Structurally Defined Alternatives and Lexicalizations of XOR

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This is the penultimate version.
Please consult the official version in *Linguistics and Philosophy.*

In his recent paper on the symmetry problem Roni Katzir argues that "the only relevant factor" for the calculation of any Quantity implicature "is structure" (2007, 688). My first aim here is to refute Katzir by providing three examples that show that structural complexity is irrelevant to the calculation of some Quantity implicatures. My second aim is to cast doubt on the advisability of assuming—as Katzir and others in effect do—that *exactly one* factor is relevant to the calculation of any Quantity implicature. To discover that there is exactly one such factor would be a major advance in our understanding of implicature. But at this stage it's simply an unwarranted assumption.

Although (1-a) conversationally implicates (1-b), (1-a) does not implicate (1-c).

(1) a. I ate some of the leftovers.
b. $\rightsquigarrow$I ate some but not all of the leftovers.
c. $\not\rightsquigarrow$I ate all of the leftovers.

Both (1-b) and (1-c) asymmetrically entail (1-a). On a naïve implementation of Grice's view on conversational implicature, this obligates a cooperative, informed speaker who knows the relevant facts not to use (1-a). Instead she should use whichever of (1-b) and (1-c) she believes to be true. If she does use the relatively uninformative (1-a), the naïve implementation has it that she implicates that (1-c) is false, since as a cooperative speaker she would have used (1-c) if she believed it to be true.[1] This prediction is right. But by symmetry of reasoning the naïve implementation has it that she also implicates that (1-b) is false, and this prediction is obviously wrong. The *symmetry problem* is the problem of breaking the kind of symmetry that leads to the conclusion that (1) implicates both (1-b) and (1-c). It is the problem of saying, in general, what alternatives are considered in the calculation of Quantity implicatures (Kroch 1972).

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[1] Somewhat less naïvely: she implicates at least that it is not the case that she believes that (1-c) is true (Soames 1982, Leech 1983, Hirschberg 1985, and Horn 1989). For recent discussion see Spector 2003, 2006, and 2007; van Rooij & Schulz 2004; Sauerland 2004; Fox 2006; Russell 2006; and Geurts 2009 and 2010. I focus on naïve versions of Gricean reasoning here for simplicity; it is straightforward to adapt my arguments to such "weak" or "primary" (Sauerland 2004) implicatures.

As an instance of the symmetry problem (1) has some misleading features. 'Some but not all' is manifestly unlike 'some' and 'all': it is considerably more complex and considerably less likely to be used in most contexts than the lexicalized determiners 'some' and 'all.' But other quite analogous instances of the symmetry problem do not involve contrasts like these. Consider:

(2) a. The heater sometimes squeaks.
b. $\rightsquigarrow$ The heater intermittently squeaks.
c. $\rightsquigarrow$ The heater occasionally squeaks.
d. $\not\rightsquigarrow$ The heater constantly squeaks.

(3) a. Going to confession is permitted.
b. $\rightsquigarrow$ Going to confession is optional.
c. $\not\rightsquigarrow$Going to confession is required.

(4) a. The statue is possibly identical to the clay.
b. $\rightsquigarrow$ The statue is contingently identical to the clay.
c. $\not\rightsquigarrow$ The statue is necessarily identical to the clay.

'Intermittently/occasionally,' 'optional,' and 'contingently' are short, simple alternatives to 'sometimes,' 'permitted,' and 'possibly.' We can easily imagine contexts in which they are just as salient as 'constantly,' 'required,' and 'necessarily.' In such contexts, a naïve implementation of the Gricean view might go as follows:

> It is common belief that the addressee reasons as follows: The speaker asserted (2-a). But there is a relevant stronger (more informative) assertion, that is salient, short, and simple, and that the speaker might have made: namely, "The heater intermittently squeaks" (2-b). Since she didn't say this, and we can assume that she is opinionated about the facts and is being cooperative, she must believe this stronger alternative to be false. So (2-a) conversationally implicates (2-d).

But this is a bad prediction. And it is just another instance of the symmetry problem, since by parallel reasoning (2-a) conversationally implicates (2-b)—as it in fact does.

Katzir's treatment (among others) also makes the wrong predictions about these cases, and any other cases that involve simple lexicalizations of exclusive disjunction. (Interestingly, Singh & Katzir 2009 denies that natural language attests XOR, but does not consider cases like those above.) For present purposes the crucial innovations of Katzir's theory are (i) an attractive definition of structural complexity that partially preorders parse trees and (ii) a conversational principle that uses that preorder to rule certain alternatives out of consideration:

Structural complexity: Let φ, ψ be parse trees. If we can transform φ into ψ by a finite series of deletions, contractions, and substitutions of constituents in φ with constituents of the same category …we will write '$\psi \lesssim \varphi$'. (Katzir 2007, 679)

Katzir's conversational principle: Do not use φ if there is another sentence ψ such that $\psi \lesssim \varphi$, $[\![\psi]\!] \subset [\![\varphi]\!]$, and ψ is weakly assertible (679). (A sentence is *weakly assertible* iff the speaker believes that it is true, relevant, and supported by the evidence (672).)

(Katzir also develops a mechanism meant to handle Yo Matsumoto's putative counterexamples to brevity/complexity approaches (685–688), but that mechanism does not help with my counterexamples.) Katzir's definition and principle allow him to break the symmetry between (1-b) and (1-c). For clearly (1-c) $\lesssim$ (1-a) but (1-b) $\not\lesssim$ (1-a). And because $[\![$(1-c)$]\!] \subset [\![$(1-a)$]\!]$, the choice not to use (1-c) licenses the inference that it is not weakly assertible. Because (1-b) $\not\lesssim$ (1-a) the choice not to use (1-b) does not license the analogous inference.

Note, however, that *both* (2-b) $\lesssim$ (2-a) and $[\![$(2-b)$]\!] \subset [\![$(2-a)$]\!]$, and (2-d) $\lesssim$ (2-a) and $[\![$(2-d)$]\!] \subset [\![$(2-a)$]\!]$. On Katzir's account, then, we shouldn't use (2-a) if (2-b) is weakly assertible. (Similarly for (3) and (4): we shouldn't use (3-a) if (3-b) is weakly assertible, and we shouldn't use (4-a) if (4-b) is weakly assertible.) Of course we use sentences like (2-a), (3-a), and (4-a) freely and without censure, even if we *could* use (2-b), (2-c), (3-b), and (4-b). So Katzir's account is too restrictive. And it overgenerates, too. In the event that a speaker *does* use (2-a), Katzir's account predicts that the addressee will infer that (2-b) and (2-c) are not weakly assertible. This generates (2-d) as an implicature. So again we have the symmetry problem. Cases like these raise analogous problems for the theories of focus alternatives in Fox & Katzir 2009a, 107, and 2009b, 11–12.

What conclusions should we draw from the data in (2), (3), and (4)? Obviously at least that

C1: Brevity and structural complexity aren't enough to solve the symmetry problem for (2), (3), and (4).

Moreover, it seems likely that any successful explanation of (2), (3), and (4) could be deployed to explain (1). If this is right then we might be justified in drawing the further lesson that

C2: Brevity and structural complexity aren't enough to solve the symmetry problem for $\exists$ to $\neg\forall$ implicatures.

Whether or not we have enough evidence for C2, it follows straightaway from either C1 or C2 that

C3: Brevity and structural complexity aren't enough to solve the symmetry problem *in general*.

This is an interesting and important conclusion, but obviously it is much weaker than

C4: Brevity and structural complexity have no role to play in solving the symmetry problem.

Approaches on which a wide range of factors may interact with "the principles of cooperation [that] constrain the speaker's choice" of expression (McCawley 1978, 257) might well be committed to C3 *and* committed to the negation of C4. Consider for example the theories developed in Atlas & Levinson 1981, Horn 1984 and 1989, Hirschberg 1985, and Levinson 2000. Horn in particular appeals to brevity, degree of lexicalization, markedness, prolixity, stereotypicality, and other factors in the derivation of Q-implicatures (1989, 197). As a reviewer notes, some combination of such factors might help explain the features of (2), (3), and (4) that Katzir's pure structural complexity account cannot explain.

Notwithstanding the fact that C4 is not supported by the data we have considered, the kind of move exemplified by inferring C4 on the basis of (2), (3), and (4) is common in work on conversational implicature. Here is one example. Yo Matsumoto observes that (5-a) implicates (5-b) even though "It was a little bit more than warm yesterday" is longer than "It was warm yesterday" (44).

(5) a. It was warm yesterday, and it is a little bit more than warm today.
b. $\rightsquigarrow$ It was not a little bit more than warm yesterday.

This is a problem for accounts that rely *exclusively* on brevity (or structural complexity) to solve the symmetry problem, as Katzir is well aware (685–688). Let us suppose that Matsumoto is right that brevity plays no role in the correct explanation of (5); let us even suppose that "This example shows that the relative prolixity of *S* cannot by itself constrain the production of Quantity-1 implicature" (Matsumoto 1995, 44). It does not follow from this that

> If a stronger item is regarded as carrying necessary information, that expression is expected to be used even if it is prolix. That is, one cannot reduce lengthiness at the cost of necessary information. …the Maxim of Brevity…is not really relevant [to the symmetry problem]. (44)

Showing that brevity does not have as big a role to play as its partisans might hope does not show that it has no role to play. Similarly, although Katzir raises problems for Matsumoto's account, even if those problems are decisive, all they show is that Matsumoto's story is not complete. Katzir is wrong to take himself to have an argument "against the use of scales and monotonicity" (689); Fox and Katzir are wrong to say that "the question … is whether the alternatives are constrained by complexity or whether … the appropriate constraint is semantic" (2009a, 102). There needn't be a unique "appropriate constraint" on alternatives.

The right methodology to use in working on conversational implicature is thus subtler than one might have thought. If a theorist is bold enough to assert that the symmetry problem can be solved through appeal to feature *F* alone, then showing that an instance of the symmetry problem cannot be solved through appeal to feature *F* is enough to refute that theorist. But the import of such counterexamples is easy to overestimate, for their existence is wholly compatible with feature *F* playing a significant role in other instances of the symmetry problem.

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