Conditional Perfection: The truth and the whole truth

Hearers are apt to take *if*-clauses to express necessary conditions in addition to sufficient ones (Geis and Zwicky 1971). Thus, when "perfected" (1) has the force of a bi-conditional. As (2) shows, Conditional Perfection resembles scalar implicature (SI) in being cancelable.

(1)   If you WORK HARD you'll succeed. (CAPS=focus)

(2)   If you WORK HARD you'll succeed. And if you'RE LUCKY you'll also succeed.

The puzzle: On a neo-Gricean view (3a) implicates (3b) because the Maxim of Quantity requires the speaker to be maximally informative, and because *all* constitutes a stronger alternative to *some* on the relevant Horn-scale (Horn 1972):

(3)   a.   Ben ate some of the biscotti.   b.   Ben didn't eat all of the biscotti.

It is a challenge to analyze CP as a scalar implicature on a neo-Gricean view because it is not clear what the Horn alternative to *if* would be; *iff*, though semantically stronger, is not only not a real word, but the SI that would be derived this way, given in (4), expresses not the perfected reading of (1) but in fact its negation (van der Auwera 1997, Horn 2000). In light of this, Horn (2000) advocates analyzing CP as an R-based rather than Q-based inference.

(4)   It is not the case that if and only if you work hard you'll succeed.

First stab at a "grammatical" account: On Chierchia et al.'s (2012) theory the strengthened meaning of (3a) is due to its being embedded under a tacit propositional operator (*Exh/O*). It is fashioned after a Rooth-style semantics for *only*, except that the prejacent is not presupposed but asserted and the alternatives are given by items scalar items, which behave as if they were inherently focused (cf. Krifka 1995, Fox and Katzir 2011).

(5) $[[Exh/O]] (A_{<st,t>})(p_{<st>})(w) \Leftrightarrow p(w) \wedge \forall q (q \in NW(p, A) \rightarrow \neg q(w))$
        $NW(p, A) = \{q \in A: p$ does not entail $q\}$ (Fox 1997)

If we try to extend this analysis to CP, we expect the CP of (1) to follow from (6):

(6)   Exh/O [if you WORK HARD you will succeed]

Taking as a given that bare conditionals have universal force (e.g. Lewis 1973, Sommers 1982), the conditional prejacent p in (6) is universally quantified and (6) will assert, as desired, that all relevant cases of hard work lead to success. Yet, assuming that the alternatives to (1) are determined by the focus on *work hard*, the universal prejacent also predicts that the CP of (1) denies that *all* instances of working little, etc. lead to success. That is too weak as it allows some failure to work hard to lead to success too, which is inconsistent with the CP of (1).

Conditionals under *only*: The problem posed by conditional prejacents under *Exh/O* is in part related to one known to arise with *only if* conditionals. Assuming again that bare conditionals have universal force, *only* in (7) merely rules out that *all* instances of working little, etc. lead to success (von Fintel 1997). This falls short of capturing the force of *only*:

(7)   Only if you WORK HARD do you succeed.

Appeal to the conditional excluded middle (CEM) derives the exclusionary force of *only if* (Barker 1993; von Fintel 1997), but it does not predict that (7) does not presuppose that *all* instances of hard work lead to success (McCawley 1974)—it only presupposes that some do. The presuppositions and truth-conditions follow if instead of positing CEM we assume (8):

(8)   <u>Duality of conditionals:</u> (cf. Dekker 2001)
        Bare conditionals have universal or existential force. In downward entailing contexts they generally exhibit the semantically stronger existential reading.

Concretely, I assume that *if*-clauses are definite descriptions (Schein 2003, Schlenker 2004, Bhatt and Pancheva 2005) and that the duality of the conditional arises from an ambiguous ($\forall/\exists$) tacit adverb quantifying over the main clause (Herburger 2014). Given the downward

entailing nature of *only* it then correctly follows (i) that (7) presupposes that the cases where you work hard include some where you succeed and (ii) that (7) denies that the cases where you don't work hard contain any where you also succeed. The duality hypothesis in (8) finds additional support in that it explains the longstanding puzzle of conditionals under decreasing quantifiers (e.g. von Fintel and Iatridou 2002, Leslie 2009, Klinedinst 2010):

 (9) No student succeeds if he goofs off. (Higginbotham 1986, 2003)

If the conditional in (9) is existential the truth conditions of (9) follow: it is true exactly when no student is such that the cases where he goofs off contain any where he succeeds.

Perfected conditionals: Unlike *only if* conditionals, perfected ones have the full force of bi-conditionals. As noted, an analysis where the prejacent under *Exh/O* has universal force will not capture their exclusionary force. But one where the prejacent under *Exh/O* has existential force will not explain that their *if*-clauses express sufficient conditions. What we need to explain CP is an analysis of strengthening where the conditional can show its duality:

 (10) <u>The *S and only S* theory:</u>
   Semantic strengthening through SI/exhaustification/CP arises when a sentence *S* is conjoined with a tacit conjunct *and only S* (cf. Fox and Katzir 2011) where each instance of an ambiguous *S* has the reading that is strongest in the context.

Crucially, the two instances of *S* (10) provides for (1) differ semantically: given conditional duality, the first *S* (*if you work hard you succeed*) has universal force, whereas the second instance of *S*, the one under *only* (*and only if you work hard do you succeed*), has existential force. CP follows. Put in traditional terms:

 (11) CP of (1) = [[*if you work hard you succeed* [*and only* [*if you work hard you succeed*]]]^{w,g} =
   $\{w\colon \forall w'\,(\text{Accessible}(w',w) \land \text{Work-hard}(you,w)) \to \text{Succeed}(you,w')\}\ \cap$
   $\{w\colon \neg \exists w'\,(\text{Accessible}(w',w) \land \neg\,\text{Work-hard}(you,w) \land \text{Succeed}(you,w'))\}$

Extension: As is well known, bare plurals exhibit (quasi-)universal as well as existential readings. Strikingly, however, bare plurals that normally have a (quasi-)universal reading show an existential reading in the scope of *only*, as illustrated in (12b) (McCawley 1974):

 (12) a. Men smoke cigars. b. Only MEN smoke cigars.

I take the lack of (quasi-)universal force of *men* in (12b) to indicate that (9) should be generalized to include bare plurals. I note further that when the relevant bare plurals appear as exhaustive answers, as in (13B), the universal reading resurfaces:

  (13) A: Who smokes cigars? B: MEN do/smoke cigars.

If exhaustivization were merely derived by embedding under *Exh/O* (13B) should pattern with (12b), leaving the universal reading unexplained. In contrast, the *S and only S* analysis in (10) explains (13B): the first conjunct (*Men smoke cigars*) explains the universal interpretation of *men*, the second conjunct (*and only MEN smoke cigars*) its exhaustivity.

Conclusion: Bare plurals and bare conditionals exhibit $\forall/\exists$ duality. CP, and semantic strengthening through exhaustivization and SI arise not from simple embedding under an exhaustivizing operator but when a sentence *S,* expressing "the truth", is conjoined with a silent *and only S* conjunct, thus expressing "the whole truth". When *S* is ambiguous each instance of *S* is interpreted with the contextually semantically stronger reading.

Selected references: Chierchia, Fox & Spector 2012. The grammatical view of scalar implicatures. In *International Handbook of Semantics.* Dekker, 2001. On *if* and *only. SALT 11.* Fox & Katzir 2011. On the characterization of alternatives. *NLS* 19. Herburger 2014. *Only if*: If only we understood it. *Sinn und Bedeutung* 19. Horn 2000. From *if* to *iff. JPragmatics* 32. McCawley 1974. *If* and *only if. LI* 5.