

To choose or not to choose.

Pragmatic aspects of free choice

This paper presents a pragmatic solution to the free choice paradox, i.e. the fact that from "You can take an apple or a pear" the hearer safely concludes that he can freely choose between them. Free choice inferences under disjunction can be derived in a number of different cases as a kind of conventional inferences, based on an extension of the communicative principles underlying clausal implicatures proposed by Gazdar (1979). The core idea is that if a sentence s_1 gives rise to a conventional pragmatic inference S_1 , and there is a sentence s_2 which has the same truth conditional content but lacks the inference S_1 or has a logically weaker inference S_2 , then the hearer may conclude that if the speaker utters s_2 then S_1 is not intended by the speaker, i.e. S_1 is false. This principle immediately yields free choice inferences for the classical cases and with slight modifications also accounts for a number of related cases.

The nature of the problem

In relatively standard modal logic, permission is analyzed as an accessibility relation between worlds \diamond_p , such that from any world, all worlds are \diamond_p accessible which are permitted for that particular world. Hence the meaning $\diamond_p p$ (to be read as 'p is permitted') in a given world w is: There is a world v such that $\langle w, v \rangle$ is a member of the accessibility relation \diamond_p and p is true in v . (See e.g. Schulz (2007, 14) for a formally more precise formulation.) A relatively standard analysis of disjunction (which arguably captures the meaning of the English 'or') is that \vee is a binary propositional operator such that $p \vee q$ is false iff both p and q are false. Under these assumptions the problem of free choice under disjunction is that $\diamond_p(p \vee q) \models \diamond_p p \wedge \diamond_p q$ is not necessarily valid. Nevertheless, for natural language sentences that would be standardly analysed as $\diamond_p(p \vee q)$ such an inference seems solidly available, as e.g. in (1), in which the a. and b. inferences are available.

- (1) You may take an apple or a pear.
a. So, you may take an apple.
b. So, you may take a pear.

Since such inferences are available in natural language, natural language semantics (at least in combination with some pragmatic principles) should be able to account for them, however simply adding them into the rule inventory of the semantic system won't do, since in that case an inference like the one presented in (2) would be predicted to be valid (assuming that the step from (2-a) to (2-b) is valid, which seems fairly natural). This paradox has been pointed out by Zimmermann (2000).

- (2) a. You may take an apple.
b. So, you may take an apple or a pear
c. So, you may take a pear
- $p \rightarrow q \models (p \vee r) \rightarrow q$
free choice inference

An additional aspect of the problem is that there are a number of related cases which, one senses, are related in nature. I will call (3) the epistemic case, (4) the existential case, and (5) the necessity case. In the same line of thinking, I will call the classical case of free choice permission in (1) the deontic case.

- (3) John may be in Paris or in London.

- a. So, John may be in Paris.
 - b. So, John may be in London.
- (4) There is beer in the fridge or on the table.
- a. So, there is beer in the fridge.
 - b. So, there is beer on the table.
- (5) You must take an apple or a pear.
- a. So, you needn't take an apple.
 - b. So, you needn't take a pear.

Previous accounts and their problems

All previous accounts of the free choice problem are defective in different ways. E.g. Kamp (1973) proposes a semantics of giving permission as adding sets of worlds to a list of permissions (or removing sets of worlds from a list of prohibitions) and argues that under the treatment of disjunction as set theoretic union, free choice inferences are immediately predicted. Unfortunately there is no obvious way in which to generalize the approach to any other cases of free choice inferences discussed above.

Zimmermann (2000) assumes that 'or' as an expression of English denotes a conjunction of epistemic possibilities, i.e. 'or' is treated as a list-builder, as shown in ((6)). Assuming a wide-disjunction LF representation of (1) it also immediately gives free choice inferences.

- (6) Peter is in the kitchen or in the bathroom.
 So, it may be that Peter is in the kitchen and it may be that Peter is in the bathroom.

However the whole power of the approach is based on the assumption that free choice effects involve wide disjunction, which is empirically questionable. This gets particularly annoying in cases in which the narrow scope of disjunction is clearly marked (e.g. by *either*) and free choice inferences are still available. In addition, the approach also systematically fails on the obligation inferences as pointed out by Schulz (2004).

Aloni (2007) argues that modal operators do establish relations between alternatives introduced by a proposition and a set of accessible worlds. Aloni (2007) proposes also a specific logic for generating alternatives, according to which on one reading sentences containing disjunction or existentials generate all alternatives that satisfy the truth conditions of the sentence but on another reading the only alternative generated is the sentence itself. Applying the modal operators to these sets of alternatives immediately yields one reading that guarantees free choice and one reading that does not guarantee free choice for the case of deontic or epistemic possibility. The problem is, however, that in Aloni's system the very same proposition gives rise to different sets of alternatives, basically depending on the way the proposition is *represented in the metalanguage*. Aloni needs to show how to compositionally derive the necessary alternatives. If this is not shown, her system can be misused by tautological extension of the alternatives to predict whatever one likes.

Asher and Bonevac (2005) proposes an analysis of strong permission. Strong permission is conceived as a conditional saying that if you do *p* a sanction will be avoided, i.e. things will be OK. Free choice then logically follows under disjunction. Asher and Bonevac (2005) use a special defeasible conditional to avoid standard problems with strong permission. Unfortunately there is no evidence for the claim that permission is strong permission or that there is a notion of strong permission that would be conventionally coded in natural language by means of a lexical item at

all.

The strategy of Schulz (2007) is to assume that the hearer H thinks that the speaker S is obeying some general principles of cooperation. If H thinks that S is a Gricean speaker then from what S said, H is able to construct a minimal model of the beliefs of S such that if S would believe anything not included into this minimal model he would turn out not to be cooperative. Schulz shows that free choice inferences must come out as true in minimal (Gricean) models. This works fine for the epistemic case, but for the deontic case additional stipulations are necessary, namely that there are no prohibitions that are not made explicit by the speaker. Hence, for any proposition that is not prohibited by the utterance of the speaker, the hearer may conclude that it is allowed. But at these costs, free choice inferences are trivialized.

Fox (2006), following Kratzer and Shimoyama (2002), assumes that free choice inferences are second order scalar implicatures. The idea of Fox (2006) is that scalar implicatures are calculated at the syntax-pragmatics interface in form of an exhaustivity operator quantifying over a conventionally given set of alternatives. This operator is conceived as an optional pragmatic operator hard-wired into the syntax. Crucially, Fox (2006) argues that this operator may be applied recursively. In order to derive free choice inferences, all alternatives will be exhaustified, hence yielding a new set of alternatives, and the SI derived from the initial sentence will then be exhaustified again against the background of this new set of alternatives, which finally yields free choice inference. But this mechanism ignores any kind of locality constraints generally assumed in semantic composition. The recursively applied operator should not be able to see the alternatives it quantifies upon.

My solution

The solution I will propose is in essence similar to the ideas pursued by Fox and Schulz. Like Fox I think that free choice inferences are something very similar to scalar implicatures (since it can be shown that they share most of their distinguishing properties) and like Schulz I think that the right way of deriving free choice inferences is by means of some communicative principle and not by means of a syntactic operator.

The solution I wish to defend is based upon the following assumptions. (i) Free choice inferences only appear with narrow disjunction. (ii) In the process of pragmatic interpretation all easy to compute alternatives of every sentence are calculated, and (iii) the principle of conventional inferences given in (7).

(7) **Principle conventional inferences (PCI):**

If you hear a sentence s_1 involving at least two scalar items (like existentials, disjunction, modal operators etc.) consider all easy to compute alternatives (s_k ($k:1..n$)) that you can get by changing scope relations or replacing scalar items. If some s_j has different truth conditions being logically stronger than s_1 , you can assume that all entailments of s_j that are not entailed by s_1 are not intended by the speaker. If some s_i has the same truth conditions as s_1 and has some conventional implicature S_i that is logically stronger than s_1 and its scalar implicature S_1 , then S_i is not intended by the speaker.

It is easy to see that applying this principle to all cases of free choice inferences immediately derives the correct results under the assumption that the sentences are interpreted with narrow scope for disjunction. Consider for instance (1). Let u_1 be the utterance *You may take an apple or a pear* uttered by John to Mary and that John is competent about prohibitions and permissions. Let u_2 be the utterance *You may take an apple or you may take a pear* in the same context. Let p be the proposition *Mary takes an apple* and q be the proposition *Mary takes a pear*. Let us assume that u_1

has the semantic representation: $\diamond(p \vee q)$ while u_2 is represented as $\diamond p \vee \diamond q$. Let us assume that $\diamond(p \vee q)$ gives rise to the scalar implicature $SI_1 = \neg \diamond(p \wedge q)$ while $\diamond p \vee \diamond q$ gives rise to the scalar implicature $SI_2 = \neg(\diamond p \wedge \diamond q)$. Note that on fairly standard assumptions about the semantics of \diamond it is true that $\diamond p \vee \diamond q \leftrightarrow \diamond(p \vee q)$, hence u_1 and u_2 are logically equivalent. Similarly, nontrivially $SI_2 \models SI_1$ and SI_2 and SI_1 are not logically equivalent, hence the scalar implicature triggered by u_2 is stronger than the one triggered by u_1 . Applying PCI gives us the information that the speaker believes that SI_2 is false. The negation of SI_2 is, however, exactly the free choice inference. Hence, equipped with PCI Mary can conclude that John believes that $\diamond p \wedge \diamond q$.

Of course I still need to show that narrow disjunction is indeed the right representation for (1) and that the alternative u_2 is indeed calculated. While I will leave the second part of the question as an open empirical issue to be discussed by experimental psycholinguistics, I can only give a hint that the representation of (1) is on the right tracks, for both in (8) and (9) overtly marking wide disjunction blocks the free choice inference.

- (8) a. John told me that Peter may take an apple or a pear.
So (according to John) Peter may take an apple.
b. John told me that Peter may take an apple or (he) may take a pear.
? So (according to John) Peter may take an apple.
- (9) a. Peter may *either* take an apple or a pear. [+FC]
b. *Either* Peter may take an apple or a pear. [-FC]

Hence, in all cases in which the scope of 'or' is overtly marked, the assumption that free choice inferences only arise with narrow disjunction is confirmed. Of course in all other cases the assumption relies on rather strong assumptions about the very nature of scope. I will argue, however, that there is a general preference for narrow disjunction that in fact may also lead to a lexicalization of the PCI for disjunction.

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