

Disjunction under *if*

Outline: The equivalences known as de Morgan’s Law, the Paradox of Free Choice, and Simplification of Disjunctive Antecedents, illustrated in (1)-(3), respectively, name instances where constituent disjunction seems equivalent to sentential conjunction:

- (1) a. I didn’t see Amy or Tim. b. I didn’t see Amy and I didn’t see Tim.
- (2) a. You may have cake or ice cream.
- b. You may have cake and you may have ice cream.
- (3) a. If you go skiing or skating you will have fun.
- b. If you go skiing you will have fun and if you go skating you will have fun.

I argue that on a ‘conditionally strict’ account of *if*, (3) follows from the standard semantics of *or*, just as de Morgan’s Law does, and that the Free Choice Paradox is a separate matter.

1. *Not (or)* and *if (or)* form a natural class excluding *may (or)*:

Whereas *not (or)* and *if (or)* license NPIs, *may (or)* does not, suggesting that *if (or)* like *not (or)*, and unlike *may (or)*, creates a DE environment (e.g. Ladusaw 1979).

- (4) a. Kristen didn’t hear anything (or remember anything).
- b. If Kristen hears anything (or remembers anything), she will write it down.
- c. *Kristen may hear anything (or remember anything).

Similarly, when *or* appears under *not* or *if*, as in (5a, 5b), no upper-bounding conversational implicature arises, but not when *or* appears under *may*, where it does arise, as in (5c):

- (5) a. I didn’t see Amy or Tim #In fact, I didn’t see both Amy and Tim.
- b. If I see Amy or Tim, I’ll call. #In fact, if I see both Amy and Tim, I’ll call.
- c. You may have cake or ice cream. In fact, you may have both.

Scalar implicature: You may not have both cake and ice cream.

(5) is consistent with the claim that *if* patterns with *not*, and contrasts with *may*, in creating a DE contexts: in UE contexts *and* constitutes the stronger Horn-alternative to *or*, with *or* generating the implicature that the stronger *and* alternative is not true (‘exclusive *or*’). Since in DE contexts the direction of entailment is reversed, *or* becomes semantically stronger than *and* and is rendered incapable of triggering an upper-bounding inference.

2. From strict to conditional strict analysis: That *if* resembles *not* in creating a DE context would follow on a strict conditional analysis, where antecedents translate as universal quantifiers. SDA would then derive directly, with no change to the semantics of *or*, as in (7):

- (6) Strict Conditional (Lewis 1918): *If p then q* is true iff all *p*-worlds are *q*-worlds.

$$(7) \quad [\forall w: p(w) \vee r(w)] q(w) \Leftrightarrow [[\forall w: p(w)] q(w)] \wedge [[\forall w: r(w)] q(w)]$$

Yet, the strict conditional cannot explain failures of Antecedent Strengthening in (8) (or related inferences). This is widely thought to be remedied by a ‘variably strict’ conditional:

- (8) a. If this match were struck, it would light.
- b. If this match were struck after having been soaked in water, it would light.
- (9) Variably Strict Conditional (Lewis 1973): *If p then q* is true iff there is a close *p*-world that is a *q*-world and there is no closer *p*-world that is not a *q*-world.

But, the variably strict account runs afoul of SDA: as soon *if you go skiing* describes worlds closer to the world of the evaluation α than *if you go skating* and *you have fun* is true in former but false in the latter, (3a) should be true when it is in fact judged false (e.g. Creary and Hill 1975, Fine 1975, Nute 1975). A version of the variably strict analysis of conditionals can be maintained only if the standard analysis of disjunction is jettisoned in favor of an account of (3a) where the consequent is evaluated relative to the closest worlds described by *each disjunct within* the antecedent (e.g. Nute 1980, Alonso-Ovalle 2006, 2009, van Rooij 2006, 2010).

3. A conditionally strict account: We can maintain a standard account of *or* and explain failures of Antecedent Strengthening (and related inferences):

- (10) Conditionally Strict Conditional (Schein 2003): *If p then Q-often q* is true iff the *p*-eventualities are such that Q-many of them are followed by eventualities where those where contextually relevant matters were and remained equal are all *q*-eventualities. (In ‘bare’ conditionals ‘Q’ has typically universal force.)

Things do not remain equal in a relevant sense when the match in question in (8a) was dry to begin with but was subsequently soaked in water, cf. (8b) The equivalence in (3) now follows from (3a) having the logical form in (11a), where *or* means what it normally does. (11a) licenses an inferences to both (11b) and (11c), and hence their conjunction, cf. (3):

- (11) a. $[uE: \forall e (E(e) \leftrightarrow (\text{Ski}(you, e) \vee \text{Skate}(you, e))$
 $[\forall e: E(e)] [\exists E': \exists e' (E'(e') \wedge \forall e' (E'(e') \rightarrow \text{Follow}(e', e)))]$
 $[uE'': \forall e'' (E''(e'') \leftrightarrow (E'(e'') \wedge \text{Cet.-paribus}(e'', e)))] [\forall e''': E''(e'')] \text{Fun}(you, e'')$
- b. $[uE: \forall e (E(e) \leftrightarrow \text{Ski}(you, e))] [\forall e: E(e)]$
 $[\exists E': \exists e' (E'(e') \wedge \forall e' (E'(e') \rightarrow \text{Follow}(e', e)))]$
 $[uE'': \forall e'' (E''(e'') \leftrightarrow (E'(e'') \wedge \text{Cet.-paribus}(e'', e)))] [\forall e''': E''(e'')] \text{Fun}(you, e'')$
- c. $[uE: \forall e E(e) \leftrightarrow \text{Skate}(you, e)] \dots [\forall e''': E''(e'')] \text{Fun}(you, e'')$

4. Predicted exceptions to SDA: On my account *If p or r then Q-often q* is not expected to be equivalent to *If p then Q-often q and if r then Q-often q* but rather to *The cases that are p or r are such that Q-many of them are (all things being equal) q cases*. When the operator in question has universal force (e.g. *would, always, will* in (3)) the result is indistinguishable from SDA, but when the operator has less than universal force, the two can come apart. The falsity of Alonso-Ovalle’s (12) might suggest that this is an unwelcome prediction, as (12) seems to show that *might* is interpreted in the scope of *each* disjunct and not the disjunction as a whole:

- (12) If you had a good magic book or you had been a newborn baby, you might have bent that fork too.

However, I attribute the falsity of (12) to the pragmatic disparity of the disjuncts, which forces consideration of the consequent relative to two separate ordering sources. In support of the conditionally strict account, I then point to (13) and (14). Imagine there are four indistinguishable pills, where pills 1, 3, and 4 only contain a harmless vitamin supplement, but pill 2 contains lethal cyanide. Poor Nick is contemplating taking one of these pills. (13a) is then false, since Nick has a fifty/fifty chance of survival, but, for the very same reason, (13b) is true! This shows that in (13b) all cases described by the disjunctive antecedent are *jointly* considered for the interpretation of the modalized consequent—those where he takes pill 1 and those where he takes pill 2. Given the consequent’s existential force, it suffices if just one of them is followed by one that makes, *ceteris paribus*, the main clause true.

- (13) a. If Nick took pill 1 or pill 2 tonight, he would die. F
b. If Nick took pill 1 or pill 2 tonight, he may/might die. T

- (14) If you pick hearts or a queen, you usually pick hearts.

Likewise, (14) accurately describes a situation where a card is picked from of a 52-card deck of cards, given that it has 13 hearts but only 4 queens (one of which is the queen of hearts). Again, this indicates that the consequent is not interpreted relative to each of the disjuncts, but relative to the disjunction as a whole, as predicted on the Conditionally Strict account

Selected References: Alonso Ovalle. 2009. Counterfactuals, correlatives and disjunction. *L&P* 32: 207-244. Schein. 2003. Adverbial, descriptive reciprocals. In *Language & Philosophical Linguistics, Philosophical Perspectives* 17.1: 333-367.

