
On the Role of Past Tense in Resolving Similarity in Counterfactuals*

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Abstract

In this paper I investigate the semantics of counterfactual conditionals. I propose a generalized *de re* analysis according to which counterfactuals are predicated *de re* of situations in the actual world. I compare the resulting *local* view of similarity with the *global* view found in Lewis-Stalnaker style proposals, presenting arguments in favor of the former. In the *de re* analysis, past tense identifies the actual world situation the counterfactual is about.

1 Introduction

In their classic analysis of the interpretation of counterfactuals, both Stalnaker (1968) and Lewis (1973) assigned a crucial role to the notion of *similarity*. My objective in this paper is to examine similarity in counterfactuals, and tie it to the semantics of past tense: I will provide arguments in favor of a *local* view of similarity (as opposed to the *global* perspective taken by Stalnaker and Lewis) and I will spell out a semantics of tense in the situations framework of Kratzer (1989), blurring the boundaries between times and worlds.

I will begin by briefly presenting similarity in a Lewis-Stalnaker style analysis of counterfactuals. Setting aside some differences, a Lewis-Stalnaker style analysis can be characterized (roughly) as follows:

*I would like to thank Angelika Kratzer and Phil Bricker for early discussions related to this material. All mistakes are my own.

Worlds in which somebody cut the cable before the button was pushed (like w_1), which differ from the actual world at some time before the button pushing event, will not enter the domain of quantification of the counterfactual. The fact that in those worlds there is button pushing without a holocaust will not affect the truth conditions of the sentence.

2 A generalized *de re* analysis

In this paper I would like to compare the global account of similarity that is part of the Lewis-Stalnaker semantics with a ‘local’ approach. Instead of a view according to which all facts matter in figuring out the domain of quantification of counterfactuals, I will present a view according to which only certain facts matter. In the analysis presented here, counterfactuals are interpreted as making *de re* claims about past facts. The proposal divides the work traditionally carried out by the *g*-similarity relation into two parts: the role of identifying the actual-world facts that matter (the *res* the counterfactual is about) is assigned to past tense, and the role of invoking the laws relevant to the resolution of the counterfactual is assigned to the modal. Some intuitive motivation for the idea that counterfactuals are about ‘some facts’ (as opposed to all the facts) can be found in Adams’s famous examples (Adams 1970):

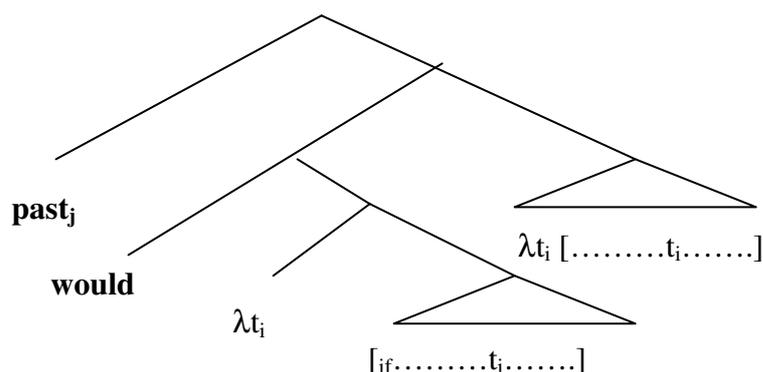
- (4) a. If Oswald didn’t kill Kennedy, somebody else did.
 b. If Oswald hadn’t killed Kennedy, somebody else would have.

As Adams pointed out, our intuitions regarding (4a, b) differ. We tend to judge (4a) true and (4b) false. One way of understanding this would be to say that in the case of (4a), we are obliged to consider worlds that are like the actual world with respect to the facts regarding Kennedy’s death. In the case of (4b), however, we can set some facts aside. In particular, we are allowed to consider worlds in which Kennedy was not killed at all. It is the possibility of considering the truth of the antecedent in worlds that fail to match the actual world regarding Kennedy’s death that explains our intuitions about (4b). In this sense, (4b) shows a *reduced dependency* on facts. This fits in well with the idea that (4b) is only about *some* facts.

2.1 Preliminaries

I will adopt the simplified structure in (5) (but see von Fintel (2001), Bhatt et al. (2001):

(5)



One of the puzzles that needs to be addressed when dealing with tense in counterfactuals is the interpretation of the apparently past-tense morphology in the antecedent clause. According to (5), there is a past tense in counterfactuals, but it surfaces above the modal, c-commanding both the antecedent and consequent clause of the conditional (the relation between the interpretation of *would*-conditionals and past tense had already been investigated by Thomason and Gupta (1980), and has been the subject of much recent interest, see a.o. Iatridou (2000), Ogihara (2000), Ippolito (2003)).

It has been observed that even though tense *morphology* in the antecedent clause of counterfactuals surfaces as past, the *reference time* for the antecedent clause can be past, present or future (an early version of this observation can be found in Dudman (1984)). In the proposal made here, the reference time of the antecedent clause is set by the modal (Section 2.3): it combines with a property of times and fixes its reference time (the idea that modals are responsible for shifting reference times can be found in various places in the literature, a.o. Abusch (1996), Condoravdi (2001), Eng (1996)). According to (5), the antecedent clause denotes a property of times. This proposal allows us to make sense of the presence of past morphology in the antecedent and the absence of a past interpretation. Tense in the antecedent clause is a variable tense, that surfaces with the morphological features of the c-commanding past tense (for a theory of agreement of tense features, see Kratzer 1998). As a variable, tense in the antecedent clause can give rise to a bound reading, resulting in the property of times manipulated by the modal.

2.2 Interpreting past tense

My objective in this paper is to defend a view of counterfactuals according to which the presence of past tense is linked to the counterfactual interpretation. Part of the analysis is the idea that the information encoded in past tense is not purely temporal. As we will see, past tense in counterfactuals brings with it the features relevant for evaluating similarity. In this account, there is a modal dimension to tense, and the analysis encodes it by allowing tenses to refer to situations (understood as in Kratzer 1989), thus bringing together information about worlds and times.

In a Kratzer-style framework, situations are part of worlds (where worlds are considered maximal situations). Given a Lewis-style perspective, situations are considered to be at most part of one world. To distinguish this mereological part-of relation from the modal part-of relation I will also make use of, I will use $\text{part}_k (<_k)$.

In a referential theory of tense, tenses are characterized as pronouns (a.o. Partee 1973, Heim 1994, Kratzer 1998). Working with a situations framework, I propose the denotation below:

(7) **A ‘pronoun’ theory of tense**

$[[\text{past}_i]]^g = g(i) = s_i$, where s_i is presupposed to precede the speech event.

As well as the mereological part-of relation ($<_k$), I will make use of a modal part-of relation ($<$). Following Lewis, situations (as individuals) are identified in other worlds via *counterparts*. I will say that a situation in the actual world is *part of* another world (not in a strict k -sense) to claim that the actual world situation has a counterpart in another world. Imagine that s is a situation in the actual world, and s' is a situation in another world, then:

(8) $s < s'$ iff s has a counterpart in s'

As usual, counterpart relations are contextually established on the basis of salient parameters of similarity.

I have referred to the view presented here as a *de re* analysis of counterfactuals. In Section 2.3 I propose a denotation for *would* in which the modal is given an argument slot for the situation identified as the denotation of past tense (see (5)). The counterfactual construction functions as a modal predicate of this situation. Thus the counterfactual is predicated *de re* of this situation.

2.3 A law-like modal

Let us consider the denotation of *would*. For the sake of clarity, I will begin by finding an abbreviation for the future-shifted proposition identified by the modal on the basis of the antecedent clause. Suppose that p is the property of situations corresponding to the denotation of the antecedent clause, then:

(9) $p^* = \lambda s \exists s': s' < s \ \& \ s' \text{ is non-past} \ \& \ p(s') = 1$

I will treat modals as restricted quantifiers over possible worlds. In the spirit of von Stechow (1994), I will assume that the modal in counterfactuals enters the derivation with a variable that restricts its domain of quantification. In the case of counterfactuals, the domain of quantification is restricted to law-like worlds:

- (10) Given two propositions p^* and q^* , and a past situation s in w ,
 $[[\mathbf{would}_L]]^{w, g}(p^*)(q^*)(s) = 1$ iff
 $\{s_L': s < s_L' \ \& \ p^*(s_L') = 1\} \subseteq \{s_L: \exists s_L'': s_L < s_L'' \ \& \ q^*(s_L'') = 1\}$,
 where s_L is a situation that satisfies the set of laws L salient in the context.

The contribution of the resource variable L introduced by *would* could be unpacked as follows:

- (11) Given a situation s ,
 $\{s_L': s < s_L' \ \& \ p^*(s_L') = 1\}$ abbreviates $\{s': s < s' \ \& \ [[\mathbf{L}]]^{w, g}(s') = 1 \ \& \ p^*(s') = 1\}$
 where $g(\mathbf{L})$ is the set of possible situations characterized by the contextually salient/ relevant laws of w

According to (10), *would* combines with two propositions and a situation. Given (5), this will be the situation corresponding to the denotation of *past* in the counterfactual (the *res* situation). We will obtain truth iff all the law-like situations that extend the *res* situation in which the antecedent proposition is true are also situations that can be extended to lawlike situations in which the consequent proposition is true. The only facts about the actual world that matter for the identification of the domain of quantification are the features corresponding to the denotation of *past* (the *res* situation). We are making use of similarity relations, but only *locally*, with respect to the *res* situation (only the features corresponding to this situation count). (Note that proposals to quantify over situations and put constraints on their extensions can be found in the literature, for example in Heim (1990)'s analysis of E-type pronouns).

In the proposal in (10), *would* appeals to the laws of the evaluation world. The concept of law should be understood broadly, to include natural laws, regularities and expectations. I will not be able to discuss in greater length the types of laws invoked by *would*. However, it is worthwhile pointing out that the modal will activate a subset of the laws, and not all generalizations need to be taken into consideration simultaneously. An antecedent proposition that violates some laws will not lead to inconsistencies.

Before working through an example, let us consider an alternative to (10) in terms of possible worlds:

- (12) *A worldly alternative*
 Given two propositions p^* and q^* , and a past situation s in w ,
 $[[\mathbf{would}_L]]^{w, g}(p^*)(q^*)(s) = 1$ iff
 $\{w_L: s < w_L \ \& \ p^*(w_L) = 1\} \subseteq \{w_L: q^*(w_L) = 1\}$

The accounts in (10) and (12) are very similar. The only difference is that in (12) we are quantifying over possible worlds, whereas in (10) we are quantifying over possible worlds and the situations that constitute them (remember that possible worlds are a type of situation). The difference can thus be thought of as a difference of 'granularity': in

(12) we care only about the maximal situations that contain s , and in (10) we care about all the situations that contain s . We will see in Section 4 why the difference matters.

To illustrate (10), let us work through an example:

- (13) *An example*
 [[If Sara had visited my house, she would have sneezed]]^{w g} = 1 iff
 $\{s_L: s < s_L \text{ 'Sara has visited my house in } s_L\} \subseteq$
 $\{s_L: \exists s_L'': s_L < s_L'' \text{ \& Sara has sneezed in } s_L''\}$

Imagine that Sara is a friend of mine allergic to cats, and that I have two cats at home. Suppose past tense denotes a situation s corresponding to these features of the actual world and L invokes the actual world laws that make people with allergies to cats sneeze in the presence of cats. With this set up, (10) predicts the counterfactual will be true. All law-like situations that include (a counterpart of) s in which Sara has visited my house will also be situations that can be extended to law-like situations in which Sara sneezed. The role of past tense is to identify the (accidental) features of the actual world that matter for the interpretation of the counterfactual. The rest is up to the laws.

The proposal in (10) makes use of the possibility of allowing *past* to have as denotation the situation corresponding to the actual world features of me having cats, my friend having allergies, etc. However, given that *past* is a variable, its denotation depends on the variable assignment. What happens if *past* is assigned as value an ‘irrelevant’ situation? For example, the situation s of me having brown hair? Such an assignment would make (13) false. In itself, this is not wrong. However, variable assignments encode shared knowledge and mutual understanding about communicative intentions: listeners will try to accommodate values that allow (13) to be true.

As a last remark, let me note that the proposal in (10) quantifies over law-like worlds that include (a counterpart of) the *res* situation. The proposal does not make any claims about how exactly the *res* situation fits into the situations quantified over (except to claim that they are law-like). This seems advantageous over global views of similarity, that must deal with the difficult problem of explaining when and how divergence takes place from the actual world history.

2.4 Weakly-centered similarity

One of the differences between the *de re* analysis presented here and a Lewis-Stalnaker style account has to do with the centering of similarity. Lewis (1973) discussed two possible ways of conceptualizing similarity: it could be strongly centered or weakly centered. The features of the similarity relation in each case are presented below:

- (14) *Strongly centered similarity*
- No world is more similar to i than it itself is.

- A world i is more similar to itself than any other world is.

(15) *Weakly centered similarity*

- No world is more similar to i than it itself is.
- There may be worlds other than i that are as similar to i as it itself is.

(Lewis 1973: 29)

To see the different options at work, consider the example in (16):

(16) If Verdi had been Italian, Bizet would have been French.

Given a strongly centered similarity relation, (16) will be judged true. This is because if similarity is strongly centered, counterfactuals with true antecedents and true consequents come out true. With a weakly centered similarity relation (16) could be judged false. With weakly centered similarity, there could be worlds other than the actual world just as similar to the actual world. And it could be the case that Verdi was Italian in such worlds and Bizet was not French. With weakly centered similarity, the mere truth of the antecedent and of the consequent (in absence of a law-like regularity) does not guarantee the truth of the counterfactual.

The *de re* analysis presented above patterns with weakly centered similarity. There is no actual world fact that guarantees, in conjunction with the laws, that a world in which Verdi is Italian will also be a world in which Bizet is French. Intuitively, this is the case because no feature of the actual world ‘connects’ those two truths. The result is that (16) would come out false, and that, in general, counterfactuals with true antecedents and consequents can be false.

Lewis favored strongly centered similarity, but noted that the oddness of examples like (16) gets in the way of our judgments: *In fact, the oddity dazzles us. It blinds us to the truth value of the sentences, and we can make no confident judgment one way or the other. We ordinarily take no interest in the truth value of extreme oddities, so we cannot be expected to be good at judging them. They prove nothing at all about truth conditions.* (Lewis 1973: 28)

3 On *aboutness* in counterfactuals

The *de re* analysis makes use of a referential theory of tense and claims that past tense is responsible for picking out the actual world features counterfactuals are about. In this section I will provide some intuitive support for this view, by pointing out that we do indeed have intuitions regarding the situations counterfactuals are about. In the examples, we will embed counterfactuals in belief contexts, and make use of the account of belief-sentences proposed in Kratzer (2002).

According to Kratzer (2002), knowledge can be characterized as true belief about facts. The proposal is in (17), with auxiliary definitions for *fact* and *minimal situation* in (18):

- (17) *S knows p* iff
- (i) There is a fact *f* that exemplifies *p*
 - (ii) *S* believes *p de re* of *f*, and
 - (iii) *S* can rule out relevant possible alternatives of *f* that do not exemplify *p*.
(Kratzer 2002)
- (18) If *s* is a possible situation and *p* is a proposition, then *s* is a *fact* exemplifying *p* iff for all *s'* such that $s' < s$ and *p* is not true in *s'*, there is an *s''* such that $s' < s'' < s$ and *s''* is a minimal situation in which *p* is true. (A minimal situation in which *p* is true is a situation that has no proper parts in which *p* is true) (Kratzer 2002)

The proposal in (17) allows Kratzer to deal with the well-know problems posed by *Gettier-examples* and still hold on to a characterization of knowledge as justified true belief:

- (19) A Gettier example:
Smith knows that either Jones owns a Ford or Brown is in Barcelona.

We should imagine (19) uttered in a context in which Jones used to own a Ford and has just offered Smith a ride in a Ford. Smith has strong evidence that Jones owns a Ford, and given his belief that Jones owns a Ford, Smith is willing to believe that either Jones owns a Ford or Brown is in Barcelona (though Smith has no evidence about Brown's whereabouts!). It turns out that Jones has sold his Ford, and is driving around in a friend's car, and Brown actually is in Barcelona. Smith believes a true proposition, however in this context we judge (19) false. Kratzer's proposal correctly predicts this: Smith is not properly acquainted with the facts (a kind of situation) that make the embedded proposition true.

Having a theory that ties knowledge of a proposition to an appropriate acquaintance with the situation that makes it true, let us turn now to counterfactuals. The proposal in (10) claims that counterfactuals are about the situation corresponding to *past*. We can use our intuitions regarding counterfactuals embedded under belief in Gettier contexts to identify the situation counterfactuals are about (the situation that makes the counterfactual true). Consider (20):

- (20) Smith knows that if Nixon had pushed the button, there would have been a nuclear holocaust.

Imagine the sentence uttered in the following context: at some point in the past, the button had been connected to an A-set of missiles, and if those had been launched, there would have been a nuclear holocaust. Smith knew this. But at some later point, there was a change of strategy, and the button was disconnected from the A-missiles and

connected to a B-set of missiles. If those had been launched, there would have been a nuclear holocaust. Smith never found out that the wiring had been changed. In this scenario we would say that the sentence in (20) is false. Following Kratzer's account, we could explain this by saying that Smith was not properly acquainted with the situation that makes the counterfactual true: the actual world facts regarding the wiring of the buttons and missiles.

The example above shows that we have intuitions with respect to the situations counterfactuals are about. We can identify them. This is important for a theory that claims that we make reference to such situations when judging a counterfactual true. In the next section we will examine arguments that show that an analysis stated in terms of the situations counterfactuals are about makes better predictions than global similarity.

4 Global similarity vs. Local similarity

Whether we make use of global similarity (to identify the most similar worlds) or local similarity (to identify counterparts of situations), we always appeal to context-dependent notions of similarity. Does it really matter which one we choose? In this section I will argue that the answer is 'yes', presenting data supporting a local similarity view.

4.1 The case of multiple counterparts

Lewis' theory of counterparts provides us with a way to understand how we identify individuals across possible worlds even though an individual is part of at most one world. According to Lewis, modal predicates are made true of an individual by what happens to his/ her counterparts. An individual's counterparts are identified on the basis of similarity, and one of the well-known features of Lewis' proposal is that an individual may end up with multiple counterparts in one world. In his 1973 book, Lewis presents an example with a man called Ripov. According to Lewis, Ripov bribed the judges to win. We are asked to consider (21) (Lewis 1973: 36):

(21) If he had reformed, he would have confessed.

As Lewis notes, predicated *de re* about Ripov, (21) will be true if in the most similar worlds in which Ripov's counterpart reforms, he confesses. But Lewis asks the following question:

(22) *What if he has multiple counterparts at one of the closest worlds where he vicariously reforms? It is not enough if one reforms and another one confesses; it is not even enough if one reforms and confesses and another reforms without confessing. What we must require is that at every closest world where one of*

Ripov's counterparts reforms all of those who reform also confess – that is, none reform without confessing. (Lewis 1973: 42)

What we learn from this example is that in cases of *de re* predication, if there is more than one counterpart to the *res*, then all counterparts must satisfy the predicate. With this diagnostic in mind, we turn to situations. Consider the following example:

- (23) *Smith makes candied apples and popcorn that he sells in the park. One particular day he only makes one candied apple, which he accidentally poisons. He doesn't sell it, and it gets thrown away.*

If a child had eaten a candied apple, he would have died.

The actual world situation that supports the truth of the counterfactual in (23), the situation it is about (*res*), includes Smith selling the candied apples he makes in the park, his making of a poisoned apple, etc. Imagine a world in which there are two Smiths and two toxic apples have been made. In such a world, the situation the counterfactual is about has two counterparts. We will only judge the counterfactual true if both situations are such that if a child eats the candied apple that Smith has made in that situation, the child dies. If a child eats the apple in one of the counterpart situations and lives, the counterfactual in (23) will be judged false.

This type of example supports the proposal in (10), which puts restrictions on both worlds that contain the *res* situation and smaller situations that contain the *res* situation. By doing so, (10) forces us to consider all counterparts of the *res* situation separately (we quantify over all situations that contain it).¹

What does a possible worlds analysis say about multiple counterpart scenarios? One option would be to claim that worlds with multiple counterparts of the *res* situation are too different from the actual world to be relevant antecedent worlds. But this gives no explanation for the robust intuition that both counterparts matter. Another option would be to claim that in examples like (23) quantification proceeds over worlds as usual and that it is the situations restricting the domain of quantification of the DP that are responsible for multiple counterparts. The relation between domains of quantification and the situations that support the truth of a counterfactual is an important issue, but I must leave it unexplored here. The second option remains open for future investigation.

4.2 Two final comparisons

4.2.1 Inference patterns

¹The proposal itself does not guarantee that the antecedent and consequent situations will be matched appropriately. Something else would need to be said to account for this. The reader is referred to Rothstein (1995).

One of the important triumphs of a g-similarity Lewis-Stalnaker style analysis is that it provides us with an explanation for the failure of certain inference patterns. Examples are provided in (24):

- (24)
- a. *Contraposition* (attributed to Kratzer in von Fintel 2001)
 - (i) (even) if Goethe hadn't died in 1832, he would still be dead now.
 - (ii) (therefore) if Goethe were alive now, he would have died in 1832.
 - b. *Strengthening of the antecedent* (Lewis 1973)
 - (i) If the US threw its weapons into the sea, there would be war.
 - (ii) (therefore) If the US and Russia threw their weapons into the sea, there would be war.
 - c. *Syllogism* (Stalnaker 1968)
 - (i) If Hoover had been born in Russia, he would have been a Communist.
 - (ii) If Hoover had been a Communist, he would have been a traitor.
 - (iii) (therefore) If Hoover had been born in Russia, he would have been a traitor.

A *de re* analysis also makes correct predictions regarding the patterns in (24): the fact that there is a situation that supports the truth of one conditional does not guarantee that there is a situation supporting the truth of the other one. For example, the existence of features in the actual world (the belligerent attitude of superpowers), extended to a situation in which the US throws its weapons into the sea, will lead us (via well-known regularities) to a situation in which there is war. But that does not itself guarantee that there exist features in the actual world which, extended to a situation in which the US and Russia throw their weapons into the sea will lead us (via regularities) to a situation in which there is war. The pattern in (b) is not predicted to be valid. And the same kind of reasoning will make correct predictions regarding (a) and (c).

4.2.2 A problem of *packaging*

In this section I will include some remarks on a well-known problem in the semantics of counterfactuals. It has been noted that when identifying the quantificational domain of counterfactuals, some features of the world pattern together and others separate more freely. I will refer to this as the *packaging* problem. (The packaging problem has been addressed in other frameworks with the notions of 'lumping' (Kratzer 1989) and 'retraction' (Veltman 2005). Working within a Lewis-Stalnaker style analysis, Bennett (2003) appeals to 'causal chains'.) To see packaging at work, consider the contrast between the examples below:

- (25) Peter presses the button in a completely random coin-tossing device, and the coin comes up heads.
- (a) If Susan had pressed the button, the coin would have come up heads.

- (26) A friend wants to make a bet with you, offering you odds that the coin will not come up heads. You refuse. Your friend presses the lever in the completely random coin tossing device, and the coin does come up heads. Your friend says:
 (a) If you had bet heads, you would have won.
 (Tichy-inspired examples by Bennett (Bennett 2003: 234-236))

Our intuitions tell us that (25) is false, but (26) is true. How is this to be explained? We could describe our intuitions as follows: in the case of (25) the claim is about circumstances in which the pressing of the button is different than it actually is, and so the outcome could also be different. In the case of (26) the claim is about circumstances in which the pressing of the button is as it actually is, so the outcome is the same. The outcome of the pressing of the button is ‘packaged’ together with the pressing itself.

What does the *de re* analysis say about the contrast between (25) and (26)? In both cases there are features in the world that would in principle make the counterfactual true, namely, the fact that the coin actually came up heads. If we let *past* refer to such features in both cases, we will make the wrong predictions. Obviously, the problem is with (25). What kind of (principled) reason could there be for *past* in (25) not to refer to the actual world features that the coin came up heads? It could be a pragmatic constraint: *the denotation of past cannot be resolved in such a way that it makes the counterfactual true by itself (independently of the laws invoked by the modal)*. However, while this makes some intuitive sense, there are examples that point against such a constraint. Consider (27) and (28):

- (27) The straps in the baby seat are very sturdy, and the cushioning is excellent.
 (a) So, if the baby had turned over, she would have been safe.
- (28) One parent: How could you drive so carelessly! The baby could have turned over!
Other parent (*annoyed*): Well, if the baby had turned over, she would have been strapped into a safe seat.

The features of the actual world that make the counterfactuals true in both cases are the fact(s) that the baby is strapped safely to a very sturdy seat. This situation in itself makes the consequent true in both cases (these are examples of *even if* counterfactuals). And although the pragmatics of this kind of counterfactual is arguably different from others we have seen, there is nothing wrong with them. A general pragmatic prohibition against allowing *past* to denote a situation that makes the consequent true seems off the mark.

It seems that the constraint needed to explain the packaging facts illustrated in (25) must be sensitive to the relation between the antecedent and consequent clause. If the antecedent and consequent in principle are linked by laws/regularities, we cannot (feliculously) assign to *past* an interpretation that allows the truth of the counterfactual to bypass those laws.

5 Conclusion

I have presented a proposal that generalizes a *de re* analysis to all counterfactuals. It targets the idea that counterfactuals are made true by ‘certain facts’, and works with the hypothesis that the semantics of counterfactuals should be stated in terms of the facts counterfactuals are about. The proposal has the theoretical advantage of providing an explanation for the presence of past tense in counterfactuals, and the empirical advantage of capturing our intuitions in cases of multiple counterparts.

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