Neg-raising: Focus and Implicatures

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The Problem

Gajewski (2005, 2007) proposes that the NR reading (1c) arises as an entailment of the negative assertion (1a) and the excluded middle (EM) presupposition (1b).

(1) a. John doesn't believe that it's raining. $\neg bel\phi$
b. John has an opinion as to if it's raining. $bel\phi \vee bel\neg\phi$
c. John believes that it isn't raining. $bel\neg\phi$

The EM is hard to cancel in a basic negation case like (1a), however, non-NR paraphrases emerge only if the negative auxiliary or the NRP is stressed.

(2) a. John DOESN'T believe that it's raining.
b. John doesn't BELIEVE that it's raining.

I argue for a **feature-based** account to explain the cancellation effects triggered by focus. This account integrates Rooth's (1985) Alternative Semantics for focus into the grammatical view of scalar implicatures (SIs) (Chierchia 2004 a.o.).

The SI-based Account

- Romoli (2012, to appear): EMs are SIs, computed via exhaustifications. The EXH-operator affirms the prejacent and negates the excludable alternatives.
  (3) $\mathscr{A}lt\,(bel\phi) = \{bel\phi, bel\phi \vee bel\neg\phi\}$
  (4) a. $\mathscr{E}xcl\,(p) = \{q \in \mathscr{A}lt(p) : \lambda w[\neg q(w)] \cap p \neq \emptyset\}$
  b. $\text{EXH}\,(p) = \lambda w[p(w) \wedge \forall q \in \mathscr{E}xcl(p)[\neg q(w)]]$
- **NR Readings** are derived via global exhaustification.
  (5) a. $\mathscr{A}lt\,(\neg bel\phi) = \{\neg bel\phi, \neg[bel\phi \vee bel\neg\phi]\}$
  b. $\text{EXH}\,(\neg bel\phi) = \neg bel\phi \wedge \neg\neg[bel\phi \vee bel\neg\phi] = bel\neg\phi$
- **Non-NR Readings**

In (2a), the negated EM alternative is not activated, because it is **irrelevant**.

***Definition**: Relevant assertions mustn't discriminate between the cell-mates of current questions. (Heim 2011)*

PROBLEM: this definition of RELEVANCE concerns only extensional semantics, and it doesn't capture the requirements of non-NR readings on focus-marking.

In (2b), EXH can and only can take scope under negation, so as to avoid a contradiction with the following EM suspension.

(6) a. John doesn't BELIEVE that it's raining, he isn't sure.
b. $\mathscr{A}lt\,(bel\phi) = \{bel\phi, bel\phi \vee bel\neg\phi\}$
c. $\neg\,\text{EXH}\,(bel\phi) = \neg bel\phi$

PROBLEM: this assumption suggests that a sentence can freely take local exhaustification once the EM is suspended. It thus can't explain the markedness of EM cancellation in a basic negation case like (1a).

Grammatical Features

- NRPs are endowed with the **SI feature [+σ]**. It activates EMs, and must be checked by a c-commanding EXH-operator (in the spirit of Chierchia 2006).
  (7) a. $\mathscr{A}lt\,(\mathbf{P}_{[-\sigma]}) = \{\lambda x\lambda\phi.\mathbf{P}(\phi)(x)\}$ Non-NRPs
  b. $\mathscr{A}lt\,(\mathbf{P}_{[+\sigma]}) = \{\lambda x\lambda\phi.\mathbf{P}(\phi)(x), \lambda x\lambda\phi.[\mathbf{P}(\phi)(x) \vee \mathbf{P}(\neg\phi)(x)]\}$ NRPs
- The **[+F] feature** on focused items activates an alternative set $\mathscr{A}lt_F(p)$, a subset of $[\![p]\!]^f$ containing the prejacent p and particular contextually selected elements (cf. the interpretation operator '$\sim$' in Rooth 1985).

My Analysis: a Feature-based Account

- **NR Readings are from global exhaustification:**
  (8) EXH ¬ [John believes$_{[+\sigma]}$ it's raining] **(1a)**
- **Non-NR Readings are from double or local exhaustification:**
  (9) EXH $\neg_{[+F]}$ EXH [John believes$_{[+\sigma]}$ it's raining], he isn't sure. **(2a)**
  a. $\text{EXH}\,[bel_{[+\sigma]}\phi] = bel\phi$
  b. $\mathscr{A}lt\,(\neg_{[+F]}\,\text{EXH}\,[bel_{[+\sigma]}\phi]) = \mathscr{A}lt\,(\neg_{[+F]}bel\phi) = \{\neg bel\phi, bel\phi\}$
  c. $\text{EXH}\,[\neg_{[+F]}\,\text{EXH}\,[bel_{[+\sigma]}\phi]] = \neg bel\phi \wedge \neg bel\phi = \neg bel\phi$
  (10) ¬ EXH [John believes$_{[+\sigma,+F]}$ it's raining], he knows it. **(2b)**
  a. $\mathscr{A}lt\,(bel_{[+\sigma,+F]}\phi) = \{bel\phi \vee bel\neg\phi, bel\phi, know\phi\}$
  b. $\neg\,\text{EXH}\,[bel_{[+\sigma,+F]}\phi] = \neg[bel\phi \wedge \neg know\phi] = \neg bel\phi \vee know\phi$

Principles of EXH-insertion

- **P1: avoid an unchecked feature or a syntactically vacuous EXH** (Chierchia 2013).
  (11) a. *[... some$_{[+\sigma]}$ ... [EXH [... some$_{[+\sigma]}$ ...]]]
  b. *EXH [EXH [... some$_{[+\sigma]}$...]]
- **P2: avoid self-contradiction** (in the spirit of Chierchia 2006).

  P2 achieves a similar result to Fox (2007), in which EXH only negates the set of Innocently Excludable (IE) alternatives. These alternatives can be excluded consistently, irrespective of which other alternatives have been excluded. However, an assumption that attributes semantic requirements to the LF instead of to the lexical entry of EXH is more compatible with Chierchia's analyses on NPIs: an NPI has to be licensed in a DE context because excluding its obligatorily activated alternatives in a UE context leads to a semantic contradiction.
- **P3: avoid an empty $\mathscr{E}xcl_F$ set**, viz. at least one focus-triggered alternative is excludable (cf. ***AvoidF*** in Schwarzschild 1999).
- **P4: Maximize Strength**, i.e., don't exhaustify S in [$_{S'}$ ... S ...] if the resulted reading is weaker than or equivalent to S' (Chierchia, Fox and Spector in press a.o.).

Eliminating Alternative EXH-structures

- **For (1a)**, local EXH results in a reading that is equivalent to the assertion.

	P1	P2	P3	P4	Explanations
☞ EXH [¬bel$_{[+\sigma]}\phi$]					
¬ EXH [bel$_{[+\sigma]}\phi$]				*!	Equivalent to assertion

- **For (2a)**, single local EXH has an unchecked feature [+F]; single global EXH has to negate both positive and negative EMs, giving rise to a self-contradiction.
  (12) $\mathscr{A}lt\,(\neg_{[+F]}bel_{[+\sigma]}\phi) = \{bel\phi, \neg bel\phi, bel\phi \vee bel\neg\phi, \neg[bel\phi \vee bel\neg\phi]\}$

	P1	P2	P3	P4	Explanations
☞ EXH $\neg_{[+F]}$ EXH [bel$_{[+\sigma]}\phi$]				*	
$\neg_{[+F]}$ EXH [bel$_{[+\sigma]}\phi$]	*!				Unchecked feature [+F]
EXH [$\neg_{[+F]}$bel$_{[+\sigma]}\phi$]		*!			Self-contradiction

- **For (2b)**, the $\mathscr{E}xcl_F$ set from global EXH is empty.

	P1	P2	P3	P4	Explanations
☞ ¬ EXH [bel$_{[+\sigma,+F]}\phi$]				*	$\mathscr{E}xcl_F = \{\neg know\phi/...\}$
EXH [¬bel$_{[+\sigma,+F]}\phi$]			*!		$\mathscr{E}xcl_F = \emptyset$

Related Issues

- How to explain the obligatory NR readings with Mandarin negative *bu*? (Stressing *bu* doesn't yield a non-NR reading; NRPs negated by *bu* can't be focused.)
- How to use local and double exhaustification structures to analyze embedded SIs?

Selected References

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