

## Conditionals in Semantic Theory: Conditionals and definite descriptions

Stefan Kaufmann<sup>1</sup>, University of Connecticut  
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- So far, we have been assuming that conditionals are quantificational constructions.
- Alternative: *if*-clauses (antecedents of conditionals) are referential expressions.

## 1 Comparing *if* and *the*

Day 1: Conditionals display non-monotonic behavior.

(Intuitively,) conditionals fail:

- (1) a. **Strengthening of the Antecedent:**  
If *If*  $\phi, \psi$ , then *If*  $\phi \ \& \ \phi', \psi$ .
- b. **Contraposition:**  
If *If*  $\phi, \psi$ , then *If*  $\neg\psi, \neg\phi$ .
- c. **Transitivity:**  
If *If*  $\phi, \psi$ , and *If*  $\psi, \chi$ , then *If*  $\phi, \chi$ .

Lewis (1973) discusses Strengthening of the Antecedent specifically, and points out that definite descriptions and *if*-clauses behave similarly. Schlenker (2002, 2004) picks this up and considers the patterns in (2) (his (9)).

- (2) a. **‘Strengthening of the Antecedent’** for definite description :  
If *The*  $\phi, \psi$ , then *The*  $\phi \ \& \ \phi', \psi$
- b. **‘Contraposition’** for definite descriptions:  
If *The*  $\phi, \psi$ , then *The*  $\neg\psi, \neg\phi$ .
- c. **‘Transitivity’** for definite descriptions:  
If *The*  $\phi, \psi$ , and *The*  $\psi, \chi$ , then *The*  $\phi, \chi$ .

The inference patterns in (2) are intuitively invalid:

- Failure of ‘Strengthening of the Antecedent’:

- (3) a. The pig is grunting, therefore the pig with the floppy ears is grunting. (*invalid*)  
Schlenker (2002)  
b. The pig is grunting, but the pig with floppy ears is not grunting.  
(*non-contradictory*), Lewis (1973)

Similarly with plural descriptions (Schlenker 2002,2004:(5))

- (4) [Uttered in Los Angeles]  
a. The students are happy, therefore the students in Kabul are happy (*invalid*)

- b. The students are happy, but the students in Kabul aren't (*non-contradictory*)
- Failure of 'Contraposition' (Schlenker 2002,2004:(10b,11b)):
 

(5) a. The professor is not Dean, therefore the Dean is not professor. (*invalid*)  
 b. The professor is not Dean, but of course the Dean is a professor. (*non-contradictory*)
  - Failure of 'Transitivity' (Schlenker 2002,2004:(10c,11c)):
 

(6) a. The students are vocal. The undergraduates in Beijing are students. Therefore, the undergraduates in Beijing are vocal. (*invalid*)  
 b. The students are vocal, and of course the undergraduates in Beijing are students, but the undergraduates in Beijing are certainly not vocal at the moment. (*non-contradictory*)

Standard analyses for definite descriptions do not lead us to expect these patterns.

- To judge inferences between sentences carrying presuppositions, we rely on Strawson validity (von Fintel 1999, his (19)):
 

(7) **Strawson validity:**  
 An inference  $p_1, \dots, p_n \therefore q$  is **Strawson-valid** iff the inference  $p_1, \dots, p_n, S \therefore q$  is (classically) valid, where  $S$  is a premise stating that the presuppositions of all the statements involved are satisfied.
- (8) **Strawsonian Definite Descriptions:** If *The*  $\phi$  can be used felicitously, there is exactly one  $\phi$ -individual in the domain of discourse. If used felicitously, it refers to that one  $\phi$ -individual.

Strawson's *the* predicts all three inferences in (2) to be valid (bad news).

Note: At least at first glance, Russell's analysis fares a little better:

(9) Russell:  $\exists x[\phi(x) \wedge \forall y[\phi(y) \rightarrow x = y] \wedge \psi(x)]$

Russell predicts only Transitivity, and avoids Strengthening of the Antecedent and Contraposition. But they are invalid only with wide-scope negation; if narrow scope is made explicit, the following are incorrectly predicted to be inconsistent (exemplified for Strengthening of the Antecedent, Schlenker 2002,2004:(16a,b)):

- (10) a. The pig is grunting, but it is not the case that the pig with floppy ears is grunting. (*non-contradictory*)  
 $The(\phi, \psi) \wedge \neg(The(\phi \wedge \chi, \psi))$
- b. The pig is grunting, but the pig with floppy ears is doing something other than grunting. (*contradiction*)  
 $The(\phi, \psi) \wedge The(\phi \wedge \chi, \neg\psi)$

Lewis (1973, 1979) proposes that definite descriptions rely on an order of salience:

"The proper treatment of descriptions must be more like this: "the F" denotes x if and only if x is the most salient F in the domain of discourse, according to some contextually determined salience ranking."  
 (Lewis 1979:348)

Lewis develops a system of spheres of individuals, starting out from an egocentric logic (Prior) (idea: ‘*x* is thinking’ is true at me), and individuals are ordered as more or less salient from the point of view of the center.

Right now, as I sit writing this, my typewriter is more salient to me than my left shoe; that is more salient than the kitchen clock in the house where I grew up; that is more salient than the fourteenth brick from the right in the seventh row from the top in the garden wall outside my window; but all of these are salient to me to some extent, in contrast to the countless things that are outside my ken altogether.’

(Lewis 1973:113, ch.5.3)

- (11) The pig is grunting. The pig with floppy ears is not grunting. The spotted pig with floppy ears is grunting. (Lewis 1973:115)

Here we have another of our alternating sequences; and we know now that such sequences are the mark of a variably strict conditional. We should not take a fixed set of things that fall within a certain fixed degree of salience. Instead, we should expand the set of things under consideration, starting with the most salient things and working outward until we have expanded enough to admit something that falls under the description in question. If the most salient pig does not have floppy ears, we must expand farther still to admit a spotted pig with floppy ears. (Lewis 1973:115)

What if two pigs are equally salient? – According to Lewis, we obtain a presupposition failure, but that doesn’t have to mean that the sentence couldn’t be true. (Lewis 1973:116)

## 2 Types of *if*-theories to compare

Parameters of classification for *If*:

- **Monotonicity:** Is Strengthening of the Antecedent (logically) valid?  
(Note: Intuitively, it is not valid. But other factors might be interfering with the logical properties of *if*.)
- **Referentiality:** Do *if*-clauses refer to worlds or do they restrict quantifiers/express quantification over worlds?
  - Referential *if*: singular or plural referent?

All combinations are attested, and the debate about the correct one is on-going. From a purely truth-conditional perspective, most combinations are mutually translatable, but extra-semantic considerations may still play a role.

- **Non-monotonic quantificational:** variably strict conditional (e.g., Lewis 1973; Kratzer 1991): quantification over ordered worlds
- **Non-monotonic referential** (e.g., Stalnaker 1968; Schlenker 2002; Schlenker 2004): choice functions depending on similarity.

- **Monotonic quantificational:** (relativized) strict conditional (e.g., von Stechow 1999; von Stechow 2001)<sup>2</sup>: *if*-clauses restrict a universal quantifier.
- **Monotonic referential** (e.g., Schein 2001; Ebert, Ebert, and Hinterwimmer 2014): standard (monotonic) definite descriptions that pick out the maximal set that satisfies its restrictor.

### 3 Non-monotonic referential

#### 3.1 Stalnaker's (1968) proposal

Basic idea:

- At a world of evaluation  $w$ , *if*  $\phi$  selects the world  $w'$  closest to  $w$  such that  $\phi$  is true, and...
- ...*If*  $\phi, \psi$  is true iff  $\psi$  is true at the thus selected  $w'$ .

Implementation:

- (12) A **Stalnaker selection function**  $f$  applies to a world and a set of worlds, and, for any  $w$  and  $A$ , meets the following conditions:
- Condition 1:  $f(A, w) \in A$ . *(makes it a choice function)*
  - Condition 2:  $f(A, w) = \lambda$  iff  $A = \emptyset$ .  
(Where  $\lambda$  stands for the absurd world at which everything and its negation is true.)
  - Condition 3 (**Centering**): If  $w \in A$ , then  $f(A, w) = w$ .
  - Condition 4: For any  $A'$ , if  $f(A', w) \in A$  and  $f(A, w) \in A'$ , then  $f(A, w) = f(A', w)$ .
- (13) A conditional of the form *If*  $\phi, \psi$  is true at  $w$  iff  $f(\llbracket \phi \rrbracket, w) \in \llbracket \psi \rrbracket$ .

Note: the parallel to definite descriptions may not be perfect. Do we really want this additional (individual) argument (skolemized choice function)? Schlenker is tentatively optimistic (Schlenker 2002:(21)):

- (14)
- The teacher resigned in despair.  
 ${}^{ok}\iota y \text{ teacher}(y)$
  - No class was so bad that the teacher resigned in despair.  
# no  $x$  [class( $x$ ),resigned( $\iota y \text{ teacher}(y)$ )]  
 ${}^{ok}\text{no } x$  [class( $x$ ),resigned( $\iota_{xy} \text{ teacher}(y)$ )]

Alternatively, this might involve binding into a relational noun (Barker 1995: *of*-test) [*# to verify*]

- (15)
- teacher of John
  - \*car of John
  - #No neighbor <sub>$i$</sub>  was so unlucky that the <sub>$i$</sub>  car broke down.

<sup>2</sup>Schlenker writes 'following much of the literature', which is surprising in view of the prevalence of the non-monotonic-Kratzer-style framework.

### 3.2 One or more worlds?

Stalnaker's assumption that there is exactly one most similar world is controversial:

- Intuitions about the selection function (Lewis 1973):

- (16)    a.    If Bizet and Verdi had been compatriots, Bizet would have been Italian.  
           b.    If Bizet and Verdi had been compatriots, Verdi would have been French.

However little there is to choose for closeness between worlds where Bizet and Verdi are compatriots by both being Italian and worlds where they are compatriots by both being French, the selection function still must choose. I do not think it *can* choose—not if it is based entirely on comparative similarity, anyhow. Comparative similarity permits ties, and Stalnaker's selection function does not. (Lewis 1973:80)

- Stalnaker predicts Conditional Excluded Middle to be valid:

- (17)    **Conditional Excluded Middle:**  
            $If(\phi, \psi) \vee If(\phi, \neg\psi)$

- Interaction between *if*-clauses and quantifiers (Lewis 1975):

- (18)    a.    Necessarily, if John comes, Mary will be happy.  
           b.    Probably, if John comes, Mary will be happy.

These problems go away if we select **a plurality of worlds** (for adaptation of Stalnaker's four conditions to pluralities, Schlenker 2004).

- (19)    a.     $F(A, w) \in \wp(W)$             (a function to sets of worlds, alternatively: pluralities of worlds)  
           b.    A conditional of the form *If*  $\phi$ ,  $\psi$  is true at  $w$  iff  $\llbracket \psi \rrbracket$  is true at all  $w' \in F(\llbracket \phi \rrbracket, w)$ .

(Any treatment of plural can be made to work, cf. Link 1991 for discussion.)

## 4 Could we just stay monotonic?—Enter domain restrictions

- (Relativized) strict conditionals express universal quantification over a (suitable) set of antecedent worlds, making *if* left downward monotonic.
- This is problematic, because Strengthening of the Antecedent doesn't feel valid.
- Lewis suggests that non-monotonicity is a specific property of *if*-clauses and definite descriptions. But doesn't natural language quantification display non-monotonic behavior quite generally?
- Alternative: Quantification is sensitive to contextual restrictions on quantifier domains, and contexts can change.

For example, Strengthening of the Antecedent-like inference can fail for universal quantification over individuals

(example from Schlenker 2002: (17))

- (20) The situation in our department has deteriorated. Every student is depressed. This isn't the case in competing departments. For instance, many Harvard students are perfectly happy. Competition will be tough. Schlenker 2002:(17)

But standardly, we take *every* to be left downward monotonic:

- (21) Every student is depressed.  
 $\therefore$  Every Harvard student is depressed.

- Standard assumption: *every* is left-downward monotonic, but *every student* carries a covert domain restriction and domain restrictions on (instances of) quantifiers can change throughout discourse ([in our department], ..., [at US institutions], ..., [worldwide]).
- Can we analyze *if*-clauses in terms of universal quantification with context-sensitive domain restrictions?
- Lewis (1973) considers and rejects this possibility: 'our problem is not a conflict between counterfactuals in different contexts, but rather between counterfactuals in a single context. [...] I put my examples in the form of a single run-on sentence' (p. 13)

But apparently domain restrictions can shift within sentence boundaries (Schlenker 2002:(18), 2004:(17); crediting Szabolcsi, p.c., and Westerstahl):

- (22) [*Situation*: A committee must select some applicants. Some of the applicants are Italian, and there are also Italians on the committee, though of course they are not the same.]  
 Every Italian voted for every Italian.

So, Lewis's argument against context sensitive domain restrictions for *if*-clauses is not cogent.

- The relativized strict conditional is defended by von Fintel (1999) (also von Fintel 2001).

## 5 In search of arguments for the best *if*

### 5.1 Negative Polarity Items

- Von Fintel's original motivation to defend a (logically) monotonic analysis is the fact that NPIs can occur in the antecedents of conditionals:

- (23) a. If John subscribes to *any* newspaper, he is probably well informed.  
 b. If he has *ever* told a lie, he must go to confession.  
 c. If you had left *any* later, you would have missed the plane.

In light of the standard assumption about NPI licensing (Fauconnier-Ladusaw Generalization), this is unexpected if *if* is non-monotonic:

- (24) **Fauconnier-Ladusaw Generalization:**  
 NPIs are licensed in downward entailing environments.

If the Fauconnier-Ladusaw Generalization is correct and NPIs are generally licensed in the antecedents of conditionals, this constitutes strong evidence for the monotonic analysis.

- But Heim (1984) argues that
    - conditional antecedents are not downward entailing (relying on our intuitions about failures of Strengthening of the Antecedent)
    - Not all conditionals license NPIs
      - (25) a. If you read any newspaper at all, you are well informed.
      - b. #If you read any newspaper at all, you remain quite ignorant.
    - some uncontestedly non-monotonic operators can license NPIs:
      - (26) a. #Most mountaineers with any experience (still) need a guide for this tour.
      - b. Most men with any brains eat rutabagas.
    - NPI licensing is captured by a modified generalization: downward entailingness for conditionals in the presence of suitable background assumptions (her (24)):
      - (27) Assume X contains an occurrence of NPI A. Let X[A/B] be just like X, except with A replaced by B. Let c be the set of presupposed background assumptions. Then A is licensed in *if X then Y* if for any B of the appropriate type:
 
$$\frac{c, X[A/B] \rightarrow X, \text{ If } X \text{ then } Y}{\therefore \text{ If } X[A/B] \text{ then } Y.}$$
- In this, NPIs are interpreted as weakest existential quantifiers (*any*  $Z \mapsto$  *at least one*  $Z$ , *ever*  $\mapsto$  *at least once*, ...). The alternatives in question are then things like *more than one*  $Z$ , *more than once*, ...
- In effect the constraint comes down to the requirement that a speaker who is committed to the truth of
- (28) a. ... and if you read more than one newspaper, { you are well informed / #you remain quite ignorant } too.
  - b. ... and most men with more than a minimum of brains also { #need a guide / eat rutabaga } too.
- Even definite descriptions might marginally license NPIs (data from Schlenker 2004):
    - (29) a. ?The Ling 1 students who understood anything at all got an A.
    - b. #The Ling 1 students who understood anything at all still got bored.
    - (30) a. The students who read any newspapers at all are well-informed.
    - b. #The students who read any newspapers at all remain quite ignorant.
  - Examples of *if*-clauses that fail to license NPIs are also found in Lakoff (1969) (mentioned as an open problem by von Stechow 1999, his (86a,b)):
- (31) a. #If you drink any water, you'll feel a whole lot better.
  - b. #If you think Bob had any fun, you should have seen Fred!

NPI licensing does not decide whether $\phi$ in ' <i>if</i> $\phi$ ' is a monotonic environment.
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## 5.2 Sobel Sequences and a first look at Reverse Sobel Sequences

- The sequences Lewis uses to refute the validity of Strengthening of the Antecedent are called **Sobel sequences** (as Lewis credits J. Howard Sobel, Lewis 1973:10).

(32) If the USA threw its weapons into the sea tomorrow, there would be war; but if the USA and the other nuclear powers all threw their weapons into the sea tomorrow there would be peace; but if they did so without sufficient precautions against polluting the world's fisheries there would be war; but if, after doing so, they immediately offered generous reparations for the pollution there would be peace; . . .

- Apparently, *If  $\phi$ ,  $\psi$*  and *If  $\phi$  &  $\chi$ ,  $\neg\phi$*  are not mutually inconsistent. Lewis and Stalnaker account for this by allowing for the (set of) world(s) to be selected for quantification/reference to be independent (determined by what  $\phi$  and what  $\phi$  &  $\psi$  worlds are closest to  $w$ , respectively). On their assumptions, *prima facie*, it should not matter whether we are considering first  $\phi$ -worlds, and then  $\phi$ & $\psi$ -worlds, or the other way round.
- But intuitively, **Reverse Sobel Sequences** are significantly less felicitous than ordinary Sobel Sequences (von Fintel 1999:(84), crediting Irene Heim):

(33) ??If all nuclear powers threw their weapons into the sea tomorrow, there would be peace; but if the USA threw its weapons into the sea tomorrow, there would be war.

Von Fintel (1999, 2001) argues that this reflects a shift in what worlds are contextually relevant. Called to consider  $\phi$ -worlds, we start out with more normal ones only, ignoring  $\phi$  &  $\psi$  worlds (which are too far-fetched). When forced to consider  $\phi$ & $\psi$  worlds by the antecedent of the second conditional, we widen the **Modal Horizon** to include some such worlds, resulting in apparent non-monotonicity for *if*.

- Additional assumption: we assume that we can only expand the Modal Horizons (we cannot ignore possibilities, once introduced).
- Note: this is reminiscent of what Lewis (1973:352) says about standards for vagueness ("for some reason raising of standards goes more smoothly than lowering.").
- Self-defense of the non-monotonists (especially, Schlenker 2004):
  - definite descriptions, salience is clearly manipulated by overt mention (—*plausible enough*)
  - *if*-clauses: we have to assume that similarity is manipulated when explicitly mentioning possibility (—*more controversial*)
- But are Reverse Sobel Sequences always infelicitous?—Moss (2012) observes that they can be completely acceptable in the right contexts. Therefore, she opts for the standard (non-monotonic) Lewis-Stalnaker analysis together with pragmatic conditions on felicitous conversational moves.

(34) a. If Sophie had gone to the parade, she would have seen Pedro.  
 b. But if Sophie had gone to the parade and been stuck behind a tall person, she would not have seen Pedro. her (2a,b)

(35) a. If Sophie had gone to the parade and been stuck behind a tall person, she would not have seen Pedro.



- b. #But if Sophie had gone to the parade, she would have seen Pedro. her (3a,b)

Moss argues that this is a pragmatic effect (her (EI), p. 9):

- (36) Epistemically irresponsible (EI)  
It is epistemically irresponsible to utter sentence S in context C if there is some proposition  $\phi$  and possibility  $\mu$  such that when the speaker utters S:
- S expresses  $\phi$  in C
  - $\phi$  is incompatible with  $\mu$
  - $\mu$  is a salient possibility
  - the speaker of S cannot rule out  $\mu$

Someone who utters (3b) [our (35b), MSK] generally will not be able to rule out the possibility that if Sophie had gone to the parade, she might have been stuck behind a tall person. Hence, (EI) entails that it is epistemically irresponsible to utter (3b), since:

- (3b) expresses the proposition that Sophie would have seen Pedro if she had gone to the parade,
  - The proposition that Sophie would have seen Pedro if she had gone to the parade is incompatible with the possibility that Sophie might have been stuck behind a tall person if she had gone to the parade.
  - The possibility that Sophie might have been stuck behind a tall person if she had gone to the parade is a salient possibility.
  - The speaker of (3b), at the time at which she utters (3b), cannot rule out the possibility that Sophie might have been stuck behind a tall person if she had gone to the parade.
- (Moss 2012)

Note: this is formulated quite sloppily regarding what propositions exactly should be incompatible; the intuition should be clear enough, though.

- Moss argues that the Reverse Sobel sequence in her (3a,b) is fine in a scenario where (iv) does not hold (i.e., the speaker can rule out the presence of tall interveners). In the following, I'll use '**Moss-effects**' for the use of weaker restrictions to deny the relevance of possibly true statements that would result from stronger ones.

'For instance, suppose you belong to a mafia organized to manipulate the exact movements of every tall person who attends a parade. If I ask you whether your mafia is conspiring to corner Sophie, you could still have a reason to tell me (3a) even if you can rule out that possibility that she might have been stuck behind a tall person if she had gone to the parade' (Moss 2012)

Speakers can also use Moss effects to disagree with their interlocutor about what possibilities merit consideration:

- (37) (following (3a) Oh, *come on*—if she'd gone, she would have seen Pedro. her (10b).

Reverse Sobel Sequences do not settle the question of monotonicity once and for all.

### 5.3 Comparing quantifiers, definite descriptions, and *if*-clauses

- If non-monotonicity effects with *if*-clauses, definite descriptions, and quantifiers are to be treated the same, we would expect them to display the same inference patterns.—Do they?
- Differences in behavior could support a distinction between logically monotonic (uncontested for *every* and probably also *necessarily*) and non-monotonic analyses (suggested for *the* and *if*).

#### 5.3.1 Acceptability/reference

- Compare the influence of extra-linguistic salience on the interpretation of descriptions vs. quantifiers:

- (38) [There are ten girls and ten boys in the class. Three girls raise their hands. Talking to the teacher, I say:]
- a. Wait, the girls have a question!
  - b. Wait, the three girls have a question!
  - c. ?Wait, the girls each have a question!
  - d. #Wait, every girl has a question!
  - e. #Wait, all girls have a question!

Salience seems to influence descriptions more than it influences quantifiers.

- In the domain of worlds, *necessarily* and *if* appear to replicate the difference between *every* and *the* (Schlenker 2004:(19b,a))

- (39)
- a. If the United States threw its weapons into the sea, there would be war. However, if the United States and all other nuclear powers threw their weapons into the sea, there would be peace.
  - b. #Necessarily, if the United States threw its weapons into the sea, there would be war. However (necessarily) if the United States and all other nuclear powers threw their weapons into the sea, there would be peace.

- Note a puzzle about *all/each*:

- (40) [same context as in (38):]
- a. ?Wait, all the girls have a question!
  - b. ?Wait, each of the girls has a question!

‘We could stipulate that in such contexts the salience hierarchy becomes trivial, such that all girls in the domain are equally salient[... ]’ (Schlenker 2004:426, on his (18f,g)).

#### 5.3.2 Entailment patterns

- Schlenker (2004:426) claims that *every/necessarily* behave differently from *the/if* [boldfacing mine, MSK]:

Entailment patterns for individuals (Schlenker 2002; examples Schlenker 2004:(20a,b,21a,b))

- (41) a. (Uttered in Los Angeles) **Every student** is happy, therefore **the students at the Sorbonne** are happy.  
 b. (Uttered in Los Angeles) **#The students** are happy, therefore **the students at the Sorbonne** are happy.

Entailment patterns for worlds:<sup>3</sup>

- (42) a. **Necessarily**, if the United States threw its weapons into the sea, there would be war. Therefore, **if** the United States and all other nuclear powers threw their weapons into the sea, there would be war.  
 b. **#If** the United States threw its weapons into the sea, there would be war. Therefore, **if** the United States threw its weapons and all other nuclear powers threw their weapons into the sea, there would be war.

- Argument:

- Monotonic view: charitable interpreters keep domain restrictions fixed with *every* and *necessarily* (so, the inferences feel valid), but not with *the* and *if* (so, the inferences don't feel valid).  
 ⇒ If the non-monotonic behavior of quantifiers (*every*, *necessarily*), descriptions (*the*), and *if* has the same source (contextual shift in domain restrictions), then this difference is unexpected.

To the extent that the data are robust, these inference patterns provide evidence for a distinction between monotonic quantification with domain restrictions (*every*, *necessarily*) and non-monotonic *the* and *if* (possibly with an additional domain restriction).

### 5.3.3 NP-Ellipsis (subtle data, only for type individuals)

- Schlenker (2002) (replaced by French examples in Schlenker 2004) discusses a possible contrast in NP ellipsis (his fn. 6):

- (43) [Uttered in Los Angeles]
- ?Every student reads Chomsky. But some students in Beijing don't.
  - $[\forall x : C(x) \ \& \ S(x)](RC(x))$ . But  $[\forall x : C'(x) \ \& \ S(x)](\neg RC(x))$
  - #Every student reads Chomsky. But some  $\emptyset$  in Beijing don't.
  - $[\forall x : C(x) \ \& \ S(x)](RC(x))$ . But  $[\forall x : C(x) \ \& \ S(x)](\neg RC(x))$

Domain restrictions for ellided nouns cannot shift ⇒ room for apparently non-monotonic behavior disappears.

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<sup>3</sup>Schlenker uses slightly different examples, which aren't fully parallel to (41). In fact, I think they are insufficiently parallel to make his point:

- (i) a. **Necessarily**, if the United States threw its weapons into the sea, there would be war. Therefore, **necessarily**, **if** the United States and all other nuclear powers threw their weapons into the sea, there would be peace.  
 b. **#If** the United States threw its weapons into the sea, there would be war. Therefore, **if** the United States threw its weapons and all other nuclear powers threw their weapons into the sea, there would be peace.

- (44) [Uttered in Göttingen] (German, *without grammaticality judgment*.)
- Alle Studenten lesen Chomsky. Aber einige Studenten in Beijing tun es nicht.
  - Alle Studenten lesen Chomsky. Aber einige in Beijing tun es nicht.

- Ellipsis can be used to force domain restrictions to remain constant. Non-monotonicity effects that rely on shifting domain restrictions should disappear with ellipsis.
- For *the*, non-monotonicity effects survive ellipsis (vs. *every*). Apparently, *the* is genuinely non-monotonic.

- (45) [Uttered in Los Angeles]
- The students read Chomsky. But some students in Beijing don't.
  - The students read Chomsky. But some  $\emptyset$  in Beijing don't.

To the extent that the ellipsis data is robust, it provides evidence for the non-monotonicity of *the* (in contrast to *every*). This test does not extend to *if*.

#### 5.3.4 Reverse Sobel Sequences once more

- In standard contexts (but see Moss 2012), non-monotonic behavior of conditionals depends on order of appearance (Frank 1996; von Fintel 2001; von Fintel's examples)

- (46)
- If the USA threw its weapons into the sea tomorrow, there would be war; but if the USA and the other nuclear powers all threw their weapons into the sea tomorrow, there would be peace.
  - ??If all nuclear powers threw their weapons into the sea tomorrow, there would be peace; but if the USA threw its weapons into the sea tomorrow, there would be war.  
(von Fintel 1999, attributed to Heim)

von Fintel (1999) sees this as an argument in favor of monotonic *if* with context shifts.

- Domain restrictions for universals behave the same:

- (47) [Uttered in Storrs]
- Every student** cheated, but fortunately, not **every student at UCLA** cheated.
  - #Not **every student at UCLA** cheated, but unfortunately, **every student** cheated.  
In favor of monotonicity, granted that domain restrictions can be expanded but not retracted.

Schlenker (2002,2004) points out that definite description behave exactly like conditionals (hence also, as we may add, universal quantifiers):

- (48)
- The dog is barking, but fortunately, the neighbor's dog isn't.
  - ??The neighbor's dog is barking, but fortunately, the dog isn't.

- For conditionals, we have seen that Moss-effects can rescue Reverse Sobel Sequences. Interestingly, quantifiers don't seem to allow for Moss-effects.

- (49) A: Every student ate at the Italian restaurant.  
 B: No, Chris didn't.  
 A: Oh, come on, EVERY student ate at the Italian restaurant.  
 [*cannot imply that C is not contextually relevant*]

I am less sure about definites [*to judge*]:

- (50) A: The students ate at the Italian restaurant.  
 B: No, Chris didn't.  
 A: Oh, come on, the students ate at the Italian restaurant.  
 [*could this be used to imply that C is not contextually relevant?*]

Contextual standards seem to behave like conditionals. Lewis (1979) observes that contextual standards seem to be hard to lower ('for some reason raising of standards goes more smoothly than lowering.', p. 352). Attempts to lower them/keep them low look like Moss-effects:

- (51) A: France is hexagonal and Italy is boot-shaped.  
 B: Well, you know, France is actually not hexagonal, it's shape. . .  
 A: Oh, come on, France IS hexagonal.

For Sobel sequences, conditionals pattern with universals, definites, and contextual standards. For Reverse Sobel Sequences, they pattern with contextual standards and differ from quantifiers (descriptions to be tested in more detail).

## 5.4 Referential vs. quantificational

### 5.4.1 *if*-clauses and topics

- Referential expressions can appear as topics in left-dislocated position, quantificational expressions or simple restrictors cannot (Schlenker 2004; but see Endriss 2009):

- (52) a. \*Every man, he is happy.  
 b. \*Man, every he is happy.

*If*-clauses can appear in left-dislocated position.

### 5.4.2 *then* as a proform

- Conditionals are similar to correlative constructions: free relative clause adjoined to the matrix clause and coindexed with a pronoun inside the matrix clause (Bhatt and Pancheva 2006).
- On this view, *if*-clauses are definite descriptions of possible worlds and *then* is a world pronoun (see also Cresswell 1990; Iatridou 1994; Izvorski 1996).
- Iatridou (1994), Izvorski (1996), and Schlenker (2004) (his (40a,b,41a,b,a',b')) use this to derive restrictions on the distribution of *then*:

- (53) a. If Peter runs for President, (then) the Republicans will lose.

- b. If John is dead or seriously ill, (then) Mary will collect the money.
- c. If John is dead or alive, (#then) Mary will collect the money.

Iatridou argues that *then* triggers a presupposition/implicature about alternatives:

- (54) a. Assertion:  $if[p]q$
- b. Presupposition/Implicature:  $\neg if[\neg p]q$

She argues that this parallels left-dislocation with doubling in German:

- (55) Hans<sub>i</sub>, der<sub>i</sub> hat es verstanden.  
Hans he has it understood  
Assertion: 'Hans understood.'  
Presupposition: 'There is some other person who did not understand.'

Trouble?

- (56) Alle haben die Vorlesung verstanden. Hans hat sie verstanden. Marie hat sie verstanden. Und unser Freund Peter, der hat sie auch verstanden.  
'Everybody understood the lecture. John understood it. Mary understood it. And our friend Peter understood it too.'  
(Iatridou credits Irene Heim, p.c.)

- Following ideas by Izvorski (1996), Schlenker (2004) argues that *then* is a strong pronoun and evokes alternatives (over possibilities). These are either used for exhaustification (negation of stronger alternatives; leading to the requirement of alternatives, fails in (53c)), or for association with the focus sensitive particle *auch* 'too'.
- Examples like (56) can be replicated with conditionals:

- (57) Wenn es regnet gehen wir zum Kurs, und wenn es nicht regnet, dann gehen wir  
if it rains go we to.the class, and if it not rains then go we  
auch.  
also  
(roughly) 'If it rains, we will go to the class, and if it doesn't rain, then we'll also go to the class.'

- *then* displays Condition C effects (Schlenker 2004:(54a,b,c;56a,b,c)):

- (58) a. John likes [people who admire him<sub>i</sub>].  
b. \*He<sub>i</sub> likes [people who admire John<sub>i</sub>].  
c. [His<sub>i</sub> mother] likes [people who admire John<sub>i</sub>].
- (59) a. [if it were sunny right now]<sub>i</sub> I would see [people who would then<sub>i</sub> be getting sunburned]  
b. \*I would then<sub>i</sub> see [people who would be getting sunburned [if it were sunny right now]<sub>i</sub>]  
c. Because I would then<sub>i</sub> hear lots of people playing on the beach, I would be unhappy [if it were sunny right now]<sub>i</sub>

### 5.4.3 Distal/proximal marking on referential expressions

- Pronouns for individuals are marked for relative distance from the center/speaker: *this/that*
- Schlenker (2004): indicative vs. subjunctive indicates location of the (plural) world referent to the common ground

### 5.4.4 Schein-sentences

- The restriction of a generalized quantifier can be introduced through a plural description referring to the domain of the quantifier:

- (60)
- Each student is happy.
  - $[\forall x: \text{student}(x)](\text{happy}(x))$
  - Each of the students is happy.
  - $[\forall x: x \text{ atom-of } [\iota X: \text{STUDENT}(X)]](\text{happy}(x))$

Stacked definite descriptions (Schlenker 2004:(30)):

- (61)
- Les Français, ceux que je connais sont pour la plupart sympathiques.  
The French, those that I know are for the most part nice  
'As for the French, those I know are mostly nice.'
  - $[\iota X': \text{French}(X')][\iota X: X \subseteq X' \ \& \ \text{I-know}(X)][\text{MOST } x:Xx](\text{nice}(x))$
  - $[\text{Most } x: \text{French}(x) \ \& \ \text{I-know}(x)](\text{nice}(x))$   
'Most Frenchmen I know are nice.'

Barker's puzzle (Barker ): iterated *if*-clauses (Schein 2001; Schein 2003; Schlenker 2004:(31)):

- (62)
- If John comes, if Mary comes as well, the party will probably be a disaster.
  - $[\iota W': \text{John-Comes}(W')][\iota W: W \subseteq W' \ \& \ \text{Mary-comes}(W)][\text{Most } w:Ww](\text{disaster}(w))$
  - $[\text{Most } w: \text{John-comes}(w) \ \& \ \text{Mary-comes}(w)](\text{disaster}(w))$

The c-clauses show that both (61a) and (62a) can be treated as standard generalized quantification over individuals/worlds, but it is unclear how logical forms along these lines could be derived from the object language expressions.

Stacked *if*-clauses restricting non-universal quantificational operators (Barker's puzzle) provide evidence in favor of a (monotonic or non-monotonic) referential analysis of *if*-clauses.

## 6 Topics and biscuits

- Hypothetical conditionals or **normal indicative conditionals** (NC) and **biscuit conditionals** (BC) (Austin 1961)<sup>4</sup> (examples from Ebert, Ebert, and Hinterwimmer 2014)

- (63)
- If Peter went shopping, (then) there is pizza in the fridge. NC
  - If you are hungry, (#then) there is pizza in the fridge. BC

<sup>4</sup>The name comes from Austin's example *There are biscuits on the sideboard if you want them*.

- Formal difference: no *then* in BCs, German: V2nd, no *dann*-proform
- Ebert, Ebert, and Hinterwimmer (2014) argue that NCs are **aboutness topics** and BCs are **relevance topics**
- In German, these are distinguished by two types of left dislocation constructions (Frey 2004):

(64) Den Pfarrer, den kann keiner leiden.  
 the-ACC pastor RP-ACC can nobody like  
 ‘The pastor nobody likes.’ **German Left Dislocation (GLD)**

(65) Der/den Pfarrer, keiner kann ihn leiden.  
 the-NOM/the-ACC pastor nobody can him like  
 ‘The pastor, nobody likes him.’ **Hanging Topic Left Dislocation (HTLD)**

Differ in:

- Prosodic Integration
- Resumption
- Binding (quantifiers can bind into GLD topics, but not into HTLD-topics)

- (66) a. Seinen<sub>i</sub> Vater, den verehrt jeder<sub>i</sub>.  
 his father, RP-ACC admires everybody  
 b. \*Sein(en)<sub>i</sub> Vater, jeder<sub>i</sub> verehrt ihn.  
 his(-ACC) father everybody admires him

- Discourse structure: GLD (64), but not HTLD (65) can answer *Any news about the pastor?*; HTLD indicates relevance *as for X*

## 6.1 Ebert, Ebert and Hinterwimmer’s (2014) analysis of NCs vs. BCs

- Ebert, Ebert, and Hinterwimmer (2014) argue that NCs are aboutness topics (like GLD) and BCs are relevance topics (like HTLD)
- Topics make for an extra speech act (REFERENCE drawing the listener’s attention to the referent of the topic)

Rest of the sentence: separate speech act (e.g. ASSERTION), possibly involving predication (if the comment part constitutes a predicate that gets applied to the topic)

Aboutness topic:

(67)  $\text{ASSERT}(\langle \phi_{\text{topic}}, \psi_{\text{comment}} \rangle) \mapsto \text{REF}_X(w_0, \phi_{\text{topic}}) \ \& \ \text{ASSERT}(w_0, \psi_{\text{comment}}(X))$   
 their (50)

Resumptive pronouns: trigger abstraction (predicate is created).

Relevance topic: no resumptive pronoun in the left-periphery, no abstraction, no predication of topic referent (REF, followed by ASSERTION of comment proposition).

- *if*  $\phi$ : refers to maximal sum of  $\phi$ -worlds that are compatible with beliefs of the speaker

(68) For a given proposition  $p$  and a world  $w'$  we define  $\mathbf{M}_{w'}$  as follows:  
 $\mathbf{M}_{w'}(p) := \sigma(\lambda w. p(w) \wedge R_{ep}(w')(w))$   
 their (36)



- (69) If Peter went shopping, then there is pizza in the fridge.  
 $\text{REF}_X(w_o, \lambda w'. \mathbf{M}_{w'}(\lambda w. \text{go-shopping}(w)(\text{peter}))) \& \text{ASSERT}(X, \lambda w. \text{pizza-in-fridge}(w))$
- (70) [If you are hungry,]<sub>T</sub> there is pizza in the fridge.  
 $\text{REF}_X(w_o, \lambda w'. \mathbf{M}_{w'}(\lambda w. \text{hungry}(w)(\text{listener}))) \& \text{ASSERT}(w_o, \lambda w. \text{pizza-in-fridge}(w))$
- No resumptive pronoun (no *then*), no prosodic break: just plain ASSERTION (*if*-clause can be focal, or sentences arethetic/topicless)
- (71) If Peter went shopping, there is pizza in the fridge.  
 $\text{ASSERT}(\mathbf{M}_{w_o}(\lambda w. \text{go-shopping}(w)(\text{peter})), \lambda w. \text{pizza-in-fridge}(w))$
- Referential analysis works particularly well. (Quantificational *if*  $\phi$  can work (Endriss 2009 on quantificational topics). *if*-clauses as restrictors: topicalized situation predicates, outermost arguments of operators they restrict; cf. Ebert, Ebert, and Hinterwimmer 2014).

## 7 Conclusion

- It is hard to decide if the intuitive non-monotonicity of *if* comes from the semantic meaning of *if*/an operator it constrains, or if it is a more general phenomenon.
- Some evidence in favor of a referential analysis
- (Left-dislocated) normal indicative conditionals and biscuit conditionals as two types of topics

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