} = \lambda p_{\langle s,t \rangle} \,.\, \lambda w_s \,.\, p(w)$

$\rightsquigarrow$ presupposition: $\forall q \in \mathit{Alt}\,[q \neq p \rightarrow p <_{\mathit{likely}} q]$

"The prejacent is less likely than its alternatives"

Also and *even* simply pass up their prejacents' at-issue meaning, introducing an additional not-at-issue requirement, here described as a presupposition. We will take a closer look at the exact formulation of these particle meanings in §2.

2 Focus particle semantics

- Today, we take a closer look at the semantics of *only*, *also*, and *even* — or in more general terms, *exclusive*, *additive*, and *scalar* focus particles.

2.1 Exclusives

2.1.1 Components of meaning

Recall that a sentence with *only* seems to convey two different inferences, which a speaker of an *only*-sentence is committed to.

(30) Alex only took [the turtle]$_F$ to school. from (18, 21)

a. the prejacent / positive inference:
the prejacent "Alex took the turtle to school" is true

b. the exclusive / negative inference:
all the alternative propositions ("Alex took the frog to school," "Alex took the pig to school"...) are false

Neither part is cancellable:[1]

(31) Alex only took [the turtle]$_F$ to school...

a. #...and/but didn't take the turtle to school.

b. #...and/but (also) took the frog to school.

But the two inferences seem to differ in status:

- The exclusive / negative inference is asserted / **the "main point" / "at-issue,"** whereas **the prejacent / positive inference is secondary**, in some sense. The classic description of this idea is that the prejacent / positive inference is a presupposition (Horn, 1969).

Consider the pattern of acceptability with *because* clauses in (32). The *because* clauses in (ii) and (iii) reflect the positive and negative components of the *only*-clauses in (i).

(32) **Causality:** (exx based on Oshima, 2023: 1533)

[Context: Capsule A is a hypnotic and Capsule B is a digestive.]

a. Ken is still awake because { i. ✓ he only took Capsule B; ii. # he took Capsule B; iii. ✓ he didn't take Capsule A }.

b. Ken fell asleep because { i. # he only took Capsule A.; ii. ✓ he took Capsule A.; iii. # he didn't take Capsule B. }

[1] Although some report examples which suggest that the prejacent can maybe sometimes be cancelled, as in *Only Ann will pay her taxes on time, and maybe even she won't* which Horn (2002: 70) reports with the judgment mark "(#)".

- ▶ The (un)acceptability of each *only* variant (i) tracks the status of its (iii) variant, which supports the "main point" status of the negative/exclusive meaning of *only*.

Non-at-issue / non-main-point meanings also tend to *project* out of embeddings such as negation (see e.g. Tonhauser et al., 2013):

(33) **Embedding under negation:**
Alex didn't only take [the turtle]$_F$ to school.
a. #... He didn't take the turtle to school.
b. ✓... He also took the frog to school.

(We discuss the other classic "family of sentences" tests below.)

2.1.2 Points of variation: Japanese exclusives (Oshima, 2023)

The status of the positive and negative inferences are not necessarily universal, even across particles that invite translations as 'only':

- ▶ Japanese has a few common *only*-like particles: *dake*, *dake-wa*, and *shika*+NEG. They can seem interchangeable in some simple examples, but they feel quite different.

(34) **Japanese exclusive particles:**[2]
a. Ken-**dake**-(**ga**) shuppatsu shi-ta.
Ken-DAKE-(NOM) depart do-PAST
≈ 'Only Ken left.'
b. Ken-**dake-wa** shuppatsu shi-ta.
Ken-DAKE-TOP depart do-PAST
≈ 'Only Ken left.'
c. Ken-**shika** shuppatsu shi-nak-atta.
Ken-SHIKA depart do-NEG-PAST
≈ 'Only Ken left.'

Here are three examples that illustrate the different distributions of the three particles. I give the contexts and English schemas here, followed by the actual sentences below.

(35) **Tournament:** (Oshima, 2023: 1531)
[Ken, Toru, and Masaki are competing in a round-robin chess tournament with 10 participants. The three of them are tied in the first place, each with seven wins and two losses. They will have their last match today, each playing against a different opponent.]
"If {✓DAKE / #DAKE-WA / #SHIKA} Ken wins, Ken will be the champion."

[2] Bare *dake* (a) can cooccur with case markers like nominative, but *dake-wa* (b) is more restricted.

(36) **Lifeboat:** (Oshima, 2023: 1539)
[I was adrift on a lifeboat for seven days, without any food. But...]
"I was able to survive because there was {#DAKE / ✓DAKE-WA / #SHIKA} water."

(37) **Paints:** (Oshima, 2023: 1540)
[The speaker is going to paint a picture, and realizes that he does not have any paint brushes.]
"Oh no, I'm in trouble. I have {#DAKE / #DAKE-WA / ✓SHIKA} the paints."

(35′) a. Moshi Ken {✓**-dake**-(ga) / #**-dake-wa**} kat-eba, Ken-ga yuushoo da.
if Ken -DAKE-NOM -DAKE-TOP win-COND Ken-NOM win.tournament COP.PRES
'If only Ken wins, he will be the champion.'

b. #Moshi Ken-**shika** kat-anak-ereba, Ken-ga yuushoo da.
if Ken-SHIKA win-NEG-COND Ken-NOM win.tournament COP.PRES

(36′) a. Mizu {#**-dake**-(ga) / ✓**-dake-wa** / ✓-NOM} atta node, ikinobiru koto-ga deki-ta.
water -DAKE-NOM -DAKE-TOP -NOM exist.PAST because survive matter-NOM do.able-PAST
'I was able to survive because (at least) there was water.'

b. #Mizu-**shika** nak-atta node, ikinobiru koto-ga dekita.[4]
water-SHIKA not.exist-PST because survive matter-NOM possible.PAST
'I was able to survive because there was only water.'

(37′) a. #Enogu **dake-(ga/wa)** aru.
paint DAKE-NOM/TOP exist.PRS
'I only have the paints.'

b. Enogu **shika** nai.
paint SHIKA not.exist.PRS
'I only have the paints.'

► The contexts above all differ in "what matters":

	dake	*dake-wa*	*shika*+NEG	what matters
(35) tournament	✓	#	#	both prejacent and exclusion
(36) lifeboat	#	✓	#	prejacent
(37) paints	#	#	✓	exclusion

(38) **Oshima's (2023) analysis:**

	dake	*dake-wa*	*shika*+NEG
prejacent inference	main point	main point	secondary
exclusive inference	main point	secondary	main point

Aside: If the meaning of exclusive particles can vary within and across languages, how do children learn these distinctions?

[4] The *shika* data point was not given in Oshima 2023.

2.1.3 More on the positive inference of English *only*

Recall that the prejacent of English *only* project out of negation; see (33) and also (39a).

(39) **More tests for projection:** (Geurts and van der Sandt, 2004: 20)

a. Not only [Wilma]$_{\text{F}}$ guessed the secret word.

b. It is possible that only [Wilma]$_{\text{F}}$ guessed the secret word.

c. If only [Wilma]$_{\text{F}}$ guessed the secret word, she has won €100.

d. Did only [Wilma]$_{\text{F}}$ guess the secret word?

"According to our intuitions, none of [(b–d)] suggest very strongly that Wilma guessed the secret word."

- Horn 1969 described the positive inference as a presupposition, based on its behavior under negation, as in (39a), but this has been controversial.
- In addition to not always projecting, the prejacent is not required to already hold of the utterance context. (It is not a "strong contextual felicity requirement" in Tonhauser et al. 2013 terms.) This is counter to the standard conception of presuppositions.
- Various authors have suggested that **the prejacent inference is another kind of meaning:**
  - McCawley 1981; van Rooij and Schulz 2007: a conversational implicature
  - Atlas 1993: an entailment
  - Horn 2002: an entailment, but not part of the assertion ("assertorically inert")
- Another possible analysis is that ***only* presupposes an existential requirement** (see e.g. Horn, 1996; Geurts and van der Sandt, 2004):

(40) $[\![\text{only}]\!]^{\text{o}} = \lambda p_{\langle s,t\rangle} \,.\, \lambda w_s \,.\, \forall q \in \mathit{Alt}\,(q \neq p \rightarrow \neg q(w))$

"All non-prejacent alternatives are false" (unchanged)

$\rightsquigarrow$ presupposition: $\exists s \in \mathit{Alt}\,(s(w))$

"Some alternative is true"

(Note that *Alt* includes the prejacent in Alternative Semantics.)

See also Coppock and Beaver's (2014) MIN for a more sophisticated version of this.

2.1.4 What *only* excludes

Next, we revisit the exclusive / negative inference of *only*.
To say that all non-prejacent alternatives are false can run into problems:

(41) John only $[\text{swims}]_{\text{F}}$.

a. $\Rightarrow$ John does not run.

b. $\not\Rightarrow$ John does not breathe.

c. $\not\Rightarrow$ John does not live.

One option is to say that "breathe" and "live" are not relevant alternatives in *Alt* (however we define what's contextually relevant).
But appealing to contextual restriction doesn't help in all cases:

(42) *How many kids does John have?* (Does he have two? or three? or four? or five?)
John only has $[\text{two}]_{\text{F}}$ kids.

a. $\Rightarrow$ John does not have three kids

b. $\not\Rightarrow$ John does not have one kid

(43) [Anne, Bob, and Cara were supposed to attend the meeting. But in the end...]
Only [Anne and Bob]$_{\text{F}}$ attended the meeting.

a. $\Rightarrow$ Cara didn't attend the meeting

b. $\not\Rightarrow$ Anne didn't attend the meeting

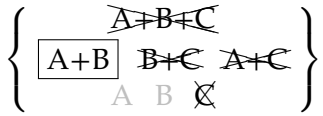
c. $\not\Rightarrow$ Bob didn't attend the meeting

► *Only* should **exclude all alternatives that are not entailed by the prejacent.**

(44) $[\![\text{only}]\!]^{\text{o}} = \lambda p_{\langle s,t\rangle} \,.\, \lambda w_s \,.\, \forall q \in \mathit{Alt}\, \big(\underline{p \not\Rightarrow q} \rightarrow \neg q(w)\big)$

$\rightsquigarrow$ presupposition: ...

Let's assume *Alt* in (43) includes (at least) the alternatives on the right, where X stands for $^\wedge X$ attended the meeting.



- This same idea is often described as "exclude all non-weaker alternatives," where:

"q is weaker than p" $(q <_S p)$ $\equiv$ "p is stronger than q" $(p >_S q)$ $\equiv$ $p \Rightarrow q$.

(45) $[\![\text{only}]\!]^{\text{o}} = \lambda p_{\langle s,t\rangle} \,.\, \lambda w_s \,.\, \forall q \in \mathit{Alt}\, \big(\underline{p \not>_S q} \rightarrow \neg q(w)\big)$

$\rightsquigarrow$ presupposition: ...

where $>_S$ is a partial order based on entailment. (The S stands for "strength" or "scale," which we return to below.)

On this view, (44) is then just one specific case of (45), using an entailment "scale."

Note that there are some cases where we still have a problem, even with (44/45):

(46) [Anne, Bob, and Cara were supposed to attend the meeting. But, according to the limited information I have...]
Only [Anne or Bob]$_{\text{F}}$ attended the meeting. (I'm not sure who.)
a. $\Rightarrow$ Cara didn't attend the meeting
b. $\not\Rightarrow$ Anne didn't attend the meeting
c. $\not\Rightarrow$ Bob didn't attend the meeting

- Notice that the prejacent $(A \vee B)$ does not entail A, nor B.

  Our revised *only* as in (44/45) would incorrectly predict excluding both A and B. This in turn leads to a contradiction, as we presuppose the prejacent $(A \vee B)$ but assert $\neg A \wedge \neg B$, which is impossible.

  $\left\{ \boxed{A \vee B} \;\; ... \right\}$

► Intuitively, we must **negate as much as we can, without leading to inconsistencies.** See Fox's (2007) "Innocent Exclusion" for such a proposal.

  $\left\{ \boxed{A \vee B} \;\; ... \right\}$

2.2 Scalar exclusives

Consider the following contrasts, based on examples in Horn 2002: 69:

(47) a. They're {just / only} living together; they're not married.
b. They're {#just / only} married; they're not living together.

(48) a. They're not {just / only} living together; they're (also) engaged.
b. They're not {just / #only} engaged; they're (#also) married.

- Notice that the relative alternatives appear to be on a socially/culturally salient scale:

  living together $<_S$ engaged $<_S$ married

► *Just* is a scalar exclusive that must use (45) with the contextually salient ranking/ordering $<_S$, not an ordering based on entailment.

  – In (47b), the prejacent *married* is the highest on the scale, so *just* is infelicitous as it has nothing to exclude. *Only* is felicitous as it can exclude *married* $\wedge$ *living together*.
  – In (48b), *only* is strange because *engaged* and *married* are incompatible predicates (also blocking *also*), but *just* can meaningfully exclude *married*.

(As Coppock and Beaver 2014 note, there is some speaker variation in the availability of scalar uses of *only*.)

- ► More generally, different particles can be lexically specified to make use of different scales/orders. (See e.g. Coppock and Beaver 2014.)

2.3 Additive particles

Particles such as *also* and *too* are called *additive* particles, as they presuppose that some additional alternative is true.

- ► Although there is agreement that additives require that "some additional alternative is true," there is *a lot* of debate regarding the exact nature of the requirement that "some additional alternative is true."

The simplest or most naive formulation is that **the additive requirement is *existential*:**

(49) $[\![\text{also}]\!]^{o} = \lambda p_{\langle s,t\rangle} \,.\, \lambda w_s \,.\, p(w)$ =(28)

$\rightsquigarrow$ presupposition: $\exists q \in Alt\,[q \neq p \wedge q(w)]$

- First, the additive requirement can be satisfied indirectly, or even require accommodation:

(50) Mary will decide to study abroad, and $[\text{John}]_{F}$, too, will make a stupid decision. (Chemla and Schlenker, 2012: 190)

$\rightsquigarrow$ (we accommodate that) *deciding to study abroad* entails *making a stupid decision*

It can also just be a belief or a possibility:

(51) a. [John thinks Mary has gone to Bill's party.] $[\text{Carol}]_{F}$ has gone there too.

b. [John dreamt that his car was stolen.] $[\text{My}]_{F}$ car was stolen too.[5]

c. [Maybe John will sing tonight.] $[\text{I}]_{F}$ will sing too. (exx Zeevat 2002: 65)

- ► Kripke (2009) (presented in 1990) argues that the existential analysis is too weak:

[5] But interestingly, Zeevat (2002) also reports (p. 73): *Mary dreamt that John had an icecream. Bill had one* (*?*too*). I am not certain whether these two examples really differ in the acceptability of *too* licensed by the dream proposition.

(52) a. [Sam]$_F$ is having dinner in New York tonight, too. (Kripke, 2009: 373)
b. [Sam]$_F$ is also having dinner in New York tonight.

The existential analysis predicts *too* in (52a) to be acceptable "out of the blue," because we should almost always be able to assume or accommodate that someone else besides Sam is having dinner in New York tonight. But in fact such examples are infelicitous "out of the blue."

- Kripke therefore argues that the additive requirement is *anaphoric* (or deictic). More specifically, this might mean:
  - An additive refers to a salient *individual* X in the discourse that contrasts with the focus (*Sam*), such that the prejacent with *Sam* replaced by X is true. (Heim 1992: 189ff)
  - An additive refers to a salient *proposition* in the discourse, which is a focus alternative of the prejacent, and is true.

  But anaphoric analyses may in turn be too strong...

- Donáti and Sudo (2025: 296) observe, "Additive particles that trigger indexical additive presuppositions [referring to speaker or hearer] are generally felicitous out of the blue."

(53) Hey, that kitten has feelings too, you know! (Ruys, 2015: 359)

(54) [Two women are standing at a bus stop on a rainy day. A car drives by, through a puddle, splashing one of the women with muddy water. To the splashed woman:]
One splashed [me]$_F$ this morning, too. (Grubic, 2019: 173)

Donáti and Sudo 2025: 297: "Concretely, the intended context for Kripke's original example is one where the speaker and hearer are not having dinner in New York themselves..."

- Furthermore, additives are sometimes acceptable out of the blue, even when the apparently relevant alternative is not indexical:

(55) [Sam used to be really poor, which made him feel ostracized and lonely. But now that Sam has struck it rich, he no longer feels alone.] Now he too can drive a Mercedes, and have dinner in fancy restaurants in New York. (Ruys, 2015: 356)

The alternative that licenses *too* should be of the form "X [$\neq$ Sam] can drive a Mercedes," but who is X? Intuitively, X is other rich people, but you cannot refer to *them*:

(56) ...#Now he hangs out with them in Manhattan all the time. (D&S: 302)

Grubic (2019) shows experimentally that the German additive *auch* can be easier to accommodate than corresponding anaphoric pronouns. As D&S point out, such facts seem to challenge Kripke's anaphoric view (or at least its anaphoric individual variant).

2.4 Scalar particles

2.4.1 Scale reversal with *even*

Even introduces a secondary meaning (generally described as a presupposition) that its prejacent is somehow special as compared to its alternatives. This might be "less likely" / "less expected" / "more noteworthy," etc. (See discussion in Bennett 1982; Kay 1990; Lycan 1991.)

(57) $[\![\text{even}]\!]^{o} = \lambda p_{\langle s,t\rangle} \,.\, \lambda w_s \,.\, p(w)$ =(29)

$\rightsquigarrow$ presupposition: $\forall q \in \mathit{Alt}\,[q \neq p \rightarrow p <_{\mathit{likely}} q]$

"The prejacent is less likely than its alternatives"

(58) Bill even read $[\mathit{Syntactic\ Structures}]_{F}$.

$\rightsquigarrow$ For all alternatives x to *Syntactic Structures*:

(Bill read *Syntactic Structures*) $<_{\mathit{likely}}$ (Bill read x)

- Karttunen and Peters (1979) observed that this scalar inference of *even* is reversed in downward-entailing environments.

(59) ***Scale reversal* of *even*:**

Bill didn't even read $[\mathit{Syntactic\ Structures}]_{F}$.

$\rightsquigarrow$ For all alternatives x to *Syntactic Structures*:

(Bill read *Syntactic Structures*) $>_{\mathit{likely}}$ (Bill read x) (cf 58)

There are broadly two approaches to this scale reversal behavior:

1. ***Ambiguity theory:***

   There is an NPI *even*, whose scalar meaning is reversed (Rooth, 1985; Rullmann, 1997; Erlewine, 2014, 2018: a.o.):

   (60) $[\![\text{even}]\!]^{o} = \lambda p_{\langle s,t\rangle} \,.\, \lambda w_s \,.\, p(w)$

   $\rightsquigarrow$ presupposition: $\forall q \in \mathit{Alt}\left[q \neq p \rightarrow p \underline{>_{\mathit{likely}}} q\right]$

"The prejacent is more likely than its alternatives"

The *even* in (57) is then either a PPI or in some sort of blocking relationship with $even_{\text{NPI}}$.

Note that there are languages where these two forms of *even* are pronounced differently (König, 1991; von Stechow, 1991; Rullmann, 1997; Giannakidou, 2007; Lahiri, 2008: a.o.):

	even (positive)	$even_{\text{NPI}}$
Dutch	*zelfs*	*zelfs maar* 'even only,' *ook maar* 'also only'
Finnish	*jopa*	*edes*
German	*sogar*	*auch nur*
Greek	*akomi*	*oute*
Spanish	*incluso*, *hasta*	*siquiera*
Swedish	*tom*	*ens*

2. ***Scope theory:***

   Even in examples such as (59) takes higher scope than its pronounced position (Karttunen and Peters, 1979; Wilkinson, 1996; Guerzoni, 2004; Nakanishi, 2012: a.o.).

   (61) **Interpreting (59) using the scope theory:**

   a. LF: *even* $[_{\alpha}$ Bill didn't read $[\textit{Syntactic Structures}]_{\text{F}}]$

   b. *even* $\rightsquigarrow$ For all alternatives x to *SS*:
   (Bill didn't read *SS*) $\lessdot_{likely}$ (Bill didn't read x)
   $\iff$ For all alternatives x to *SS*:
   (Bill read *SS*) $\gtrdot_{likely}$ (Bill read x)

► The scope theory is very clever and attractive. It also seems to be wrong, at least for English sentential *even* (Rullmann, 1997; Erlewine, 2018).

In the scope theory, the mismatch between the pronounced and interpreted positions of *even* is often described as covert movement, but this "movement" would not leave a semantically contentful trace (see e.g. LFs given in Wilkinson 1996, Guerzoni 2004. It also doesn't obey regular constraints on movement, such as islands (Rullmann, 1997).

(62) **Scale-reversed *even* inside a relative clause (Rullmann, 1997: p. 48):**
They hired no linguist who had even read $[\textit{Syntactic Structures}]_{\text{F}}$.

(63) **Predicted meaning from the scope theory:**

LF: *even* [they hired no linguist who had read [*Syntactic Structures*]$_{\text{F}}$]

even $\rightsquigarrow$ For all alternatives x to *SS*:

(they hired no linguist who had read *SS*) $<_{\textit{likely}}$ (they hired no linguist who had read x)

$\iff$ For all alternatives x to *SS*:

(they hired a linguist who had read *SS*) $>_{\textit{likely}}$ (they hired a linguist who had read x)

(63) predicts a presupposition for *even* in (62) which does seem to accord with our intuitions. But notice that *even* had to move out of a relative clause island at LF.

In contrast, under the ambiguity theory (with appropriate tweaks from Erlewine 2014, 2018), *even*$_{\text{NPI}}$ interpreted in (62) would yield the following meaning:

(64) **Predicted meaning from the ambiguity theory:**

LF: They hired no linguist who had *even*$_{\text{NPI}}$ read [*Syntactic Structures*]$_{\text{F}}$.

$$\textit{even}_{\text{NPI}} \rightsquigarrow \textsc{gen}(y \text{ linguist}) \left(\begin{array}{l} \text{for all alternatives } x \text{ to } \textit{SS}: \\ (y \text{ had read } \textit{SS}) >_{\textit{likely}} (y \text{ had read } x) \end{array} \right)$$

Practically, it seems very difficult to distinguish the inferences predicted in (63) and (64).

Finally, Nakanishi 2012 offers a clever recent argument for the scope theory, but ultimately I do not think the argument goes through (Erlewine, 2018).

2.4.2 The additive part of *even*

That *even* introduces a scalar presupposition is uncontroversial. There is, however, controversy around whether *even* also has an additive meaning or not.

(65) **Two meanings introduced by *even*:**

Even [John]$_{\text{F}}$ came to the party.

a. $\rightsquigarrow$ John was less likely than others to come to the party *scalar*

b. $\rightsquigarrow$ Someone other than John came to the party. *additive*

Horn (1969), Karttunen and Peters (1979), and some others clearly claim that *even* has the additive meaning in (b), in addition to its scalar meaning. This has been disputed by von Stechow (1991), Krifka (1992), Rullmann (1997), and others.

Some evidence for the additive meaning (from Wagner, 2013):

(66) I heard the results of this year's marathon were surprising. Is it true that this time it wasn't a Kenyan who won the gold medal?
Oh yes. # Even a $[\text{Canadian}]_F$ won it.

(67) John was a favorite in the marathon. Did he win a medal?
Oh yes. # John won even the $[\text{gold}]_F$ medal.

These improve with possibility modals, which makes sense — multiple people *could* win the gold medal, even though only one does.

(68) a. Even a $[\text{Canadian}]_F$ could win the gold medal.
b. John could win even the $[\text{gold}]_F$ medal.

Additives require a non-entailing/entailed anaphoric alternative. Wagner (2013) attributes the strangeness of (69) to the additive meaning of *even*.

(69) I was hoping that at least some of the students would be able to pass the test.
But in the end, even $[\text{everyone}]_F$ was able to do it.

Some evidence for the lack of an additive meaning:
Rullmann (1997: p. 61) discusses scales with mutually exclusive alternatives, e.g. {being an Assistant Professor, being an Associate Professor,...}:

(70) A: Is Claire an Assistant Professor?
B: No, she's even an $[\text{Associate}]_F$ Professor.

(71) **Wagner's (2013) observation:**
The presence or absence of the additive meaning of *even* depends on its sytnax. Constituent *even* encodes the additive meaning, but sentential *even* need not.

(72) **Constituent *even* is additive but sentential *even* is not (Wagner, 2013):**
Did John read some of the books?
a. Yeah, John **even** read $[\text{all}]_F$ of the books.
b. #Yeah, John read **even** $[\text{all}]_F$ of the books.

What about Rullmann's example (70) which shows no additive part? Wagner proposes that this has a parse with a sentential *even*, although obscured by the position of the copula.

(73) **A clearer "Associate Professor" example (Wagner, 2013):**

a. Claire married an Assistant Prof., and Sally even married an $[\text{Associate}]_F$ Prof.

b. #Claire married an Assistant Prof., and Sally married even an $[\text{Associate}]_F$ Prof.

(74) **The gold medal revisited (Wagner, 2013):**

The results in the Marathon were quite surprising. A Russian won the gold medal.

a. #Even a $[\text{Canadian}]_F$ won the silver medal. (unless two people won it)

b. #The silver medal was won even by a $[\text{Canadian}]_F$. (unless two people won it)

c. The silver medal was even won by a $[\text{Canadian}]_F$. (one winner)

See Wagner 2013 for discussion of two approaches to this contrast.

2.4.3 Deriving NPIs with *even*

NPIs are licensed by downward-entailing environments (Fauconnier, 1975; Ladusaw, 1979).

- Many have considered versions of the following hypothesis (Heim, 1984; Krifka, 1994; Lee and Horn, 1995; Lahiri, 1998; Chierchia, 2013; Crnič, 2014):[6]

  An NPI is an *even* associating with a weak element (e.g. indefinite).

NPIs in many languages in fact involve 'even':

(75) **Some Hindi indefinites and NPIs (Lahiri, 1998):**

ek 'one'	*ek bhii* 'any, even one'
koii 'someone'	*koii bhii* 'anyone, any (count)'
kuch 'something, a little'	*kuch bhii* 'anything, any (mass)'

Consider *even* associating with 'someone,' with alternatives *many* (*people*) and *everyone*:

(76) *[EVEN [I saw SOMEONE]]

$$[\![\text{I saw SOMEONE}]\!]^{\text{alt}} = \left\{ \begin{array}{l} {}^\wedge\text{I saw someone}, \\ {}^\wedge\text{I saw many}, \\ {}^\wedge\text{I saw everyone} \end{array} \right\}$$

$$\text{EVEN} \rightsquigarrow ({}^\wedge\text{I saw someone}) <_{\textit{likely}} ({}^\wedge\text{I saw many}) \wedge$$
$$({}^\wedge\text{I saw someone}) <_{\textit{likely}} ({}^\wedge\text{I saw everyone})$$

This presupposition is unsatisfiable, in any context.

[6] Heim 1984 raises various concerns regarding this approach, but see Crnič 2014 for an explicit attempt to defuse her concerns.

(77) ✓[EVEN [NEG [I see SOMEONE]] = "I didn't see *anyone*."

$$[\![\text{NEG [I saw SOMEONE]}]\!]^{\text{alt}} = \left\{ \begin{array}{l} \text{NEG}(\text{^I saw someone}), \\ \text{NEG}(\text{^I saw many}), \\ \text{NEG}(\text{^I saw everyone}) \end{array} \right\}$$

$$\text{EVEN} \rightsquigarrow \text{NEG}(\text{^I saw someone}) <_{\textit{likely}} \text{NEG}(\text{^I saw many}) \wedge$$
$$\text{NEG}(\text{^I saw someone}) <_{\textit{likely}} \text{NEG}(\text{^I saw everyone})$$
$$\iff (\text{^I saw someone}) >_{\text{likely}} (\text{^I saw many}) \wedge$$
$$(\text{^I saw someone}) >_{\text{likely}} (\text{^I saw everyone})$$

This presupposition is always satisfiable.

- The scalar meaning of *even* associated with an indefinite will be strange, unless it's in a downward-entailing environment.

  More generally, the scalar meaning of *even* makes it useful for deriving certain forms of quantification or licensing behaviors.

See also Erlewine 2020 for an approach to the derivation of universal free choice using the interaction of the scalar meaning of *even* with conditionals.

2.4.4 Burmese *hma* (Erlewine and New, 2021)

Colloquial Burmese has a particle *hma* which in some contexts expresses exhaustivity and in some contexts expresses a scalar ('even'-like) meaning. Okell (1969) describes these two uses simply as "hma_A" 'even' and "hma_B" 'only' (pp. 284–286).

(78) **Exhaustive *hma* (cleft):**

A: I wonder what Aung drank.

B: Aung-ga ye-ko-**hma** thauq-k'èh-teh.
Aung-NOM water-ACC-HMA drink-PAST-NONFUT

(# Thu-ga biya-ko-leh thauq-k'èh-teh.)
3-NOM beer-ACC-also drink-PAST-NONFUT

'It's WATER that Aung drank. (#He also drank beer.)'

This exhaustive *hma* is not an *only*, as diagnosed by embedding under a higher clause negation:

(79) ***hma* embedded under non-local negation: embedded cleft**

[Aung-ga ye-ko-**hma** thauq-k'èh-teh] **mă**-houq-**bu**.
Aung-NOM water-ACC-HMA drink-PAST-NONFUT NEG-right-NEG

lit. 'It's false [that Aung drank water-HMA]' 'It isn't WATER that Aung drank.'

a. ⇝ Aung didn't drink water.

b. ⇝ Aung drank something.

c. ⇝ if Aung drank water, he didn't drink anything else.

The speaker of (79) believes that Aung didn't drink water, in contrast to a negated *only*.

(80) **Scalar *hma*:**

Context: There were only two drinks available at the party last night: water and beer. Aung is a child, so he is more likely to drink water than beer.

a. Aung-ga ye-ko-**hma** **mă**-thauq-k'èh-**ta**.
Aung-NOM water-ACC-HMA NEG-drink-PAST-TA
lit. 'Aung didn't drink water-HMA' ≈ 'Aung didn't even drink WATER.'

b. #Aung-ga biya-ko-**hma** **mă**-thauq-k'èh-**ta**.
Aung-NOM beer-ACC-HMA NEG-drink-PAST-TA
lit. 'Aung didn't drink beer-HMA' ≈ # 'Aung didn't even drink BEER.'

Because of the sensitivity to the prejacent's relative ordering on the scale of likelihood, (80a) often gets translated as 'Aung didn't even drink WATER.'

Q: When is *hma* interpreted as exhaustive vs scalar?
A: "Scalar" uses of *hma* require both local sentential negation *mă-* and the final *-ta* marker.

(81) ***hma* with negation but no *-ta*: cleft > NEG** cf (80)
Aung-ga ye/biya-ko-**hma** **mă**-thauq-k'èh-**bu**.
Aung-NOM water/beer-ACC-HMA NEG-drink-PAST-NEG
'It's WATER/BEER that Aung didn't drink.'

Proposal:

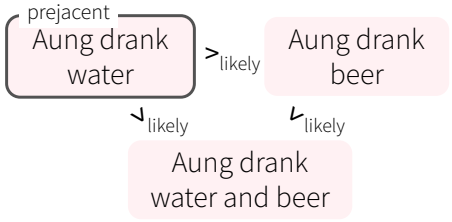
- Adopt the operator–particle theory: particle *hma* corresponds to covert HMA operator, taking propositional scope.
- The presence or absence of *-ta* (indirectly) tracks the relative scope of *hma* and negation; see Erlewine and New 2021 for analysis.
- Let C be the (relevant) focus alternatives of the sister of HMA at LF. C is closed under conjunction and is ordered by $<_{likely}$.
- *hma* passes up its sister's truth conditions, but introduces the presupposition that "no less likely alternative is true":[7]

(82) $\text{HMA}(p)(w) \rightsquigarrow \forall q \in C\,[(q <_{likely} p) \rightarrow \neg q(w)]$

Wide-scope *hma* yields an exhaustive (cleft) meaning:
Let the relevant atomic alternatives be "Aung drank beer" and "Aung drank water." Suppose drinking water is more likely than drinking beer (not crucial here).

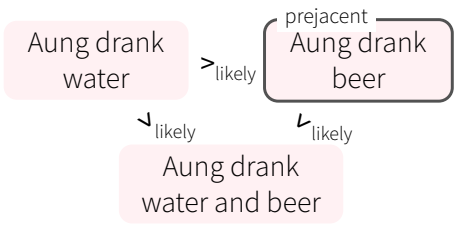
[7] This meaning proposed for *hma* is very close to what is proposed for English *it*-clefts in Velleman et al. 2012.

(83) LF: HMA [$_p$ Aung drank [water]$_F$]



presupposes: ¬beer ∧ ¬(water ∧ beer)
asserts: p = water
result: 'It's water that Aung drank.'

(84) LF: HMA [$_p$ Aung drank [beer]$_F$]



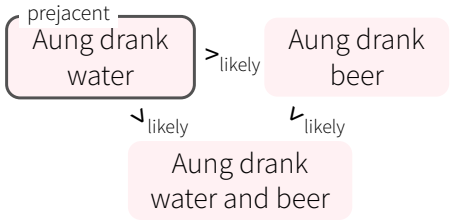
presupposes: ¬(water ∧ beer)
asserts: p = beer
result: 'It's beer that Aung drank.'

This logic will apply as long as *hma* takes widest scope. Without *-ta*, *hma* takes scope over negation, explaining the cleft > NEG reading in (81).

hma scoping under negation yields scale-sensitivity:

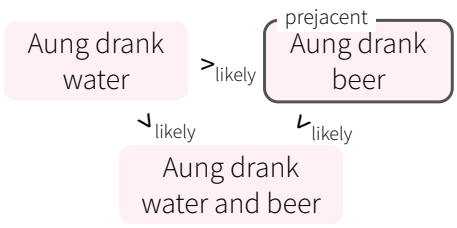
Let the relevant atomic alternatives be "Aung drank beer" and "Aung drank water." Suppose drinking water is more likely than drinking beer (now crucial).

(85) LF: NEG [HMA [$_p$ A. drank [water]$_F$]]



presupposes: ¬beer ∧ ¬(water ∧ beer)
asserts (with NEG): ¬p = ¬water

(86) LF: NEG [HMA [$_p$ Aung drank [beer]$_F$]]



presupposes: ¬(water ∧ beer)
asserts: ¬p = ¬beer

- The addition of *hma* doesn't add anything to the meaning in (86), so its addition is ungrammatical by Non-Vacuity (Crnič, 2011) or a similar condition.

(87) **The Principle of *Non-Vacuity* (Crnič, 2011: p. 110):**
The meaning of a lexical item used in the discourse must affect the meaning of its host sentence (either its truth-conditions or its presuppositions).

Because *hma* in (85/86) can only be used when some less likely alternatives can be negated in the presupposition, *hma* under negation seems scale-sensitive, lending itself to translations with (scale-reversed) English *even*.

3 Focus particle syntax/semantics

- ▶ Today, we will investigate the syntax/semantics of focus particles such as *only*. For each which focus particle, we may ask:
- Where can the focus particle go?
- Where can its *focus associate* be?[8]
- What scope does the focus particle take?

Along the way, I will emphasize the distinction between *sentential particles* (adjoining to the clausal spine) or *constituent particles* (adjoining to a subclausal phrase such as DP, PP, etc.).

3.1 Sentential vs constituent particles and the c-command requirement

English *only* comes in two types, which I call "sentential" (adjoining to the clausal spine) and "constituent" (adjoining to a subclausal phrase such as DP, PP, etc.), in analogy with sentential vs constituent negation:

(88) a. I **only** $[_{VP}$ introduced $[\text{Sue}]_F$ to Mary. *sentential only*
b. I introduced **only** $[_{DP}$ Sue$]_F$ to Mary. *constituent only*

Jackendoff (1972) shows that, given a fixed position of *only*, the possible constituents it can associate with vary greatly between these two types of *only*s: (based on his exx 6.89–6.92)

(89) **Possible associates of sentential *only*:**
a. *JOHN had *only* given his daughter a new bicycle.
b. ✓ GIVEN
c. ✓ HIS
d. ✓ DAUGHTER
e. ✓ NEW
f. ✓ BICYCLE

(90) **Some positions for constituent *only*:**
a. ✓*Only* JOHN had given his daughter a new bicycle.
b. * GIVEN
c. * HIS
d. * DAUGHTER
e. * NEW
f. * BICYCLE

[8] "Focus associate" here is a noun — the focused constituent that a focus particle "associates" with. The verb is *assóci*[*ej*]*t* and the noun is *assóci*[*ə*]*t*.

(91) a. *JOHN had given *only* his daughter a new bicycle.
b. * GIVEN
c. ✓ HIS
d. ✓ DAUGHTER
e. * NEW
f. * BICYCLE

(92) a. *JOHN had given his daughter *only* a new bicycle.
b. * GIVEN
c. * HIS
d. * DAUGHTER
e. ✓ NEW
f. ✓ BICYCLE

► Sentential *only* is adjoined to the clausal spine (here, *v*P) whereas constituent *only* is adjoined to a subclausal phrase (here, DP). In both cases, *only* then can associate with any focused constituent in its sister or with the entire sister.

(93) ***The c-command requirement*** **on association with focus:** (Jackendoff, 1972; Rooth, 1985; Tancredi, 1990; Aoun and Li, 1993; McCawley, 1996; Bayer, 1996; Erlewine, 2014: a.o.)
A focus particle must c-command its associate.

- Alternative Semantics (25) and the simple definitions for focus particles above (27–29) explain the c-command requirement for sentential particles.[9]
- In many languages, the c-command requirement on focus association is less clearly enforced for *even* and *also* as compared to *only*. Erlewine (2014) suggests a semantic basis for this contrast.

Whether a particular focus particle is a sentential or constituent particle is not always immediately obvious. In addition to differences in placement and association patterns (the preceding examples), relevant considerations include:

§3.1.1 differences in scope-taking
§3.1.2 patterns of multiple focus association

[9] We discuss the analysis of constituent particles in §3.2. Deriving the c-command requirement in those cases is unfortunately not as straightforward.

3.1.1 Differences in scope-taking behavior

As noted by Taglicht (1984), Rooth (1985), and others, sentential *only* always takes surface scope,[10] but constituent *only* introduces scope ambiguities:

(94) **Sentential *only*:**

a. I knew (that) he had **only** learnt [Spanish]$_F$. knew > only

b. I **only** knew (that) he had learnt [Spanish]$_F$. only > knew

(95) a. We are required to **only** study [syntax]$_F$. required > only

b. We are **only** required to study [syntax]$_F$. only > required

(96) **Constituent *only*:**

I knew (that) he had learnt [*only* [Spanish]$_F$] (Taglicht, 1984: 150)

a. knew > *only*:
I knew he *hadn't* learnt any other language.

b. *only* > knew:
I *didn't* know he had learnt any other language.

(97) We are required to study [*only* [syntax]$_F$]. (Rooth, 1985: 90)

a. required > *only*:
We are required to *not* study {semantics, phonology,...}.
$\Longleftrightarrow$ we are not allowed to study {semantics, phonology,...}.

b. *only* > required:
We are *not* required to not study {semantics, phonology,...}.

- ► Sentential focus particles can be modeled using the one-place semantic operator meanings as in (27–29) above or similar. This immediately predicts sentential focus particles take scope where they are pronounced.
- • The analysis of constituent focus particles is more complicated. We return to the analysis of constituent *only* scope in section 3.2.3.

[10] Except in environments where negation systematically takes non-surface scope with respect to certain modals. Sentential *only* patterns with negation in these cases. For example, "John can *only* speak [Spanish]$_F$" = "John cannot speak other languages" (not > can).

3.1.2 Multiple focus association

In addition to associating with one focused phrase, focus particles can also associate with *multiple foci* as long as they all satisfy the c-command requirement.[11] Consider the following:

(98) **Multiple focus with English sentential and constituent *only*:**
Some people asked some others to be quiet. Do you know who asked who to be quiet?
a. ✓I *only* saw [the children]$_F$ ask [the adults]$_F$ to be quiet.
b. *I saw *only* [the children]$_F$ ask [the adults]$_F$ to be quiet.
c. *I saw [the children]$_F$ ask *only* [the adults]$_F$ to be quiet.

(99) a. **Only* [the children]$_F$ asked [the adults]$_F$ to be quiet.
b. *[The children]$_F$ *only* asked [the adults]$_F$ to be quiet.

(100) ✓It was *only* [the children]$_F$ that asked [the adults]$_F$ to be quiet. cf. (102) below

(101) ✓I heard *only* (the rumor) that [the children]$_F$ asked [the adults]$_F$ to be quiet.

- These patterns suggest that pre-subject *only* is a constituent *only* (99), *it's only* clefts involve sentential *only* (100), and constituent *only* can adjoin to complement clauses (101).

Aside: Multiple association patterns can also be important clues regarding the syntax/semantics of other (non-particle) focus constructions.

(102) **English multiple focus cleft:** (Ball and Prince, 1977)
It isn't *John* that shot *Mary*... it's *Mary* that shot *John*!

Such examples teach us that it is *not* simply the case that English *it*-clefts express exhaustivity with respect to the "pivot" (the moved/clefted constituent) and presuppose all the content of the "background clause." See Hedberg 2013 for additional examples and discussion.

Compare this to another exhaustive focus construction, the pseudocleft:

(103) **English pseudocleft does not allow multiple focus use:** (Ball and Prince, 1977)
* The one who shot *Mary* isn't *John*... the one who shot *John* is *Mary*!

[11] Such configurations have also been called "complex focus" (Krifka, 1991) or "pair focus" (Surányi, 2011).

3.2 The analysis of constituent focus particles

- The analysis of sentential focus particles is relatively straightforward:
  - They adjoin to the clausal spine (semantically, of propositional type) and can be interpreted using the one-place semantic operators as in (27–29).
  - This predicts (generally correctly) that sentential particles can associate with anything in their c-command domain (§3.1) and take scope where pronounced (§3.1.1).
- In contrast, **the syntax/semantics of constituent focus particles is more challenging.** There are broadly two approaches:

§3.2.1 The quantificational particle theory

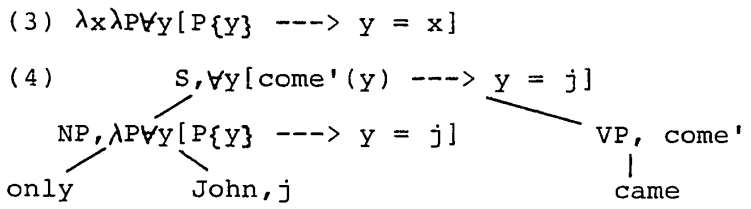
§3.2.2 The operator–particle theory

3.2.1 The quantificational particle theory

▶ The focus particle and its sister (i.e. *focus particle phrase*) together behave as a quantifier.

Rooth (1985) sketches the following proposal for constituent *only*:

(104) From Rooth 1985: 28:



(105) **A two-place *only*, with types:**
$[\![\text{only}]\!]_{\langle e,\langle\langle e,t\rangle,t\rangle\rangle} = \lambda x_e \,.\, \lambda P_{\langle e,t\rangle} \,.\, \forall y \in \mathit{Alt}\,[P(y) \rightarrow y = x]$
where *Alt* is a set of alternatives of type e. Implicitly, $\mathit{Alt} = D_e$ in (104).

A couple notes:

1. The prejacent presupposition is not illustrated here. It would be $P(x)$.
2. The semantic type of an *only*-phrase (*only* and its sister) is type $\langle\langle e,t\rangle,t\rangle$, the type of quantificational DPs. We predict that *only* might be able to participate in scope ambiguities in the way that quantifiers can, via *Quantifier Raising* (QR).

This is a good first approximation of constituent *only*, but requires (at least) two refinements:

1. (105) works when *only*'s sister is the F-marked constituent. But it's not sensitive to the placement of F-marking *within* the sister of *only*.

(106) **The choice of focus within the sister of *only* matters too:**

a. [Only [$_{DP}$ [Mary]$_F$'s son]] likes John.

b. [Only [$_{DP}$ Mary's [son]$_F$]] likes John.

2. A further problem is that the analyses above require the sister of *only* to be type e.
   - Something would have to change if we wanted to take a DP of type $\langle\langle e,t\rangle,t\rangle$.
   - Something would have to change if we wanted to take a PP of type ???.

These two points are concretely addressed in Wagner 2006a and Erlewine and Kotek 2018.

3.2.2 The operator–particle theory

► The focus particle itself is semantically inert, but reflects the presence of a corresponding *operator* nearby. The operator has the semantics of a sentential focus particle.

(107) Alex$_i$ **OP$_{only}$** [$_{vP}$ t_i made [**PRT$_{only}$** [sandwiches]$_F$] for Brie]

a. Pronouncing the operator:
Alex **only** made [sandwiches]$_F$ for Brie. (sentential *only*)

b. Pronouncing the operator:
Alex made **only** [sandwiches]$_F$ for Brie. (constituent *only*)

But they cannot be pronounced together in English.

► The plausibility of the operator–particle theory receives support from languages where the operator and particle can both be overtly pronounced. This is called *focus particle concord* (see Yip 2026 for a review).

(108) **Vietnamese 'only' concord:** (Erlewine, 2017: 331)

a. Nam **chỉ** mua [cuốn sách]$_F$.

b. Nam mua **mỗi** [cuốn sách]$_F$.

c. Nam **chỉ** mua **mỗi** [cuốn sách]$_F$.
Nam OP$_{only}$ buy PRT$_{only}$ CL book
'Nam only bought [the book]$_F$.' (a = b = c)

► The cooccurrence of *chỉ* and *mỗi* in (108), in a concord-like relationship, supports their analysis as an operator–particle pair.

The particle (phrase) and operator must establish some syntactic relationship:

- Hirsch 2017; Branan and Erlewine 2023: The particle must Agree with its corresponding operator. Assume the operator must c-command the particle.
- Lee 2004; Erlewine and Kotek 2018: The particle phrase (covertly) moves to the operator.

  This would explain particles which are not allowed to be separated from their corresponding operator position by syntactic islands, as in Premodern Japanese, Okinawan, and Sinhala (see e.g. Hagstrom, 1998), Imbabura Quechua (Hermon, 1984), Tlingit (Cable, 2010), and Tundra Yukaghir (Matić, 2014).[12]

Support for the idea that the operator and particle Agree comes from Lavukaleve. Constituent particles in Lavukaleve inflect for the ϕ-features of their host/sister, and an optional sentence-final focus marker — which we take to be the operator — also reflects these ϕ-features:

(109) **Lavukaleve** (Terrill, 2003: 277)

a. [Aira la]$_F$ **feo** fo'sal na aua **heo**.
woman(f) ART.SGF PRT.3SGF fish(m) ART.SGM ate.AGR OP.3SGF
'[The woman]$_F$ ate a fish.'

b. Aira la [fo'sal na]$_F$ **fin** oum **hin**.
woman(f) ART.SGF fish(m) ART.SGM PRT.3SGM ate.AGR OP.3SGM
'The woman ate [a fish]$_F$.'

3.2.3 Explaining the scope of constituent *only*

Recall from §3.1.1 that constituent *only* can introduce scope ambiguities.

(110) I knew (that) he had learnt [*only* [Spanish]$_F$]. =(96) (Taglicht, 1984: 150)

a. knew > only:
I knew he *hadn't* learnt any other language.

b. only > knew:
I *didn't* know he had learnt any other language.

Such scope differences are in principle compatible with both approaches to the analysis of constituent focus particles.

[12] See also Rochemont 2018 for a different version of the movement theory, which suggests that the particle alone moves to the operator's position. Strictly speaking, Rochemont's theory is not an operator–particle theory, but it does lead to similar predictions that the path between corresponding sentential and constituent particles should be island-sensitive.

- On the quantificational particle approach (§3.2.1):

  Constituent *only*-phrases take scope via QR, so it is unsurprising that they may lead to scope ambiguities... But *only* in (96/110) quite naturally takes wide scope in a higher finite clause, which may be surprising on the QR view (cf. e.g. Wurmbrand 2018).

- On the operator–particle approach (§3.2.2):

  The constituent particle does not take scope; the corresponding covert ONLY operator can be adjoined at different heights:

  (111) a. I OP_{only} knew [(that) he had learnt [PRT_{only} [Spanish]$_{\text{F}}$]] only > know

  b. I knew [(that) he had OP_{only} learnt [PRT_{only} [Spanish]$_{\text{F}}$]] know > only

  Pronunciation of PRT in (111a,b) leads to the scope ambiguity in (110). Pronunciation of OP in (111a,b) leads to the scopally transparent sentential *only* examples in (94) above.

English pre-subject *only*:

The ambiguities above in §3.1.1 (and other examples given by Taglicht and Rooth) all have an *only*-phrase in non-subject position. Bayer (1996: 59–61) notes that *only* on subjects of finite clauses do not lead to these types of ambiguities, and instead only have surface scope.

(112) ***Only* on subjects of finite clause embeddings do not take wide scope:**
They believe [(that) only [John]$_{\text{F}}$ is stupid].

a. ✓believe > only:
They believe that {Mary, Sue,...} are *not* stupid.

b. *only > believe:
They do not believe that {Mary, Sue,...} are stupid.

Note that this is not a general requirement for pre-subject *only* to take surface scope. *Only* on subjects of nonfinite clauses (ECM embeddings and small clauses) can/must take wide scope:

(113) ***Only* on nonfinite subjects can take wide scope (Bayer, 1996: 60):**

a. They find [$_{\text{SC}}$ only [John]$_{\text{F}}$ stupid].

b. They believe [$_{\text{TP}}$ only [John]$_{\text{F}}$ to be stupid].

Bayer (1996) attributes this difference between finite subjects (112) and nonfinite subjects (113) to the Empty Category Principle, a syntactic rule governing the movement of some subjects.

3.2.4 Interactions with ellipsis

Consider how quantifiers and focus association interact with (VP) ellipsis:

- Quantificational noun phrases can scope out of ellipsis sites (see e.g. Sag, 1976; Fox, 2000), as on the salient readings of the following examples:

  (114) a. The duke may marry most commoners. The prince may Δ, too. (✓most > may)
  b. A boy is standing in front of every building. A girl is Δ, too. (✓every > a)

- Sentential focus particles cannot associate with elided material (see e.g. Beaver and Clark, 2008: 177ff; exx from Stockwell 2020: 235):

  (115) a. *John *only* eats [cheese]$_F$. Bill *only* does Δ, too. (Δ = <eat [cheese]$_F$>)
  b. John *only* eats [cheese]$_F$. Bill does Δ, too. (Δ = <only eat [cheese]$_F$>)

Bassi, Hirsch, and Trinh 2022: The two approaches to constituent particles make **different predictions with respect to ellipsis:**

- On the quantificational particle approach (§3.2.1):

  (116) Alex made [*only*$_{\text{quantifier}}$ [sandwiches]$_F$] for Brie.

  We expect *only* to be able to scope out of ellipsis sites, just like true quantifiers (114).

- On the operator–particle approach (§3.2.2):

  (117) Alex ONLY$_{\text{unpronounced}}$ made [*only*$_{\text{inert}}$ [sandwiches]$_F$] for Brie.

  We expect *only* scoping out of an ellipsis site to be ungrammatical, as this should involve the corresponding operator ONLY attempting to associate with an elided focus as in (115).

As a baseline, note that example (118) is scopally ambiguous, in line with the scope-ambiguity of English constituent *only* in object position, observed above (§3.1.1). Then consider (119).

(118) Jill may bring only wine. (Bassi et al., 2022: 816)
  a. may > only: Jill is allowed to only bring wine (i.e., allowed to not bring anything else)
  b. only > may: Jill is only allowed to bring wine (i.e., not allowed to bring anything else)

(119) Jill may bring only wine. Bill may Δ, too.[13] (ibid.)
  a. ✓may > only: Bill is allowed to only bring wine.
  b. *only > may: Jill is not allowed to bring anything other than wine.

[13] The additive *too* associates with the subject *Bill*, which contrasts with *Jill*. The observed restriction on the scope of *only* under ellipsis here does not depend on the presence of an additive:

(i) I would like to know if guests may bring only wine. Yes, they may. ⇒ may > only

► This contrast supports the operator–particle approach for English constituent *only*.

Interestingly, this appears to be a point of cross-linguistic variation:

(120) **Thai constituent 'only' *khee*:** (Yip and Manowang, 2026)

Thim daj ?aaw *khee* [wine]$_F$ maa. Nit daj Δ duaj.
Tim can take only wine come Nit can also

literally: 'Tim can bring only wine. Nit can Δ, too.'

Felicitous in both contexts:

a. can > only: This is Tim and Nit's graduation and everyone should bring two kinds of alcohols to celebrate. Tim and Nit, as the ones who graduate, are not subject to this requirement. They may bring whatever they wants, such as just wine.
b. only > can: Tim and Nit are going to a wine tasting event where everyone is allowed to bring wine but not other type of alcohol.

► Survival of the wide scope reading (context (a)) under ellipsis suggests that Thai *khee* is a quantificational particle 'only', unlike English constituent *only*.

Yip (2026) reports that the wide scope reading of object constituent 'only' survives VP ellipsis in Yoruba and Akan (supporting the quantificational particle approach, as for Thai), but not in Vietnamese (supporting the operator–particle approach, as for English).

3.3 Anti-pied-piping (Branan and Erlewine, 2023)

Some languages allow for a somewhat systematic set of exceptions to the c-command requirement. Consider Japanese *mo* 'also' in (121):

(121) **Japanese *mo* inside its focus associate:** (based on Kuroda, 1965: 81)

[[Musuko]$_{MSF}$-**mo** daigaku-ni hairi]$_F$, [[musume]$_{MSF}$-**mo** yome-ni it]$_F$-ta.
son-also college-DAT enter daughter-also bride-DAT go -PAST

'[The son entered college]$_F$ and [the daughter got married]$_F$, too.'

► Kenyon Branan and I dub this pattern *"anti-pied-piping"* and identify (versions of) it in over 60 different languages.

- In the schema in (122), MSF is the **m**orpho**s**yntactic response to **f**ocus, which in (121) is where the focus particle *mo* adjoins.

(122) **Anti-pied-piping**



A few more predicate (VP) focus examples:

(123) **Ishkashimi** (Karvovskaya, 2013: 81)
Salima [kulča]$_{MSF}$ **-məs** pacu.
Salima kulcha -also bake
a. 'Salima also bakes [kulcha]$_F$.'
b. 'Salima also [bakes kulcha]$_F$.'

(124) **Dagbani** (Fiedler and Schwarz, 2005: 9)
ɔ̀ bɔ̀l **lá** [George]$_{MSF}$.
3sg call PRT George
a. 'She called [George]$_F$.'
b. 'She [called George]$_F$.'

(125) **Tibetan**
Kunga's a very good person. She prays at the temple every day.
Kun.dga' khyi-la-{ˇ**yang**} kha.lag-{ˀ**yang**} sprad-gi-'dug.
Kunga dog-DAT -also food -also give-IMPF-AUX
'Kunga also [gives food to dogs]$_F$.'

A few sentence (vP/TP) focus examples:

(126) **Ishkashimi** (Karvovskaya, 2013: 82)
[Wai mol]$_{MSF}$**-məs** xi dusto-i zənayu isu.
DEM husband-also REFL hands-ACC wash come
a. '[Her husband]$_F$ goes to wash his hands, too.'
b. '[Her husband goes to wash his hands]$_F$, too.'

(127) **Ewe** (Ameka, 2010: 151)
[ɖeví-á-wó]$_{MSF}$**-é** gba ze-a.
child-DEF-PL-PRT break pot-DEF
'[The children broke the pot]$_F$.'

(128) **Konkomba** (Schwarz, 2007: 23, 24)
[Àjúá]$_{MSF}$ **lé** !ŋmán ŋítùùn.
Ajua FM chew beans
a. '[Ajua]$_F$ ate beans.'
b. '[Ajua ate beans]$_F$.'

English also exhibits sentence focus with anti-pied-piping:

(129) **English**
a. The judge **only** sent you to prison; your wife didn't leave you too.
'It's only the case that [the judge sent you to prison]$_F$...' (McCawley, 1970: 296)
b. The results of today's games will be remarkable: Harvard will **even** beat Loyola.
'...it's even the case that [Harvard will beat Loyola]$_F$.' (Jackendoff, 1972: 248)

- Following McCawley 1970, we can think of *only* and *even* in (129) as associating with its sister vP, with the subject reconstructed into its vP-internal base position.
- However, this cannot be the general explanation for anti-pied-piping: anti-pied-piping is not always the result of some material moving out of the surface sister of a particle.

- In summary, **anti-pied-piping is cross-linguistically well attested**[14] and **exhibits certain cross-linguistic generalizations:**
  - In sentence focus examples ($\approx$ *v*P or TP focus), MSF targets the subject.
  - In predicate focus examples ($\approx$ VP focus), MSF targets the (leftmost) object.
  - More generally, **MSF often targets the *leftmost* part of the focus:** compare the Ishkashimi (123) vs (126), and see also the Tibetan ditransitive in (125).[15]
  - Targets of focus movement is also subject to anti-pied-piping (not shown here).
- Focus particles with anti-pied-piping **require the operator–particle theory (§3.2.2):** the pronounced particle is itself semantically inert (PRT), indicating the presence of a covert operator (OP) nearby. See Branan and Erlewine 2023 for details.

4 The nature of alternatives

4.1 Review

Let's start by reviewing the basic ideas of Alternative Semantics, based roughly on Rooth 1985.

- In addition to the ordinary semantic value of syntactic object α, $[\![\alpha]\!]^{o}$, we can recursively compute an alternative set (focus semantic value) $[\![\alpha]\!]^{alt}$.
- If α does not contain focus (F-mark), $[\![\alpha]\!]^{alt} = \{[\![\alpha]\!]^{o}\}$
- If α contains focus, $[\![\alpha]\!]^{alt}$ will be a set that contains $[\![\alpha]\!]^{o}$ and other meanings of roughly the same size and shape, with variation in the position of focus.

Two objects and their denotations, based on (24):

(24a′) $[\![\text{Mary buy [the sandwich]}_F]\!]^{o} = {}^{\wedge}\text{Mary buy the sandwich}$ (prejacent)

$$[\![\text{Mary buy [the sandwich]}_F]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{Mary buy the sandwich,} \\ {}^{\wedge}\text{Mary buy the pizza,} \\ {}^{\wedge}\text{Mary buy the salad,...} \end{array} \right\}$$

(24b′) $[\![\text{Mary [buy]}_F \text{ the sandwich}]\!]^{o} = {}^{\wedge}\text{Mary buy the sandwich}$

$$[\![\text{Mary [buy]}_F \text{ the sandwich}]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{Mary buy the sandwich,} \\ {}^{\wedge}\text{Mary eat the sandwich,} \\ {}^{\wedge}\text{Mary sell the sandwich,...} \end{array} \right\}$$

- Focus particles like *only* make reference to a set of alternatives. Assume for the moment that this is the alternative set for *only*'s sister: $Alt = [\![v\text{P}]\!]^{alt}$.

[14] Following Branan and Erlewine 2023, anti-pied-piping has also been documented in Pintupi-Luritja (Pama-Nyungan; Gray 2024), Kasem and Kusaal (Mabia) and Yoruba (Aremu, 2025), Kalaallisut (Inuit; Mikkelsen et al. 2026), Guébie (Kru; Sande et al. 2026).

[15] We additionally show that this determination of "leftmost" has a tendency to skip material such as pronouns and indefinites, which tend to avoid stress in pitch accent languages (see (15)).

(130) **Simplified structures for (24a,b), ignoring subject movement and tense:**

a. "Mary only bought [the sandwich]$_{\text{F}}$"
$[\![\text{only } [_{v\text{P}} \text{ Mary buy [the sandwich]}_{\text{F}}]]\!]^{\text{o}}$
= 1 iff Mary didn't buy the pizza, the salad, etc.
$\rightsquigarrow$ presupposition: Mary bought the sandwich

b. "Mary only [bought]$_{\text{F}}$ the sandwich"
$[\![\text{only } [_{v\text{P}} \text{ Mary [buy]}_{\text{F}} \text{ the sandwich}]]\!]^{\text{o}}$
= 1 iff Mary didn't eat the sandwich, sell the sandwich, etc.
$\rightsquigarrow$ presupposition: Mary bought the sandwich

► Today: How do we determine the the set of alternatives to quantify over?

4.2 Restricting focus sensitivity

But first: what makes focus-sensitive meanings special? Note that the vast majority of lexical items are not sensitive to focus. That is:

- The ordinary semantic value $\left[\!\!\left[\begin{array}{c} \diagup\diagdown \\ \beta \quad \gamma \end{array} \right]\!\!\right]^{\text{o}}$ is determined based solely on $[\![\beta]\!]^{\text{o}}$ and $[\![\gamma]\!]^{\text{o}}$, using the appropriate composition rule such as Functional Application.
- In contrast, $\left[\!\!\left[\begin{array}{c} \diagup\diagdown \\ \text{OP} \quad \alpha \end{array} \right]\!\!\right]^{\text{o}}$ where OP is a sentential (one-place) focus particle (e.g. *only*/*even*/*also*) appears to depend both on $[\![\alpha]\!]^{\text{o}}$ and $[\![\alpha]\!]^{\text{alt}}$. Then we can't simply rely on a basic composition rule such as Functional Application.

We could explicitly put this in the lexicon, making (sentential) focus particles *syncategorematic* (i.e. lexically specifying a non-standard mode of compositional interpretation):

(131) $\left[\!\!\left[\begin{array}{c} \diagup\diagdown \\ \textit{only} \quad \alpha \end{array} \right]\!\!\right]^{\text{o}} = \lambda w \;.\; \forall q \in [\![\alpha]\!]^{\text{alt}} \left([\![\alpha]\!]^{\text{o}} \not\Rightarrow q \rightarrow \neg q(w)\right)$
$\rightsquigarrow$ presupposition: $[\![\alpha]\!]^{\text{o}}(w)$ is true

Rooth 1992 suggests making the reference to focus / alternative sets indirect, in two steps:

1. Focus particle meanings make reference to a free, contextually-determined variable (*Alt* here but often C in this literature).
2. There is just one operator in the grammar that can make reference to alternative sets with a syncategorematic rule: the *focus interpretation operator* $\sim$, aka "squiggle":[16]

[16] Rooth (1992) proposes that the $\sim$ additionally presupposes that (i) the alternative set contains the ordinary value / prejacent ($[\![\alpha]\!]^{\text{o}} \in [\![\alpha]\!]^{\text{alt}}$) and (ii) the alternative set also contains an alternative distinct from the ordinary value (in other words, $[\![\alpha]\!]^{\text{alt}}$ should not be a singleton set). Rooth (1992) suggests that $\sim$ also has other uses, such as for enforcing question–answer congruence.

(132) $\left[\!\left[\begin{array}{c} \sim Alt \quad \alpha \end{array} \right]\!\right]^{o} = [\![\alpha]\!]^{o}$

$\rightsquigarrow$ presupposition: $Alt \subseteq [\![\alpha]\!]^{alt}$

This allows us to write meanings for focus particles, which lexically make reference to *Alt*, but otherwise can compose normally. (See the one-place denotations for *only* / *even* / *also* from the previous days.)

However, the syntactic placement of $\sim$ is underdetermined!! Consider (133):

(133) Mary will only not buy [the sandwich]$_F$.

Again, ignoring subject movement and tense, and without $\sim$:

a. [① only [② not [③ Mary buy [the sandwich]$_F$]]]

b. the prejacent of *only* is $[\![②]\!]^{o}$ = ^Mary doesn't buy the sandwich

c. ✓let [$\sim$ *Alt*] adjoin to ②, just below *only*:

$$Alt \subseteq [\![②]\!]^{alt} = \left\{ \begin{array}{l} \text{^Mary doesn't buy the sandwich,} \\ \text{^Mary doesn't buy the pizza,} \\ \text{^Mary doesn't buy the salad,...} \end{array} \right\}$$

$[\![①]\!]^{o}$ = 1 iff Mary buys the pizza and the salad and...

$\rightsquigarrow$ presupposition: Mary doesn't buy the sandwich

d. **let [$\sim$ *Alt*] adjoin to ③, below *not*:

$$Alt \subseteq [\![③]\!]^{alt} = \left\{ \begin{array}{l} \text{^Mary buy the sandwich,} \\ \text{^Mary buy the pizza,} \\ \text{^Mary buy the salad,...} \end{array} \right\}$$

Notice that all of the alternatives in *Alt* are not entailed by the prejacent *Mary doesn't buy the sandwich*. Therefore:

$[\![①]\!]^{o}$ = 1 iff M doesn't buy anything — the sandwich / the pizza / the salad / etc.!

Therefore, to really make the Rooth 1992 theory work (and avoid syncategorematic lexical entries like (131), focus-sensitive operators must be lexically special in at least *two* ways:

1. Semantically, they make reference to a contextually-determined set of alternatives.
2. Syntactically, they enforce the presence of a $\sim$ adjoined to its sister.
3. (The variable in step 1 has to be the one that is restricted by $\sim$ in step 2!)

4.3 Alternatives as semantic objects

Here again is the recursive definition of alternative sets:

(134) **A recursive procedure for computing alternative sets:** =(26)

If α (type τ) is F-marked: $[\![\alpha]\!]^{alt}$ = a subset of D_τ.

If α is not F-marked:

$$[\![\alpha]\!]^{\text{alt}} = \begin{cases} \{[\![\alpha]\!]^{o}\} & \text{if terminal node} \\ \left\{ b \circ g : b \in [\![\beta]\!]^{\text{alt}}, g \in [\![\gamma]\!]^{\text{alt}} \right\} & \text{if } \alpha \text{ has daughters } \beta, \gamma \end{cases}$$

where $\circ$ is the relevant composition rule, e.g. Functional Application.

In the classic Roothian Alternative Semantics framework (e.g. Rooth, 1985, 1992):

1. Focus alternatives are (merely) semantic objects.
2. If $[\![\alpha]\!]^{\text{alt}}$ is type τ, $[\![\alpha]\!]^{\text{alt}} = D_\tau$: the whole domain of possible meanings of type τ.
3. *Alt* is a subset of the alternative set: $Alt \subseteq [\![\alpha]\!]^{\text{alt}}$, enforced by $\sim$ (Rooth, 1992).

4.3.1 A note on inflectional features

On the view that focus alternatives are semantic objects, it is unsurprising that alternatives (if written as sentences) do not need to be consistent in inflectional features:

(135) They only know that $[\text{you}]_{\text{F}}$ are in class.

$$[\![\text{they know that } [\text{you}]_{\text{F}} \text{ are in class}]\!]^{\text{alt}} = \left\{ \begin{array}{l} \text{^they know that you are in class,} \\ \text{^they know that I } \underline{\text{am}} \text{ in class,} \\ \text{^they know that John } \underline{\text{is}} \text{ is in class, ...} \end{array} \right\}$$

This might seem like a silly point. But it is relevant for less obvious facts like the availability of the "bound" interpretation of *you* in (136):

(136) Only $[\text{I}]_{\text{F}}$ brushed my teeth. (based on Kratzer, 1998, 2009: 202)

a. $\Rightarrow$ John/Mary/you did not brush my teeth

b. $\Rightarrow$ John did not brush John's teeth, Mary did not brush Mary's teeth, you did not brush your teeth, etc. ("fake indexical" reading)

- Note that this is a pre-subject *only*, which can only associate with the subject, not the subject and something lower down (see §3.1.2). We therefore cannot analyze (136b) as a multiple focus structure, with F-marking on both *I* and *my*.

► The pronoun *my* in (136b) must be a bound pronoun, not strictly referring to the speaker.

(137) $[_{\text{TP}}$ [only $[\text{I}]_{\text{F}}$] [λ_7 PAST $[_{v\text{P}}$ t_7 brush [pro_7's teeth]]]] (based on Kratzer, 1998: 94)

pro_7 (genitive) in the surface structure is then pronounced "my" because 7 = addressee in the prejacent. The fact that *pro* would have different φ-features in the alternatives, if we try to pronounce them, is irrelevant.

See Kratzer 2009, Bassi 2021, and others for further details.

4.3.2 A note on presuppositions

Singular definites are commonly described as introducing two presuppositions:

(138) the Dutch professor
  a. existence: $\rightsquigarrow$ a Dutch professor exists (in the context)
  b. uniqueness: $\rightsquigarrow$ there is exactly one Dutch professor (in the context)

Now consider following example from von Heusinger 2007, in the contexts below:

(139) Sam only talked to the $[\text{Dutch}]_F$ professor. (von Heusinger, 2007: 487)

- We predict the alternatives to include one which includes ⟦the German professor⟧:
  $[\![\text{Sam talk to the } [\text{Dutch}]_F \text{ professor}]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{Sam talk to the Dutch professor,} \\ {}^{\wedge}\text{Sam talk to the German professor,...} \end{array} \right\}$

But consider (139) in the following contexts:

(139′) Sam only talked to the $[\text{Dutch}]_F$ professor.
  A. There is one Dutch professor and one German professor. Sam talked to the Dutch professor but not to the German professor. *true*
  B. There is one Dutch professor and three German professors. Sam talked to the Dutch professor but not to any of the German professors. *true*
  C. There is one Dutch professor and three German professor. Sam talked to the Dutch professor and one of the three German professors. *false*

- As von Heusinger (2007) notes, (139) seems to be felicitous in the B/C contexts, and hence does *not* come presuppose that there is a unique German professor.

- One possibility is that (certain) presuppositions that are predicted to be part of the meaning of focus alternatives can be ignored.
  - See Walker 2012 for arguments that so-called "soft" presuppositions of alternatives do not project (are somehow ignored) but "hard" presuppositions project.
  - This could be useful for the fake indexicals data above (136), if we treat φ-features on pronouns as presuppositions (see e.g. Heim and Kratzer 1998, Sudo 2012).

- Alternatively (to my knowledge not discussed), perhaps alternatives of "the $[\text{Dutch}]_F$ professor" are underspecified for number (singular/plural), and we take advantage of the insensitivity to inflectional feature mismatches within alternatives (§4.3.1).
  - But this approach doesn't extend to Walker's (2012) data with other soft presupposition triggers (e.g. *stop*).

4.3.3 Unnatural alternatives

Consider again the case where the verb is focused, as in (24b):

(24b) Anne only $[\text{saw}]_{\text{F}}$ Bob.

- We assume there is F-marking narrowly on the verb, *see*. (Ignore tense morphology.)
- $[\![\text{see}]\!]^{\text{o}} = \lambda x \,.\, \lambda y \,.\, \text{see}(y, x)$; type $\langle e, \langle e, t\rangle\rangle$.[17]

(140) $[\![\text{see}]\!]^{\text{alt}} = D_{\langle e,\langle e,t\rangle\rangle}$. This will include:

a. $\lambda x \,.\, \lambda y \,.\, \text{see}(y, x)$, $\lambda x \,.\, \lambda y \,.\, \text{hit}(y, x)$, $\lambda x \,.\, \lambda y \,.\, \text{praise}(y, x)$, ...

b. $\lambda x \,.\, \lambda y \,.\, \text{smile.at}(y, x)$, $\lambda x \,.\, \lambda y \,.\, \text{talk.to}(y, x)$, ... (prepositional)

c. $\lambda x \,.\, \lambda y \,.\, \text{buy}(y, x)$, $\lambda x \,.\, \lambda y \,.\, \text{sell}(y, x)$, ... (semantically inappropriate)

d. $\lambda x \,.\, \lambda y \,.\, 1$ iff y tells x to come to class, ... (complex)

e. $\lambda x \,.\, \lambda y \,.\, \text{see}(x, y)$, ...

f. $\lambda x \,.\, \lambda y \,.\, \text{run}(y)$, $\lambda x \,.\, \lambda y \,.\, \text{run}(x)$, ... (ignores the object/subject!)

g. $\lambda x \,.\, \lambda y \,.\, 1$ iff it is raining , ... (ignores both arguments!)

▶ The semantic domain $D_{\langle e,\langle e,t\rangle\rangle}$ is much bigger than the set of denotations of simple transitive verbs!

- Of course, *Alt* is merely a contextually relevant subset of the Roothian alternative set. Perhaps the unnatural alternatives are filtered out because they're not contextually relevant?
- Attempts to make unnatural alternatives contextually relevant are acceptable for some but not for others:

(141) Anne only $[\text{saw}]_{\text{F}}$ Bob...

a. ✓she didn't talk to him.

b. ✓she wasn't seen by him.

c. ✓she didn't tell him to come to class.

d. #she/he didn't run.

e. #it wasn't raining.

4.4 Alternatives as questions

▶ *Alt* may be a *Question Under Discussion* (Roberts, 1996) that exists in the discourse.

Questions are standardly analyzed as denoting a set of propositions, which correspond to unelided possible answers (Hamblin, 1973, a.o.).

[17] I give only extensional denotations here. The set of alternatives at vP will be intensionalized, hence a set of propositions of type $\langle s, t\rangle$.

(142) $[\![\text{who came to the party?}]\!] = \left\{ \begin{array}{l} {}^{\wedge}\text{Anne came...,} \\ {}^{\wedge}\text{Bob came...,} \\ {}^{\wedge}\text{Cara came..., ...} \end{array} \right\}$

- More specifically, Beaver and Clark (2008: 35) refers to the *Current Question* (CQ):

  "A question that is proffered and mutually accepted by the interlocutors as the most immediate goal of the discourse becomes the Current Question (henceforth the CQ)."

- Notice that we could then (maybe) eliminate the calculation of alternative sets ($[\![...]\!]^{alt}$).

This naturally explains the fact that explicit questions in preceding discourse can help determine the relevant set of alternatives. (More data of this form below, in (147).)

(143) a. *Which of his pets did Alex take to school?*
Alex only took [the turtle]$_F$to school
⇒ Alex did not take any other pets to school.

b. *Did Alex remember to take both the turtle and the soccer ball to school today (like he said he would)?*
Alex only took [the turtle]$_F$ to school.
(with accommodation of a formally related question)
Note: Maybe he also took his dog.

We would, however, then require an independent mechanism to enforce congruence between the position of focus and the relevant question:

(144) Alex only took [the turtle]$_F$ to school.
a. $^{\checkmark}Alt = CQ = [\![\text{Alex took what to school}]\!]$
b. $\#Alt = CQ = [\![\text{Alex took the turtle where}]\!]$

However, Kadmon and Sevi 2011 presents an argument against the view that focus alternatives are always QUDs (and especially the Current Question), also discussed in Roberts 2011 and Büring 2019.

(145) Kadmon and Sevi 2011: 7, as modified slightly in Roberts 2011: 41:
A: What's peculiar about Granny's dog?
B: She only barks at John, (who's the most unthreatening person I know).
H* !H* !H* L L%

The natural interpretation of *only* in (145) is as associating with [John]$_F$, even though there is no QUD of the form *Who does Granny's dog bark at?* (The same issue arises with Katz and Selkirk's (2011) *Manny* type examples (16), although they do not point out this connection.)

4.5 Contextual restriction (work in progress)

We now return to the determination of *Alt*, without assuming dependence on QUDs.

- Consider the following configuration:

  (146) OP [$_\alpha$ ... XP_F ...]

  where OP is a focus-sensitive operator and α is of propositional type ($\langle s,t\rangle$)

- Recall that in the widely adopted Rooth 1992 theory (§4.2):

  1. If $[\![\text{XP}]\!]^\text{o}$ is type τ, $[\![\text{XP}_\text{F}]\!]^\text{alt} = D_\tau$, the entire domain of meanings of type τ.
  2. The squiggle [$\sim$ *Alt*] adjoined to α, just below OP, ensures that $\mathit{Alt} \subseteq [\![\alpha]\!]^\text{alt}$.

► Where is the right place to implement contextual restriction? Is contextually determining $\mathit{Alt} \subseteq [\![\alpha]\!]^\text{alt}$ right? Should we (also) restrict the alternatives at the source, XP_F?

Recall the QUD-sensitivity of *Alex only took* [*the turtle*]$_F$ *to school* in (143) above, and similarly:

(147) a. *Which animal did Alex take to school?*

Alex only took [the turtle]$_\text{F}$ to school.

$$\mathit{Alt} = \left\{ \begin{array}{l} \text{^Alex took the turtle to school,} \\ \text{^Alex took the dog to school,} \\ \text{^Alex took the cat to school, ...} \end{array} \right\}$$

b. *Which of his prized possessions did Alex take to school?*

Alex only took [the turtle]$_\text{F}$ to school.

$$\mathit{Alt} = \left\{ \begin{array}{l} \text{^Alex took the turtle to school,} \\ \text{^Alex took the soccer ball to school,} \\ \text{^Alex took the trumpet to school, ...} \end{array} \right\}$$

Context restriction as in $\mathit{Alt} \subseteq [\![\alpha]\!]^\text{alt}$ could be guided by a QUD / salient propositions in a QUD.

How about context restriction at the source (XP_F)?

(148) Among (the) even numbers, only [2]$_\text{F}$ is prime.

(149) [Context: Carlo is a polyglot. In addition to his native Italian, he speaks various languages from different language families.]

a. Among Romance languages, he also speaks French.

b. Among Slavic languages, he (#also) speaks Polish.

► *Among* can specify/restrict the domain over which the focused value (*French*/*Polish*) varies across the alternatives.

(We could use *as for* in (149) as well, but *as for* as additional (contrastive topic) requirements, which *among* doesn't.)

- On the standard definition of $[\![...]\!]^{alt}$, for both (149a,b):

  $[\![\alpha]\!]^{alt} = \{$ ^Carlo speaks $x : x \in D_e$ $\}$

- In the end, it must be the case that *Alt* $=$

  (149a') $\left\{ \begin{array}{l} \text{^Carlo speaks French,} \\ \text{^Carlo speaks Italian,} \\ \text{^Carlo speaks Spanish, ...} \end{array} \right\}$ (149b') $\left\{ \begin{array}{l} \text{^Carlo speaks Polish,} \\ \text{^Carlo speaks Russian,} \\ \text{^Carlo speaks Czech, ...} \end{array} \right\}$

  ...so that we predict:

  - *Also* is felicitous in (149a) because a non-prejacent alternative in *Alt*, *Carlo speaks Italian*, is true.
  - *Also* is infelicitous in (149a) because there is no non-prejacent alternative in *Alt* which has been established as true.

    Notably, *Carlo speaks Italian*, which has been established in the context, cannot be in *Alt*, even though it is in $[\![\alpha]\!]^{alt}$. This must be due to the effect of *among*.

(See also: order of mention asymmetries as in Greenberg 2022)

► Contextual restriction with *among*-phrases cannot be implemented via contextual restriction over the whole set of propositional alternatives: *Alt* $\subseteq [\![\alpha]\!]^{alt}$.

(150) [Context: A game involves the numbers 1 through 10, organized into odds and evens. For the purposes of the game, players comment on which numbers of each class (odd vs even) they want.]

a. Among the evens, I only want $[2]_F$.

b. #Among the odds, I only want $[2]_F$.

Let *among* set a contextual variable $\mathcal{D}$. $\mathcal{D}$ and the *Alt* we want to end up with are as follows:

(150a') $\mathcal{D} = \{2, 4, 6, 8, 10\}$
$Alt = \left\{ \begin{array}{l} \text{^I want 2, ^I want 4,} \\ \text{^I want 6, ^I want 8,} \\ \text{^I want 10} \end{array} \right\}$

(150b') $\mathcal{D} = \{1, 3, 5, 7, 9\}$
$Alt = \left\{ \begin{array}{l} \text{^I want 1, ^I want 3,} \\ \text{^I want 5, ^I want 7,} \\ \text{^I want 9} \end{array} \right\}$

► Claim: It is not possible to use $\mathcal{D}$ to identify the intended subset *Alt* $\subseteq [\![\alpha]\!]^{alt} = \{$^I want x : $x \in D_e\}$.

- Intuitively, we want to constrain *Alt* such that there exists a property P which maps $\mathcal{D}$ into $[\![\alpha]\!]^{\text{alt}}$ and $Alt = P(\mathcal{D}) \equiv \{P(d) : d \in \mathcal{D}\}$.

  The problem is, there is also a property $P' = \lambda x \ .^{\wedge}$ I want $(x - 1)$ which maps $\mathcal{D} = \{1, 3, 5, 7, 9\}$ to $\left\{ \begin{array}{l} {}^{\wedge}\text{I want 2}, {}^{\wedge}\text{I want 4}, \\ {}^{\wedge}\text{I want 6}, {}^{\wedge}\text{I want 8}, \\ {}^{\wedge}\text{I want 10} \end{array} \right\}$.

  Hence we cannot simply consider $\mathcal{D}$ and $[\![\alpha]\!]^{\text{alt}}$ and restrict *Alt* to the desired subset.

- ▶ Therefore, we (probably) need two mechanisms of contextual restriction when computing focus alternative sets:

  1. $[\![\text{XP}_{\text{F}}]\!]^{\text{alt}} \subseteq D_{\tau}$ ← new here
     restricted by devices such as *among*
  2. $Alt \subseteq [\![\alpha]\!]^{\text{alt}}$ (Rooth, 1992)
     restricted by relevance / QUDs / etc.

4.6 Further topics

1. Structural alternatives:

   see e.g. Fox and Katzir 2011; Hirsch and Schwarz 2025

2. *Tanglewood*:

   see e.g. Kratzer 1991; Erlewine and Kotek 2018; Bassi and Longenbaugh 2020

3. The "resetting" of alternatives by focus particles and/or $\sim$:

   see Erlewine 2025 and citations there

5 Focus and *wh* alternatives

- There are deep affinities between the alternative sets of Alternative Semantics, developed for the analysis of focus, and the semantics of constituent questions.

- These parallels are not only conceptual; there are empirical phenomena such as so-called "focus intervention effects" which suggest that the two types of "alternatives" are actually the same semantic objects. See e.g. Beck 2006; Kotek 2019; Erlewine 2025.

- ▶ Today: As one concrete illustration of the productive interaction between Alternative Semantics for focus and *wh*-semantics, I present some of my work in progress on *wh*-quantification. (*see separate slides*)

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