The Lewis-Stalnaker Analysis of Subjunctives: Criticism

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1 Review

Goodman's Puzzle A counterfactual $\mathsf{A} > \mathsf{B}$ is true in w just in case B follows all the facts about w which are co-tenable with A.

- 'Co-tenability' isn't logical consistency. Counterfactually assuming A definitely requires giving up $\neg\mathsf{A}$, but it may require giving up things that followed by law from $\neg\mathsf{A}$. Also, assuming A may require adding things that follow from it and the laws.
- But what are laws? Further, doesn't this require a total theory of how to revise one's beliefs when you learn that A is false.

The Lewis-Stalnaker Strategy A counterfactual $\mathsf{A} > \mathsf{B}$ is true in w just in case B is true in all of the A-worlds most **similar** to w. We can say enough about similarity to capture the logic of subjunctive conditionals without proposing a solution to Goodman's problem.

Stalnaker on this 'Abstract Strategy'
"As a response to the philosophical problem of counterfactuals, this semantic analysis and others like it contrasts sharply with the traditional approach to the problem exemplified in the classic papers of Nelson Goodman and Roderick Chisholm... From the point of view of this approach, formal semantic analyses look circular and question-begging... A proponent of the traditional approach might complain that such an analysis does not solve the problem, but only packages and relabels it. There would be merit in this complaint if the abstract analysis of conditionals were presented as a finished solution to the philosophical problem posed by Goodman and Chisholm, but a formal semantic analysis, by itself, is intended as neither a solution to nor a dismissal of the problem of counterfactual conditionals. What such an analysis purports to do is to clarify the abstract structure of a problematic concept in order to help separate formal problems about its logic from substantive problems, and for precise statements of alternative solutions to them. If formal semantic analyses seem to beg the interesting questions, this is, I think, only because such analyses seek to change the order in which questions are asked and to formulate them in new ways." (Stalnaker 1984: 121-2)

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1.1 The Abstract Theory

Lewis-Stalnaker Theory (Stalnaker 1968; Stalnaker & Thomason 1970; Lewis 1973)

- $\phi > \psi$ is true at w just in case all of the ϕ-worlds most **similar** to w are ψ-worlds
  - Most similar according to the selection function f
  - f takes a proposition p and a world w and returns the p-worlds most similar to w
- $[\![\phi > \psi]\!]^f = \{w \mid f(w, [\![\phi]\!]^f) \subseteq [\![\psi]\!]^f\}$

(Momentarily making 'Limit Assumption': there are most similar worlds)

- Logic of $>$ is determined by constraints on f (where $p, q \subseteq W$ and $w \in W$):

(a)	$f(w,p) \subseteq p$	**success**
(b)	$f(w,p) = \{w\}$, if $w \in p$	**strong centering**
(c)	$f(w,p) \subseteq q$ & $f(w,q) \subseteq p \implies f(w,p) = f(w,q)$	**uniformity**
(d)	$f(w,p)$ contains *at most* one world	**uniqueness**

Stalnaker Constraints (a)-(d)

Limited Lewis Constraints (a)-(c)

- 'Limited Lewis': Lewis if he had accepted the Limit Assumption

1.2 Debate about Uniqueness

- Review of Lewis and Stalnaker's debate about **uniqueness**
  - Uniqueness leads to:
    - Conditional Excluded Middle (CEM): $(\phi > \psi) \vee (\phi > \neg\psi)$
    - Conditional Negation (CN): $\neg(\phi > \psi) \vDash \phi > \neg\psi$
  - Why care?
    - CEM is useful for the Bizet-Verdi case (Lewis 1973: 80)
    - But, as Stalnaker acknowledges, uniqueness is quite rarely met in conversation:
      - Strategy: supervaluations
      - CEM is always super-true, but sometimes fails to be true
    - But CN raises a puzzle about how to treat *might* subjunctives (Lewis 1973: 81)
      - If $\mathsf{A} > \mathsf{Might}\,\mathsf{B}$ then $\neg(\mathsf{A} > \neg\mathsf{B})$
      - And vice-versa, but CN makes the latter equivalent to $(\mathsf{A} > \mathsf{B})$, in which case $\mathsf{A} > \mathsf{Might}\,\mathsf{B}$ and $\mathsf{A} > \mathsf{B}$ come to the same thing!

- ▶ Stalnaker (1984: 142-6) makes a different proposal for *might*-subjunctives:
  - ▷ In *If Bob had danced, he might have had fun*, *might* is epistemic and scopes over a normal *would*-subjunctive
  - ▷ Objection 1: non-compositional and ad-hoc, since the *would* comes out of nowhere and the *might* is assumed to move, but there are no syntactic reasons to think that it does.
  - ▷ Objection 2: won't work for *could*-subjunctives. Suppose I would never do drugs with my parents (plausible). Nevertheless, if I had been alive in the 60s, I could have done drugs with them. Yet, it's obvious that this is false: it could be the case that if I had been alive in the 60s, I would have done drugs with my parents.

- What about obvious cases where uniqueness fails?
  - "Let me look first at the uniqueness assumption. This is the assumption which rules out ties in similarity. It says that no distinct possible worlds are ever equally similar to any given possible world. That is, without a doubt, a grossly implausible assumption to make about the kind of similarity relation we use to interpret conditionals, and it is an assumption which the abstract semantic theory that I want to defend does make." (Stalnaker 1980: 89)
  - Supervaluations: CEM is supervalid, but admits of exceptions where neither $\mathsf{A} > \mathsf{B}$ nor $\mathsf{A} > \neg\mathsf{B}$ are true (van Fraassen 1969; Stalnaker 1980)
- Recent arguments for CEM and uniqueness:
  - von Fintel & Iatridou (2002) and Williams (2010)

1.3 Debate about the Limit Assumption

Limit Assumption There is are antecedent-worlds **most similar** to w

- One potential consideration in favor of the limit assumption:
  - Everybody agrees this is true:
    - ▶ If: $\mathsf{A} > \mathsf{B}$ a and $\mathsf{B} \vDash \mathsf{C}$
    - ▶ Then: $\mathsf{A} > \mathsf{C}$
  - And this:
    - ▶ If: $\mathsf{A} > \mathsf{B}_1, \ldots, \mathsf{A} > \mathsf{B}_n$ and $\mathsf{B}_1, \ldots, \mathsf{B}_n \vDash \mathsf{C}$
    - ▶ Then: $\mathsf{A} > \mathsf{C}$
  - But limit assumption is required for general version (Pollock 1976; Herzberger 1979):
    - ▶ Let $\Gamma = \{\mathsf{B}_1, \mathsf{B}_2, \ldots\}$ (potentially infinite set of premises)
    - ▶ If: for all $\mathsf{B}_i \in \Gamma$: $\mathsf{A} > \mathsf{B}_i$ and $\Gamma \vDash \mathsf{C}$
    - ▶ Then: $\mathsf{A} > \mathsf{C}$

- Contra the limit assumption, Lewis (1973: 20) brings up the case of a line just under 1 inch long:
  - If it were more than 1 inch long...
  - Which worlds count as best?
    - ▶ For each world with n greater than 1, there is a still closer world, where the line is $n - m$ long.
  - Why not say that all worlds with a line greater than 1 inch count as most similar?
  - Because a world where the line is 1.1 inches long is more similar to our world than one where it is 100 feet long!
- Stalnaker (1984: 140-2) responds: selection is similarity *in relevant respects*
  - In line example, we must ask which respects of similarity are relevant?
  - If the context makes clear that we're interested in the line being over an inch long, all worlds where it is over an inch long are equally good.
  - What about a context where every millimeter matters? Then it is just inappropriate to say *if the line were more than an inch long...*, since there is no hypothetical scenario this could be about!
- Stalnaker (1984: Ch.7) observes that a straightforward application of his supervaluationist approach to failures of uniqueness won't work for the limit assumption
- But see Swanson (to appear) for a new way of applying supervaluations to cope w/Limit failures, and an argument for this application

The Big Question Are subjunctive conditionals true *because* certain relations of similarity hold between worlds?

- **Metaphysical Dimension**: Is an account of similarity between worlds really going to be at the heart of a true answer to Goodman's puzzle?
  - If not, does this undercut the explanatory power of a semantic theory? Even if everything it says about similarity is consistent with the real answer?
- **Epistemic Dimension**: Do we really use some intuitive notion of similarity to evaluate the truth of subjunctive conditionals?

- Two ways of challenging the abstract analysis:
  - Challenge the logical properties it secures (§4)
  - Arguing it's an unpromising way of abstracting from Goodman's puzzles (§§2, 3)

2 Similarity, Communication and Context

(Starr's editorial...)

- Lewis and Stalnaker are committed to there being an intuitive concept of similarity which we use to interpret subjunctive conditionals. Why?
  - The *abstract* notion of similarity defined by their semantics is too unconstrained to explain how we ever interpret subjunctive conditionals as true or false
  - Lewis and Stalnaker say that context determines f further
  - But the way *that* works implies that our intuitive concept of similarity really is put to use in evaluating subjunctive conditionals
- For any given assertion of a subjunctive conditional, a single selection function must be isolated in order for that assertion to express a proposition
- But nothing in the *formal* constraints of the Lewis-Stalnaker theory tells you which one
  - Suppose there are just 4 possible worlds. How many selection functions does the formal theory provide? There are 1024 $f : (W \times \mathscr{P}(W)) \mapsto \mathscr{P}(W)$ $((4 \times 16) \times 16)$. Strong centering eliminates 480 of these functions. Success, at most 73. Uniformity, who knows. Say generously: 75. This still leaves 396. Uniqueness would give us only 320 functions to begin with. Adding strong centering would eliminate 120 and success, at most 9. Uniformity, again, who knows. Say 20. This still leaves us with 171.
    - The point of this slightly silly exercise: there are **a lot** of formally admissible selection functions, especially since there are a lot more than 4 possible worlds.
    - There must be some way in which they get narrowed down
- Lewis and Stalnaker assume that **context** narrows down the choice of f
  - So, subjunctive conditionals are **context sensitive**
  - Standard context-sensitive expression: *I*.
    - How we use I depends on the information available in the utterance situation
    - Information about who is speaking! Call this info s.
    - Actually, it's more complicated than s just being available
    - To use I, I'm not just assuming that you know s
      - ▷ To interpret I, you also need to assume that I know that you know s
      - ▷ So I must know that you know that I know that you know s, and so on.
    - In short: s needs to be **mutual information**
      (Lewis 1969; Stalnaker 1978; Fagin *et al.* 1995)
  - **Context sensitivity**: expressions which require mutual information available in the utterance situation to be interpreted

- Two consequences:

  Availability Information about f must be mutually available and used in utterance situations to interpret subjunctive conditionals
  - So f cannot encode a metric of similarity that we don't all have access to

  Variability The interpretation of subjunctive conditionals will vary with the mutual information about f available in the utterance context
- About **availability**: we all have an intuitive grasp of things being similar and different.
  - "Somehow, we *do* have a familiar notion of comparative overall similarity, even of comparative similarity of big, complicated, variegated things like whole people, whole cities, or even – I think – whole possible worlds. However mysterious that notion may be, if we can analyze counterfactuals by means of it we will be left with one mystery in place of two." (Lewis 1973: 92)
  - "There is a rough consensus about the important respects of comparison, and hence about comparative similarity. Our standards of importance and similarity do vary; but mostly within a certain range, narrow by comparison with the range of variation permitted by the formal constraints in my definition of a system of spheres. We mostly stay within it, expect each other to stay within it, expect each other to expect each other to stay within it, and so on." (Lewis 1973: 93-4)
  - "Even if we take the selection function as the basic primitive semantic determinant in the analysis of conditionals, we still must rely on some more or less independently understood notion of similarity of closeness of worlds to describe the intuitive basis on which the selection is made. The intuitive idea is something like this: the function selects a possible world in which the antecedent is true but which otherwise is as much like the actual world, in *relevant respects*, as possible." (Stalnaker 1984: 141)
- About **variability**: the respects by which we measure overall similarity will vary depending on the interests of the discourse participants.
  - Quine's examples (Lewis 1973: 66-7):

    (1) If Caesar had been in command in Korea he would have used the atom bomb

    (2) If Caesar had been in command in Korea he would have used catapults
  - In contexts where we care about similarity of brutal warfare tactics, (1) is true
  - In contexts where we care about similarity of military resources, (2) is true
  - So, the respects of similarity we care about vary from context to context, just like the propositions expressed by subjunctive conditionals

- One worry:
  - Is it not possible to have one historian assert (1) and another, in the same context, disagree by asserting (2)?
    - Isn't there more of a disagreement here than if one said *I am a Canadian historian* and the other said *I am an American historian*?
    - Stalnaker (1984: 131-2): yes, but in that case you are using the same f and asserting the same proposition but disagreeing whether w_0 or w_1 is the actual world
  - OK, but what if the two historians make explicit their metrics of similarity:

    (1) Caesar's defining characteristic was his use of the most brutal weopons available. So, if Caesar had been in command in Korea he would have used the atom bomb

    (2) No, Caeser's defining characteristic was his use of weaponry he understood perfectly. So, if Caesar had been in command in Korea he would have used catapults, swords, arrows, etc.
  - Isn't this a *factual debat*e about how the world is?
    - It at least seems more factual that the *I am Canadian* vs. *I am American* cases
- A second worry:
  - Here's a natural discourse:

    (3) In the other room, there are two switches hooked up to a light bulb. Currently, only switch 1 is up and the light is off. But if switch 2 were up, the light would be on.
  - For the counterfactual to be true, the most similar world where switch 2 is up, must be one where the light is on.
    - According to the Lewis-Stalnaker account, this fact about similarity had to be mutual information *before* the utterance of the counterfactual.
      - ▷ Otherwise, you wouldn't the have mutual information about f necessary to interpret the conditional as true
    - But (3) certainly doesn't require this fact about similarity to be mutual information
    - Indeed, if I already knew that, it's hard to see how the counterfactual would be informative
  - It seems like subjunctive conditionals actually *provide* information about similarity
    - Rather than the Lewis-Stalnaker model where that information is presupposed
  - It might be that the model of context as mutual information is just too limited
  - But it is the best model we have!
- A third worry:
  - An f must be fixed in order to get a proposition out of a subjunctive conditional

  - In fixing an f, don't we just run immediately into Goodman's puzzles?
  - How is saying which antecedent-worlds are most similar to the actual world any easier than spelling out co-tenability?
  - Insofar as part of semantics is predicting sentences truth-conditions in various contexts, it would seem that the abstract analysis is not successful at giving a semantics without solving Goodman's puzzles.

3 Counterexamples and Lewis' System of Weights

3.1 Nixon and Jones

- Fine (1975: 452):

  (4) If Nixon had pressed the button there would have a been a nuclear holocaust $\mathsf{B} > \mathsf{H}$
  - Plausibly, (4) is true, or can at least supposed to be.
  - Suppose further that there never will be a nuclear holocaust.
  - For every $\mathsf{B} \wedge \mathsf{H}$-world, there will be a closer $\mathsf{B} \wedge \neg\mathsf{H}$-world
    - In this world a small change prevents the holocaust, such as a malfunction in the electrical detonation system
  - The idea: surely a world where Nixon presses the button and a malfunction prevents nuclear holocaust is more like our own than one where there is a nuclear holocaust!
  - So it would seem that the Lewis-Stalnaker theory predicts (4) to be false!
- Tichý (1976: 271):

  (5) a. Invariably, if it is raining, Jones wears his hat

  b. If it is not raining, Jones wears his hat at random

  c. Today, it is raining and so Jones is wearing his hat

  d. But, even if it had not been raining, Jones would have been wearing his hat
  - Given (5a-c), (5d) seems clearly incoherent/false/bad
  - Why is this a counterexample to the Stalnaker-Lewis theory?
    - In the actual world $w_@$, Jones is wearing his hat.
    - So in the non-raining-worlds most similar to $w_@$, Jones is wearing his hat
    - But then Stalnaker-Lewis predict that (5d) is true!

3.2 The Lewis (1979) Weight System

- Lewis (1979): analyze the asymmetry of time in terms of the asymmetry of counterfactuals
  - The future counterfactually depends on the past
    - If the past had been different, the future/present could be too
  - Not vice versa
    - If the future/present were different, it doesn't follow that the past would have been different
  - There are reasons from statistical mechanics to think this project fails (Elga 2000)
- This requires articulating 'the standard resolution of similarity'
  - In part, to rule out *backtrackers*:

    (6) "Jim and Jack quarreled yesterday, and Jack is still hopping mad. We conclude that if Jim asked Jack for help today, Jack would not help him. But wait: Jim is a prideful fellow. He never would ask for help after such a quarrel; if Jim were to ask Jack for help today, there would have to have been no quarrel yesterday. In that case, Jack would be his usual generous self. So if Jim asked Jack for help today, Jack would help him after all. At this stage we may be persuaded (and rightly so, I think) that if Jim asked Jack for help today, there would have been no quarrel yesterday." (Lewis 1979: 456)

  - "[The Abstract Analysis] is about all that can be said in full generality about counterfactuals. While not devoid of testable content – it settles some questions of logic – it does little to predict the truth values of particular counterfactuals in particular contexts. The rest of the study of counterfactuals is not fully general. [The Abstract Analysis] is only a skeleton. It must be fleshed out with an account of the appropriate similarity relation, and this will differ from context to context. Our present task is to see what sort of similarity relation can be combined with Analysis 2 to yield what I have called the standard resolution of vagueness: one that invalidates back-tracking arguments, one that yields an asymmetry of counterfactual dependence." (Lewis 1979: 465)
  - The standard resolution is also supposed to make the correct prediction about the Nixon case
- This strategy departs from the idea that intuitive similarity is at work:
  - "...[W]e must use what we know about the truth and falsity of counterfactuals to see if we can find some sort of similarity relation – not necessarily the first one that springs to mind – that combines with [the Abstract Analysis] to yield the proper truth conditions. It is this combination that can be tested against our knowledge of counterfactuals, not [the Abstract Analysis] by itself. In looking for a combination that will stand up to the test, we must use what we know about counterfactuals to find out about the appropriate similarity relation-not the other way around." (Lewis 1979: 466-7)

- But Lewis thinks that we must depart from that view anyway:
  - "Sometimes a pair of counterfactuals of the following form seem true: *If A, the world would be very different; but if A and B,the world would not be very different.* Only if the similarity relation governing counterfactuals disagrees with that governing explicit judgments of what is 'very different' can such a pair be true under [the Abstract Analysis]. (I owe this argument to Pavel Tichy and, in a slightly different form, to Richard J. Hall.) It seems to me no surprise, given the instability even of explicit judgments of similarity, that two different comparative similarity relations should enter into the interpretation of a single sentence." (Lewis 1979: 466)
- I think that this maneuver is in conflict with what Lewis and Stalnaker have to say about how context determines f
  - If f is determined by mutual information, we all must have means of accessing it
  - The only option seems to be our intuitive concept of similarity
  - But now Lewis is saying that this is not our automatic, intuitive concept of similarity that's relevant!
  - Indeed, similarity is an enigma which we only understand by probing our intuitions about which counterfactuals are true/false!
- Putting this aside for the moment, what is the standard resolution? how does it address the puzzles about Nixon and Jones?
- The standard resolution is articulated as a system of weights:

(1) It is of the first importance to avoid big, widespread, diverse violations of law. ('big miracles')

(2) It is of the second importance to maximize the spatio-temporal region throughout which perfect match of particular fact prevails.
  - Maximize the time periods over which the worlds match exactly in matters of fact

(3) It is of the third importance to avoid even small, localized, simple violations of law. ('little miracles')

(4) It is of little or no importance to secure approximate similarity of particular fact, even in matters that concern us greatly.

- Lewis wants the most similar world to be:
  - A world just like ours, call it w_1, w/the exact past of our world, except a tiny miracle (exception to the laws of w_0) occurs which leads to Nixon pressing the button
  - Compare this to a world w_2 where Nixon's button pushing is the result of a different past and no miracle
    - This would lead to backtracking: if Nixon had pushed the button, the prior history of the USA would have to have been different.
  - The ranking of (2) over (3) makes w_1 prevail over w_2

- ▶ The perfect match of pre-button history is worth the tiny miracle
- ○ But what about w_3, which exactly like w_1 but with another miracle: one that leads to an equipment failure
  - ▶ w_3 is worse by (3) since it is more miraculous
  - ▶ w_3 shows that overall approximate match of fact can't matter for much
- ○ Another possibility, w_4 is like w_1 but has as second, widespread violation of law
  - ▶ Nixon presses the button, but all traces of this vanish from the universe, leading to a perfect cover-up
  - ▶ In this case, we see that perfect match of fact is outweighed by massive miracles
  - ▶ This is the point of (1)

- It was crucial for ruling out w_3 that preserving matters of fact don't matter
- This explains the Jones case to some degree:
  - ○ We shouldn't care about preserving the fact that Jones is wearing his hat when we counterfactually assume that it wasn't raining
- But, as Lewis notes, there are cases that go the other way:

(7) [You're invited to bet heads on a coin-toss. You decline. The coin comes up heads.] See, if you had bet heads you would have won!
(Slote 1978: 27 fn33) (Attributed to Sydney Morgenbesser.)

(8) If we had bought one more artichoke this morning, we would have had one for everyone at dinner tonight (Sanford 1989: 173)

(9) [Suppose there is a circuit such that the light is on exactly when both switches are in the same position (up or not up). At the moment switch one is down, switch two is up and the lamp is out.] If switch one had been up, the lamp would have been on.
(Lifschitz)

(10) a. Jones flips a coin before he opens the curtain to see what the weather is like
b. If it's not raining and the coin comes up heads, he wears his hat
c. If it's not raining and the coin comes up tails, he doesn't wear his hat
d. Invariably, if it is raining he wears his hat
e. Today, the coin came up heads and it is raining, so Jones is wearing his hat
f. But, even if it hadn't been raining, Jones would have been wearing his hat

(Veltman 2005: 164)

- Lewis says "I would like to know why".
- Diagnosis of Veltman (2005: 164):

> Similarity of particular fact is important, but only for facts that do not **depend** on other facts. Facts stand and fall together. In making a counterfactual assumption, we are prepared to give up everything that depends on something that we must give up to maintain consistency. But, we want to keep in as many independent facts as we can.

4 Does the Abstract Analysis Get the Logic Right?

4.1 Impossible Antecedents

- The Lewis-Stalnaker analysis renders all counterfactuals with 'impossible' antecedents true
- But it isn't obvious that this is true:
  - ○ If 2^2 were 0, 2^3 would be 0 too
  - ○ If 2^2 were 0, 2 would be 9.
- Impossible worlds?
  - ○ Nolan (1998)
- Counterlegals:
  - ○ If $e = mc^3$, there would be more energy in the universe

4.2 Transitivity

- The Abstract Analysis invalidates Transitivity, but some instances sound good:
  - ○ If Pedro had danced, he would have met Maria, and if he had met Maria, he would be happy. So, if Pedro had danced, he would be happy.
- Why is this?

4.3 Disjunctive Antecedents

- This seems good:

(11) a. If Bob had danced or Sarah had sang, Andy would have cried
b. So, if Bob had danced, Andy would have cried, and if Sarah had sang, Andy would have cried

- But SDA is invalid according to the Abstract Analysis: $(\phi_1 \vee \phi_2) > \psi \vDash (\phi_1 > \psi) \wedge (\phi_2 > \psi)$
  - ○ Fine (1975): it must be if we allow the substitution of equivalents in the antecedent
  - ○ ϕ_1 is equivalent to $(\phi_1 \wedge \phi_2) \vee (\phi_1 \wedge \neg\phi_2)$
  - ○ Substituting equivalents: from $\phi_1 > \psi$ we get $((\phi_1 \wedge \phi_2) \vee (\phi_1 \wedge \neg\phi_2)) > \psi$
  - ○ By SDA, we would get: $(\phi_1 \wedge \phi_2) > \psi$, which is the antecedent strengthening inference the Abstract Analysis was designed to block
- McKay & van Inwagen (1977) have claimed that there are counterexamples to SDA:

(12) a. If Spain had fought for the Axis or the Allies, she would have fought for the Axis
b. # So, if Spain had fought for the Allies, she would have fought for the Axis

- But note that (12a) really seems to say Spain would never have fought for the Allies.

- Indeed, the acceptability of (12a) is destroyed once the possibility of Spain fighting for the Allies is seriously countenanced.

  (13) Spain didn't fight on either the Allied or Axis side. Though she had deep ties to the Axis, she really could have wound up fighting on the Allied side. # But, if she had fought on either side, it would have been the Axis side.

- In this case, (12b) follows on the Lewis-Stalnaker analysis too:
  - $\Box\phi$ is defined as $\neg\phi > \phi$ (Stalnaker 1968: 47)
  - So $\Box\neg$Allies amounts to Allies > Axis, which is just the problematic conclusion!
- So everyone needs to explain away (12) somehow.

4.4 Reverse Sobel Sequences

- Reverse Sobel Sequences (von Fintel 2001; Gillies 2007):

  (14) a. If Sophie had gone to the parade, she would have seen Pedro dance

  b. But of course, if Sophie had gone to the parade and been stuck behind someone tall, she would not have seen Pedro dance

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

  b. # But of course, if Sophie had gone to the parade, she would have seen Pedro dance

- The Lewis-Stalnaker theory predicts that there should be no difference.
- In (14) there can be just one f at work.
- But (15) suggests that once you've selected an f that makes the strengthened conditional true, it doesn't make the unstrengthened one true
- von Fintel and Gillies use this to motivate a strict-conditional story where (14) involves a shift of the accessibility relation.
- But they motivate a framework which disallows the kind of shift in (15).
- Precedent: Warmbrōd (1981a,b)

References

Elga, A (2000). 'Statistical Mechanics and the Asymmetry of Time.' *Philosophy of Science Supplement*, **68**: 313–324.

Fagin, R, Halpern, JY, Moses, Y & Vardi, MY (1995). *Reasoning about Knowledge*. Cambridge, Massachusetts: The MIT Press.

Fine, K (1975). 'Review of Lewis' *Counterfactuals*.' *Mind*, **84**: 451–8.

von Fintel, K (2001). 'Counterfactuals in a Dynamic Context.' In M Kenstowicz (ed.), *Ken Hale: a Life in Language*, 123–152. Cambridge, Massachusetts: The MIT Press. URL http://mit.edu/fintel/www/conditional.pdf.

von Fintel, K & Iatridou, S (2002). 'If and When *If*-Clauses Can Restrict Quantifiers.' Ms. MIT, Department of Linguistics and Philosophy, URL http://web.mit.edu/fintel/www/lpw.mich.pdf.

Gillies, A (2007). 'Counterfactual Scorekeeping.' *Linguistics & Philosophy*, **30(3)**: 329–360. URL http://rci.rutgers.edu/~thony/counterfactualscorekeeping_landp.pdf.

Herzberger, H (1979). 'Counterfactuals and Consistency.' *Journal of Philosophy*, **76(2)**: 83–88.

Lewis, DK (1969). *Convention: A Philosophical Study*. Cambridge, Massachusetts: Harvard University Press.

Lewis, DK (1973). *Counterfactuals*. Cambridge, Massachusetts: Harvard University Press.

Lewis, DK (1979). 'Counterfactual Dependence and Time's Arrow.' *Noûs*, **13**: 455–476.

McKay, TJ & van Inwagen, P (1977). 'Counterfactuals with Disjunctive Antecedents.' *Philosophical Studies*, **31**: 353–356.

Nolan, D (1998). 'Impossible Worlds: A Modest Approach.' *Notre Dame Journal of Formal Logic*, **38(4)**: 535–573.

Pollock, J (1976). *Subjunctive Reasoning*. Boston: D. Reidel Publishing Co. URL http://oscarhome.soc-sci.arizona.edu/ftp/PAPERS/Pollock_Subjunctive_Reasoning.pdf.

Sanford, DH (1989). *If P then Q: Conditionals and the Foundations of Reasoning*. London: Routledge.

Slote, M (1978). 'Time in Counterfactuals.' *Philosophical Review*, **7(1)**: 3–27.

Stalnaker, RC (1968). 'A Theory of Conditionals.' In N Rescher (ed.), *Studies in Logical Theory*, 98–112. Oxford: Basil Blackwell Publishers.

Stalnaker, RC (1978). 'Assertion.' In P Cole (ed.), *Syntax and Semantics 9: Pragmatics*, 315–332. New York: Academic Press. References to reprint in Stalnaker (1999).

Stalnaker, RC (1980). 'A Defense of Conditional Excluded Middle.' In WL Harper, R Stalnaker & G Pearce (eds.), *Ifs: Conditionals, Belief, Decision, Chance, and Time*, 87–104. Dordrecht: D. Reidel Publishing Co.

Stalnaker, RC (1984). *Inquiry*. Cambridge, Massachusetts: The MIT Press.

Stalnaker, RC (1999). *Context and Content: Essays on Intentionality in Speech and Thought*. Oxford: Oxford University Press.

Stalnaker, RC & Thomason, RH (1970). 'A Semantic Analysis of Conditional Logic.' *Theoria*, **36**: 23–42.

Swanson, E (to appear). 'Conditional Excluded Middle Without the Limit Assumption.' *Philosophy and Phenomenological Research*. URL http://www-personal.umich.edu/~ericsw/research/Swanson,%20Conditional%20Excluded%20Middle%20without%20the%20Limit%20Assumption.pdf.

Tichý, P (1976). 'A Counterexample to the Stalnaker-Lewis Analysis of Counterfactuals.' *Philosophical Studies*, **29**: 271–273.

van Fraassen, BC (1969). 'Facts and Tautological Entailments.' *The Journal of Philosophy*, **66(15)**: 477–487.

Veltman, F (2005). 'Making Counterfactual Assumptions.' *Journal of Semantics*, **22**:

159–180. URL http://staff.science.uva.nl/~veltman/papers/FVeltman-mca.pdf.

Warmbrōd, K (1981a). 'Counterfactuals and Substitution of Equivalent Antecedents.' *Journal of Philosophical Logic*, **10(2)**: 267–289.

Warmbrōd, K (1981b). 'An Indexical Theory of Conditionals.' *Dialogue, Canadian Philosophical Review*, **20(4)**: 644–664.

Williams, JRG (2010). 'Defending Conditional Excluded Middle.' *Noûs*, **44(4)**: 650–668.