

Contrastive negation and the theory of alternatives

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Objective. Show that contrastive negation gives us evidence that focus alternatives must be constrained. To do this, we propose two constraints on alternatives:

1. A semantic constraint using two notions of equivalence (Strawson-equivalence and P-equivalence)
2. A constraint to linguistic items

1 Contrastive negation: Data

- Contrastive negation is a negated sentence containing a focus-marked constituent, which is contrasted with some other true sentence in which the focus-marked constituent is substituted for another.

- (1)
 - a. Kim doesn't study LINGUISTICS at Northwestern.
 - b. Kim doesn't study linguistics at NORTHWESTERN.

The focus marking constrains the possible readings these sentences can get.

- When presupposition triggers are contrastively negated, their presuppositions can be denied.

- (2)
 - a. Jimi isn't bringing BOTH his guitars, he has three guitars.
 - b. Chris didn't KNOW that Hillary was going to win the election; in fact, she didn't!
 - c. Emilia isn't coming to Montréal AGAIN, this is the first time she's coming!

- **Generalization.** Presuppositions can be denied by contrastive negation.
- Contrastively negating *the* can deny its presupposition, but only in a particular way. Observe this contrast:

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- (3) a. Jake isn't THE student who failed the midterm, many students failed.
b. #Jake isn't THE student who failed the midterm, no one failed the midterm.
- (4) a. Sam didn't invite THE syntax professor at McGill, he invited A syntax professor at McGill.
b. #Sam didn't invite THE syntax professor at McGill, he didn't invite any syntax professors.
- (5) a. Sam didn't invite THE syntax professor at McGill, there are three syntax professors at McGill.
b. #Sam didn't invite THE syntax professor at McGill, there are no syntax professors at McGill.

- Recall that the definite can be described as having two presuppositions:

- (6) Jacques invited the king of France.
 - a. *Existence presupposition.* There is a king of France.
 - b. *Uniqueness presupposition.* There is at most one king of France.

- **Generalization.** The definite's uniqueness presupposition can be denied under contrastive negation, but not its existence presupposition.
- We have seen that:
 - Contrastive negation can deny presuppositions.
 - The definite article is restricted in which portion of its presupposition can be denied.
- We propose to make sense of this by using focus to constrain the possible readings, and this is what gives us the correct interpretation of contrastively negated definites.

2 Contrastive Negation: Theory

Two mechanisms are used here:

1. To allow negation to deny presuppositions: the floating-*A* theory of negation (Beaver and Kraemer 2001).
2. To get the contrastive interpretation: focus (Beaver and Clark 2009; Jackendoff 1972; Rooth 1992).

Negation. Beaver and Kraemer (2001) introduce the operator *A*, which shifts presupposed content into asserted content.

$$(7) \quad \llbracket A \rrbracket = \lambda p_{\langle s,t \rangle} . \lambda w_s . p(w) \wedge w \in \text{dom}(p)$$

Letting *A* scope below negation lets presupposed content be negated.

- (8) a. The king of France is *not* bald, since there is no king of France. (Beaver and Krahmer 2001, (27))
 b. [not [A [The king of France is bald]]]
 c. $w_0 \notin \{w' : \text{KoF}_{w'} \subseteq \text{BALD}_{w'} \wedge \underline{\text{KoF}_{w'} \neq \emptyset} \wedge |\text{KoF}_{w'}| \leq 1\}$

Focus. Use the alternatives semantics from Rooth (1992). Consider (9a).

- (9) a. Chris didn't KNOW that Hillary was going to win (, because she didn't).
 b. $\llbracket \text{Chris [knew]}_F \text{ Hillary was going to win} \rrbracket = \lambda w. \llbracket \text{know} \rrbracket^w (\lambda w'. \mathbf{h} \in \text{WIN}_{w'}) (\mathbf{c})$

Recall the semantics of *know*:

- (10) $\llbracket \text{know} \rrbracket^w (p)(x)$ asserts $\llbracket \text{believe} \rrbracket^w (p)(x)$ and presupposes $p(w)$.

Without *A* and before incorporating focus, (9a) has the interpretation in (11a), which is equivalent to (11b).

- (11) $\llbracket (9a) \rrbracket =$
 a. $\lambda w. \llbracket \text{know} \rrbracket^w (\lambda w'. \mathbf{h} \in \text{WIN}_{w'}) (\mathbf{c})$
 b. $\lambda w : \mathbf{h} \in \mathbf{win}_w. \llbracket \text{believe} \rrbracket^w (\lambda w'. \mathbf{h} \in \text{WIN}_{w'}) (\mathbf{c})$

To incorporate focus: First, obtain the focus alternative set.

- (12) a. **Focus alternative set.** $\llbracket S \rrbracket^f$ is the set of all ϕ such that ϕ is obtained by replacing (the interpretation of) every focus marked item X_F in S with any semantic object of the same type as $\llbracket X_F \rrbracket$.
 b. $\llbracket \text{Chris [knew]}_F \text{ Hillary was going to win} \rrbracket^f = \{\lambda w. \mathcal{P}(\lambda w'. \mathbf{h} \in \text{WIN})(\mathbf{c}) : \mathcal{P} \in D_{\text{type}(\llbracket \text{know} \rrbracket)}\}$

so (12b) contains items such as these:

$$\{\lambda w. \llbracket \text{know} \rrbracket (\lambda w'. \mathbf{h} \in \text{WIN})(\mathbf{c}), \\
\lambda w. \llbracket \text{believe} \rrbracket (\lambda w'. \mathbf{h} \in \text{WIN})(\mathbf{c}), \\
\lambda w. \llbracket \text{hope} \rrbracket (\lambda w'. \mathbf{h} \in \text{WIN})(\mathbf{c}), \\
\lambda w. \llbracket \text{want} \rrbracket (\lambda w'. \mathbf{h} \in \text{WIN})(\mathbf{c}), \dots \}$$

Second: the focus operator scopes over the whole proposition and contributes the focus presupposition:

- (13) **Focus operator.** $\llbracket \sim S \rrbracket$ asserts $\llbracket S \rrbracket$ and presupposes $\exists \psi \in \llbracket S \rrbracket^f [\psi \neq \llbracket S \rrbracket \wedge \psi \text{ is true}]$.

Putting it all together: \sim scopes below negation (Beaver and Clark 2009), and *A* scopes below \sim .

- (14) a. [not [\sim [A [Chris knew that Hillary was going to win]]]]
 b. $\llbracket (14a) \rrbracket^{w_0} =$

- (i) (*Focus presupposition*)
 $\exists \psi \in \llbracket \text{Chris [knows]}_F \text{ that Hillary was going to win} \rrbracket^f$
 $\psi \neq \llbracket \text{Chris knows that Hillary was going to win} \rrbracket \wedge \psi(w_0)$
- (ii) (*Asserted content*)
 $w_0 \notin \{w : \llbracket \text{believe} \rrbracket^w(\lambda w'. \mathbf{h} \in \text{WIN}_{w'}) (\mathbf{c}) \wedge \mathbf{h} \in \text{WIN}_w\}$

The relevant alternative is $\psi = \llbracket \text{Chris } \underline{\text{believed}} \text{ that Hillary was going to win.} \rrbracket$

3 The definite

- In this section:
 - Try to constrain the meaning of contrastively negated definites with focus.
 - Show why Rooth’s focus set is too big.
 - Show what we need to constrain the set to.
 - Show how to constrain it.
- Consider this example:

- (15) a. Sam didn’t invite THE syntax professor at McGill, he invited A syntax professor at McGill.
b. #Sam didn’t invite THE syntax professor at McGill, he didn’t invite any syntax professors.

We get this focus set:

$$(16) \quad \llbracket \text{Sam invited [the]}_F \text{ syntax professor} \rrbracket^f = \{\lambda w. \delta(\lambda x. x \in \text{PROF})(\lambda x. \langle \mathbf{s}, x \rangle \in \text{INVITE}) : \delta \in D_{\langle \langle e, st \rangle, \langle \langle e, st \rangle, st \rangle \rangle}\}$$

So *the* can be substituted with any quantificational determiner.

- **Possible quantificational determiners.** the, all, some, no, not all, both, neither, most, three, at most three, at least three, . . .
- Some of these alternatives don’t entail existence for their first argument. *No* is one:

- (17) Sam invited no syntax professor at McGill.
a. Compatible with: # Sam didn’t invite any syntax professor.
b. Compatible with: # There are no syntax professors.

- **Goal.** Exclude focus alternatives that are compatible with (17a) and (17b) (like *no*).
- **One idea.** Suppose we stipulate a small set of lexical alternatives:

$$(18) \quad A(\mathbf{the}) = \{\mathbf{some}\}$$

If **the** can only alternate with **some**, then the only possible focus alternative is:

- (19) Sam invited some syntax professor at McGill.
- a. Not compatible with: # Sam didn't invite any syntax professor.
 - b. Not compatible with: # There are no syntax professors.
 - c. Compatible with: Sam invited more than one syntax professor.

- In the next section we attempt to derive a similar set from general principles.

3.1 Strawson-equivalence

- In this section:
 - Define Strawson-equivalence.
 - Reformulate focus alternative set using Strawson-equivalence as a constraint.
- **Idea.** (Inspired by von Stechow (1999)'s *Strawson-entailment*) ϕ is *Strawson-equivalent* to ψ iff, given their presuppositions, their assertions are equivalent. We write $\phi \stackrel{S}{\Leftrightarrow} \psi$.
- **Definition (for propositions).** $\phi \stackrel{S}{\Leftrightarrow} \psi$ iff:
 1. if ϕ is true and ψ 's presupposition is true, then ψ is true; and
 2. if ψ is true and ϕ 's presupposition is true, then ϕ is true.
- One can formulate a recursive definition that allows Strawson-equivalence to hold for non-propositional types (as von Stechow did for *Strawson-entailment*).
- **Result.** We can prove that:
 - **the** $\stackrel{S}{\Leftrightarrow}$ **some**
 - **the** $\not\stackrel{S}{\Leftrightarrow}$ **no**
- Strawson-equivalence initially provides us with the partition on alternatives we desire.
- **Hypothesis 1.** Define the alternatives for α as follows:

$$A(\alpha) = \{\gamma \in D_{\text{type}(\alpha)} : \alpha \stackrel{S}{\Leftrightarrow} \gamma\}$$
- Incorporate this into a definition of focus-alternative:
 - The relevant portion of Rooth's (1996) definition:

$$(20) \quad \text{If } X \text{ is F-marked then } \llbracket X \rrbracket^f = \{\alpha : \alpha \in D_{\text{type}(\llbracket X \rrbracket)}\}$$
 - We alter it as such:

$$(21) \quad \text{If } X \text{ is F-marked then } \llbracket X \rrbracket^f = \{\alpha : \alpha \in A(\llbracket X \rrbracket)\}$$

- Now we apply this to the definite, and see how it solves our problem.
- Let us be generous about what we consider a quantificational determiner. Suppose that they include all and only these: **some**, **every**, **no**, **both**, **neither**, **at-least- n** , **exactly- n** , **the**, **the- n not-all**, **at-most- n** , **fewer-than- n** , and **most**.
- The Strawson-equivalent determiners are:

$$(22) \quad A(\mathbf{the}) = \{\mathbf{every}, \mathbf{some}, \mathbf{the}, \mathbf{most}\}$$

- All these alternatives provide an existential implication, either through entailment (**some**, **most**), or via a presupposition (**every**, **the**, following De Jong and Verkuyl 1985; Strawson 1950).

Linguistic alternatives. The case of **every**.

- *Every* in English has an existential presupposition, but we can just as easily formulate one without it:

$$(23) \quad \forall = \lambda P. \lambda Q. \{x : P(x)\} \subseteq \{x : Q(x)\}$$

- (23) is an item of type $\langle\langle e, st \rangle, \langle\langle e, st \rangle, st \rangle\rangle$ Strawson-equivalent to **the**, so it is a valid alternative.
- So (24) is a valid alternative.

$$(24) \quad \forall(\text{PROF})(\lambda x. \langle \mathbf{s}, x \rangle \in \text{INVITE})$$

- a. Compatible with: # There are no syntax professors.
- b. Compatible with: # Sam didn't invite any syntax professor.

- **Proposal.** To exclude \forall , restrict our alternatives to *linguistic items*.
- We alter our definition of focus set for the final time:

$$(25) \quad \text{If } X \text{ is F-marked then } \llbracket X \rrbracket^f = \{\llbracket y \rrbracket : \llbracket y \rrbracket \in A(\llbracket X \rrbracket)\}$$

(where $\llbracket \cdot \rrbracket$ is a function from parse trees to lambda-terms)

3.2 P-equivalence

- **Problem.** We can find examples of contrastive negation where the alternatives are not Strawson-equivalent.

$$(26) \quad \text{Jimi isn't bringing BOTH of his guitars, he isn't bringing either of them.}$$

None of the Strawson-equivalent alternatives (27) are compatible with (26).

$$(27) \quad A(\mathbf{both}) = \{\mathbf{both}, \mathbf{every}, \mathbf{two}\}$$

So our alternative set predicts a reading that is too strong.

- Consider again (28).

- (28) a. Kim doesn't study LINGUISTICS at Northwestern (, she studies physics).
 b. Kim doesn't study linguistics at NORTHWESTERN (, she studies at Rutgers).

Even worse, (28) are predicted to be contradictory, since $\llbracket \text{linguistics} \rrbracket$ and $\llbracket \text{Northwestern} \rrbracket$ are only Strawson-equivalent to themselves.

- In (26), **both** seems to contrast with **neither**.
- These contrastive pairs have a property which is similar to Strawson-equivalence: their presuppositions (if they have presuppositions) are equivalent.

$$\text{dom}(\mathbf{both}) = \{P \in D_{\langle e,t \rangle} : |P| = 2\} = \text{dom}(\mathbf{neither})$$

$$\begin{aligned} \text{dom}(\lambda P.P(\llbracket \text{linguistics} \rrbracket)) &= D_{\langle e,t \rangle} = \text{dom}(\lambda P.P(\llbracket \text{physics} \rrbracket)) \\ \text{dom}(\lambda P.P(\llbracket \text{Northwestern} \rrbracket)) &= D_{\langle e,t \rangle} = \text{dom}(\lambda P.P(\llbracket \text{Rutgers} \rrbracket)) \end{aligned}$$

- **Solution.** Define *P-equivalence* and incorporate it into our constraint on alternatives.

(29) **Definition.** (P-equivalence)

Let ϕ, ψ be functions of type $\langle \sigma, \tau \rangle$. ϕ and ψ are *P-equivalent* iff $\text{dom}(\phi) = \text{dom}(\psi)$, and we write $\phi \stackrel{P}{\Leftrightarrow} \psi$.

(30) **Hypothesis 2.** $A(\alpha) = A_S(\alpha) \cup A_P(\alpha)$ where

- a. $A_S(\alpha) = \{\gamma \in D_\tau : \alpha \stackrel{S}{\Leftrightarrow} \gamma\}$ (*Strawson-alternatives*)
 b. $A_P(\alpha) = \{\gamma \in D_\tau : \alpha \stackrel{P}{\Leftrightarrow} \gamma\}$ (*P-alternatives*)

(31) **Focus set.** (repeated from (25))

If X is F-marked then $\llbracket X \rrbracket^f = \{\llbracket y \rrbracket : \llbracket y \rrbracket \in A(\llbracket X \rrbracket)\}$

4 Conclusion

- We provided new evidence for focus alternatives being more tightly constrained than previously thought.
- We saw that contrastively negated definites have a restricted interpretation.

- The Roothian type-based notion of focus alternative gave us a meaning which was too weak.
- We solved this by placing two constraints on focus alternatives:
 - Semantic constraint based on equivalence (Strawson- and P-equivalence)
 - Constraint to linguistic objects

References

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