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Alternative Semantics, Focus Domains and Contrast

Annotating Corpora with Information Structure
ESSLLI 2014

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Two important theoretical contributions in the past

(1) a. Who is laughing?
b. JOHN$_{focus}$ [is laughing]$_{given/background}$.

- Of the two most influential focus frameworks in the past 30 years, one concentrates on the focus part, the other on the given part.
- Mats Rooth's **Alternative Semantics (Rooth 1985, 1992, 1996, 2010)** is based on the idea that focus triggers (contrastive) alternatives.
- Roger Schwarzschild **(Schwarzschild 1999)** develops a technical givenness notion.
- Contemporary theories of information structure, such as Büring (2008); Beaver & Clark (2008); Wagner (2012) and others, mainly build on, and combine, ideas from Rooth and Schwarzschild.

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Mats Rooth (Cornell University)

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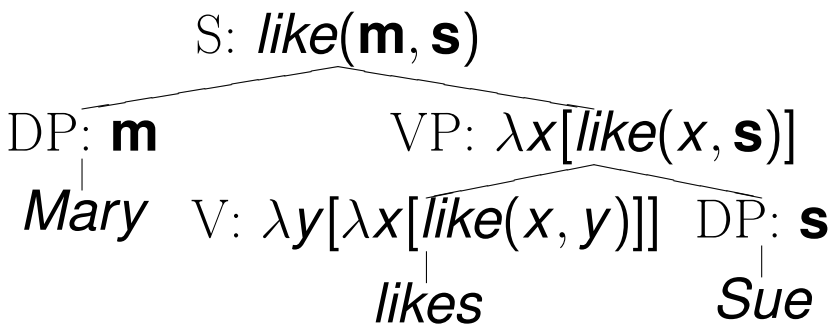
“Ordinary” semantic values, as known from Montague semantics



Notation:

$[\![\textit{Mary}]\!]^{\mathbf{o}} = \mathbf{m}$

$[\![\textit{likes Sue}]\!]^{\mathbf{o}} = \lambda x[\textit{like}(x, \mathbf{s})]$

etc.

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Alternative semantic values (focus semantic values)

Idea: focusing adds an "alternative" semantic value (a set).

> *"the focus semantic value for a phrase of category S is the set of propositions obtainable from the ordinary semantic value by making a substitution in the position corresponding to the focused phrase." (Rooth 1992, p.76)*

(2) a. $[\![\mathit{MAry}_F \text{ likes } \mathit{Sue}]\!]^o = \mathit{like}(\mathbf{m}, \mathbf{s})$

b. $[\![\mathit{MAry}_F \text{ likes } \mathit{Sue}]\!]^f = \{\mathit{like}(x, \mathbf{s}) \mid x \in D_e\}$

(3) a. $[\![\mathit{Mary} \text{ likes } \mathit{SUE}_F]\!]^o = \mathit{like}(\mathbf{m}, \mathbf{s})$

b. $[\![\mathit{Mary} \text{ likes } \mathit{SUE}_F]\!]^f = \{\mathit{like}(\mathbf{m}, x) \mid x \in D_e\}$

Note, in general, that $[\![\alpha]\!]^o \in [\![\alpha]\!]^f$.

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Focus-sensitive particles: *only*

- Association with focus

Bill Mary Tom Sue

(4) Mary only introduced BILL$_F$ to Tom.
$\Rightarrow$ *Mary didn't introduce anyone else to Tom.*

(5) Mary only introduced Bill to TOM$_F$.
$\Rightarrow$ *Mary didn't introduce Bill to anyone else.*

- Consider a scenario in which Mary introduced Bill to Tom and Sue, and there were no other introductions.
- In this scenario, (4) is true and (5) is false.

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Semantics of *only*

A first proposal:

(6) $[\![\textit{Mary only VP}]\!]^o = \forall P \in [\![VP]\!]^f : [P(\mathbf{m}) \rightarrow P = [\![VP]\!]^o]$

(7) $[\![[_{VP}\ \textit{introduce BILL}_F\ \textit{to Tom}]]\!]^f = \{\lambda x[\textit{intro}(x, y, \mathbf{t})] \mid y \in D_e\}$

(8) $[\![[_{VP}\ \textit{introduce Bill to TOM}_F]]\!]^f = \{\lambda x[\textit{intro}(x, \mathbf{b}, y)] \mid y \in D_e\}$

(9) $[\![\textit{Mary only introduced BILL}_F\ \textit{to Tom}]\!]^o$
$= \forall P \in \{\lambda x[\textit{intro}(x, y, \mathbf{t})] \mid y \in D_e\} :$
$[P(\mathbf{m}) \rightarrow P = \lambda x[\textit{intro}(x, \mathbf{b}, \mathbf{t}]]$

If Mary has a property of the form 'introducing y to Tom', it is the property 'introducing Bill to Tom'.

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Problem

- In most cases, the focus semantic value is too big to function as a reasonable restrictor (Rooth 1992).

(10) John only READ$_F$ *Ulysses*.

- Intended VP alternatives: $\{[\![\textit{read Ulysses}]\!], [\![\textit{understood Ulysses}]\!]\}$

- Actual alternatives: $\{\lambda x[R(x, \mathbf{u})] \mid R \in D_{\langle e,\langle e,t\rangle\rangle}\}$
- Contains properties like *buying Ulysses*, *having lived in the same millenium as the author of Ulysses* etc.
- This makes the semantics of *only* much too strong.
- There must be some kind of **restriction** on the alternative set.

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Another example

(11) a. We always invite members of your family. But we are really neglecting my relatives.

b. So far, we have only(C) invited [Uncle THEodore]$_F$.

- The alternative set C should consist of Uncle Theodore and other relatives *from my family*.
- It should not include the members of *your family*, and it certainly should not comprise all individuals in the world.
- Sentence meaning of (11b): For all persons from C, i.e. **from my family** (except for Theo), it holds that we did not invite them.
- This shows that the choice of alternatives is not trivial (it has an influence on the truth conditions).

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An attempt at fixing the problem

- The restrictor/domain of quantification C for *only* (the *actual* alternative set) is not *equal* to the focus semantic value but merely a *subset* of it.

(12) a. John only VP.
b. $\forall P \in C : [P(\mathbf{j}) \rightarrow P = [\![VP]\!]^o]$, where $C \subseteq [\![VP]\!]^f$

"Instead of fixing the value of C, one should simply use the focus semantic value to constrain C, leaving room for a pragmatic process of constructing a domain of quantification [. . .]" (Rooth 1992, p.79)

- C is determined in the actual communicative situation (using discourse, lexical and encyclopaedic information).
- For recent accounts of the semantics of *only*, see Beaver & Clark (2008); Coppock & Beaver (2014)

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Non-truth-conditional uses of alternatives: contrast

(13) An [AMErican]$_F$ farmer was talking to a [CaNAdian]$_F$ farmer.

- It is sometimes claimed that *givenness* is the only reason for deaccentuation (e.g. in *CaNAdian farmer*).
- But why is, then, the first mention of *farmer* also deaccented?
- Rooth, following Chomsky (1971); Ladd (1980); Rochemont (1986), rejects a givenness explanation, and, instead, proposes that the two phrases are symmetrically in **contrast** with each other.
- Semantics of contrast (first proposal):

(14) α contrasts with β ($\neq \alpha$) if $[\![\beta]\!]^o \in [\![\alpha]\!]^f$ (and $[\![\alpha]\!]^o \in [\![\beta]\!]^f$)

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Open questions

- Is it *necessary* to mark contrast?
- What is the size of the contrasted constituents (e.g. in (13): properties, individuals, . . .)
- Must a contrastive pair be marked with a special intonation contour (rise-fall)?
- Can the alternative also be left *implicit*?

(15) Next time, I hope that we will have a COMpetent$_F$ lecturer.

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Focus Interpretation Principle

(adapted from Rooth 1992)

(16) *Focus Interpretation Principle (FIP)*: In interpreting focus at the level of a phrase α, there must be a salient contrastive set γ, s.th. $\gamma \subseteq [\![\alpha]\!]^f$.

- γ will be identified with a particular set (sometimes a singleton set), either from the discourse context or construed via some other pragmatic process.
- In syntax, the domain of the FIP (the **focus domain**) is indicated by means of the $\sim$ *squiggle* operator.
- Rooth does not say how focus domains are formed in general.

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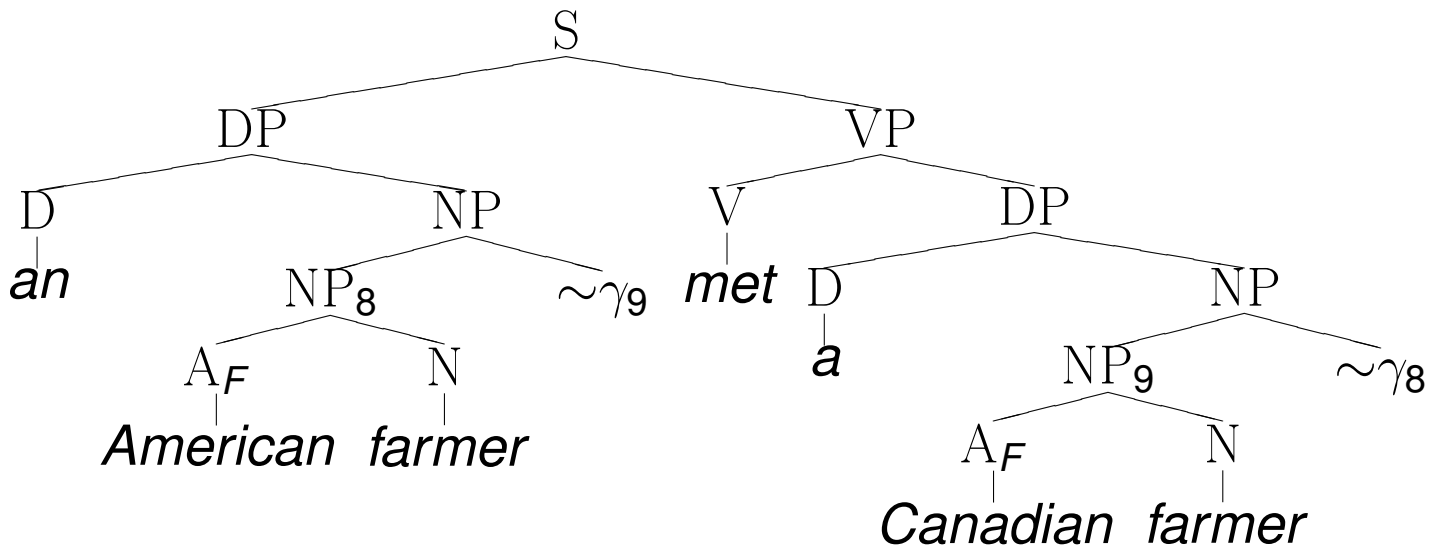
Focus domains



The two $\sim$ operators resolve their variables (γ_8, γ_9) to the semantic objects corresponding to the respective coindexed phrases:
$\gamma_9 = [\![\textit{Canadian farmer}]\!]^o$; $\gamma_8 = [\![\textit{American farmer}]\!]^o$

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Other contrastive constellations

Comparatives:

(17) He explained that the $\sim\gamma_2$[[situation in the MEtal$_F$ industry]$_1$] was more stable than the $\sim\gamma_1$[[one in the CHEmical$_F$ industry]$_2$].

Coordination:

(18) Unless the $\sim\gamma_4$[[LAbour$_F$ party]$_3$] and the $\sim\gamma_4$[[conSERvative$_F$ party]$_3$] reach an agreement, the bill cannot be passed.

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Snowden interview: contrastive constellations

A very unsatisfactory attempt:

60 [00:1	61 [00:19.0]	62 [00:1	63 [00:20.1]	64 [00:2	65 [00:20.7]	66 [00:21.5	67 [00:22.0*]	68 [00:2	69 [00:22.6]	70 [00:23.0]
the	GCHQ	is	collecting	an	incredible	amount	data	on	British	Citizens
DT	NP	VBZ	VBG	DT	JJ	NN	NNS	IN	JJ	NNS
	focus								focus domain	
									focus	

71 [00:2	72 [00:2	73 [00:2	74 [00:24.2]	75 [00:24.5]	76 [00:25.1]	77 [00:2	78 [00:26.1]	79 [00:26.6]	80 [00:27.3]	81 [00:2	82 [00:27.8*]	83 [00:2	84 [00:2	85 [00:28.4]
just	as	the	National	Security	Agency	is	gathering	enormous	amount	of	data	on	US	citizens.
RB	IN	DT	NP	NP	NP	VBZ	VBG	JJ	NN	IN	NNS	IN	NP	NNS
			focus										focus domain	
													focus	

- How many focus domains should we have?
- How big are they?
- How can we tell?

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Constraints on alternative sets

Wagner (2006): Not any two expressions that have a corresponding focus domain can be contrastive (contra Rooth).

(19) Mary's uncle, who produces high-end convertibles, is coming to her wedding. I wonder wonder what he brought as a present.

a. ✓He brought a $\sim$[CHEAP$_F$ convertible].
b. #He brought a $\sim$[RED$_F$ convertible].
c. ✓He brought a [RED conVERtible]$_F$.

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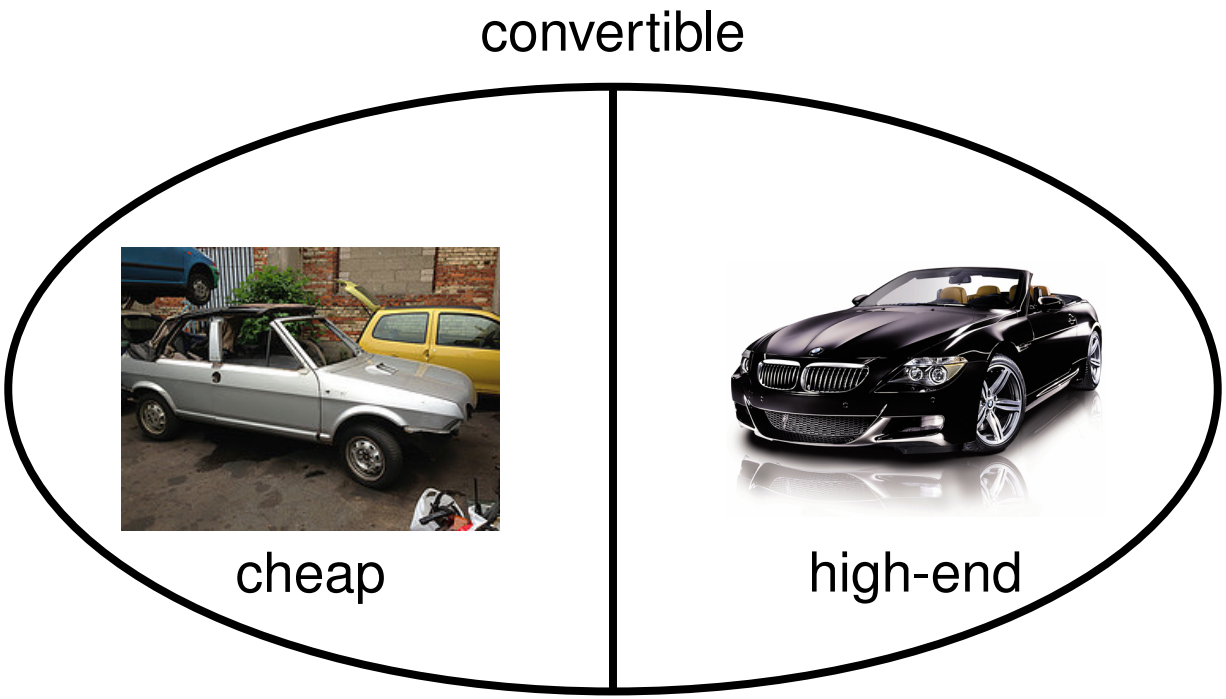
Proper alternatives

- Alternatives must form a **partition**.



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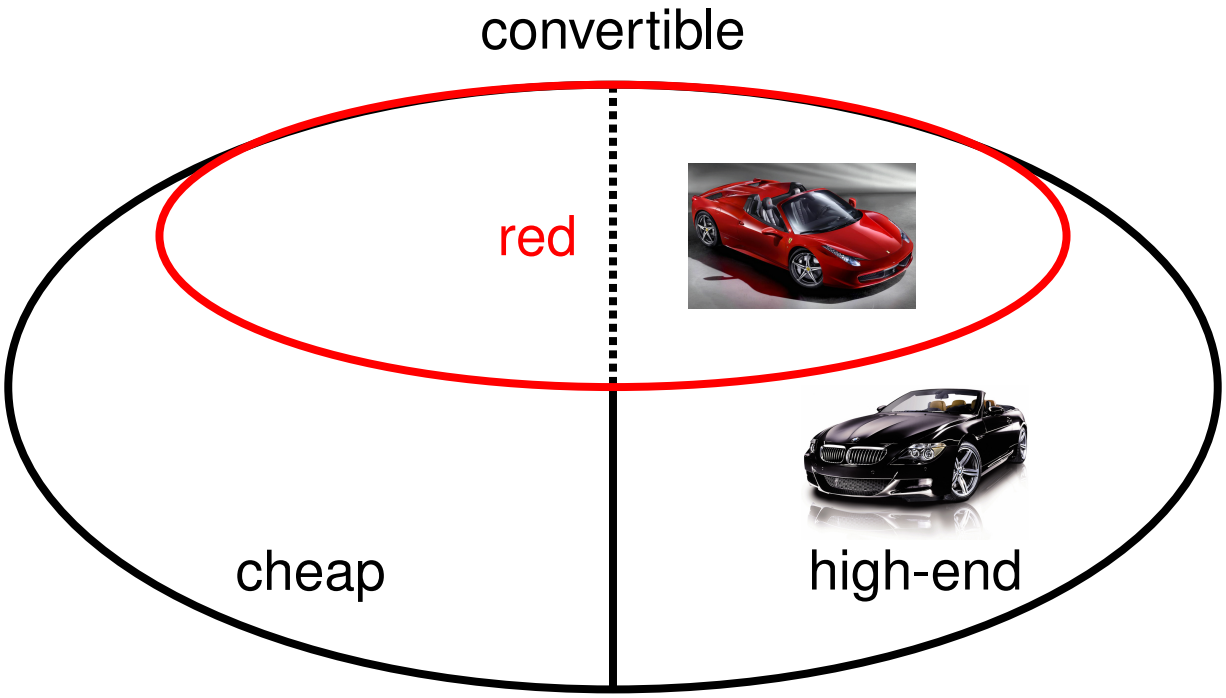
Pseudo-alternatives

- If the denotations of two expressions overlap, they do not form proper alternatives.
- They cannot be contrasted against each other.
- This is reflected in information structure and prosody



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Pseudo-alternatives (cont.)

(20) In Nordirland läuft heute das Ultimatum für die Bildung einer eigenständigen Re**GIE**rung aus. Falls sich die Parteien nicht auf ein Bündnis einigen, hat die britische Re**GIE**rung mit einer Auflösung des nordirischen Parlaments gedroht.
*In Northern Ireland, the ultimatum to form an independent GOvernment will expire today. If the parties cannot agree on a coalition, the British **GO**vernment has threatened to disband the Northern Irish Assembly.*

(21) [independent GOvernment]$_F$ [British GOvernment]$_F$
(no contrast involved)

(22) #∼[indePENdent government]$_F$ ∼[BRItish government]$_F$

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Constraints on alternative sets (cont.)

adapted from Wagner (2006); Büring (2008)

MATCH:

For each focus domain D, there is some salient element $M \in [\![D]\!]^f$ in the context, s.th. D and M are proper alternatives.

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Constraints on alternative sets (cont.)

Anaphoric constituent:

> *A constituent is anaphoric iff, within its focus domain, it neither bears nor is dominated by an F-marker.*

MAXANA (MaximizeAnaphoricity):

> *Maximize the number of anaphoric constituents in a sentence, while respecting* MATCH.

This means:

- Place the $\sim$ as high as possible .
- Use as few F-marks as possible.
- If you use an F-mark, check whether it has potential anaphoric subconstituents.
- If yes, try to embed another focus domain under F.

. . . but do not violate MATCH!

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Satisfying MAXANA

(23) a. Whom did Jo's mother recommend?
b. [She [recommended [a [friend of ∼[Jo's]]]]].

1. *She*
2. *recommended*
3. *friend*
4. *Jo's*
5. *friend of Jo's*
6. *recommended a friend of Jo's*
7. *She recommended a friend of Jo's*

anaphoric constituent MATCH violation

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7. *She recommended [a friend$_F$ of Jo's]$_F$*

anaphoric constituent MATCH violation

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Snowden interview: determining focus domains

(24) ∼[The GCHQ$_{CT}$ is collecting an incredible amount of data on British$_F$ citizens].

(25) ∼[The NSA$_{CT}$ is gathering an enormous amount of data on US$_F$ citizens].

- Anaphoric constituents for (25): *gathering, enormous, amount, data, citizens, X citizens, data on X citizens, amount of data on X citizens, enormous amount of data on X citizens, gathering an enormous amount of data on X citizens, Y is gathering an enormous amount of data on X citizen*
- No MATCH violations

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