Lectures on focus

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Contents

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1 The plan

- Topics in the syntax and semantics of focus and related phenomena.
  - The syntax of focus particles (e.g. *only*, *also*, *even*)
  - The compositional semantics of focus and focus particle meanings
  - The relationship of focus to questions, and of focus constructions to question constructions
- Highlighting many case studies from languages of (South) (East) Asia
- The study of focus raises architectural questions:
  - Semantics and prosody — mediated through F-marking?
  - Syntax and semantics — reference to "focus" features?
  - Semantics and pragmatics — how does focus relate to questions?

1. Introduction, Alternative Semantics, sentential vs constituent particles
2. Explaining patterns of association
3. Anti-pied-piping and the operator–particle theory
4. Scalar particle meanings
5. *Wh*-quantification
6. Focus and the architecture of grammar

2 Focus: An introduction

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

2.2 Focus particles

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

(9) Alex { only / even / also } took the TURTLE to school.

(10) Alex { only / even / also } took the turtle to SCHOOL.

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

(11) **Analyzing (9):**
The sentence without the particle: Alex took the TURTLE to school.
The *prejacent* sentence: Alex took the turtle to school.
Focused constituent: turtle
Contextual alternatives to "turtle": frog, 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 (9):

(12) *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

(13) *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"...

(14) *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*.

2.3 Focus and prosody

The relationship between the position of focus and the position of prosodic prominence is indirect. Jackendoff (1972) proposed that the focus is a constituent with the abstract feature F; also called *F-marking*. (We discuss F on Friday.)
We can determine the F-marked constituent through an utterance's semantics/pragmatics:

(15) *What did Mary eat this morning?*
Mary ate [a SANDWICH]$_{\text{F}}$.

(16) *What did Mary do this morning?*
Mary [ate a SANDWICH]$_{\text{F}}$.

(17) *Wait, what happened??*
[Mary ate a SANDWICH]$_{\text{F}}$!

(18) *Who ate a sandwich this morning?*
[MARY]$_{\text{F}}$ ate a sandwich.

► Notice that (15–17) can be pronounced identically, but vary in the logical position of focus. In contrast, the pitch accent in (18) 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 placement of the pitch accent within the focused constituent is complicated. In many cases, pitch accent goes on the rightmost word in the focus, explaining the pitch accents in (17–18). But indefinites and pronouns avoid pitch accents (Bresnan, 1971: 258):

  (19) *Wait, what happened??* [Mary ATE something]$_{\text{F}}$!

  Given material also seems to avoid focus; see Schwarzschild 1999; Wagner 2006b, 2012.
- 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 is instead indicated morphosyntactically; e.g. through the use of focus particles or movement, or by eliding/pronominalizing non-focused parts.

2.4 Alternative Semantics (Rooth, 1985, 1992)

What we want to capture is the following intuition:

(20) a. Mary *only* bought [the sandwich]$_F$.
$\forall x \in D_e$: Mary bought $x \rightarrow x =$ the sandwich

b. Mary *only* [bought]$_F$ 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 (20a–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.

(21) **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 $[\![\alpha]\!]^o$; and
b. *the alternative set* $[\![\alpha]\!]^{alt}$ (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 $[\![\alpha]\!]^f$ for $[\![\alpha]\!]^{alt}$.)

(20a′) $[\![\text{Mary bought [the sandwich]}_F]\!]^o = {}^\wedge\text{Mary bought the sandwich}$ (prejacent)

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

(20b′) $[\![\text{Mary [bought]}_F \text{ the sandwich}]\!]^o = {}^\wedge\text{Mary bought the sandwich}$

$$[\![\text{Mary [bought]}_F \text{ the sandwich}]\!]^{alt} = \left\{ \begin{array}{l} {}^\wedge\text{Mary bought the sandwich} \\ {}^\wedge\text{Mary ate the sandwich} \\ {}^\wedge\text{Mary sold the sandwich} \end{array} \right\}$$

(20′) $[\![\text{Mary [bought the sandwich]}_F]\!]^o =$

$$[\![\text{Mary [bought the sandwich]}_F]\!]^{alt} = \left\{ \quad \right\}$$

Alternative Semantics provides a recursive procedure for computing these alternative sets, sometimes called *"pointwise" composition*:

(22) **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, (22) 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.

(We return to these results later.)

(23) **A basic one-place, syncategorematic *only*:**

$$\left[\!\!\left[\begin{array}{c} \diagup\diagdown \\ \textit{only} \quad \alpha \end{array} \right]\!\!\right]^{\text{o}} = \lambda w \ . \ \forall q \in [\![\alpha]\!]^{\text{alt}} (q \neq [\![\alpha]\!]^{\text{o}} \rightarrow \neg q(w))$$

"All non-prejacent alternatives are false"

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

Aside: What *only* negates

To say that all non-prejacent alternatives are false in (23) will run into problems:

(24) 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.

Maybe we can claim that "breathe" or "live" are reasonably not properties that are relevant alternatives here. But this approach can't be taken in some other cases:

(25) *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.

► *Only* negates all alternatives that are not entailed by the prejacent. (*Only* negates everything that it can, without contradicting the prejacent.)

In (25), the prejacent "John has two kids" entails "John has one kid" so it is not negated.

The prejacent does not entail "John has three kids," so it is negated.

(Furthermore, see Fox 2007 for further concerns regarding negated alternatives.)

We can also use this basic approach to compute other focus particles, like *also* and *even*:

(26) $\left[\!\left[\begin{array}{c} \diagup\!\diagdown \\ \textit{also} \quad \alpha \end{array} \right]\!\right]^{o} = \lambda w \ . \ [\![\alpha]\!]^{o}(w)$

$\rightsquigarrow$ presupposition: $\exists q \in [\![\alpha]\!]^{alt} [q \neq [\![\alpha]\!]^{o} \wedge q(w)]$

"A non-prejacent alternative is true"

(27) $\left[\!\left[\begin{array}{c} \diagup\!\diagdown \\ \textit{even} \quad \alpha \end{array} \right]\!\right]^{o} = \lambda w \ . \ [\![\alpha]\!]^{o}(w)$

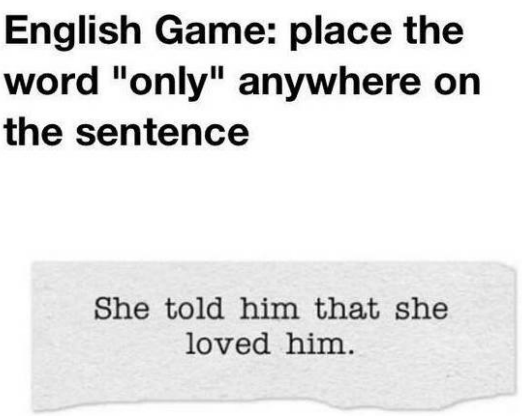
$\rightsquigarrow$ presupposition: $\forall q \in [\![\alpha]\!]^{alt} [q \neq [\![\alpha]\!]^{o} \rightarrow [\![\alpha]\!]^{o} <_{\textit{likely}} q]$

"The prejacent is less likely than its alternatives"

Also and *even* simply pass up their prejacents' at-issue content, introducing an additional not-at-issue requirement, here described as a presupposition.

3 The geometry of focus association

Here's a minor meme from the mid-2000's internet (tumblr):



(28) **Questions to ask in the focus particle game:**

a. Where can the focus particles go?

b. Where can its *focus associate* be?[1]

c. What scope can the focus particle take?

d. (And not a geometry question, but: What meaning does the focus particle contribute? Necessary to answer (c).)

[1] "Focus associate" here is a noun — the focused constituent that a focus particle "associates" with.

We'll start with questions (a) and (b).

3.1 Two English *only*s and the c-command requirement

English *only* comes in two types, which I call "sentential" and "constituent" (in analogy with sentential vs constituent negation):

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

Claims:

- *Only* is adjoined to the clausal spine (e.g. *v*P) in (a) but to a DP in (b).
- (29a) and (29b) are semantically equivalent. (But we discuss scope possibilities in §3.3.)

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: (Exx based on his ex 6.89–6.92)

(30) **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

(31) **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

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

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

► In English, both sentential and constituent *only* can associate with any focused constituent in its sister (or the entire sister).

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

The process of alternative computation (22) and definitions for focus particles above explain the c-command requirement, at least for sentential particles. (There are however some exceptions, as we discuss below.)

3.2 Two theories of constituent focus particles

There are broadly two approaches to the syntax/semantics of constituent focus particles:

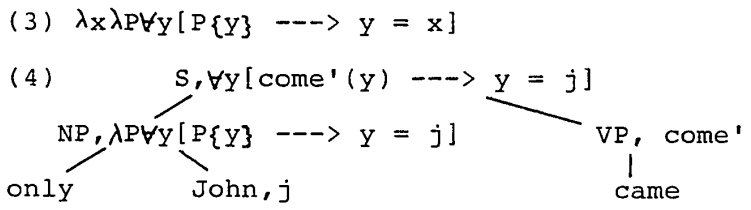
1. The quantificational particle theory
2. The operator–particle theory

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*:

(35) Rooth 1985: 28:



With types:

(36) **A two-place *only*:**
$[\![\text{only}]\!]_{\langle e,\langle\langle e,t\rangle,t\rangle\rangle} = \lambda x_e \,.\, \lambda P_{\langle e,t\rangle} \,.\, \forall y \in D_e\, [P(y) \rightarrow y = x]$

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 two refinements:

1. (36) 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*.

   (37) **The choice of focus within the sister of *only* matters too:**
   a. [Only [$_{\text{DP}}$ [Mary]$_{\text{F}}$'s son]] likes John.
   b. [Only [$_{\text{DP}}$ Mary's [son]$_{\text{F}}$]] 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 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.

(38) Alex$_{\text{i}}$ **OP$_{\textbf{only}}$** [$_{vP}$ t_{i} made [**PRT$_{\textbf{only}}$** [sandwiches]$_{\text{F}}$] for Brie]
   a. Pronouncing the operator:
      Alex **only** made [sandwiches]$_{\text{F}}$ for Brie. (sentential *only*)
   b. Pronouncing the operator:
      Alex made **only** [sandwiches]$_{\text{F}}$ for Brie. (constituent *only*)

But they cannot be pronounced together in English.

The 'only' particle NUR$_1$ in German Sign Language (Deutsche Gebärdensprache, DGS) can appear in two positions. In a sentence-final position, it associates with a focus in its scope:

(39) **DGS sentence-final NUR$_1$:** (Herrmann, 2013: 299)

a. [TIM]$_F$ BLUME GIESS **NUR$_1$**
Tim flower water OP$_{only}$
'Only [Tim]$_F$ waters flowers.'

b. TIM [BLUME]$_F$ GIESS **NUR$_1$**
Tim flower water OP$_{only}$
'Tim only waters [flowers]$_F$.'

The position of focus in (40a) vs (40b) is reflected in DGS by "nonmanual features such as head tilts and facial expressions" on the focus (Herrmann, 2013: 309).
NUR$_1$ can also immediately follow its focus (40). In these cases, *sentence-final NUR$_1$ may cooccur*:

(40) **DGS constituent NUR$_1$:** (Herrmann, 2013: 299–300)

a. [TIM]$_F$ **NUR$_1$** BLUME GIESS (**NUR$_1$**)
Tim PRT$_{only}$ flower water OP$_{only}$
'Only [Tim]$_F$ waters flowers.'

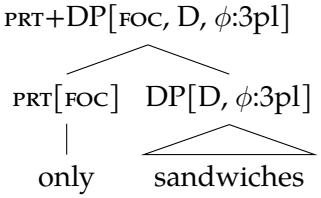
b. TIM [BLUME]$_F$ **NUR$_1$** GIESS (**NUR$_1$**)
Tim flower PRT$_{only}$ water OP$_{only}$
'Tim only waters [flowers]$_F$.'

Vietnamese is like DGS, but where the operator and particle are pronounced differently:

(41) **Vietnamese** (Erlewine, 2017b: 331)
Nam {**chỉ**} mua {**mỗi**} [cuốn sách]$_F$.
Nam OP$_{only}$ buy PRT$_{only}$ CL book
'Nam only bought [the book]$_F$.'

- The cooccurrence of both NUR$_1$ in (40) and *chỉ* and *mỗi* in (41), in a concord-like relationship, supports their analysis as an operator–particle pair.

Features of the particle and its host both project to the particle phrase (Kotek, 2014; see also Citko, 2008). The particle may introduce some formal features, such as [FOC].

(42)


We label the resulting structure PRT+XP in the general case.

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

- Hirsch 2017: 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).

Support for (42), and the idea that the operator and particle Agree (Hirsch, 2017), come from Lavukaleve. Constituent particles in Lavukaleve inflect for the ϕ-features of their host/sister. In addition, an optional sentence-final focus marker — which we take to be the relevant operator — also inflects for the same ϕ-features:

(43) **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]$_F$.'

3.3 The scope of the two *only*s

As noted by Taglicht (1984), Rooth (1985), and others, sentential *only* always takes surface scope, but constituent *only* introduces scope ambiguities:[2]

(44) **Constituent *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

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

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

[2]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).

(46) **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.

(47) 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,...}.

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

- 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 (46) quite naturally takes wide scope in a higher finite clause, which may be surprising on the QR view. (On the clause-boundedness of QR, see 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.

Pre-subject *only*

The ambiguities above (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.

(48) ***Only* on subjects of finite clause embeddings do not take wide scope:**

They believe [(that) only [John]$_F$ 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:

(49) ***Only* on nonfinite subjects can take wide scope (Bayer, 1996: 60):**
   a. They find $[_{SC}$ only $[\text{John}]_F$ stupid$]$.
   b. They believe $[_{TP}$ only $[\text{John}]_F$ to be stupid$]$.

Bayer (1996) attributes this difference between finite subjects (48) and nonfinite subjects (49) to the Empty Category Principle, a syntactic rule governing the movement of some subjects.

4 Explaining patterns of association

- For any focus particle, we can describe its patterns of association — where the particle may appear and what positions of focus it can associate with. These patterns are not the same across languages or across individual particles.

► How do we explain these patterns?

  – For example, the c-command requirement (34) on association with sentential focus particles is explained by the semantics of alternative computation.
  – Are these patterns generally explained by the semantics? Or is there more to the syntax of focus particles as well?

This session: Two case studies.

4.1 Vietnamese (Erlewine, 2017b)

Vietnamese has a sentential *only* and a constituent *only* which are pronounced differently. (Similar facts hold for other focus particles in the language, too; see Hole 2013.)

(50) **Two *only*s in Vietnamese (Hole, 2013):**
   a. *chỉ* is a sentential *only*; (glossed here as OP_{only})
   b. *mỗi* is a constituent *only*. (glossed here as PRT_{only})

(51) Nam {**chỉ**} mua {**mỗi**} $[$cuốn sách$]_F$.
   Nam OP_{only} buy PRT_{only} CL book
   'Nam only bought $[$the book$]_F$.' =(41)

As noted above, I adopt the operator–particle theory for these Vietnamese particles: *chỉ* is the semantically active one-place operator (23); *mỗi* is a semantically inert particle.

(52) **Stacking the two *only*s on the subject:**

a. ✓**Mỗi** [Nam]$_F$ mua cuốn sách.
PRT$_{only}$ Nam bought CL book
'Only [Nam]$_F$ bought the book.'

b. ✓**Chỉ** [Nam]$_F$...
OP$_{only}$ Nam

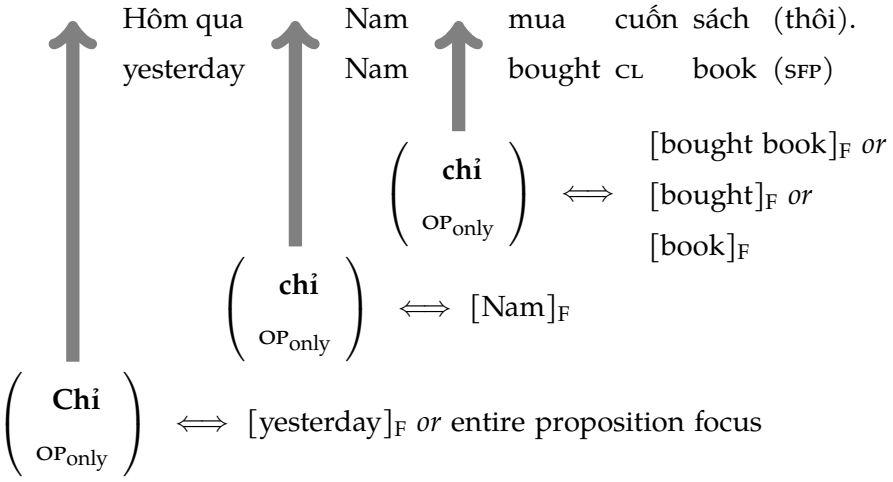
c. ✓**Chỉ** **mỗi** [Nam]$_F$...
OP$_{only}$ PRT$_{only}$ Nam

d. ***Mỗi** **chỉ** [Nam]$_F$...
PRT$_{only}$ OP$_{only}$ Nam

This is what is predicted *chỉ* as a sentential particle and *mỗi* as a constituent particle: the sentential *only* is necessarily linearly outside of the constituent *only*.

Question: Given a particular position for *chỉ*, where can its focus associate be? Or given a particular position of focus, where can *chỉ* be to associate with it?

(53)



Chỉ can associate long-distance, into a lower clause, but when it does, it must be in immediately preverbal position:

(54) (***Chỉ**) Tôi ✓**chỉ** nói [$_{CP}$ là Nam thích [Ngân]$_F$ (thôi).
OP$_{only}$ I OP$_{only}$ say that Nam like Ngan (SFP)
'I *only* said Nam likes [Ngan]$_F$.'

(55) Tôi nói [$_{CP}$ là (***chỉ**) Nam ✓**chỉ** thích [Ngân]$_F$ (thôi).
I say that OP$_{only}$ Nam OP$_{only}$ like Ngan (SFP)
'I said Nam *only* likes [Ngan]$_F$.'

In Erlewine 2017b, I proposed that Vietnamese *chỉ* follows the following generalization:

(56) Sentential focus particles must be as low as possible while c-commanding their focus associate, within a given phase.

Interestingly, a similar "as low as possible" requirement on the placement of sentential focus particles has been described for German (Jacobs, 1983, 1986; Büring and Hartmann, 2001) — although see Reis 2005; Meyer and Sauerland 2009; Smeets and Wagner 2016 for alternative accounts — and Mandarin Chinese (Erlewine, 2020a).

Notice that, in (54–55), where there are multiple options for the position of *chỉ*, the two positions lead to different readings (*only* > *said* vs *said* > *only*). Perhaps *chỉ* must be as low as possible, unless being in a higher position leads to a different meaning.

(57) **A semantically-sensitive revision to generalization (56):**
Sentential focus particles must be as low as possible while c-commanding their focus associate and *deriving the intended truth conditions*.

(58) **Scope Economy (Fox, 2000):**
Scope-shifting operations cannot be semantically vacuous.

We can argue against (57) from interactions with subject quantifiers:

(59) **Baseline with subject quantifier:**
Ai cũng **chỉ** mua [cuốn sách]$_F$.
who also OP_{only} buy CL book
✓ 'Everyone only bought [the book]$_F$.' *every* > *only*
* 'The book is the only thing that everyone bought.' **only* > *every*

(60) ***Chỉ* cannot be higher, even if it would lead to a different reading:**
***Chỉ** ai cũng mua [cuốn sách]$_F$.
OP_{only} who also buy CL book
Intended: 'Only [the book]$_F$ is such that$_i$ everyone bought it$_i$.' *only* > *every*

► The distribution of sentential focus particles in Vietnamese is governed by an "as low as possible" constraint within the phase/clause, which must be a *syntactic* constraint.

4.2 Association with moved material (Erlewine, 2014b)

Jackendoff (1972) noted that *even* but not *only* can associate with a leftward subject:

(61) **Association with a leftward subject:**

a. *A $[\text{professor}]_{\text{F}}$ will *only* come to the party.

b. ✓A $[\text{professor}]_{\text{F}}$ will *even*/*also* come to the party.

Note also that English sentential *even* and *also* can associate with material which has moved out of its scope, but *only* cannot:

(62) **Association with a topicalized phrase:**

a. *$[\text{John}]_{\text{F}}$, they *only* consider ___ intelligent.

b. ✓$[\text{John}]_{\text{F}}$, they *even* consider ___ intelligent. (Kayne, 1998: fn. 75)

c. ✓$[\text{John}]_{\text{F}}$, they *also* consider ___ intelligent.

► With the VP-internal subject hypothesis, (61) can be unified with (62).

Support for this comes from contrasts such as in (63):

(63) **Leftward association across raising vs control:**

a. ✓A $[\text{professor}]_{\text{F}}$ seems to *even* be at the party. *raising*

b. *A $[\text{professor}]_{\text{F}}$ wants to *even* be at the party. *control*

This contrast is explained under the common view that raising involves a movement chain, but the control construction does not:

(64) a. ✓ $\underbrace{[\text{A } [\text{professor}]_{\text{F}}]}$ seems to *even* $[\underbrace{[\text{a } [\text{professor}]_{\text{F}}]}$ be at the party]. *raising*

b. *$[\text{A } [\text{professor}]_{\text{F}}]_i$ wants to *even* $[\text{PRO}_i$ be at the party]. *control*

Q: Can the focused constituent move out of the scope of its focus-sensitive operator?

(65) **Associating "backwards":**

$\underset{\uparrow}{\alpha_{\text{F}}}$ ... [*Op* [... ___ ...]] (with α interpreted as the associate of the operator)

- *No:* Tancredi 1990, Aoun and Li 1993, Beaver and Clark 2008, primarily from English *only*
- *Yes:* Barbiers 1995 based on Dutch; Rullmann 2003 based on English *also*

Empirically, contrasts such as in (62–63) show that *even* (and *also*) can associate with focused constituents which have moved out, but *only* cannot.

Proposal: Adopt the *Copy Theory of movement* (Chomsky, 1993). Whenever a focus-sensitive operator seems to associate "backwards," it is actually associating with *F-marking in the lower copy* of the movement chain, which may be unpronounced.

(66) **Copying F-marking:**

a. Narrow syntax: [... α_F ...] ... [*Op* ... [... α_F ...] ...]

b. LF: [... α_F ...] ... [*Op* ... [... α_F ...] ...]
important!

c. PF: [... α_F ...] ... [*Op* ... ~~[... α_F ...]~~ ...]

At LF, the lower copy must be converted into a definite description bound variable via *Trace Conversion* (Rullmann and Beck, 1998; Fox, 2002): the determiner is replaced with "the" and a bound variable restrictor is added to the domain.

(67) **Interpreting copies in a movement chain:**
"John read every book."

a. Quantifier Raising as copying: [every book] John read [every book]

b. LF after Trace Conversion: [every book] λx John read [the book x]

The difference between *even* and *only* derives from their different semantics (Horn, 1969):

- *Even* uses focus alternatives to introduce a non-at-issue inference, expressing the relative unlikeliness/noteworthiness of the prejacent (boxed below) relative to its alternatives. It does not affect the truth conditions.
- *Only* uses focus alternatives to introduce a new truth condition, that the non-prejacent alternatives must be false. This at-issue meaning then composes with material above it.

(68) A $[\text{professor}]_F$ will OP come to the party. =(61)

a. Narrow syntax: [A $[\text{professor}]_F$] FUT OP [a $[\text{professor}]_F$] come to the party

b. LF after Trace Conversion:
[A $[\text{professor}]_F$] λx FUT OP [$_{vP}$ [the $[\text{professor}]_F$ x] come to the party]

c. Alternatives to F-marked "professor": $\{\boxed{\text{professor}}, \text{student}\}$

d. Alternatives in the scope of OP:
$\left\{ \begin{array}{l} \boxed{\lambda w \text{ . the professor } x \text{ comes to the party in } w}, \\ \lambda w \text{ . the student } x \text{ comes to the party in } w \end{array} \right\}$

► Note that the alternatives in the scope of *Op* include an unbound variable (x).

The semantics of *even* and *only* deal with this unbound variable differently:

- *Even* introduces a non-at-issue meaning (e.g. presupposition), which does not compose with material above it (like the λ-binder). So the variable gets bound where *even*'s inference is computed, using generic quantification.[3]
- *Only* uses the alternatives to build a truth condition which composes with material above it, so unbound variables will get bound above.

If OP = *even* in (68):[4]

(69) $\textsc{even} \rightsquigarrow \textsc{Gen}(x) \left(\left(\begin{array}{c} \lambda w \,.\, x \text{ is a professor and} \\ \text{comes to the party in } w \end{array} \right) <_{\textit{likely}} \left(\begin{array}{c} \lambda w \,.\, x \text{ is a student and} \\ \text{comes to the party in } w \end{array} \right) \right)$

The resulting inference does not compose with material above it, but the truth conditions are unmodified by *even* and will compose with higher material.

If OP = *only* in (68):
Only requires the negation of the non-prejacent alternative(s), which then composes with the higher copy of *a professor* above:

(70) LF for (61a) after Trace Conversion:
[A [professor]$_{\text{F}}$] λx TNS *only* [$_{v\text{P}}$ [the [professor]$_{\text{F}}$ x] came to the party]
$\Longleftrightarrow$ $\exists$ **professor** λx [the **student** x] didn't come to the party

- ► If the sets of "professors" and "students" are disjoint, the higher and lower copies of the DP introduce conflicting requirements on the variable.

In Erlewine (2014b), I show that the problem also occurs even if the alternatives are not entirely disjoint, based on certain assumptions about presupposition projections.

- ► Patterns of grammatical and ungrammatical backwards association is explained by independent differences in the *semantics* of these operators.

[3] This is argued for in detail in a chapter of the dissertation, based on the behavior of *even* in quantified sentences without backwards association.

[4] There is a local accomodation step here that applies to each alternative so the requirement that x be a professor or student is part of the content of each proposition.

5 Anti-pied-piping (Branan and Erlewine, 2020)

Recall the two theories of constituent focus particles:

1. Quantificational particle theory (§3.2.1): The particle is semantically contentful. The particle with its sister forms a kind of quantifier.
2. Operator–particle theory (§3.2.2): The particle itself is *not* contentful, but instead reflects the presence of a nearby semantically contentful operator (Lee, 2004; Hirsch, 2017).

► Today, consider the position of focus particle placement:

(71) **Focus-triggered particle placement in Japanese:**

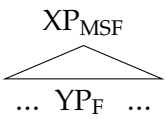
Hanako-wa [hon]$_F$-**mo** kat-ta.
Hanako-TOP book-also buy-PAST
'Hanako also bought [a book]$_F$.'

(72) **Pied-piping in Japanese focus particle placement:** (Kuroda based on 1965: 78)

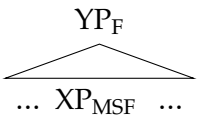
Hanako-wa [[hon]$_F$-o kai]$_{MSF}$-**mo** si, [[zassi]$_F$-o kai]$_{MSF}$-**mo** si-ta.
Hanako-TOP book-ACC buy -also do magazine-ACC buy -also do-PAST
'Hanako bought [books]$_F$ and also bought [magazines]$_F$.'

We can schematize pied-piping as in (73) below, where MSF is the **m**orpho**s**yntactic response to **f**ocus — in Japanese, particle placement.

(73) **Pied-piping**



(74) **Anti-pied-piping**



► Does anti-pied-piping (74) exist? What does it look like?

(75) **Anti-pied-piping in Japanese focus particle placement:** (Kuroda based on 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.'

These mismatches don't just affect focus particles; they also affect focus movement:

(76) **Focus-triggered movement in Hungarian:** (É Kiss, 1998: 249)

Mari [egy kalapot]$_F$ nézett ki magának ___.
Mary a hat.ACC picked VM herself.DAT
'Mary picked [a hat]$_F$ for herself.'

(77) **Pied-piping in Hungarian focus movement:** (Horvath, 2000: 199)

Anna [a [tegnapi]$_F$ cikkeket]$_{MSF}$ olvasta ___.
Anna the yesterday's articles-ACC read
'Anna read [yesterday]$_F$'s articles (not today's).'

(78) **Anti-pied-piping in Hungarian focus movement:** (Kenesei, 1998: 77)

Péter [a Hamletet]$_{MSF}$ [olvasta fel ___ a kertben]$_F$, nem pedig [úszott]$_F$.
Peter the Hamlet read VM the garden.INE not rather swim
'Peter [read out Hamlet in the garden]$_F$, rather than [swim]$_F$.'

- Anti-pied-piping is attested across a wide range of languages; we have identified this behavior in over 50 languages to date. Its detailed behavior constitutes evidence for:
  (a) the operator–particle theory of constituent particles,
  (b) Ā-movement as particle phrase movement (Horvath, 2007; Cable, 2010), and
  (c) particle placement during cyclic Spell-Out.

  New joint work with Kenyon Branan; see Branan and Erlewine 2020.

5.1 Anti-pied-piping in particle placement

Consider the distribution of *du* in Yaeyaman (Ryukyuan) (Davis, 2013, 2014):

(79) **Subject focus:**

a. *Taa*-**du** suba-ba fai.
who-PRT soba-BA ate
'Who ate soba?'

b. [Kurisu-n]$_F$-**du** suba-ba fai.
Chris-NOM-PRT soba-BA ate
'[Chris]$_F$ ate soba.'

(80) **Object focus:**

a. Kurisu-ja *noo*-ba-**du** fai.
Chris-TOP what-BA-PRT ate
'What did Chris eat?'

b. Kurisu-ja [suba-ba]$_F$-**du** fai.
Chris-TOP soba-BA-PRT ate
'Chris ate [soba]$_F$.'

(81) **Sentence focus:**

a. *Noo*-n-**du** ari?
what-NOM-PRT existed
'What happened?'

b. [Hajasi-san]$_{MSF}$-**du** ziroo-ba bari.
Hayashi-san-PRT Jiro-BA hit
'[Hayashi-san hit Jiro]$_F$.'

(82) **Predicate focus:**

a. Unu midunpïto-o *noo*-ba-**du** hii?
that woman-TOP what-BA-PRT did
'What did that woman do?'

b. Kunu midunpïto-o [izï-ba]$_{MSF}$-**du** fai.
this woman-TOP fish-BA-PRT ate
'This woman [ate fish]$_F$.'

Davis (2013, 2014) describes anti-pied-piping in Yaeyaman as obligatory: for sentence focus, *du* goes on the subject, for predicate focus (with transitive VP), *du* goes on the object.
I do not reproduce questions or continuations below.
Particle placement with anti-pied-piping is attested in a wide range of other languages. Some examples with predicate focus: (More in Branan and Erlewine 2020)

(83) **Korean** (Choe, 1996: 677)

[sakwa]$_{MSF}$-**man** mekesseyo.
apple-only ate

a. '[I] only ate [the/an apple]$_F$.'
b. '[I] only [ate the/an apple]$_F$.'

(84) **Ishkashimi** (Karvovskaya, 2013: 81)

Salima [kulča]$_{MSF}$ -**məs** pacu.
Salima kulcha -also bake

a. 'Salima also bakes [kulcha]$_F$.'
b. 'Salima also [bakes kulcha]$_F$.'

Anti-pied-piping is not always obligatory:

(85) **Japanese** (Aoyagi, 1998: 143)

a. [sushi-o tabe]$_{MSF}$ -**sae** si-ta.
sushi-ACC eat -even do-PST
'(He) even [ate sushi]$_F$.'

b. [sushi]$_{MSF}$ -**sae** tabe-ta.
sushi -even eat-PST
'(He) even [ate sushi]$_F$.'

Not just in head-final languages:

(86) **Awing** (Fominyam and Šimík, 2017: 1039)

a. A-pe'-náŋnə **tsɔ́'ə** [ŋgəsáŋə́]$_{MSF}$.
AGR-PAST-cook only maize
'He only cooked [maize]$_F$.'

b. A-tə́-ndzí'ə **tsɔ́'ə** [alí'ə]$_{MSF}$.
AGR-PROG-till only farm
'She is only [tilling the farm]$_F$.'

(87) **Dagbani** (Fiedler and Schwarz, 2005: 9)

ɔ̀ bɔ̀l **lá** [George]$_{MSF}$.
3sg call PRT George

a. 'She called [George]$_F$.'
b. 'She [called George]$_F$.'

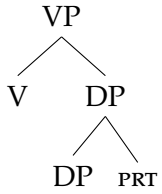
However, note that the examples so far largely fall into two groups:

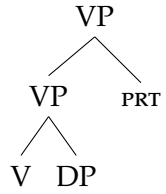
1. head-final languages with postfocal/enclitic particles
2. head-initial languages with prefocal/proclitic particles

There's a methodological reason for this.

Consider the Konkomba in (88), a sister language of Dagbani. Just looking at this structure on the surface, we can't tell if the structure in (88) is as in (89a) or (89b):

(88) **Konkomba** (Schwarz, 2007: 123, 126)
Ù ŋmán !ŋítùùn **lá**.
CL chew beans PRT
a. 'She ate [beans]$_F$.'
b. 'She [ate beans]$_F$.'

(89) a.


b.


Further syntactic work would be necessary to establish the constituency in (88) first in order to know what mismatches are represented, if any.

Sentence focus in many languages involves treating the subject as focused:

(90) **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.'

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

(92) **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:

(93) **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 (93) as associating with its sister *v*P, with the subject reconstructed into its *v*P-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.

5.2 Anti-pied-piping in focus movement

As we saw in Hungarian above (78), anti-pied-piping is also descriptively observed in focus movement. Fanselow and Lenertová (2011) refer to such cases as *subpart of focus fronting* or SFF, but we argue that such patterns are most fruitfully studied in conjunction with anti-pied-piping in focus particle placement.

First, some examples of object focus fronting for predicate focus in VO languages:

(94) **Garrwa** (Mushin, 2006: 311)
[Nganbi-nyi]$_{MSF}$ ngayu yadajba.
lilyseed-DAT 1sg.NOM wait
'I'm [waiting for lilyseed]$_F$.'

(95) **Yoruba** (Manfredi, 2004: ex 39a)
[Ẹmụ]$_{MSF}$ **ni** Àràbá rà ___.
palmwine FM Araba buy
a. 'Araba bought [palmwine]$_F$.'
b. 'Araba [bought palmwine]$_F$.'

Like focus particle placement (85), anti-pied-piping is sometimes optional rather than required:

(96) **German** (Fanselow, 2004: 10)
a. [Ein Buch]$_{MSF}$ hab ich __ gelesen.
one book have I read
'I have [read a book]$_F$.'
b. [Ein Buch gelesen]$_F$ hab ich __.
one book read have I
'I have [read a book]$_F$.'

German also allows the fronted constituent to host a focus particle, as in (97). Note that the stranded verb itself has been independently fronted here to verb-second position.

(97) **German** (Fanselow, 2004: 17)
On his wedding anniversary...
[**Nur** einen Blumenstrauß]$_{MSF}$ überreicht jeder dritte Ehemann ___.
only a bunch.of.flowers hands.over every third husband
'Every third husband only [hands over a bunch of flowers]$_F$.'

For sentence focus, many languages target the subject for focus movement:

(98) **French** (Sasse, 1987: 538)
C' est [maman]$_{MSF}$ qui ___ me bat.
This is mother who me hit
'[Mum's hitting me]$_F$.'

(99) **Welsh** (Mac Cana, 1973: 93, as glossed in Sasse, 1987: 539)

[Y ffermwr]$_{MSF}$ (a) adawodd y glwyd ar agor.

DEF farmer REL let.3sg DEF gate open

a. 'It was [the farmer]$_F$ that left the gate open.'

b. '[The farmer left the gate open]$_F$.'

5.3 The position of MSF

Which constituent is targeted for MSF in anti-pied-piping?

- In many languages, MSF targets the leftmost constituent within the focus, although there is significant cross-linguistic variation in this effect.

Davis (2013, 2014) explicitly show this to be true for Yaeyaman *du*, and Karvovskaya (2013) shows the same for Ishkashimi, both SOV:

(100) **Miyara Yaeyaman *du* (Davis, 2013, 2014) and Ishkashimi *məs* (Karvovskaya, 2013):**

a.	Sentence focus:	[S O V]$_F$	⇒	✓S-PRT O V	*S O-PRT V
b.	Predicate focus:	S [O V]$_F$	⇒	*S-PRT O V	✓S O-PRT V

In some cases, the leftmost requirement is a preference:

(101) **Tibetan** (Erlewine notes)

Kunga's a very good person. She prays at the temple every day.

Kun.dga' khyi-la-{✓**yang**} kha.lag-{?**yang**} sprad-gi-'dug.

Kunga dog-DAT -also food -also give-IMPF-AUX

'Kunga also [gives food to dogs]$_F$.'

There are also cases where there is apparently complete optionality:

(102) **Japanese** (Aoyagi, 2006: 123, based on Aoyagi, 1998: 151)

At yesterday's party, not only did Hanako dance a dance, but...

a. [Taro]$_{MSF}$-**mo** piano-o hiita.
Taro-also piano-ACC played
'[Taro played piano]$_F$, too.'

b. Taro-ga [piano]$_{MSF}$-**mo** hiita.
Taro-NOM piano-also played
'[Taro played piano]$_F$, too.'

Anti-pied-piping in focus movement also exhibit similar leftmost requirements or preferences:

(103) **German** (Fanselow, 2004: 11)

a. [Die Bücher]$_{MSF}$ hab ich ___ ins Regal gestellt.
the books have I into.the shelf placed

i. 'I put [the books]$_F$ on the shelves.'

ii. 'I [put the books on the shelves]$_F$.'

b. [Ins Regal]$_{MSF}$ hab ich die Bücher ___ gestellt.
into.the shelf have I the books placed

i. 'I put the books [on the shelves]$_F$.'

ii. * 'I [put the books on the shelves]$_F$.'

(104) **Kikuyu** (Schwarz, 2003: 95)

Q: What does Abdul do?

a. **Ne-** [mwana] Abdul aðomaɣera ___ iβuku.
PRT 1.child Abdul read book

b. ? **Ne-** [iβuku] Abdul aðomaɣera mwana ___.
PRT book Abdul read child
'Abdul [read the child a book]$_F$.'

Exceptions to leftmost requirements

- Certain constituents — roughly, indefinite, given, less informative constituents — are skipped for the evaluation of anti-pied-piping particle placement. This results in some apparent exceptions to leftmost requirements.

(105) **Czech** (Lenertová and Junghanns, 2007: 356)

Q: What's new?

a. #[Guláš]$_{MSF}$ **matka** uvařila ___.
goulash.ACC mother.NOM cooked.SGF
Intended: '[Mother made goulash]$_F$.'

b. [Janu]$_{MSF}$ **někdo** hledal ___.
Jana.ACC somebody.NOM looked.for.SGM
'[Somebody was looking for Jane]$_F$.'

(106) **Hausa** (Hartmann and Zimmermann, 2007b: 385)

a. [B'àràayii]$_{MSF}$ **nèe** ___ su-kà yi mîn saatàa!
robbers FM 3PL-REL.PERF do to.me theft
'[Robbers have stolen from me]$_F$!'

b. [Dabboobi-n jeejìi]$_{MSF}$ **nee** mutàanee su-kà kaamàa ___.
animals-of wild FM men 3PL-REL.PERF catch
'[(The) men caught wild animals]$_F$!'

"When asked as why only the object could be fronted [in (106b)], both our informants indicated that the object provided the *interesting* or *surprising* part of the utterance."

— Hartmann and Zimmermann 2007b: 395, emphasis theirs

Recall from (102) that Japanese sentence focus allows for particle placement on the subject or object. But if we make the subject indefinite...

(107) **Japanese** (based on (102) from Aoyagi 1998, 2006)
At yesterday's party, not only did Hanako dance a dance, but...

a. #[dareka]$_{MSF}$-**mo** piano-o hiita.
someone-also piano-ACC played
'[someone played piano]$_F$, too.'

b. dareka-ga [piano]$_{MSF}$-**mo** hiita.
someone-NOM piano-also played
'[someone played piano]$_F$, too.'

► What is ineligible for particle placement — roughly, indefinite, given, or less informative constituents — is the kind of material that *avoids stress* in prosodic stress languages.

Fanselow and Lenertová 2011 make this connection, giving a description for anti-pied-piping in focus movement (their "subpart of focus fronting") compatible with saying that anti-pied-piping targets the leftmost accented subpart of the focus.

Supporting evidence from Féry and Drenhaus 2008: Speakers judged the naturalness of question-answer pairs, presented aurally. Ratings at right are for the whole condition, on a 1–6 scale.

(108) **German** (Féry and Drenhaus, 2008: 24–25)
Q: Why are your neighbors complaining?

a. [Die MIETE]$_{MSF}$ haben **sie** wieder mal ___ erhöht. 5.5
the rent have they again once raised

b. [Die MIETE]$_{MSF}$ hat **der Hauswirt** wieder mal ___ erhöht. 4.8
the rent has the landlord again once raised

c. [Die MIETE]$_{MSF}$ hat **der HAUSWIRT** wieder mal ___ erhöht. 2.2
the rent has the landlord again once raised

'[They/the landlord raised the rent once again]$_F$.'

- ► But these effects extend to languages without phrasal accent or prosodic correlates of focus, such as Hausa (in (106) above)! Anti-pied-piping also occurs in other languages which do not use prosody to mark focus, including Oti-Volta Gur languages (Schwarz, 2009) such as Dagbani above, Wolof (Rialland and Robert, 2001), and Tangale (Hartmann and Zimmermann, 2007a).

  - Particle placement and its leftmost requirement (in some languages) make reference to linear order and prosodic status (accentedness) — *or* determinants of such status, such as the status of constituents as given, indefinite, or less informative, even in languages which do not otherwise reflect such information prosodically.

  See Branan and Erlewine 2020 for further discussion of the connection between anti-pied-piping and stress placement / focus projection.

Other patterns

Note that a particle appearing once is not the only option. In Sandawe sentence and predicate focus, multiple constituents in the focus can bear the focus marker:

(109) **Sandawe**

a. [Nâm]$_{MSF}$-**aː** [sómbá]$_{MSF}$-**sà** t^{h}ìmè.
Nam-PRT.NOM fish-PRT.3SGF cook
'[Nam cooked the fish]$_F$.' (Eaton, 2002: 276)

b. ... [mêlì-tà-tʃè-é]$_{MSF}$-**à?** [mìzígò-̰ː-ts'ì]$_{MSF}$-**à?** [ts'â-tà-nà]$_{MSF}$-**à?** kù?ùm̀sè.
boat-in-from-3SGM-PRT.3PL load-sp.-at-PRT.3PL water-in-to-PRT.3PL throw
'...they [threw the loads out of the boat into the water]$_F$.' (Eaton, 2010: 112)

Finally, we note that some instances of anti-pied-piping have been described as a result of second-position clitic placement. An example is Latin *que*, which following Mitrović and Sauerland (2014) and Szabolcsi (2015), we describe as an additive focus particle:

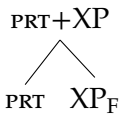
(110) **Latin** (Julius Caesar, glossed in Carlson, 1983: 80)
A cultū prōvinciae longissime absunt, [minime]$_{MSF}$-**que** ad eōs mercatores
from culture province furthest be.absent least-also to them merchants
saepe commeant, [proximī]$_{MSF}$-**que** sunt Germānīs.
often visit near-also are Germany
'[They] are furthest from the civilization of Roman Italy, are [rarely visited by merchants]$_F$, and are also [closest to Germany]$_F$.'

5.4 Proposal

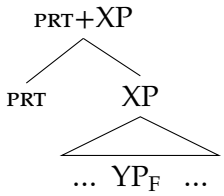
- ► Anti-pied-piping is only possible under the operator–particle theory (§3.2.2): the particle is semantically inert, signaling the presence of a nearby semantic operator.
- Anti-pied-piping behavior teaches us about the *timing* of particle placement.
- Following Horvath (2007) and Cable (2010), we propose that focus movement is always movement of a focus particle phrase, explaining their parallel anti-pied-piping behavior.

Under the operator–particle theory, the particle then does not have to be in a particular position with respect to the focus, as long as they both are in the scope of the operator. Three common options for particle placement:

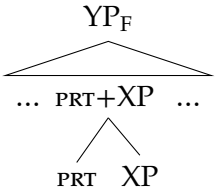
(111) **No mismatch:**



(112) **Pied-piping:**



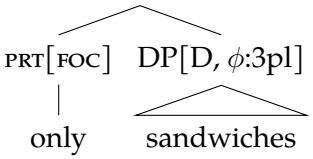
(113) **Anti-pied-piping:**



Particle phrases and pied-piping

Particles can introduce formal features, such as [FOC], which will project to the particle phrase (Kotek, 2014; see also Citko, 2008):

(114) PRT+DP[FOC, D, ϕ:3pl]



- ► Following Horvath 2007 and Cable 2010 on pied-piping, we propose that **Ā-movement is always movement of a particle phrase,** sometimes involving an unpronounced particle.[5]
  - Focus movement exhibits anti-pied-piping because focus particles do.
  - This also accords with Van Urk (2015)'s featural criterion for the A/Ā-distinction: A-movement targets obligatory features of lexical items, whereas Ā-movement targets optional features. Particle placement and projection is the mechanism for how "optional features" are introduced.

[5]Concentrating on *wh*-movement, Cable calls these particles that form targets for movement "Q-particles."

There are a number of parallels between pied-piping and anti-pied-piping which are explained by this approach:

- Both may be obligatory or optional, with variation between languages.
- We've seen that anti-pied-piping in many languages exhibits a leftmost requirement, requiring alignment between the left edge of the focus and MSF. Many types of pied-piping also exhibit such an effect:

(115) **Leftmost requirement in English pied-piping:**
  a. [*Whose* picture] did you frame ___?
  b. *[A picture of *whom*] did you frame ___?

(116) a. [[[*Whose* brother]'s friend]'s father] did you see ___?
  b. *[The father of [[*whose* brother]'s friend]] did you see ___?
(Kotek and Erlewine 2016: 687 based on Cable 2012: 823)

These leftmost effects furthermore tolerate certain, "light" exceptions:

(117) **Not quite leftmost in English *wh* pied-piping:**
  a. [To *which* student's friend] did you speak ___?
  b. *[A friend of *which* student] did you see?

(118) **Not quite leftmost in Latin *que* anti-pied-piping:** (Carlson, 1983: 73)
  ... [ob [eās]$_{\text{MSF}}$-**que** rēs]$_{\text{F}}$
  because these-also things
  '... and [because of these things]$_{\text{F}}$, too'

The timing of particle placement:

- Particle placement makes reference to linear order and prosodic status (or determinants of prosodic status).
  - If such information is determined at PF, particle placement must be post-syntactic.

► But particle placement *feeds* further syntactic operations like movement and agreement!
  - Particle placement cannot be post-syntactic! (Similarly, anti-pied-piping cannot be described as a kind of post-syntactic/PF lowering.)

► We propose that particle placement takes place during **cyclic Spell-Out** by phase (Uriagereka, 1999; Chomsky, 2000, 2001). When a phase undergoes Spell-Out:

i. the pronunciation of its terminal nodes, their word order, and prosodic phrasing are calculated (see e.g. Dobashi 2003, 2010; Ishihara 2004, 2007; Fox and Pesetsky 2005; Kratzer and Selkirk 2007; Kahnemuyipour 2009; Sato 2012);

ii. a particle can be placed into the structure by Late Adjunction (Lebeaux, 1988, 1991) — here, the grammar can make reference to the word order and prosodic information calculated for the structure;

iii. the new particle phrase may optionally move to the edge of the phase.

Further syntactic operations can then build on this result.

It's not just syntactic operations targeting the particle phrases that is fed by particle placement. Particle placement must also precede some other, independent movements.
Recall that Ishkashimi (SOV) exhibits a strict leftmost requirement (Karvovskaya, 2013):

(119) **Ishkashimi *məs* (Karvovskaya, 2013):** =(100)

a.	Sentence focus:	$[\text{S O V}]_{\text{F}}$	⇒	✓S-PRT O V	*S O-PRT V
b.	Predicate focus:	S $[\text{O V}]_{\text{F}}$	⇒	*S-PRT O V	✓S O-PRT V

But the following is also "marked but somewhat acceptable":

(120) **Ishkashimi** (cf 90) (Karvovskaya, 2013: 88)

?Xi dusto-i [wai mol]$_{\text{MSF}}$-**məs** ___ zənayu isu.
REFL hands-ACC DEM husband-also wash come
'[Her husband goes to wash his hands]$_{\text{F}}$, too.'

Sentence focus but with particle placement on the subject, not surface-leftmost.

(121) a. At phasal Spell-Out, Late Adjoin particle to the leftmost sub-phrase in the focus:
$[_{v\text{P}}$ S-**PRT** O V $]_{\text{F}}$

b. Later, independently scramble object across subject:
O S-PRT ___ V
↑└──────┘

Argument/adjunct asymmetries

Aoyagi (1998, 2006) and Kenesei (1998) observe differences between arguments and adjuncts in anti-pied-piping: Arguments can be targeted by MSF with anti-pied-piping, but adjuncts cannot.

(122) **Japanese** (Aoyagi, 1998: 175)

John not only took a shot every morning, but...

a. iti-niti san-kai [kusuri]$_{MSF}$-**mo** nom-ta
one-day three-times medicine-also drink-PAST
   i. '(he) also took [medicine]$_F$ three times a day.'
   ii. '(he) also [took medicine three times a day]$_F$.'

b. [iti-niti san-kai]$_{MSF}$-**mo** kusuri-o nom-ta.
one-day three-times-also medicine-ACC drink-PAST
   i. '(he) even took medicine [three times a day]$_F$'.
   ii. * '(he) also [took medicine three times a day]$_F$.'

(123) **Hungarian** (Kenesei, 1998: 77)

a. Péter [a Hamletet]$_{MSF}$ olvasta fel a kertben.
Peter the Hamlet read VM the garden.INE
'Peter [read out Hamlet in the garden]$_F$.' =(78)

b. Péter [hangosan]$_{MSF}$ olvasta fel a Hamletet.
Peter aloud read VM the Hamlet
   i. 'Peter read out Hamlet [aloud]$_F$.'
   ii. * 'Peter [read out Hamlet aloud]$_F$.'

► Our analysis allows for a natural explanation for such contrasts: Adjuncts are themselves introduced via Late Adjunction (Lebeaux, 1988, 1991) and thus may not be present when particle placement takes place.

  – Note that adjuncts *can* host particles, but they systematically disallow anti-pied-piping. These may be *quantificational particles*, not particles of OP–PRT pairs.
  – We therefore learn that there is a fixed order of operations in these languages:
  OP–PRT particle adjunction → adjunct Late Adjunction → quant. particle adjunction

5.5 Summary and consequences

- Anti-pied-piping is attested in over fifty different languages, from over thirty different genera; see Branan and Erlewine 2020.
- Anti-pied-piping behavior motivates a particular theory of particle placement:
  - Languages employ the operator–particle theory;
  - these particles are Late Adjoined at phasal Spell-Out, dependent on linearization and prosodification at Spell-Out;
  - these particles form particle phrases, which are the targets of Ā-movement.

This proposal leads to various consequences regarding the nature of Ā-movement:

1. Particle phrases are not built until cyclic Spell-Out, so material cannot be Ā-moved until a containing phase undergoes Spell-Out.
   - This forces a lower bound on the timing of Ā-movement.
   - If movement takes place as soon as possible, all things being equal, A-movement will precede Ā-movement.
2. We saw that particle placement avoids unstressed positions in stress languages, and similar material in other languages.
   - If Ā-movement is always movement of a particle phrase, we predict that Ā-movement can only target phrases that can be accented (or its equivalents).
   - This is a positive prediction. Such claims have been independently made by e.g. Cheung 2009 and Branan 2018.
3. Do languages ever probe directly for F-marked constituents? (Tomorrow: No!)

6 Scalar particles

6.1 Scale reversal with *even*

Even introduces a presupposition ($\rightsquigarrow$) that its prejacent is less likely than its alternatives.[6]

(124) $\left[\!\!\left[\begin{array}{c} \wedge \\ even \quad \alpha \end{array} \right]\!\!\right]^{o} = [\![\alpha]\!]^{o}$ =(27)

$\rightsquigarrow$ presupposition: $\forall q \in [\![\alpha]\!]^{alt} [q \neq [\![\alpha]\!]^{o} \rightarrow [\![\alpha]\!]^{o} <_{likely} q]$

(125) Bill even read $[\textit{Syntactic Structures}]_F$.
$\rightsquigarrow$ For all alternatives x to *Syntactic Structures*:
(Bill read *Syntactic Structures*) $<_{likely}$ (Bill read x)

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

(126) ***Scale reversal* of *even*:**
Bill didn't even read $[\textit{Syntactic Structures}]_F$.
$\rightsquigarrow$ For all alternatives x to *Syntactic Structures*:
(Bill read *Syntactic Structures*) $>_{likely}$ (Bill read x) (cf 125)

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, 2014b, 2018: a.o.):

   (127) $\left[\!\!\left[\begin{array}{c} \wedge \\ even_{NPI} \quad \alpha \end{array} \right]\!\!\right] = [\![\alpha]\!]^{o}$

   $\rightsquigarrow$ presupposition: $\forall q \in [\![\alpha]\!]^{alt} \left[q \neq [\![\alpha]\!]^{o} \rightarrow [\![\alpha]\!]^{o} \underline{\geq_{likely}} q\right]$

   The *even* in (124) is then either a PPI or in some sort of blocking relationship with $even_{NPI}$.

   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.):

[6] Or less expected / more noteworthy etc...; see discussion in Bennett (1982); Kay (1990); Lycan (1991).

	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 (126) takes higher scope than its pronounced position (Karttunen and Peters, 1979; Wilkinson, 1996; Guerzoni, 2004; Nakanishi, 2012: a.o.).

   (128) **Interpreting (126) 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*) $<_{likely}$ (Bill didn't read x)
   $\iff$ For all alternatives x to *SS*:
   (Bill read *SS*) $>_{likely}$ (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).

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

(130) **Predicted meaning from the scope theory:**
LF: *even* [they hired no linguist who had read $[\textit{Syntactic Structures}]_{\text{F}}$]
even $\rightsquigarrow$ For all alternatives x to *SS*:
(they hired no linguist who had read *SS*) $<_{likely}$ (they hired no linguist who had read x)
$\iff$ For all alternatives x to *SS*:
(they hired a linguist who had read *SS*) $>_{likely}$ (they hired a linguist who had read x)

(130) predicts a presupposition for *even* in (129) 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 2014b, 2018), $even_{\text{NPI}}$ interpreted in (129) would yield the following meaning:

(131) **Predicted meaning from the ambiguity theory:**
LF: They hired no linguist who had $even_{\text{NPI}}$ read $[\textit{Syntactic Structures}]_{\text{F}}$.
$even_{\text{NPI}} \rightsquigarrow \textsc{gen}(y \text{ linguist}) \left(\begin{array}{l} \text{for all alternatives } x \text{ to } SS\text{:} \\ (y \text{ had read } SS) >_{likely} (y \text{ had read } x) \end{array} \right)$

Practically, it seems very difficult to distinguish the inferences predicted in (130) and (131).

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

6.2 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.

(132) **Two meanings introduced by *even*:**
Even $[\text{John}]_{\text{F}}$ 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 (taken from Wagner, 2013):

(133) 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 $[\text{Canadian}]_{\text{F}}$ won it.

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

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

(135) a. Even a [Canadian]$_F$ could win the gold medal.
b. John could win even the [gold]$_F$ medal.

Additives require a non-entailing/entailed anaphoric alternative. Wagner (2013) attributes the strangeness of (136) to the additive meaning of *even*.

(136) I was hoping that at least some of the students would be able to pass the test.
But in the end, even [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,...}:

(137) A: Is Claire an Assistant Professor?
B: No, she's even an [Associate]$_F$ Professor.

(138) **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.

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

What about Rullmann's example (137) which shows no additive part? Wagner proposes that this has a parse with a sentential *even*, although obscured by the position of the copula.

(140) **A clearer "Associate Professor" example (Wagner, 2013):**
a. Claire married an Assistant Prof., and Sally even married an [Associate]$_F$ Prof.
b. #Claire married an Assistant Prof., and Sally married even an [Associate]$_F$ Prof.

(141) **The gold medal revisited (Wagner, 2013):**
The results in the Marathon were quite surprising. A Russian won the gold medal.
a. #Even a [Canadian]$_F$ won the silver medal. (unless two people won it)
b. #The silver medal was won even by a [Canadian]$_F$. (unless two people won it)
c. The silver medal was even won by a [Canadian]$_F$. (one winner)

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

6.3 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):[7]

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

NPIs in many languages in fact involve 'even':

(142) **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*:

(143) *[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.

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

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

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

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

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

6.4 Burmese *hma* (Erlewine and New, 2019)

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).

(145) **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:

(146) ***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 (146) believes that Aung didn't drink water, in contrast to a negated *only*.

(147) **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, (147a) 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.

(148) ***hma* with negation but no *-ta*: cleft > NEG** cf (147)

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:

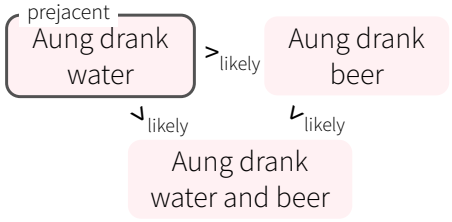
- Adopt the operator–particle theory: particle *hma* corresponds to covert HMA operator, taking propositional scope.
- The presence or absence of *-ta* (indirectly) tracks the relative scope of *hma* and negation; see Erlewine and New 2019 for analysis.
- Let C be the (relevant) focus alternatives of 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":[8]

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

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).

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

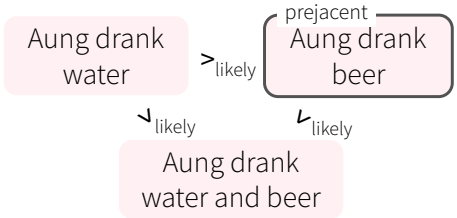


presupposes: ¬beer ∧ ¬(water ∧ beer)

asserts: p = water

result: 'It's water that Aung drank.'

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



presupposes: ¬(water ∧ beer)

asserts: p = beer

result: 'It's beer that Aung drank.'

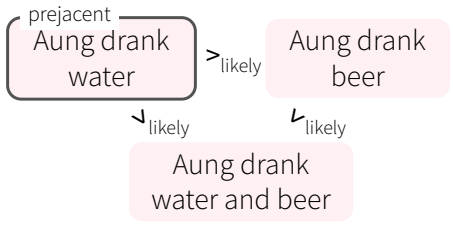
This logic will apply as long as *hma* takes widest scope. Without *-ta*, *hma* takes scope over negation, explaining the cleft > NEG reading in (148).

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

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).

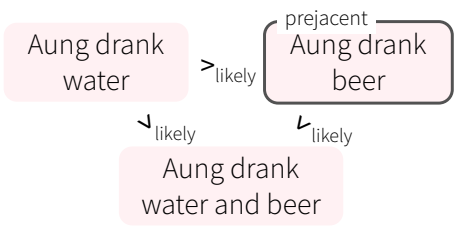
(152) LF: NEG [HMA [$_p$ A. drank [water]$_F$]]



presupposes: ¬beer ∧ ¬(water ∧ beer)

asserts (with NEG): ¬p = ¬water

(153) 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 (153), so its addition is ungrammatical by Non-Vacuity (Crnič, 2011) or a similar condition.

(154) **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 (152/153) 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*.

7 *Wh*-quantification

We commonly think of question-formation as the primary use of *wh*-phrases. But in many languages, *wh*-phrases are also used for quantification.

(155) **Uses of Japanese *dare*:** (Shimoyama, 2006: 143)

wh	*da're*	interrogative 'who'
wh-MO(?)	*da're-mo*	universal 'everyone'
wh-DISJ	*da're-ka*	existential 'someone'
wh-EVEN	*dare-mo*	NPI 'anyone'
wh-CSP	*dare-demo*	free choice 'anyone'

Kuroda (1965: 43) introduced the term "indeterminate" to refer to *wh*-words as "nouns that behave like a logical variable."
Many other languages also combine *wh*-phrases with some other particles to form quantifiers.

- Two of the most common types of morphemes involved in *wh*-quantification are (a) disjunctors and (b) scalar focus particles (see e.g. Haspelmath, 1997: 157).

This session: The independently motivated semantics for *wh*-words, disjunction, and focus particles will — with minimal massaging — combine productively in Alternative Semantics and derive these meanings.

7.1 Semantic prerequisites

A few consequences of Roothian Alternative Semantics (§2.4)

1. The definition of $[\![\cdot]\!]^{alt}$ ensures that any structure satisfies $[\![\alpha]\!]^{o} \in [\![\alpha]\!]^{alt}$.

   (156) **Interpretability:** (based on Rooth, 1992; Beck, 2006)
   To interpret α, $[\![\alpha]\!]^{o}$ must be defined and $\in [\![\alpha]\!]^{alt}$.

2. Focus particles are unique in being able to look at alternative sets ($[\![...]\!]^{alt}$). Other lexical items simply compose pointwise.

3. Once alternatives from a particular focus are "used" by a focus particle, those alternatives cannot be interpreted again by a higher operator. *All focus particles are "resetting"*:

   (157) **Reset:**
   OP is "resetting" if it specifies $[\![\text{OP } \alpha]\!]^{alt} := \{[\![\text{OP } \alpha]\!]^{o}\}$.

Neo-Hamblin question semantics

One approach to the semantics of questions, starting with Hamblin (1973), views the meaning of a question to be the set of possible answer propositions:

(158) $[\![\text{Who does Alex like?}]\!] = \left\{ \begin{array}{l} \text{Alex likes Brie,} \\ \text{Alex likes Cara,} \\ \text{Alex likes Dana,...} \end{array} \right\}$

Hamblin (1973) describes a procedure for computing such sets compositionally, equivalent to what Rooth (1985) proposes for the computation of focus alternatives.[9] See (22) above.

Here is a particular, modern implementation of this idea in the Roothian two-dimensional semantics. *Wh*-phrases have sets of possible values ($\approx$ short answers) as their alternative sets, with no defined ordinary semantic value (Ramchand, 1997; Beck, 2006):

(159) a. $[\![\text{who}]\!]^{o}$ is undefined b. $[\![\text{who}]\!]^{alt} = \{x_e : x \text{ is human}\}$

(160) a. $[\![\text{Alex likes who}]\!]^{o}$ is undefined

b. $[\![\text{Alex likes who}]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{Alex likes Brie,} \\ {}^{\wedge}\text{Alex likes Cara,} \\ {}^{\wedge}\text{Alex likes Dana} \end{array} \right\}$

But (160) has no ordinary semantic value and violates Interpretability (156)!

An operator "lifts" the meaning in (160) into an Interpretable question meaning:

(161) **AltShift (Kotek, 2019):**

a. $[\![[\textsc{AltShift}\ \alpha]]\!]^{o} = [\![\alpha]\!]^{alt}$

b. $[\![[\textsc{AltShift}\ \alpha]]\!]^{alt} = \left\{ [\![\alpha]\!]^{alt} \right\}$ ← reset

(162) a. $[\![\textsc{AltShift}\ [\text{Alex likes who}]]\!]^{o} = \left\{ \begin{array}{l} {}^{\wedge}\text{Alex likes Brie,} \\ {}^{\wedge}\text{Alex likes Cara,} \\ {}^{\wedge}\text{Alex likes Dana} \end{array} \right\}$

b. $[\![\textsc{AltShift}\ [\text{Alex likes who}]]\!]^{alt} = \left\{ \left\{ \begin{array}{l} {}^{\wedge}\text{Alex likes Brie,} \\ {}^{\wedge}\text{Alex likes Cara,} \\ {}^{\wedge}\text{Alex likes Dana} \end{array} \right\} \right\}$

◯ Interpretable (156)!

[9] Historical note: Rooth (1985) was not aware of Hamblin 1973 when developing his proposal. See Rooth 1992: fn 7.

Disjunction in Alternative Semantics

Alonso-Ovalle (2004) and Aloni (2007) propose that alternative sets are used for the interpretation of disjunction and its scope-taking, using a one-dimensional Hamblin semantics. They split disjunction into two steps:[10]

1. A junctor head J (Den Dikken, 2006 a.o.) creates an alternative set over its disjuncts;
2. an $\exists$ operator (Kratzer and Shimoyama, 2002) combines these alternatives by disjunction.

Let's translate this intuition into two-dimensional Alternative Semantics (Erlewine, 2014a, 2017a):

(163) **J with disjuncts x_1 ... x_n:**
   a. $[\![\text{J } \{x_i\}]\!]^{o}$ undefined
   b. $[\![\text{J } \{x_i\}]\!]^{alt} = \bigcup \{[\![x_i]\!]^{o}\}$

(164) a. $[\![\text{J } \{\text{Brie, Cara}\}]\!]^{o}$ undefined
   b. $[\![\text{J } \{\text{Brie, Cara}\}]\!]^{alt} = \{\text{Brie, Cara}\}$

(165) a. $[\![\text{Alex likes [Brie or}_{\text{J}}\text{ Cara]}]\!]^{o}$ undefined
   b. $[\![\text{Alex likes [Brie or}_{\text{J}}\text{ Cara]}]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{Alex likes Brie,} \\ {}^{\wedge}\text{Alex likes Cara} \end{array} \right\}$

Now what will $\exists$ look like in our two-dimensional framework?

(166) **$\exists$ with argument α:**
   a. $[\![\exists\ \alpha]\!]^{o} = \bigvee [\![\alpha]\!]^{alt}$
   b. $[\![\exists\ \alpha]\!]^{alt} = [\![\alpha]\!]^{alt}$

(167) a. $[\![\exists\ [\text{Alex likes [Brie or}_{\text{J}}\text{ Cara]}]]\!]^{o} = {}^{\wedge}\text{A likes B} \vee \text{A likes C}$
   b. $[\![\exists\ [\text{Alex likes [Brie or}_{\text{J}}\text{ Cara]}]]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{Alex likes Brie,} \\ {}^{\wedge}\text{Alex likes Cara} \end{array} \right\}$
   $\times$ Violates Interpretability (156): $[\![\exists\ \ldots]\!]^{o} \notin [\![\exists\ \ldots]\!]^{alt}$

We can avoid the problem if $\exists$ were *resetting* (157):

(168) **$\exists_{\text{reset}}$ with argument α:**
   a. $[\![\exists_{\text{reset}}\ \alpha]\!]^{o} = \bigvee [\![\alpha]\!]^{alt}$
   b. $[\![\exists_{\text{reset}}\ \alpha]\!]^{alt} = \left\{ \bigvee [\![\alpha]\!]^{alt} \right\}$ ← reset

(169) a. $[\![\exists_{\text{reset}}\ [\text{Alex likes [Brie or}_{\text{J}}\text{ Cara]}]]\!]^{o} = {}^{\wedge}\text{A likes B} \vee \text{A likes C}$
   b. $[\![\exists_{\text{reset}}\ [\text{Alex likes [Brie or}_{\text{J}}\text{ Cara]}]]\!]^{alt} = \{{}^{\wedge}\text{A likes B} \vee \text{A likes C}\}$

[10] On splitting disjunction into an alternative-collection step and a existential closure step, see also Winter 1995, 1998; Den Dikken 2006; Szabolcsi 2015.

An advantage of this approach is that we get alternative (disjunctive) questions for free, following Beck and Kim 2006. AltShift applied to (165) gives us a question denotation:

(170) a. $[\![\text{AltShift [Alex likes [Brie or}_{\text{J}}\text{ Cara]]}]\!]^{o} = \left\{ \begin{array}{l} {}^{\wedge}\text{A likes B,} \\ {}^{\wedge}\text{A likes C} \end{array} \right\}$

b. $[\![\text{AltShift [Alex likes [Brie or}_{\text{J}}\text{ Cara]]}]\!]^{alt} = \left\{ \left\{ \begin{array}{l} {}^{\wedge}\text{ A likes B,} \\ {}^{\wedge}\textit{A}\text{ likes C} \end{array} \right\} \right\}$

(171) **Pronouncing English disjunction:**

a. J $\leftrightarrow$ *or*

b. $\exists_{\text{reset}}$, AltShift $\leftrightarrow$ Ø

Some languages use distinct disjunctors in contexts with and without $\exists$:

(172) **Pronouncing Mandarin disjunction (based on Erlewine, 2017a):**

a. J $\leftrightarrow$ *háishi* which in most contexts will followed by AltShift

b. J[u$\exists$] $\leftrightarrow$ *huò* which must be checked by $\exists$ or $\exists_{\text{reset}}$

See evidence for this approach in Erlewine 2017a.

7.2 The framework

A *wh*/J-containing clause has a non-singleton alternative set and no defined ordinary value:

(173) **A *wh*/J-containing clause (schema):**

a. $[\![[_{\text{TP}}$ ... *wh*/J ... $]]\!]^{o}$ undefined

b. $[\![[_{\text{TP}}$ ... *wh*/J ... $]]\!]^{alt} = \{p, q, ...\}$ (a set of propositions)

$\times$ Violates Interpretability: $[\![...]\!]^{o}$ undefined

This violates Interpretability (156)! In particular, we need to compute an ordinary semantic value based on (173).

- I propose that AltShift, $\exists$, and $\exists_{\text{reset}}$ are the only operators that can define an ordinary semantic value where there is none.[11]

- We can apply AltShift to (173) get an Interpretable question or apply $\exists_{\text{reset}}$ to get an Interpretable existential/disjunctive proposition.

[11] These operators can only apply to structures which have no defined ordinary semantic value. In other words, it's not grammatical to override an existing prejacent value. See Erlewine 2017a and Kotek 2019 for motivation behind this restriction for AltShift.

- We could also apply ∃ to (173) to define an ordinary semantic value, but this result (174) will still violate Interpretability!

(174) a. $[\![\exists\ [_{TP}\ ...\ wh/J\ ...\ ]]\!]^{o} = p \vee q \vee\ ...$

b. $[\![\exists\ [_{TP}\ ...\ wh/J\ ...\ ]]\!]^{alt} = \{p, q, ...\}$

  - We can then apply a focus particle, which will fix the Interpretability problem, because it "resets" (157) the alternative set.
  - Focus particles can't apply directly to a *wh*/J-containing clause (173) because there is no defined ordinary value (prejacent).

► Let's see how this derives various indefinites and NPIs, highlighting data from three Tibeto-Burman languages. (See also Erlewine 2020b for FCIs.)

7.3 Bare *wh*-indefinites

Since J-disjunctions and *wh*-phrases create similar meanings, a language can apply $\exists_{reset}$ to a *wh*-containing clause.

(175) a. $[\![\exists_{reset}\ [\text{Alex likes who}]]\!]^{o}$
$= {}^{\wedge}$Alex likes Bobby $\vee$ Alex likes Chris $\vee$ Alex likes Dana
$= {}^{\wedge}$Alex likes someone

b. $[\![\exists_{reset}\ [\text{Alex likes who}]]\!]^{alt} = \{{}^{\wedge}\text{Alex likes someone}\}$ ← reset

► We yield bare *wh* indefinites if:

  - J↔ disjunctive particle, e.g. "or"
  - $\exists_{reset} \leftrightarrow \emptyset$

7.4 *Wh*-disjunctor indefinites

As Haspelmath (1997), Bhat (2000), and others note, many languages use *wh*-phrases together with disjunctive particles as indefinites:

(176)

	'who'	'someone'	
Hungarian	*ki*	*vala-ki*	(Szabolcsi, 2015)
Japanese	*dare*	*da're-ka*	(Shimoyama, 2006)
Kannada	*yaaru*	*yaar-oo*	(Amritavalli, 2003)
Tiwa	*shar*	*shar-khi*	(Dawson, to appear)

- In these languages, disjunction may reflect $\exists_{\text{reset}}$, even in the absence of J:
  - J $\leftrightarrow \emptyset$
  - $\exists_{\text{reset}} \leftrightarrow$ disjunctive particle

  The disjunction can spell out the $\exists_{\text{reset}}$ operator itself or a particle adjoined to *wh*/J.

Tiwa (Tibeto-Burman; Dawson, 2019, to appear) offers a nice example of the disjunctor as the realization of (versions of) $\exists_{\text{reset}}$:

(177) **Two types of *wh*-indefinites (Dawson, to appear):**
Maria *shar*-**pha/khí**-go lak mán-ga.
Maria who-KHI/PHA-ACC meet-PFV
'Maria met someone.'

(178) ***Wh-pha* takes narrow scope; *wh-khí* takes wide scope:**
Chidî [*shar*-**pha/khí** sister]-go lak mán-a phi-gaido, Saldi khúp khâdu-gam.
if who-PHA/KHI sister-ACC meet-INF come-COND Saldi very happy-CF
'If Saldi meets some nun, she would be very happy.'
a. *-pha* $\Leftrightarrow$ if $>\exists$: Meeting any nun will make Saldi happy.
b. *-khí* $\Leftrightarrow \exists >$ if: There is a particular nun that Saldi wants to meet.

- This correlates with the scope-taking behavior of two different disjunctions: *ba* and *khi*, related to *wh-pha* and *wh-khí*!

  (Virginia Dawson p.c.: The disjunctor *ba* is likely related diachronically to *-pha*.)

(179) ***Ba* disjunction takes narrow scope; *khi* takes wide scope:**
Mukton **ba/khi** Monbor phi-gaido, Saldi khâdu-gam.
Mukton BA/KHI Monbor come-COND Saldi happy-CF
'If Mukton or Monbor comes, Saldi would be happy.'
a. *ba* $\Leftrightarrow$ if $>\vee$: Saldi is in love with both Mukton and Monbor. She will be happy if either of them comes.
b. *khi* $\Leftrightarrow \vee >$ if: Saldi is in love with either Mukton or Monbor, but we don't know who. Whoever it is, if he comes to visit, Saldi will be very happy.

See Dawson 2018, to appear for additional scope facts.

- The uniform wide scope of *khi*/*wh-khi* and narrow scope of *ba*/*wh-pha* can be explained if *khi* and *ba*/*pha* realize different forms of $\exists_{\text{reset}}$:
  - $\exists_{\text{reset}}$ with widest scope $\leftrightarrow$ *khi*
  - $\exists_{\text{reset}}$ with narrow scope $\leftrightarrow$ *ba*/*pha*

7.5 *Wh*-EVEN NPIs

Tibetan (Erlewine and Kotek, 2016) has *wh*-(one)-EVEN NPIs but bare *wh*-(one) are not indefinites. (In contrast to e.g. Korean, which also has *wh*-EVEN NPIs, but also has bare *wh* indefinites.)

(180) **Tibetan *wh*, indefinites, and NPIs:**

su 'who'	*mi-gcig* "person-one" 'someone'	*su-yang* 'anyone'
gare 'what'	(*calag*)-*gcig* "(thing)-one" 'something'	*gare-yang* 'anything'

(181) *Su*-**yang** slebs-**ma**-song / *slebs-song.
who-EVEN arrive-NEG-PRFV / *arrive-PRFV
'No one arrived.'

► **Tibetan a free covert ∃ but not $\exists_{\textbf{reset}}$.**

(182) a. $[\![\exists\ [\text{who arrived}]]\!]^{o} = {}^{\wedge}$someone arrived

b. $[\![\exists\ [\text{who arrived}]]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{A arrived,} \\ {}^{\wedge}\text{B arrived,} \\ {}^{\wedge}\text{C arrived, ...} \end{array} \right\}$

× Violates Interpretability (156)!

Notice that this meaning in (182) produced by ∃ (166) is weird!
We can fix this Interpretability problem with EVEN, because it's resetting:

(183) a. $[\![\text{EVEN}\ [\exists\ [\text{who arrived}]]]\!]^{o} = {}^{\wedge}$someone arrived
$\rightsquigarrow \forall x\ [({}^{\wedge}\text{someone arrived}) <_{likely} ({}^{\wedge}x \text{ arrived})]$

b. $[\![\text{EVEN}\ [\exists\ [\text{who arrived}]]]\!]^{alt} = \{\ {}^{\wedge}\text{someone arrived}\ \}$
◯ Interpretable; × unsatisfiable presupposition

We additionally need a downward-entailing operator to get a satisfiable presupposition:

(184) a. $[\![\text{EVEN}\ [\text{NEG}[\exists\ [\text{who arrived}]]]]\!]^{o} = {}^{\wedge}$no one arrived
$\rightsquigarrow \forall x\ [{}^{\wedge}\neg(\text{someone arrived}) <_{likely} \neg({}^{\wedge}x \text{ arrived})]$

b. $[\![\text{EVEN}\ [\text{NEG}[\exists\ [\text{who arrived}]]]]\!]^{alt} = \{\ {}^{\wedge}\text{no one arrived}\ \}$
◯ Interpretable; ◯ satisfiable presupposition

► This explains why the use of EVEN is obligatory in *wh*-EVEN NPIs, even though the addition of EVEN does not make a contribution to the overall meaning expressed. **EVEN repairs the violation of Interpretability.**

7.6 *Wh*-CLEFT NPIs

A classic *even* need not be the only route to forming *wh*-NPI.

Burmese forms *wh*-NPIs with the scalar exhaustive particle, *hma*:

(185) ***Wh-hma* forms NPIs:** (Erlewine and New, 2019)

a. *Nga-ga *beh*-panthi-ko-**hma** yu-k'èh-teh.
1-NOM which-apple-ACC-HMA take-PAST-NONFUT

b. Nga-ga *beh*-panthi-ko-**hma** mă-yu-k'èh-bu.
1-NOM which-apple-ACC-HMA NEG-take-PAST-NEG
'I didn't take any apple(s).'

Recall our proposal for the meaning contributed by *hma*:

(186) $\textsc{hma}(p)(w) \rightsquigarrow \forall q \in C\,[(q <_{\textit{likely}} p) \rightarrow q(w)]$ =(149)

Let 1, 2, and 3 be apples in the context.

(187) a. $[\![\text{I took which apple}]\!]^{o}$ undefined

b. $[\![\text{I took which apple}]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{I took 1,} \\ {}^{\wedge}\text{I took 2,} \\ {}^{\wedge}\text{I took 3} \end{array} \right\}$

$\times$ Violates Interpretability (156)

► **Burmese has free covert ∃ but not $\exists_{\textbf{reset}}$.**

(188) a. $[\![\exists\,[\text{I took which apple}]]\!]^{o} = {}^{\wedge}\text{I took 1} \vee \text{I took 2} \vee \text{I took 3}$

b. $[\![\exists\,[\text{I took which apple}]]\!]^{alt} = \left\{ \begin{array}{l} {}^{\wedge}\text{I took 1,} \\ {}^{\wedge}\text{I took 2,} \\ {}^{\wedge}\text{I took 3} \end{array} \right\}$

$\times$ Violates Interpretability (156)

Now apply *hma* applying to (188), with and without higher negation:

(189) *$[\![\textsc{hma}\,[\exists\,[\text{I took which apple}]]]\!]^{o} = {}^{\wedge}\text{I took some apple}$

$\textsc{hma} \rightsquigarrow \neg 1 \wedge \neg 2 \wedge \neg 3$

◯ Interpretable; $\times$ Assertion incompatible with presupposition

(190) $[\![\textsc{neg}\,[\textsc{hma}\,[\exists\,[\text{I took which apple}]]]]\!]^{o}$

$= \neg\,[\text{I took some apple}] = {}^{\wedge}\text{I didn't take any apple}$

$\textsc{hma} \rightsquigarrow \neg 1 \wedge \neg 2 \wedge \neg 3$

◯ Interpretable; ◯ Assertion compatible with presupposition

In fact, the presupposition of *hma* here seems vacuous and therefore a violation of Non-Vacuity (154), but *hma* must apply here in order to satisfy the Interpretability.

7.7 Summary

- A few basic, independently motivated ingredients — *wh*, J, AltShift, $\exists$, and $\exists_{\text{reset}}$ — can together model the behavior of many attested forms of *wh*-quantification.
- Crucial are the roles of **Interpretability** and **reset**. Both are assumed notions in previous work, but they hold the key to understanding the frequent use of focus particles and disjunction in *wh*-quantification.

See also Erlewine 2020b for the derivation of *wh*-cop-even universal free choice items in Tibetan.

Q: Why are focus particles and disjunctors commonly involved in *wh*-quantification?

A:
i. Focus particles are unique in the grammar in being able to access alternative sets ($[\![...]\!]^{\text{alt}}$) (see e.g. Rooth, 1992). (Disjunctive particles often spell out $\exists_{\text{reset}}$.)
ii. Focus particles are resetting, and therefore can repair violations of Interpretability, especially following the application of $\exists$.

The frequent use of focus particles in *wh*-quantification is unexplained by earlier approaches to *wh*-quantification such as Kratzer and Shimoyama 2002, which proposes various operators that quantify over alternatives which are unrelated to focus particles.

8 Focus and grammatical architecture

8.1 Focus in the Y-model

The position of focus affects multiple modules of grammar:

- prosody: affecting the position of nuclear stress (§2.3);
- semantics: specifying the position of alternatives for quantification (§2);
- morphosyntax: triggering morphosyntactic reflexes of focus (§5).

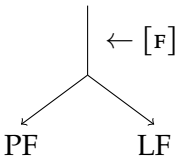
How is this possible?

> "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.

(191) **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.

This session: Questioning what focus tells us about the architecture of grammar:

1. Prosodic reference to focus
2. Semantic reference to focus
3. Morphosyntactic reference to focus

8.2 Restricting prosodic reference to focus

As already discussed in Halliday 1967: 207–208, Chomsky 1970, and Jackendoff 1972, if not earlier, F-marking is not directly represented by prosody in English:

(192) **From Chomsky 1970: 91–93, reformatted with F-marking notation:**
Was it an ex-convict with a red SHIRT that he was warned to look out for?
a. 'Was it [an ex-convict with a red shirt]$_F$...'
— No, he was warned to look out for [an AUTOMOBILE salesman]$_F$.
b. 'Was it an ex-convict [with a red shirt]$_F$...'
— No, he was warned to look out for an ex-convict [wearing DUNGAREES]$_F$.
c. 'Was it an ex-convict with [a red shirt]$_F$...'
— No, he was warned to look out for an ex-convict with [a CARNATION]$_F$.
d. 'Was it an ex-convict with a red [shirt]$_F$...'
— No, he was warned to look out for an ex-convict with a red [TIE]$_F$.

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

Stress on *shirt* is the default in (192), and also in the non-cleft (193):

(193) He was warned to look out for an ex-convict with a red SHIRT.

When the stress deviates from the default, it indicates a different, marked position of focus:

(194) Was it an ex-convict with a RED shirt...
'Was it an ex-convict with a [red]$_F$ shirt...'

(195) Was it an EX-CONVICT with a red shirt...
'Was it an [ex-convict]$_F$ with a red shirt...'

(This generalization ignores other differences related to givenness; see especially Wagner 2005.)

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

1. "Top-down": Place F-marks on the logical focus; 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.

8.3 Restricting semantic reference to focus

Rooth's squiggle:

Our definitions for focus particle meanings have been *syncategorematic*, not interpreted by a regular rule of composition such as Function Application:

(196) **The *only* we have been using:** =(23)

$$\left[\!\!\left[\begin{array}{c} \diagup\!\diagdown \\ \textit{only} \quad \alpha \end{array} \right]\!\!\right]^{o} = \lambda w \ . \ \forall q \in [\![\alpha]\!]^{alt} (q \neq [\![\alpha]\!]^{o} \rightarrow \neg q(w))$$

"All non-prejacent alternatives are false"

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

In contrast, "regular" (non-focus-sensitive) meanings compose "pointwise" without reference to alternatives; see (22) in §2.4.

Rooth 1992 suggests a mechanism for divorcing the reference to alternative sets from the denotation of focus-sensitive operators:

1. Focus-sensitive operators make reference to a free, contextually-determined variable (conventionally C).
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":

(197) [$\alpha \ \sim C$] presupposes $C \subseteq [\![\alpha]\!]^{alt}$ (based on Rooth 1992: 95)

This offers a somewhat nice unification of a range of focus-sensitive phenomena (see Rooth 1992), and also allows for a non-syncategorematic treatment for the semantics of focus particles:

(198) $[\![\text{only}_C]\!] = \lambda p_{\langle s,t \rangle} \ . \ \lambda w : p(w) \ . \ \forall q \in C(q \neq p \rightarrow \neg q(w))$

But the placement of $\sim$ at LF is itself underdetermined...

Alternatives from a/the Question Under Discussion:

Beaver and Clark 2008 offers another idea for where alternatives come from:

- The set of alternatives is always a Question Under Discussion (Roberts, 1996/2012) that exists in the discourse.

This naturally explains the fact that explicit questions in preceding discourse can help determine the relevant set of alternatives. Compare:

(199) a. *Which animal did Alex take to school?*
Alex only took [the turtle]$_F$ to school.
b. *Which of his prized possessions did Alex take to school?*
Alex only took [the turtle]$_F$ to school.

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

(200) 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 (200) is as associating with [John]$_F$, even though there is no QUD of the form *Who does Granny's dog bark at?*

8.4 Restricting morphosyntactic reference to focus

As reviewed in section 5 on anti-pied-piping effects, there are many ways that a language may morphosyntactically mark the presence of focus, e.g. by movement or agreement.

► But in all cases surveyed, these processes may all be responses to a particle phrase, not specifically to an F-marked constituent.

In particular: we are not aware of any morphosyntactic response to focus that strictly involves probing/selecting for an F-marked constituent, without any tolerance for pied-piping or anti-pied-piping mismatches that would be possible if the process is targeting a particle phrase instead.

Evidence from pied-piping with secondary fronting (Branan and Erlewine, in prep)
Van Urk 2015 suggests that the A/Ā-distinction comes down to the nature of the feature involved in its probing:

- A-movement probes for obligatory features of lexical items (e.g. category features)
- Ā-movement probes for optional (e.g. information-structural) features
  - ► Particle placement is how these "optional"-featured targets are built.
  - – Targets of Ā-movement cannot be built until phasal Spell-Out

Predictions:

- "Focus" is *never* an obligatory feature of lexical items:
  Therefore, "focus movement" is (a) always A-movement and (b) cannot take place until particle placement occurs, leading to pied-piping.
- In contrast, *wh* is a lexical feature, at least in some languages:
  "*Wh*-movement" could then potentially occur earlier — before particle placement — but without pied-piping, targeting the *wh* directly.

► This explains two previously observed generalizations regarding *secondary fronting* inside pied-piped constituents:

(201) **Secondary fronting in French:** (Heck, 2009: 91)
la fille [$_{PP}$ *dont* au frère __] tu plais __
the girl of.who to.the brother you please
'the girl whose brother you please'

1. Secondary fronting does not itself pied-pipe.
2. Secondary fronting applies to *wh*-movement but not focus movement.

(202) **Tzotzil** (Aissen, 1996: 481, 485)
I-'ixtalaj [$_{DP}$ s-kayijonal [y-osil li j-tot]]-e.
ASP-ruin A3-firelane A3-land the A1-father-ENC
'My father's land's firelane was ruined.'

(203) a. [$_{DP}$ *Buch'u* y-kayijonal s-osil ___] i-'ixtalaj ___?
who A3-firelane A3-land ASP-ruin
'Whose land's firelane was ruined?'
b. *[$_{DP}$ [*Buch'u* y-osil] s-kayijonal ___] i-'ixtalaj ___?
who A3-land A3-firelane ASP-ruin

► The contrast in (203) shows — although Tzotzil allows pied-piping in *wh*-movement — secondary fronting inside the pied-piped constituent does not itself allow pied-piping.

Suppose a particle [Q] is merged to the *wh*-containing DP to introduce a formal feature [Q], at Spell-Out of the higher VP:

(204) ruined [$_{\text{Q+DP}}$ Q [$_{\text{DP}}$ firelane [land *who*]]]

Q can attract [WH] to its edge — before a particle can be inserted, so *without pied-piping*:

(205) ruined [$_{\text{Q+DP}}$ *who* Q [$_{\text{DP}}$ firelane [land ___]]]

A higher [Q] probe can attract the entire QP:

(206) [$_{\text{Q+DP}}$ *who* Q firelane land ___] ruined ___

Notice that secondary fronting in (205) was possible due to probing for a lexical [WH] feature.

- Secondary focus is not possible, because [F/FOC] is not a lexical feature!

There are many languages with secondary fronting in *wh*-movement, where it has been noted that there is no corresponding secondary fronting in focus movement:

(207) **Quiegolani Zapotec** (Black, 1994: 168–169)
N-dux xnaa noo lo noo.
s-angry mother 1EX face 1EX
'My mother was angry with me.' (literally "whose face")

(208) a. *[Lo *txu*] n-dux xnaa noo __?
face who s-angry mother 1EX
b. [*Txu* lo __] n-dux xnaa noo __?
who face s-angry mother 1EX
'With whom was my mother angry?'

(209) a. [Lo [Jose]$_{\text{F}}$], n-dux xnaa noo __?
face Jose s-angry mother 1EX
b. *[[Jose]$_{\text{F}}$ lo __], n-dux xnaa noo __?
Jose face s-angry mother 1EX
'My mother's angry with [Jose]$_{\text{F}}$.'

- The same contrast — secondary fronting in *wh*-movement but not in focus movement — has also been explicitly observed in Copala Trique (Broadwell and Key, 2004), K'iche' (Broadwell, 2005), and San Dionisio Ocotepec Zapotec (Broadwell, 2010).

  Branan & Erlewine in prep: This is explained by our theory for the timing of particle placement (Branan and Erlewine, 2020), combined with an assumption that [F/FOC] is never a lexical feature or built early, unlike [WH].

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