The Exclusive Interpretation of Disjunction[1)]

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Song, Jae-gyun. 2002. The Exclusive Interpretation of Disjunction. *The Linguistic Association of Korea Journal, 10*(3), 117-136. This paper proposes that contrary to the claim of Rooy (2001) and Simons (2000), among others, the scalar implicature approach has no difficulty accounting for the exclusive reading of a disjunction with more than two disjuncts. In addition, I show that the alternative view proposed by them fails to explain why exclusive reading is consistently suspended in downward entailing contexts, while it is quite predictable within the scalar implicature approach.

Key words: disjunction, exclusive, scalar implicature

1. Introduction

One of the apparent discrepancies between *or* and logical $\vee$ is the tendency of the former to receive an exclusive interpretation. For instance, consider the utterance in (1):

(1) John bought chips or ice cream.

There is a general tendency that a speaker who utters (1) will usually be understood to mean that John bought chips or ice cream, *but not both*, though $p \vee q$ is true even when both p and q are true.

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In the current linguistic literature there is quite general agreement that exclusivity of *or* should be given a pragmatic explanation. Recently, however, Rooy (2001) and Simons (2000), among others, claim that the explanation based on scalar implicatures (SI, hereafter), due to Gazdar (1979), is flawed. My goal, in this paper, is to defend the SI view of the exclusive reading of disjunction, and show that the SI approach provides better explanations for the exclusivity phenomena than the alternative view proposed by the opponents.

I will review, first, the Gazdarian account of the exclusive reading of disjunction and the objections against it (section 2 and 3), and will then present and critique the alternative view, which is proposed by the opponents (section 4 and 5). I will then argue that the objections to the SI view is untenable, showing that the alleged problems can be successfully accounted for within the SI approach (section 6).

2. Gazar's (1979) Account

An often-cited account of the exclusive reading of disjunction is given by Gazdar (1979). In this section, I will briefly present Gazdar's account of the exclusive reading of disjunction. Gazdar derives the exclusive interpretation of *or* as a scalar implicature, a notion originally due to Horn (1972). This notion is a generalization of certain kinds of implicatures generated by Grice's (1989) first sub-maxim of Quantity: Make you contribution as informative as is required (for the current purposes of the exchange). Scalar implicatures are so called because they involve what Horn and Gazdar call *quantitative scales*, which have the following property:

(2) *Quantitative Scale*: Let Q be an n-tuple of expressions such that $Q = \langle e_0, e_1, \ldots e_{n-1} \rangle$ where $n>1$. Let $S[e_i]$ be a sentence containing the expression $e_i \in Q$, and let $S[e_{i+1} \backslash e_i]$ be a sentence just like $S[e_i]$ except that e_i is replaced by the subsequent element of Q, e_{i+1}. Then if Q is a quantitative scale, $S[e_i]$ entails $S[e_{i+1} \backslash e_i]$, and $S[e_{i+1} \backslash e_i]$ does not entail $S[e_i]$.

This says that if you take a sentence *S* containing some element *e* of a quantitative scale, and replace *e* with the subsequent element in the scale to form *S′*, then *S* will entail, but will not be entailed by *S′*. (So every element in a quantitative scale is informationally stronger than the element which follows it.)

According to Gazdar, scalar implicatures are generated as follows: Take a sentence *S′* as defined in the previous paragraph. *S′* scalar-implicates that the speaker knows that it is not the case that S. We now have all the ingredients of Gazdar's derivation of the exclusivity implicature. First, we note that <*and, or*> is a quantitative scale: any sentence of the form *A and B* entails, but is not entailed by *A or B*, assuming *or* to have the truth conditions of inclusive disjunction. The way in which the exclusive reading of *or* comes about may be schematically illustrated as in (3):

(3) a. $A \vee B$ (assertion)
  b. $\neg(A \& B)$ (by scalar implicature)
  c. $(A \vee B) \& \neg(A \& B)$ (from a. and b.) (=exclusive reading)

Thus, according to Gazdar, *A or B* scalarly implicates that it is not the case that *A and B*, because the *and* sentence is informationally stronger than the *or* sentence. The exclusive reading of *A or B* is derived from the conjunction of the truth conditional meaning of *A or B* and its scalar implicature $\neg(A \& B)$. By drawing a truth table, we can confirm that $(A \vee B) \& \neg(A \& B)$ is true only in the following two situations, in which only one conjunct is true:

(4) a. A=1, B=0
  b. A=0, B=1

3. Simons' (2000) Critique of Gazdar (1979)

Several authors, including Groenendijk and Stokhof (1984), McCawley

(1993), Simons (2000) and Rooy (2001), have pointed out that Gazdar's explanation of the exclusive reading of disjunction is flawed: more specifically, they argue that the implicatures generated by the <and, or> scale cannot account for the fact that a sentence of the form *A or B or C* gives rise to the inference that only one of the three is true. That is, we have the interpretation that *A or B or C* is true only in the following three situations:

(5) a. A=1, B=0, C=0
b. A=0, B=1, C=0
c. A=0, B=0, C=1

Below, I review the objections by Simons (2000), who presents the most detailed and explicit arguments against the Gazdarian account of the exclusive reading of disjunction. According to Simons, Gazdar's account of the exclusive reading of *or* does not generalize to disjunctions with more than two disjuncts. However many disjuncts there are, if we interpret the disjunction exclusively, we infer that one and only one disjunct is true. The exclusive reading never surfaces as an inference that, say, at most two of the disjuncts are true.

To begin, suppose a speaker has uttered a three-disjunct disjunction, *A or B or C*. *A & B & C* is informationally stronger than the assertion $A \vee B \vee C$, because the former entails the latter. Then, by the Gazdar's implicature computation procedure, we can infer that the stronger *A & B & C* to be false. What we can infer finally is the following:

(6) $(A \vee B \vee C)$ & $\neg(A$ & B & $C)$

But (6) does not entail that only one of *A*, *B* and *C* is true. It entails merely that at least one of *A*, *B* and *C* is false. By constructing a truth table, we can verify that (6) makes the following cases true:

(7) a. A=1, B=0, C=0 d. A=1, B=1, C=0
b. A=0, B=1, C=0 e. A=0, B=1, C=1
c. A=0, B=0, C=1 f. A=1, B=0, C=1

As mentioned above, we infer, intuitively, that one and only one disjunct is true, when *A or B or C* is asserted. However, (6) becomes true even in the cases of (7d-f), in which two disjuncts are true.

Simons also considers six other alternatives isomorphic to $A \vee B \vee C$ which lie on the scale between it and *A & B & C*:

(8) a. A & (B ∨ C) d. (A & B) ∨ C
b. C & (A ∨ B) e. (B & C) ∨ A
c. B & (A ∨ C) f. (A & C) ∨ B

Suppose that it is one of these informationally stronger scalar alternatives that we infer to be false. Could this assumption in any case lead to the inference that only one of *A*, *B* and *C* is true? In other words, is it possible to get only the cases in (5a-c) when the negation of one of the scalar alternatives in (8) is conjoined with assertion $A \vee B \vee C$?

The answer again is no. Simons' reasoning goes as follows:
(i) Any of (8a-c) can be rendered false by virtue of only one of their disjuncts being false. The truth table of, say, $(A \vee B \vee C) \,\&\, \neg(A \,\&\, (B \vee C))$ shows that it is true in the following four situations, so it renders a still weaker prediction. The other two cases also make weaker predictions:

(9) a. A=0, B=1, C=1 c. A=0, B=1, C=0
b. A=1, B=0, C=0 d. A=0, B=0, C=1

(ii) All of (8d-f) can be rendered false only if at least two of their constituents are false. However, a speaker who knew one of these to be false would be in a position to make a stronger assertion than *A or B or C*. For instance, anyone who knew that (some instance of) (8d) was false would have to know that *C* was false. If he then said *A or B or C*, he would generally be in violation of Quantity, as he could have said $\neg$*C and (A or B)*, which is more informative. The same argument holds for (8e-f).[2)]

(iii) Hence, none of (8a-f) could form the basis of a Gazdarian argument from an utterance of *A or B or C* to the conclusion that only one of *A*, *B*, *C* is true.

Based on the foregoing reasoning, Simons concludes that some other account is needed to adequately explain the exclusive interpretation of disjunction. In section 6, however, I will show that Simons' objections to the SI account of the exclusive reading is not tenable, and the exclusive reading of *A or B or C* can be accounted for within the SI approach. Before that, the alternative view proposed by Simons is presented in the next section.

4. Exclusivity from Exhaustiveness

In this section, I discuss the exhaustivity view of the exclusive reading of disjunction, which has been proposed by Simons (2000) and advocated by Rooy (2001). A similar proposal has also been made by Groenendijk and Stokhof (1984).[3)]

To begin, consider the following question-answer pair:

(10) A: Where did Jane go for her vacation?
B: Sweden.

2) According to Gazdar's (1979) theory of implicature, the clausal implicatures, *Possibly A*, *Possibly B*, *Possibly C*, rule out the negation of each of (8d-f) as a scalar implicature. Anyway, it's true that (8d-f) cannot be the basis of scalar implicatures, and in this paper I will not concern about which analysis fares better.

3) Their account differs from Simons' in that while Simons suggests that each disjunct is interpreted *pragmatically* as exhausting a given option, they argue that this interpretation is part of the *semantic*s. Refer to Simons (2000) and Fintel (2000) for arguments against the semantic analysis.

Simons observes that we will most likely interpret *B*'s answer as being exhaustive. That is, we interpret *B*'s answer to mean that Sweden was the only place Jane went. Simons claims that Grice's first sub-maxim of Quantity provides an explanation for this: as a cooperative participant in this exchange, *B* should give *A* all the information which he has which is relevant to the purpose of the exchange. If he know that Jane went to Sweden and also somewhere else, he should tell *A*. As *B* didn't, *A* can assume that Jane went only to Sweden.

Now, suppose that when *A* asked *B* his question, *B* wasn't quite sure where Jane had been, and replied as in (11):

(11) B: I'm not sure. Either Sweden or Greenland.

In this situation, we are now most likely to understand *B* to mean that either Jane went to Sweden and not to Greenland, or that she went to Greenland and not to Sweden. In other words, we will interpret the disjunction exclusively. Simons argues that the exclusivity is derived from the exhaustive interpretation of *each disjunct*. According to her, each disjunct must satisfy the requirement that it be maximally informative, under the assumption that a disjunction is used to list a series of possible answers to a question. In B's reply to *A*'s question, *B* have offered two possible answers. One is "Jane went to Sweden," and the other is "Jane went to Greenland." Application of the exhaustivization procedure to each disjunct leads to the prediction that the first answer is equivalent to "Jane went to Sweden and nowhere else." and the second is equivalent to "Jane went to Greenland and nowhere else." Given this interpretation of each disjunct, we are forced to understand that the truth of either one excludes the truth of the other, simply because the two disjuncts are interpreted exhaustively.

In sum, the basic idea is that a disjunction is interpreted exclusively because each disjunct is interpreted exhaustively. In the next section, however, I maintain that Simons' approach to exclusivity is too strong to account for the full range of data concerning the exclusive interpretation of disjunction.

5. Downward Entailment and Exhaustivity

In this section I will present data that cast some doubts on the exhaustiveness view of the exclusive interpretation of disjunction. Such data show that exclusive interpretations consistently fail to arise in downward entailing contexts, in which the scalar alternatives of an asserted disjunction become informationally *weaker* than the disjunction. The exhaustivity approach seems to run into problems explaining why exclusiveness reading is suspended in downward entailing contexts. On the contrary, the SI view has no difficulties predicting this result: the essential tenet of the SI view is that scalar implicatures come from the negation of informationally *stronger* alternatives.

5.1. Downward Entailment

Let us start with Gazdar's (1979) observation that scalar implicatures appear to be suspended under negation. Consider example (12) from Gazdar:

(12) It is not the case that Paul ate some of the eggs.

Here, the simple-minded application of Gazdar's procedure would, by replacing *some* with *all* and negating the result (where then the double negations cancel each other out), lead to the wrong prediction that the sentence in (12) would implicate *Paul ate all of the eggs*:

(13) a. It is not the case that Paul ate *all* of the eggs.
b. ¬It is not the case that Paul ate *all* of the eggs.
c. Paul ate all of the eggs.

But this result is incorrect for (12)   the putative implicature in (13c) contradicts the assertion. Gazdar′ solution to this negation problem blocking implicature computation from applying to any scalar term in the scope of a logical operator, including negation is not only stipulative, but too strong.[4] Rather, the root of the problem is that negation reverses scales, i.e. negation inverts the informational strength of the relevant alternative, which is first observed by Horn (1989). Replacing *some* with *all*, when it is not in the scope of negation, yields the right results. But when *some* occurs in the scope of negation as in (12), replacing it with *all* yields a weaker claim, as can be seen in the following entailment relationships:

(14) a. Paul ate *all* of the eggs $\Rightarrow$
Paul ate *some* of the eggs
b. It is not the case that Paul ate *some* of the eggs $\Rightarrow$
It is not the case that Paul ate *all* of the eggs

Sauerland (2001) proposes an explicit implementation to settle the problem concerning negation. The following is a simplified version of his original definitions. For details, refer to Sauerland (2001):

(15) A sentence ψ is a *scalar alternative* of φ if the following two conditions hold:
a. $\psi \neq \varphi$
b. there are scalar expressions α and α' which both occur on the same scale C such that ψ is the result of replacing α in φ with α'.

A scalar alternative of an utterance leads to an implicature only if the scalar alternative is stronger than the assertion. This is given in (16):

4) For the detailed discussions on the problems of Gazdar's analysis, refer to Sauerland (2001).

(16) $\neg\psi$ is an *implicature* of φ if the following two hold:
a. ψ is a scalar alternative of φ
b. ψ entails φ, and φ doesn't entail ψ.

Proposal (16) now solves the negation problem of (12): according to (16), $\neg$*It is not the case that Paul ate* *all* *of the eggs*, i.e. *Paul ate all of the eggs*, should not be an implicature of the assertion *It is not the case that Paul ate* *some* *of the eggs*, because the scalar alternative *It is not the case that Paul ate* *all* *of the eggs* does not entail the assertion. That is, negation reverses the entailment relationship as in (14b) above.

It is important to notice that this improvement by Sauerland still follows the basic principle of the computation of scalar implicatures: a scalar implicature of an assertion is derived from the negation of an informationally stronger, i.e. entailing, scalar alternative. Besides this, as for the question where quantitative scales come from, I hold the view that basically, any propositions in an asymmetrical entailment relationship can be potential scalar alternatives, though the potential scalar alternatives are subject to a set of limited numbers of restrictions, for instance, like Horn's (1989) Monotone Identity Condition and Matsumoto's (1995) Conversational Condition on scales, in order for them to surface as actual scalar alternatives.[5] This may be compared to the *Move-α* rule of Principles-and-Parameters theory, which is constrained by such principles as the Subjacency Condition, ECP, etc..

Now consider a disjunction within the scope of negation:

(17) a. John did not write a paper or make a presentation
b. $\neg$John did not write a paper and make a presentation
(=John wrote a paper and made a presentation)

(17b) is not the scalar implicature of assertion (17a), because the scalar alternative *John did not write a paper* *and* *make a presentation* does not entail the assertion *John did not write a paper* *or* *make a*

5) This line of thought is most explicitly pursued by Matsumoto (1995).

presentation. Therefore, it is predicted that (17a) does not have exclusive reading, but receives inclusive interpretation, which seems intuitively correct.

Horn (1989), and, more explicitly, Chierchia (2001), suggest that scalar implicatures are consistently suspended not just under negation, but more generally in downward entailing contexts. Downward entailment (DE) may be defined as follows:

(18) A function f is a downward entailment operator iff it licenses inferences from a set to its subsets, i.e. iff $f(A)$ entails $f(B)$, whenever $B \subseteq A$.

Thus, sentences of the form *DE(A and B)* are less informative than sentences of the form *DE(A or B)*, i.e. the former is entailed by the latter. Every scalar term that yields a more informative statement in a *non*-DE environment as compared to an alternative term on the same scale, will yield a less informative statement in the scope of a downward entailing operator. Observing this property of scalar terms, Chierchia (2001) claims that DE contexts reverse the information scale. Thus, a downward entailing operator like negation reverses the entailment relationship.

Compare the entailment relationships in (19) and (20):

(19) a. John wrote a paper <u>and</u> made a presentation $\Rightarrow$
b. John wrote a paper <u>or</u> made a presentation

(20) a. John did not write a paper <u>or</u> make a presentation $\Rightarrow$
b. John did not write a paper <u>and</u> make a presentation

The reversal of entailment relationships is schematically illustrated in (21):

(21) a. $\neg(A \vee B) \Rightarrow \neg(A \,\&\, B)$
b. $\neg(A \,\&\, B) \ast\!\Rightarrow \neg(A \vee B)$[6]

The set of circumstances that verify the sentence *A and B* is a subset of the circumstances that verify *A or B*. On the contrary, the sentence *It is not the case that A or B* is true in a subset of the circumstances in which *It is not the case that A and B* is true. As a consequence, a statement of the form *It is not the case that A or B* is more informative. More generally, given two sentences *S1* and *S2* such that *S1* is stronger than *S2* in non-DE contexts, *DE(S2)* is stronger than *DE(S1)*. Thus, the definition of scalar implicatures given in (16) predicts that the exclusivity implicature of *or* does not arise in downward entailing contexts in general.

This prediction seems to be borne out. Let's consider some other examples of downward and non-downward entailing contexts. Below, sentences in (b) represent the unmarked interpretation of sentences in (a). The data and grammaticality judgements are based on Chierchia (2001):

A. <u>DE Contexts</u>

(22) *Before* clause:

a. John arrived before Paul or Bill

b. John arrived before Paul or Bill *or both*

(23) Restriction of *no*:

a. No student with an incomplete or a failing grade is in good standing

b. No student with an incomplete or a failing grade *or both* is in good standing

(24) Restriction of *every*:

a. Every student who wrote a squib or made a classroom presentation got extra credit

b. Every student who wrote a squib or made a classroom presentation *or did both* got extra credit

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6) I use the symbol '*⟹' to indicate invalid entailments.

B. Non-DE Contexts

(25) *After* clause:

a. John arrived after Paul or Bill

b. John arrived after Paul or Bill, but not both

(26) Restriction of *some*:

a. There was some student who had an incomplete or a failing grade

b. There was some student who had an incomplete or a failing grade, *but not both*

(27) Scope of *every*:

a. Every student wrote a squib or made a classroom presentation

b. Every student wrote a squib or made a classroom presentation, *but didn't do both*

5.2. Downward Entailment and the Exhaustivity Account

In section 5.1, we have seen that the suspension of exclusivity implications in downward entailing contexts can be adequately accounted for within the framework of SI theory: a scalar implicature of an assertion is derived from the negation of informationally stronger, i.e. entailing, scalar alternatives, but DE contexts reverse the entailment relationship: for instance, a sentence with *or* becomes informationally stronger than the one with *and*. Thus, no implication of exclusiveness follows, since exclusive reading comes from the conjunction of the truth conditional content of an assertion and the negation of informationally stronger scalar alternatives. On the other hand, the exhaustivity approach, which is advocated by Groenendijk and Stokhof (1984), Simons (2000) and Rooy (2001), among others, runs into troubles explaining why the exclusive reading of *or* fails to arise in downward entailing contexts.

By way of illustration, let's consider (24a), repeated below as (28):

(28) Every student who wrote a squib or made a classroom presentation got extra credit

As we have already observed, sentence (28) tends to suggest that every student who wrote a squib or made a classroom presentation or both got extra credit. No exclusive reading of *or* is assumed, and *or* receives an inclusive interpretation. The SI approach can predict this result without difficulties: the restriction of a universal quantifier is a downward entailing context as evidenced by the following entailment relation:

(29) Every student who is running will arrive in time ⇒
Every student who is running fast will arrive in time

So, the scalar alternative of (28), *Every student who wrote a squib and made a classroom presentation got extra credit*, is informationally weaker than assertion (28). Thus, according to definition (16), the negation of this alternative is not qualified as an implicature of (28).

On the contrary, if we adopt the exhaustivity view and apply the exhaustivization procedure to each of the disjuncts, exclusive reading is wrongly predicted, which the assertion in (28) does not give rise to:

(30) Every student who wrote only a squib (and not others) or made only a classroom presentation (and not others) got extra credit

To recap, the exhaustivity approach to exclusive reading seems to have troubles explaining why the exclusive reading is consistently suspended in downward entailing contexts. On the contrary, the SI view has no difficulty predicting this result: the basic tenet of the SI view is that scalar implicatures comes from negating informationally *stronger* alternatives, but downward entailing contexts make the alternatives informationally *weaker* than an assertion.

6. Evidence against the Gazdarian Account?

As we saw in section 3, Simons maintains that the Gazdarian approach to the exclusive reading of *or* is problematic in that it cannot explain the exclusive reading of *A or B or C*. In this section, however, I will show that she is not on the right track. Before putting forth my proposal, I would like to recap my view on the computation of scalar implicature. I have assumed that the essential tenet of the SI approach is that the scalar implicatures of an assertion are derived from the negation of informationally stronger scalar alternatives. In addition, I hold the view that basically, any propositions in an asymmetrical entailment relationship can be potential scalar alternatives, but the potential scalar alternatives are subject to a set of limited numbers of restrictions, for instance, like Horn's (1989) Monotone Identity Condition and Matsumoto's (1995) Conversational Condition on scales, in order for them to be actual scalar alternatives.

I maintain that what's wrong with Simons' objections to the SI approach is that she misses the fact that the whole meaning of an utterance φ is computed as the conjunction of the truth conditional meaning of φ and *all* of its implicatures. This seems intuitively correct.

As a brief illustration, consider the following question-answer pair in a context in which the set of only three persons {John, Mary, Sue} is relevant:

(31) A: Who is sleeping?
B: John is.

As we observed in section 4, *B*'s answer receives exhaustive interpretation such that only John and not others are sleeping. Let P = John is sleeping, Q = Mary is sleeping, and R = Sue is sleeping. Then, the exhaustive reading of B's answer is represented as $P \,\&\, \neg Q \,\&\, \neg R$. Let me show how we can obtain the exhaustive reading within the SI approach. First, the informationally stronger scalar alternatives that entail assertion *P* are the following three:

(32) a. P & Q & R
b. P & Q
c. P & R

Accordingly, we have the following three scalar implicatures:

(33) a. $\neg$(P & Q & R)
b. $\neg$(P & Q)
c. $\neg$(P & R)

The conjunction of assertion *P* and *one* of (33a-c) does not give the exhaustive interpretation *P* & $\neg$*Q* & $\neg$*R*, which is true only in the situation where P=1, Q=0, R=0. Let me show it:

(34) *P* & $\neg$*(P* & *Q* & *R)* is true in the following three situations:
a. P=1, Q=1, R=0
b. P=1, Q=0, R=0
c. P=1, Q=0, R=1

It is also evident that neither *P* & $\neg$*(P* & *Q)* nor *P* & $\neg$*(P* & *R)* is equivalent to *P* & $\neg$*Q* & $\neg$*R*.

However, when all the implicatures in (33) and assertion *P* are conjoined, the exhaustivity interpretation *P* & $\neg$*Q* & $\neg$*R* obtains, which can verify with a truth table:

(35) P & $\neg$Q & $\neg$R $\Leftrightarrow$
P & $\neg$(P & Q & R) & $\neg$(P & Q) & $\neg$(P & R)

Both *P* & $\neg$*Q* & $\neg$*R* and *P* & $\neg$*(P* & *Q* & *R)* & $\neg$*(P* & *Q)* & $\neg$*(P* & *R)* are true iff P = 1, Q = 0, R = 0.[7)]

7) Note that $\neg$*(P* & *Q* & *R)* is entailed by $\neg$*(P* & *Q)* & $\neg$*(P* & *R)*, so it doesn't provide any additional information. Thus, just *P* & $\neg$*(P* & *Q)* & $\neg$*(P* & *R)* is enough to provide the exhaustive interpretation.

The foregoing discussion shows that the whole meaning of an utterance should be computed as the conjunction of its truth conditional meaning and *all* of its scalar implicatures.

Now we are ready to show how the SI approach accounts for the exclusivity implication of a three-disjunct disjunction. As we observed in section 3, Simons conjoins the truth conditional meaning of an utterance with only *one* of its scalar implicatures to compute the whole meaning. This is, however, wrong: we have just seen that the whole meaning of an utterance should be computed as the conjunction of its truth conditional meaning and all of its implicatures. More specifically, she considers the conjunction of $A \vee B \vee C$ and only one of (36a-c):

(36) a. $\neg(A \;\&\; (B \vee C))$
 b. $\neg(C \;\&\; (A \vee B))$
 c. $\neg(B \;\&\; (A \vee C))$

However, by constructing a truth table, you can easily verify that the conjunction of $A \vee B \vee C$ and at least two of (36a-c) correctly gives the exclusive reading of *A or B or C*.

Let me elaborate my account. First, consider the entailment relationship among the scalar alternatives of $A \vee B \vee C$. For the simplicity of exposition, I will illustrate the entailment relationship of (part of) the alternatives related to only $A \;\&\; (B \vee C)$, so not considering the alternatives related to $C \;\&\; (A \vee B)$ or $B \;\&\; (A \vee C)$. In (37) below, the direction of entailment is from (a) to (g):

(37) a. $A \;\&\; B \;\&\; C$
 b. $A \;\&\; B$
 c. $A \;\&\; (B \vee C)$
 d. A
 e. $A \vee (B \;\&\; C)$
 f. $A \vee B$
 g. $A \vee B \vee C$ (Assertion)

So, the potential scalar implicatures of *A or B or C* will be as in (38) below. Here again, the direction of entailment goes from (a) to (f). Note that negation reverses the entailment relationship:

(38) a. $\neg(A \lor B)$
b. $\neg(A \lor (B \& C))$
c. $\neg A$
d. $\neg(A \& (B \lor C))$
e. $\neg(A \& B)$
f. $\neg(A \& B \& C)$

As we saw in section 3, intuitively (38a-c) do not surface as an actual scalar implicature, because they all entail $\neg A$. We also observed in section 3 that this may be explained by the cancellation by clausal implicatures (Gazdar, 1979) or by the reasoning proposed by Simons. Which one fares better is not crucial to my argument. Thus, we only have (38d-f) as the actual implicatures. When we take into consideration the scalar alternatives which are not considered in (37), all the actual scalar implicatures of *A or B or C* are as in (39):

(39) a. $\neg(A \& (B \lor C))$; $\neg(C \& (A \lor B))$; $\neg(B \& (A \lor C))$
b. $\neg(A \& B)$; $\neg(A \& C)$; $\neg(B \& C)$
c. $\neg(A \& B \& C)$

The conjunction of $A \lor B \lor C$ and all of the implicatures in (39) is true in the following three situations in (40).[8] This is exactly the exclusive reading of *A or B or C*, i.e. the inference that only one of the three disjuncts is true :

(40) a. A=1, B=0, C=0
b. A=0, B=1, C=0
c. A=0, B=0, C=1

7. Conclusion

In this paper, I aimed to defend the scalar implicature view of the exclusive reading of disjunction, by refuting Simons' (2000) claim,

8) Since the conjunction of any two implicatures in (39a) entails the other implicature in (39a), as well as the implicatures in both (39b) and (39c), the conjunction of $A \lor B \lor C$ and any two of (39a) is sufficient to give rise to the exclusive reading of *A or B or C*.

among others, that the SI view is inadequate to account for exclusivity, and by showing that the alternative view proposed by her fails to predict the suspension of exlclusivity in downward entailing contexts. The conclusion is summarized as follows:

First, contrary to Simons and others, the scalar implicature view has no difficulty accounting for the exclusive reading of a three-disjunct disjunction: the basic tenet of scalar implicature theory i.e. a scalar implicature of an utterance is derived from the negation of an informationally stronger scalar alternative is quite compatible with the exclusive reading of a disjunction with more than two disjuncts. What's wrong with Simons' argument against the scalar implicature approach is that she misses the fact that the whole meaning of an utterance φ is computed as the conjunction of the truth conditional meaning of φ and *all* of its scalar implicatures.

Second, Simons' exhaustivity view on the exclusive reading of disjunction runs into problems explaining why exclusive reading is consistently suspended in downward entailing contexts. On the other hand, the scalar implicature approach has no difficulty predicting this result: downward entailing contexts make the scalar alternatives informationally weaker than the assertion.

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