Building Alternatives

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Inferences that result from exhaustification of a sentence S depend on the set A of alternatives to S. We will give a characterization of A which accounts for inference patterns that pose a challenge for other proposals. This is an example of such patterns:

(1) Bill went for a run and didn't smoke. John (only) went for a run.
Inference: ¬[John went for a run and didn't smoke]

(2) Bill passed some of the tests and failed some. John (only) passed some of the tests.
*Inference: ¬[John passed some of the tests and failed some]

While (1) can imply that it is not the case that John went for a run and didn't smoke (i.e. that John smoked), (2) cannot imply that it is not the case that John passed some of the tests and failed some (i.e. that John passed all of the tests). (The sequence in (2) is odd. We believe the reason for its oddness is that it cannot have the inference.) To derive the inference of (1), the exhaustification of S_1 = **John went for a run** must be relative to a set A that includes the sentence S_1' = **John went for a run and didn't smoke** (to license the inference) and excludes S_1'' = **John went for a run and smoked** (so that the inference is not canceled out). To explain the lack of an inference in the case of (2), exhaustification of S_2 = **John passed some of the tests** must be relative to a set A that includes both S_2' = **John passed all of the tests** and S_2'' = **John passed some of the tests and failed some** (so that S_2' and S_2'' cancel each other out). In both cases, S_i' and S_i'' are symmetric alternatives to S_i: $S_i' \wedge S_i''$ is a contradiction and $S_i' \vee S_i''$ is equivalent to S_i (Fintel and Heim 1997). Our theory must "break symmetry" in the case of (1) (i.e. define A in such a way that it can contain S_1' but not S_1'') without breaking symmetry in the case of (2). Assuming that $A = F(S) \cap C$, where F(S) is the set of formally defined alternatives of S and C a contextual restriction (Rooth 1992), symmetry can be broken by imposing conditions on F(S) and/or C.

Fox and Katzir (2011), henceforth F&K, advance a theory in which symmetry is broken in F(S) alone. They propose that F(S) be regarded the set in (3), where $F_R(S)$ is the set of sentences derived from S by replacement of F-marked constituents with expressions of the same semantic type.

(3) *Formal alternatives (F&K)*: $F(S) = F_R(S) \cap \{S' \mid S' \preceq_c S\}$

The relation '$x \preceq_c y$' is to be understood as 'x is no more complex than y in discourse context c.' Here is the definition.

(4) a. $E' \preceq_c E$ if $E' = T_n(...T_1(E)...)$, where each $T_i(x)$ is the result of replacing a constituent of x with an element of SS(E,c), the substitution source of E in c
b. $SS(E,c) = \{x \mid x \text{ is a lexical item}\} \cup \{x \mid x \text{ is a constituent uttered in c}\}$

(3)&(4) yield, correctly, that the sequence in (2) does not license $\neg S_2'$ as an inference since the formal alternatives of S_2 in (2) include both S_2' (generated by replacing **some** in S_2 with **all**, taken from the lexicon) and S_2'' (generated by replacing **passed some of the tests** in S_2 with **passed some of the tests and failed some**, taken from the disourse context). (3)&(4) can also break symmetry: S_2 outside a context licenses $\neg S_2'$ as an inference. This is predicted: the formal alternatives of S_2 in this case include S_2' (same as above), but not S_2'' (since **passed some of the tests and failed some** is neither in the lexicon nor in the context). Problematically, however, (3)&(4) fails to predict that the sequence in (1) does license $\neg S_1'$ as an inference: the formal alternatives of S_1 in (1) include both S_1' (generated by replacing **went for a run** in S_1 with **went for a run and didn't smoke**, taken from the context) and S_1'' (generated by replacing **didn't smoke** in S_1' with **smoked**, also

taken from the context; note that (4a) allows for successive replacements). Even worse, given what has been said the inference in (1) is licensed only if symmetry can be broken in C.

At first glance, a strategy to explain the contrast between (1) and (2) by breaking symmetry in C is to appeal to the notion of a "pragmatic scale" (cf. Klinedinst 2004). It seems much easier to construct an evaluative scale on which S_1'' is ranked lower than S_1' (e.g. a healthiness scale), than it is to construct a scale on which S_2'' ranks lower than S_2'. However, a draft dodging context makes available, and salient, a scale on which S_2'' ranks lower than S_2' (i.e. a scale measuring the degree of luck of a draft dodger). But even this context cannot support the relevant inference for (2):

(5) In the draft for the Korean war, Bill has been dealt a better hand than John. He passed some of the military fitness tests and failed some, while John (only) passed some of the tests.
*Inference: ¬[John passed some of the tests and failed some]

We conclude that a solution to the problem at hand in terms of pragmatic scales is not tenable and that a refinement of F&K's approach is called for instead. As it turns out, we only need to make a minimal adjustement. We propose to impose the constraint in (6) on F&K's concept of F(S):

(6) *Atomicity*: Expressions in the substitution source are syntactically atomic

Atomicity breaks symmetry in (1). The derivation of S_1'' proceeds as follows (where AT marks the atomic expressions): **John went for a run** → **John [$_{AT}$ went for a run and didn't smoke]** → **John [$_{AT}$ went for a run and [$_{AT}$ smoked]]**. The second step violates Atomicity so that S_1'' cannot be derived. It is still possible to derive from S_1 the alternative **John smoked**, which is contradictory to S_1', too. However, this is not a problem for our analysis since **John smoked** can be excluded from A: A=$\{S_1, S_1'\}$ satisfies the three conditions in (7) (equivalent to F&K's hypothesis that A is restricted to the set of relevant sentences which is closed under negation and conjunction).

(7) *Conditions on A (F&K)*: (i) A ⊆ F(S) , (ii) S ∈ A, and (iii) there is no S′ in F(S)\A such that S′ is in the Boolean closure of A

Atomicity does not break symmetry in (2): F(S_2) = {**pass some**, **pass all**, **fail some**, **fail all**, **pass some** ∧ **fail some**}. To get the non-attested inference, A must be the set N = {**pass some**, **fail some**, **fail all**, **pass some** ∧ **fail some**}. However, N does not qualify, as F(S_2)\N contains **pass all** which, being equivalent to **pass some** ∧ ¬**fail some**, is in the Boolean closure of F(S_2).

F&K's theory has another problem: given (3)&(4) and the assumption that exhaustification also involves logically independent alternatives (Spector 2006), (8) cannot be explained (Romoli 2012a).

(8) They did [$_{NegP}$ not [$_{VP}$ pass all of my students]]
Inference: ¬[They didn't pass some of my students]

(3)&(4) predict both S_3' = **they didn't pass some of my students** and S_3'' = **they passed some of my students** to be formal alternatives of (8). Atomicity solves this problem, too: it rules out S_3'', as its derivation involves replacing NegP with VP and **all** in the then atomic VP with **some**.

The Atomicity constraint makes the substitution source a sort of numeration. If we further impose the condition that the derivation of F(S) must proceed from bottom up, we can account for the "switching problem" (Romoli 2012b): **Some of my students did all of the readings** cannot imply ¬[all of my students did some of the readings], while **None of my students did all of the readings** can imply that all of my students did some of the readings. Atomicity and the bottom-up constraint make the syntactic derivation of formal alternatives strikingly similar to the syntactic derivation of sentences, suggesting that the former might be a "cooptation" of the latter.

References: **Fox, Katzir** (2011) On the characterization of alternatives. NaLS. **Fintel, Heim** (1997) Pragmatics in Linguistic Theory. MIT classnotes. **Klinedinst N** (2004) Only scalar only. Handout. **Romoli** (2012a) A problem for the structural characterization of alternatives, unpublished ms. ∼ (2012b) Soft but Strong. PhD thesis, Harvard University. **Rooth** (1992) A theory of focus interpretation. NaLS. **Spector** (2006) Scalar implicatures: Local or global?, unpublished ms, Institut Jean Nicod.