Contrast, scalarity, and contradiction

Roni Katzir
rkatzir@post.tau.ac.il

Paris 7 Ling-Lunch, October 31, 2012

- Scalar implicature (SI) and focus interpretation (both 'bound' and 'free') are taken to involve alternative-sensitive computations

- Rooth (1992): Like focus interpretation, SI is focus sensitive

(1) How did the exam go?
   a. Well, I [passed]$_F$
   b. Well, [I]$_F$ passed

- Fox and Katzir (2011): in both cases, the formal alternatives are the same and are derived by structurally-defined substitutions within focused constituents

- Wagner (2005, 2012), Büring (2008): for focus, the alternatives must contrast

- Goal: re-examine arguments and see whether a unified picture can be maintained

1 Alternatives for implicature and focus

1.1 Background

(2) Scalar Implicature (SI):
   a. John did *some* of the homework
       SI: ¬ [John did *all* of the homework]
   b. John did the reading *or* the homework
       SI: ¬ [John did the reading *and* the homework]

(3) a. $SI_A(S) = \bigwedge\{\neg S_i : S_i \in N_{SI}(A, S)\}$
   b. $SM_A(S) = S \wedge SI_A(S)$

(4) Association with Focus (AF):
   a. John only introduced Mary$_F$ to Sue
       ⇒ ¬ John introduced Jane to Sue
   b. John only introduced Mary to Sue$_F$
       ⇒ ¬ John introduced Mary to Jane

(5) a. $EXC_A(S) = \bigwedge\{\neg S_i : S_i \in N_{AF}(A, S)\}$
   b. $Only_A(S) = S \wedge EXC_A(S)$

- Standard assumption (Horn, 1972; Rooth, 1985):

(6) $A = C \cap F(S)$

- C needed because different entailments are generated in different contexts:

(7) John did *some* of the homework
   a. SI? ¬ John did *most* of the homework
   b. SI? ¬ John did *much* of the homework

(8) John only [read War and Peace]$_F$
   a. ⇒? ¬ John saw a movie
   b. ⇒? ¬ John ate an apple

- $F(S)$ needed to account for focus sensitivity ((1a) vs. (1b); (4a) vs. (4b)):

(9) $F(S) = \{S' : S'$ *derived by replacing focused items in S with allowable substitutions*$\}$

1.2 Symmetry

- Rooth (1985): allowable substitutions = elements of the same semantic type

- But: both for SI and for AF, Rooth's definition is too permissive due to the *symmetry problem* (Kroch 1972; von Fintel and Heim (1997); Horn 2000):

(10) Sentences S_1 and S_2 are *symmetric* alternatives of S if both
   a. ⟦ S$_1$ ⟧ ∪ ⟦ S$_2$ ⟧ = ⟦ S ⟧, and
   b. ⟦ S$_2$ ⟧ ∩ ⟦ S$_2$ ⟧ = ∅

(11) Potential alternatives for (7):
   a. John did *all* of the homework
   b. John did *some but not all* of the homework

(12) Potential alternatives for (8):
   a. S_1: John read War and Peace and saw a movie
   b. S_2: John read War and Peace and didn't see a movie

- To derive the SI of (7), we must be able to negate (11a) but not (11b). Similarly for the entailments of (8) and the alternatives in (12)

- For SI, this is accomplished by including (11a) but not (11b) in $F(S)$

- Horn (1972): allowable substitutions = variants where *scalar items* are replaced with members of their *Horn Scales* (e.g., {*some, all*}, {*or, and*}, {*three, four*})

- Significantly, some breaking of symmetry must take place in F, also for AF:

(13) (Context: Mary read exactly three books. What did John do?)
John only [read three books]$_F$
$\Rightarrow \neg$ John read exactly three books

- Fox and Katzir (2011): $F(S)$ (as well as C, and hence also A) is determined in the same way for both SI and AF

  - $F_{SI}(S) = F_{AF}(S)$, using structural complexity within focused constituents
  - Only F can ever break symmetry; C is a set of relevant alternatives

1.3   A structural theory of alternatives

- Complexity in the literature: Zipf (1949), Grice (1989), McCawley (1978), and Horn (1984), among others

- The idea: *John did some of the homework* and *John did all of the homework* are of roughly the same length; *John did some but not all of the homework* is longer

- Katzir (2007): We can try to define the alternatives to ϕ as those structures that are at most as complex as ϕ in some sense

- Looking for evidence:

(14) A tall candidate was interviewed $(= \phi)$
*SI: $\neg$ A candidate was interviewed $(= \phi')$

- Since $[\![\,\phi\,]\!] \subset [\![\,\phi'\,]\!]$, we cannot negate ϕ' without contradicting the assertion ϕ.

- Reversing the entailment relations allows us to test for complexity effects:

(15) Every tall candidate got interviewed
SI: $\neg$ Every candidate got interviewed

(16) John doubts that many dogs with long tails will be sold
SI: $\neg$ John doubts that many dogs will be sold

- Note: saying that *tall candidate* and *candidate* are alternatives will not work

(17) Every boy spoke to a candidate
*SI: $\neg$ Every boy spoke to a tall candidate

- Making complexity more precise:

(18) $X' \lesssim_C X$ if X' can be derived from X by successive replacements of sub-constituents of X with elements of the substitution source for X in C, $SS(X, C)$

(19) $SS(X, C)$, the substitution source for X in context C, is the union of:
  a. The lexicon

  b. The sub-constituents of X
  c. The set of salient constituents in C

(20) Allowable substitutions for X in context $C = \{X' : X' \lesssim_C X\}$

- The use of salient constituents in (19c) is motivated by Matsumoto (1995):

(21) It was warm yesterday, and it is a little bit more than warm today
SI: $\neg$ It was a little bit more than warm yesterday

- The SI in (21) relies on considering a stronger – and longer – alternative

2   Scalarity?

- Horn (1989) and Matsumoto (1995) offer a semantic constraint on alternatives:

(22) Scalarity Condition: Horn scales must be either all positively scalar (e.g., *<all, some>*) or all negatively scalar (e.g., *<no, few>*).

- Divergent predictions of complexity (20) and monotonicity (22):

  - (20): non-monotonic elements can have alternatives and be themselves alternatives of other elements
  - (22): non-monotonic elements cannot stand in the alternative-of relation with anything

- Observation: when Matsumoto's example is modified to involve non-monotonic elements instead of the original monotonic ones, no inference arises:

(23) John did *some* of the homework yesterday, and he did *just some* of the homework today
*SI: $\neg$ John did *just some* of the homework yesterday

- Evidence for (22) over (20)?

- Confound: symmetry

(24) a. John did *just some* of the homework yesterday . . .
b. John did *all* of the homework yesterday . . .

- We can tease apart the predictions of complexity (20) and monotonicity (22):

  - (20): too many alternatives; embedding the structure in a context where the two symmetric alternatives do not exhaust the space of possibilities will solve the problem (cf. Sauerland, 2004; Fox and Hackl, 2006; Fox, 2007)
  - (22): too few alternatives; it should hold in all cases

(25) John was required to do *some* of the homework yesterday, and he was required to do *just some* of the homework today
SI: $\neg$ John was required to do *just some* of the homework yesterday
SI: $\neg$ John was required to do *all* of the homework yesterday

- $\Rightarrow$ monotonicity plays no role in SIs; the problem is one of too many alternatives

3 Contrast?

3.1 Bound and free focus

(26) THE STANDARD PICTURE (*SP*): Many allowable replacements for focused constituents (same semantic type/structural definition/...)

- Recall the behavior of bound focus (= *AF*):

(27) John only EATS muffins
 a. ⇒ ¬John bakes muffins
 b. ⇒ ¬Mary eats muffins

(28) BEHAVIOR OF AN EXHAUSTIVE FOCUS-SENSITIVE OPERATOR: affirms the prejacent and denies various focus-alternatives to the prejacent

- A similar sensitivity to alternatives is observed with free focus:

(29) Mary eats muffins
 a.   And JOHN eats muffins
 b.   # And John EATS muffins

(30) APPROPRIATENESS CONDITION ON FREE FOCUS: each sentence must have a focus-alternative in the context

- (29) is a focus alternative to (29a) but not to (29b)

3.2 Wagner's puzzle and proposal

- *SP*: *red*, *blue*, *cheap*, and *expensive* can serve as alternatives to one another
- Wagner (2005, 2012): the permissiveness of (26) leads to puzzling results with respect to association with focus (31) and free focus (32)

(31) John only owns RED convertibles
 a. ⇒ ¬John owns blue convertibles
 b. ⇒ ¬John owns expensive convertibles

(32) John makes expensive convertibles. He is coming to Mary's wedding.
 a.   He brought a CHEAP convertible
 b.   # He brought a RED convertible

- Wagner (2005), Spathas (2010): (32a) and (32b) are both meant to deny an expectation η that is accommodated with the help of the context-setting (32)

(33) η = that John brought an expensive convertible

- (32a) and (32b) both have η as an alternative, which means that both should be acceptable according to the appropriateness condition (30)
- Only the former, however, behaves as expected, which suggests that while *cheap* has *expensive* as an alternative, *red* does not
- Wagner:
  - True alternatives must be *contrastive* in the context of their sister node
  - Two elements are contrastive if they are distinct cells in a salient partition
  - In particular, they must be mutually exclusive

(34) CONTRASTING ALTERNATIVES (*CA*): A node α' is a true alternative to a node α in the context of a sister node β only if it contrasts with α in the context of β; that is, only if $[\![[\alpha' \beta]]\!] \Rightarrow \neg [\![[\alpha \beta]]\!]$.

- Note: Contrast and scalarity are independent
  - Some pairs (*some* and *none*; *or* and *nor*) contrast but are not co-scalar
  - Some pairs (*some* and *all*; *or* and *and*) are co-scalar but do not contrast

(35) Simplifying assumptions about convertibles:
 a. $[\![$ red convertible $]\!] \cap [\![$ blue convertible $]\!] = \emptyset$
 b. $[\![$ red convertible $]\!] \cup [\![$ blue convertible $]\!] = [\![$ convertible $]\!]$
 c. $[\![$ cheap convertible $]\!] \cap [\![$ expensive convertible $]\!] = \emptyset$
 d. $[\![$ cheap convertible $]\!] \cup [\![$ expensive convertible $]\!] = [\![$ convertible $]\!]$

3.3 Outline

- Concern: How can *CA* account for scalar alternatives (*some* and *every*; *or* and *and*), which are not mutually exclusive but serve as alternatives of one another?
- I will use Fox (2007)'s work on the role of contradiction in exhaustification to show that it is possible to account for Wagner's puzzle within *SP*
- I then show that the two approaches make predictions that can be teased apart:
  - *SP*: too many alternatives
  - *CA*: too few alternatives
- The results will argue for *SP* and against *CA*

3.4 Association with focus: deriving the basic pattern with *SP*

(36) John only owns RED convertibles

- Assumption: the set of adjectives is limited to {*red*, *blue*, *cheap*, *expensive*}

- On *SP*, the set of alternatives to which *only* in (36) has access are:

(37) a. John owns blue convertibles
  b. John owns red convertibles
  c. John owns cheap convertibles
  d. John owns expensive convertibles

- A naive view: *only* negates all alternatives that are not weaker than the prejacent

- But it is impossible for John to own red convertibles and to not own cheap convertibles and to not own expensive convertibles

- So (36) should be contradictory, which it clearly is not.

- Fox (2007): Exhaustivity subject to *innocent exclusion* (38) that avoids contradictory inferences and ensures that contradiction will not be avoided by making arbitrary choices

(38) An element x is *innocently excludable* given an element a and a set A if x is in every maximal subset of A that can be negated consistently with a, $x \in IE(a, A)$
  a. $IE(a, A) := \bigcap \{B \subseteq A : B$ is a maximal set in A s.t. $\neg B \cup \{a\}$ is consistent $\}$
  b. $\neg B := \{\neg b : b \in B\}$

(39) $[\![$ only $]\!](p)(A)(w) \Leftrightarrow p(w) \& \forall q \in IE(p, A). \neg q(w)$

- In (36):
  - Negating (37c) entails that (37d) is true: if John owns red convertibles and does not own cheap convertibles, then he owns expensive convertibles
  - Similarly, negating (37d) entails that (37c) is true
  - The choice between negating (37c) and negating (37d) is thus arbitrary
  - $\Rightarrow$ Neither alternative is innocently excludable, and neither will be negated

- On the other hand, negating (37a) leads to no arbitrary conclusions: if John owns red convertibles and does not own blue convertibles the truth of the remaining alternatives remains undetermined

- $\Rightarrow$ (37a) is innocently excludable and will be negated

- Conclusion: Using innocent exclusion, *SP* derives the correct inferences for (36)

3.5 Association with focus: distinguishing *SP* and *AC*

- If we could eliminate the contradiction the predictions will diverge:
  - *SP*: the alternatives will now be negatable
  - *CA*: the modified version will exhibit the same pattern of negation (*cheap/expensive convertible* still does not contrast with *red convertible*)

- One way: change the verb
  - If one doesn't own a certain kind of convertible, then one doesn't own any instance of that kind of convertible
  - This property (related to the extensionality of *own*) is not shared by all transitive verbs
  - The intensional verb *collect*, for example, exhibits a different pattern of entailment : it is possible to collect red convertibles and yet to not collect cheap convertibles and not collect expensive convertibles

- The facts support *SP*:

(40) John only collects RED convertibles
  a. $\Rightarrow$ ¬John collects blue convertibles
  b. $\Rightarrow$ ¬John collects red convertibles
  c. $\Rightarrow$ ¬John collects cheap convertibles
  d. $\Rightarrow$ ¬John collects expensive convertibles

- A different option: keep the original verb and embed it under a universal operator

(41) John is only required to own RED convertibles
  a. $\Rightarrow$ ¬John is required to own blue convertibles
  b. $\Rightarrow$ ¬John is required to own red convertibles
  c. $\Rightarrow$ ¬John is required to own cheap convertibles
  d. $\Rightarrow$ ¬John is required to own expensive convertibles

3.6 Free focus

(42) John makes expensive convertibles. He is coming to Mary's wedding.
  a. He brought a CHEAP convertible
  b. # He brought a RED convertible

- Recall: *SP* considers the accommodated η = *that John brought an expensive convertible* to be an alternative both of (42a) and of (42b), which makes the contrast between the acceptability of (42a) and the oddness of (42b) look surprising

- For *CA*, on the other hand, η is a contrasting, and hence true alternative of (42a) but not of (42b), thus predicting the contrast

- Claim: Despite the absence of overt *only* in (42), the contrast in acceptability between (42a) and (42b) still involves exhaustification and innocent exclusion

- Let us look first at the acceptable (42a)

- Without exhaustification, this response is irrelevant to the evaluation of η (it is possible to bring two convertibles, a cheap one and an expensive one)

- If (42a) is exhaustified, on the other hand, we obtain the entailment that John did not bring an expensive convertible

- This entailment addresses η, which in turn makes it an appropriate response in the given context

- Turning to (42b), we can again see that without exhaustification the utterance is irrelevant to the evaluation of η

- But here adding exhaustification doesn't help: both (43c) and (43d) are alternatives, and since negating both contradicts the prejacent (43b), neither is innocently excludable and so neither will be negated

- The result of exhaustification, then, is as irrelevant to η as the original (42b).

(43)   a.   He brought a blue convertible
       b.   He brought a red convertible
       c.   He brought a cheap convertible
       d.   He brought a expensive convertible

- If contradiction and exhaustification are indeed the source of the unacceptability of (42b), then again eliminating contradiction will tease apart the predictions:

    - *SP*: the non-contrastive alternatives will emerge
    - *CA*: such alternatives will still not be allowed

(44)   The people in this club are very particular about the cars they collect. Mary, for example, collects expensive convertibles.
       a.   And John collects CHEAP convertibles
       b.   And John collects RED convertibles

(45)   Mary was required to bring an expensive convertible.
       a.   And John is required to bring a CHEAP convertible
       b.   And John is required to bring a RED convertible

- (44a) and (44b) are both acceptable responses to (44), and (45a) and (45b) are both acceptable responses to (45)

- Again, this is as expected by *SP* but it is surprising under *CA*

- In both bound and free focus, contrast plays no role

4   Summary

- I sketched a unified view of focus and SI from (Fox and Katzir, 2011)

    - Substitutions within focused constituents
    - Structural complexity breaks symmetry

- We saw that systematic symmetry breaking in one direction argued against the type-based definition of allowable substitutions

- We saw arguments for two restrictive semantic conditions: scalarity and contrast

- In each case, contradiction yielded a confound for the original argument

- And contradiction elimination showed that the problem was one of too many alternatives, not too few

- The structural characterization, in the cases we saw, seems to make the correct predictions

References

Büring, Daniel. 2008. What's given (and what's new) in the theory of focus. To appear in the Proceedings of the Berkeley Linguistics Society.

von Fintel, Kai, and Irene Heim. 1997. Classnotes on pragmatics. MIT.

Fox, Dannny, and Roni Katzir. 2011. On the characterization of alternatives. *Natural Language Semantics* 19:87–107.

Fox, Danny. 2007. Free choice disjunction and the theory of scalar implicatures. In *Presupposition and implicature in compositional semantics*, ed. Uli Sauerland and Penka Stateva, 71–120. Palgrave-Macmillan.

Fox, Danny, and Martin Hackl. 2006. The universal density of measurement. *Linguistics and Philosophy* 29:537–586.

Grice, Paul. 1989. *Studies in the way of words*. Cambridge, MA: Harvard University Press.

Horn, Laurence. 1972. On the semantic properties of the logical operators in English. Doctoral Dissertation, UCLA.

Horn, Laurence. 1984. Toward a new taxonomy for pragmatic inference: Q-based and R-based implicatures. In *Meaning, form, and use in context*, ed. D. Schiffrin, 11–42. Washington: Georgetown University Press.

Horn, Laurence. 1989. *A natural history of negation*. Chicago: University of Chicago Press.

Horn, Laurence. 2000. From IF to IFF: Conditional perfection as pragmatic strengthening. *Journal of Pragmatics* 32:289–326.

Katzir, Roni. 2007. Structurally-defined alternatives. *Linguistics and Philosophy* 30:669–690.

Kroch, Anthony. 1972. Lexical and inferred meanings for some time adverbials. Quarterly Progress Reports of the Research Laboratory of Electronics 104, MIT, Cambridge, Mass.

Matsumoto, Yo. 1995. The conversational condition on Horn Scales. *Linguistics and Philosophy* 18:21–60.

McCawley, James D. 1978. Conversational implicatures and the lexicon. In *Syntax and semantics*, ed. Peter Cole, volume 9: Pragmatics, 245–259. New York: Academic Press.

Rooth, Mats. 1985. Association with focus. Doctoral Dissertation, University of Massachusetts, Amherst.

Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1:75–116.

Sauerland, Uli. 2004. On embedded implicatures. *Journal of Cognitive Science* 5:107–137.

Spathas, Giorgos. 2010. Focus on anaphora: Accent placement and the syntax and semantics of anaphors. Doctoral Dissertation, Universiteit Utrecht.

Wagner, Michael. 2005. Prosody and recursion. Doctoral Dissertation, MIT, Cambridge, Mass.

Wagner, Michael. 2012. Focus and givenness: a unified approach. In *Contrasts and positions in information structure*, ed. Ivona Kučerová and Ad Neeleman, 102–147. Cambridge University Press.

Zipf, George Kingsley. 1949. *Human behavior and the principle of least effort*. Cambridge, MA: Addison-Wesley.