On the grammar of focus alternatives

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We present some observations which motivate (i) a constraint on how focus alternatives are syntactically generated and (ii) a constraint on how the set of focus alternatives can be restricted.

1 The puzzle

We are interested in explaining the following paradigm.

(1) Bill is tall and not bald. John is only tall.
Inference: ¬John is tall and not bald

(2) #Bill ate some but not all of the cake. John only ate some of the cake.
*Inference: ¬John ate some but not all of the cake

2 Association with focus

The definition of certain focus-sensitive operators such as *only* must refer to a "set of alternatives."

(3) only(A)(S) ⇔ S is true & every true S′ in A follows from S

where A = $F_R(S) \cap C$, $F_R(S)$ a grammatically determined set of focus alternatives of S and C a pragmatically determined set of relevant propositions.

(4) Focus alternatives (Rooth 1992)
$F_R(S) = \{S' \mid S'$ is derivable from S by replacement of F-marked constituents with expressions of the same semantic type$\}$

Why do we need $F_R(S)$?

(5) a. John only saw Mary_F
*AF: ¬John talked to Mary
b. John only saw_F Mary
*AF: ¬John saw Sue

Why do we need C?

(6) a. John only saw Mary_F
*AF: ¬John saw the hallway
b. John only saw_F Mary
*AF: ¬John was born in the same century as Mary

In some cases, AF gives rise to contradiction (Fox and Hackl 2006).

(7) a. John only weighs seventy_F kilograms
John weighs 70 kg & for all n, n ε ℝ & n > 70, ¬John weighs n kg
b. #John only weighs more than seventy_F kilograms
John weighs more than 70 kg & for all n, n ε ℝ & n > 70, ¬John weighs more than n kg

3 Relevance and Symmetry

3.1 Relevance

Intuitively, p is relevant if we are interested in whether p is true. But whether p is true is the same question as whether ¬p is true. Thus, relevance is closed under negation. In addition, it seems natural to assume that if p and q are both relevant, then the conjunction p ∧ q is also relevant.

(8) Closure conditions on C
a. If p ε C, then ¬p ε C
b. If p ε C and q ε C, then p ∧ q ε C

A different way to motivate (8a-b) is to assume that conversation is guided by a "question under discussion," and to be relevant is to care only about facts which determine the truth-value of some answers to this question. More explicitly, let Q be the question under discussion and Ans(Q)(w) be the set of answers to Q that are true in w. For a proposition p to be relevant, it must hold that p makes no distinction between w and w′ if there is no distinction between Ans(Q)(w) and Ans(Q)(w′), i.e. it must hold that p(w) = p(w′) if Ans(Q)(w) = Ans(Q)(w′). The conditions in (8) follow from this assumption (cf. Carnap 1950, Groenendijk and Stokhof 1984, Lewis 1988, Fintel and Heim 1997).

3.2 Symmetry

There is one problem with Rooth's (1992) definition of focus alternatives: it falls prey to symmetry.[1]

(9) John only has three_F children
S′ = John has four children, S″ = John has exactly three children

Since both S′ and S″ are in $F_R(S)$, and neither can be in C without the other also being in C, we predict that A, which is $F_R(S) \cap C$, must either contain both S′ and S″, or contain none of these alternatives. Thus, we predict that (9) either negates both S′ and S″, resulting in a contradiction, or negates none of these alternatives, resulting in a statement which does not say whether John has four children.[2] The prediction is wrong.

(10) John only has three_F children
AF: ¬John has four children

Other examples are easily found.

(11) John only $[\text{read a book}]_F$
S′ = John watched a movie, S″ = John didn't watched a movie
AF: ¬John watched a movie

Moreover, it seems that the choice is systematic: it is always S′ which is negated. We thus need a principle which prunes S″ from A and keeps S′ in A.

[1] The "symmetry problem" was first discussed in connection with scalar implicatures (Kroch 1972, Fintel and Heim 1997). However, it generalizes to association with focus, as pointed out by Fox and Katzir (2011). In fact, several arguments have been given that scalar implicatures and association with focus are the same phenomenon (cf. Krifka 1995, Fox 2007a, Chierchia et al. to appear, Magri 2009, 2011, among others).

[2] A more sophisticated definition of *only*, for example that proposed in (Fox 2007a,b), would not predict (9) to be a contradition, even if it has the two alternatives indicated. However, that sophisticated definition can only rule out (7b) when coupled with a constraint which says that *only* has to negate at least some members of A. This contraint would then also rule out (9). For simplicity of exposition, we will stick to the simpler definition of *only* given in (3) and continue to describe the deviance of such sentences as (7b) as resulting from logical inconsistency, noting that the term "logical inconsistency" used here requires further delineation so that not every contradiction is linguistically deviant (cf. Fintel 1993, Gajewski 2003, Fox and Hackl 2006, Abrusán 2007, Magri 2009, 2011).

4 Fox and Katzir (2011)

4.1 The complexity metric

Intuitively, what should be done is to constrain the set of focus alternatives of S in such a way that it contains only structures which are in some sense no more complex than S. One definition of "no more complex than" which seems to do the job is proposed in Katzir (2007, 2008). The definition makes use of the concept "SS(E)," the substitution source of expression E.

(12) a. SS(E) = {x | x is a lexical item} ∪ {x | x is a constituent uttered in the discourse}
b. $E' \preceq_K E$ if $E' = T_n(...T_1(E)...)$, where every $T_i(x)$ is the result of replacing a constituent of x with an element in SS(E)

The intuition behind (12b) is that by uttering something, the speaker signals the degree of complexity he is willing to tolerate in the current conversation. The focus alternatives of a sentence S are limited to those that are no more complex than S (Fox and Katzir 2011).

(13) Focus alternatives (Fox and Katzir 2011)
$F_{FK}(S) = F_R(S) \cap \{S' \mid S' \preceq_K S\}$

Here are some examples from Katzir (2007), Fox and Katzir (2011) with slight modification.

(14) Detective A concluded that the robbers stole the book and not the jewelry. Detective B only concluded that they stole the book
AF: ¬Detective B concluded that they stole the book and not the jewelry
AF: ¬Detective B concluded that they stole the book and the jewelry

(15) Yesterday it was warm and sunny with gusts of wind. Today it's only warm.
AF: ¬Today it's hot
AF: ¬Today it's warm and sunny with gusts of wind

(16) John only helps the students who live in Berlin and do not receive a stipend
AF: ¬John helps the students who live in Berlin
AF: ¬John helps the students who do not receive a stipend

(17) #Bill did some but not all of the homework. John only did some of the homework.
AF: ¬John did all of the homework
AF: ¬John did some but not all of the homework

4.2 Exhaustive relevance

F&K note that relevance and the complexity metric do not suffice to rule out the following scenario.

(18) John only talked to Mary or Bill
$F_{FK}(M \vee B) = \{M, B, M \vee B, M \wedge B, ...\}$, $C = \{M, M \vee B, M \wedge B\} = A$
$only(A)(M \vee B) = M \vee B \wedge \neg M$

Specifically, nothing prevents C to be the set indicated above. The remedy that F&K propose is to define A to be an "allowable restriction of $F_{FK}(S)$" instead of $F_{FK}(S) \cap C$.

(19) A is an allowable restriction of $F_{FK}(S)$ if (i) S ε A and (ii) no member of (S)\A is exhaustively relevant given A
→ p is exhaustively relevant given A if [only(A)(p)] is in the Boolean closure of A

Thus, $A = \{M, M \vee B, M \wedge B\}$ is not an allowable restriction of $F_{FK}(M \vee B)$. The reason is that $F_{FK}(M \vee B) \backslash A$ contains B, which is exhaustively relevant given A: $[only(A)(B)] = M \vee S \wedge \neg M$, which is in the Boolean closure of A. Note that this definition does not allow restricting $F_{FK}(S)$ by pruning ¬p while keeping p, thus guarantees that symmetry can only be broken formally.

5 Some observations

F&K make a very specific prediction: if both S′ and ¬S′ are focus alternatives of S and neither follows from S, [only(A)(S)] cannot negate one without negating the other. However, it turns out that such cases exist.

(20) Bill went for a run and didn't smoke. John only [went for a run]$_F$.
$F_{FK}(S)$ = {John smoked, John didn't smoke, ...}
AF: ¬John didn't smoke

(21) Bill went for a run and didn't smoke. John only [lifted some weights]$_F$.
$F_{FK}(S)$ = {John smoked, John didn't smoke, ...}
AF: ¬John didn't smoke

(22) Bill works hard and doesn't watch TV. John only [works hard]$_F$.
$F_{FK}(S)$ = {John watches TV, John doesn't watch TV, ...}
AF: ¬John doesn't watch TV

(23) Bill is tall and not bald. John is only tall$_F$.
$F_{FK}(S)$ = {John is bald, John is not bald, ...}
AF: ¬John is not bald

In light of the above observations, we might entertain the following hypothesis: [only(A)(S)] can negate ¬S′ without negating S′ if the result is a proposition which is lower on some salient evaluative scale than the proposition to which S is being contrasted. However, the following judgements will give us pause.

(24) #(Bill makes more effort to overcome gluttony than John.) He ate some but not all of the cake. John only [ate some of the cake]$_F$.
*AF: ¬John ate some but not all of the cake

(25) #(Bill suffered more from Oktoberfest than John.) He read the book and didn't understand it. John only [read the book]$_F$.
*AF: ¬John didn't understand the book

(26) #(Bill has more of an ordinary life than John.) He has children and no twins. John only [has children]$_F$.
*AF: ¬John has no twins

(27) #(Bill is more polite than John.) He eats but doesn't eat too much. John only eats$_F$.
*AF: ¬John doesn't eat too much

6 Proposal

We will propose a theory which delivers the following results.

(28) Bill went for a run and didn't smoke. John only [went for a run]$_F$.
A = {John went for a run, John went for a run and didn't smoke, John didn't smoke} ~~John smoked~~, ~~John went for a run and smoked~~
AF: ¬John didn't smoke

(29) #Bill has children and no twins. John only [has children]$_F$.
A = {John has children, John has children and no twins, John has no twins, John has twins}
~~John has children and twins~~
*AF: ¬John has no twins

Our proposal has two parts: (i) a new definition of "no more complex than," and (ii) a new definition of "allowable restriction."

6.1 Atomicity and complexity

We propose that every expression in SS(E) carries a mark, "AT." Let us call an expression which carries "AT" an "atomic" expression.

(30) a. SS(E) = {x | x is a lexical item} ∪ {x | x is a constituent uttered in the context}
b. $E' \preceq_{HT} E$ if $E' = T_n(...T_1(E)...)$, where (i) every $T_i(x)$ is the result of replacing a constituent of x with a member of SS(E) and (ii) no $T_j(x)$ is the result of replacing part of an atomic expression of x with a member of SS(E)

The intuition behind the second condition of (30b), call it the "Atomicity constraint," is that elements of SS(E) are treated as if they are lexical items.

(31) Focus alternatives (Haida & Trinh)
$F_{HT}(S) = F_R(S) \cap \{S' \mid S' \preceq_{HT} S\}$

This gives us the following result.

(32) Bill [$_\alpha$ went for a run and [$_\beta$ didn't [$_\gamma$ smoke]]]. John only [$_\delta$ went for a run].
F_{HT}(John went for a run) = {John went for a run, John went for a run and didn't smoke, John didn't smoke, **John smoked**} ~~John went for a run and smoked~~

(33) Bill has [$_\alpha$ children and [$_\beta$ no [$_\gamma$ twins]]]. John only has [$_\delta$ children].
F_{HT}(John has children) = {John has children, John has no twins, John has children and no twins, **John has twins**} ~~John has children and twins~~

What we still need is a condition which allows the elimination of the boldfaced expression in (32) but not (33). Note, first, that F&K's definition of "allowable restriction" does not do the job.

(34) a. A = {John went for a run, John didn't smoke, John went for a run and didn't smoke}
b. F_{HT}(John went for a run)\A = {John smoked}
c. Only(A)(John smoked) = ¬John didn't smoke ∧ ¬John went for a run

6.2 Entailment and restriction

We propose the following definition of "allowable restriction" of $F_{HT}(S)$.

(35) A is an allowable restriction of $F_{HT}(S)$ if (i) S ε A and (ii) no member of $F_{HT}(S)$\A entails a member of A

This condition distinguishes between data for and data against F&K.

(36) a. F_{HT}(John went for a run) = {John went for a run, John smoked, John didn't smoke, John went for a run and didn't smoke}
b. A = {John went for a run, John didn't smoke, John went for a run and didn't smoke}
c. F_{HT}(John went for a run)\A = {John smoked}

(37) a. F_{HT}(John has children) = {John has children, John has twins, John has no twins, John has children and no twins}
b. *A = {John has children, John has no twins, John has children and no twins}
c. F_{HT}(John has children)\A = {John has twins}

The reader is invited to verify for herself that (35) covers all other cases mentioned in the last section, as well as cases that F&K's definition of "allowable restriction" is intended to cover.

References

Abrusán, Martha. 2007. Contradiction and Grammar: the Case of Weak Islands. Doctoral Dissertation, MIT.

Carnap, Rudolf. 1950. Logical Foundation of Probability. University of Chicago Press.

Chierchia, Gennaro, Danny Fox, and Benjamin Spector. to appear. The grammatical view of scalar implicatures and the relationship between semantics and pragmatics. In Semantics: An International Handbook of Natural Language Meaning, ed. Paul Portner, Claudia Maienborn, and Klaus von Heusinger. De Gruyter.

Fintel, Kai von. 1993. Exceptive constructions. Natural Language Semantics 1:123–148.

Fintel, Kai von, and Irene Heim. 1997. Pragmatics in Linguistic Theory. MIT classnotes.

Fox, Danny. 2007a. 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. 2007b. Pragmatics in Linguistic Theory. MIT classnotes.

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

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

Gajewski, Jon. 2003. L-analyticity in natural language. Manuscript, MIT.

Groenendijk, Jeroen, and Martin Stokhof. 1984. Studies on the Semantics of Questions and the Pragmatics of Answers. Doctoral Dissertation, University of Amsterdam.

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

Katzir, Roni. 2008. Structural Competition in Grammar. Doctoral Dissertation, MIT.

Krifka, Manfred. 1995. The semantics and pragmatics of polarity items. Linguistic Analysis 25:209–257.

Kroch, Anthony. 1972. Lexical and inferred meanings for some time adverbials. Quarterly Progress Reports of the Research Laboratory of Electronics 104:260–267.

Lewis, David. 1988. Relevant implication. Theoria 54:161–174.

Magri, Giorgio. 2009. A theory of individual-level predicates based on blind mandatory scalar implicatures. Natural Language Semantics 17:245–297.

Magri, Giorgio. 2011. Another argument for embedded scalar implicatures based on oddness in downward entailing environments. Semantics and Pragmatics 4:1–51.

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