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COUNTERFACTUALS AND CONTEXT:
A RESPONSE TO BROGAARD AND SALERNO

Mehmet Hilmi DEMİR[*]

Abstract: According to the standard interpretation, counterfactuals fail to satisfy the following inference rules: contraposition, strengthening the antecedent and hypothetical syllogism. Contrary to the standard interpretation, Brogaard and Salerno (2008) argue that counterfactuals do satisfy these inference rules when context features are kept fixed in evaluating arguments with counterfactuals. For them, the main reason behind claiming that counterfactuals fail to satisfy these inference rules is the illicit shift in context when evaluating the arguments in question. If true, Brogaard and Salerno's claim would have a devastating effect on the counterfactuals literature because almost the entire literature is based on the assumption that counterfactuals do not satisfy those inference rules. Given its importance, Brogaard and Salerno's claim is examined in this paper. They are right in claiming that contextual features must be kept fixed throughout the evaluation of an argument, but the rest of their claim rests on a faulty reasoning. In the paper, I show that counterfactuals do fail to satisfy contraposition, strengthening the antecedent and hypothetical syllogism even when contextual features are kept fixed throughout the evaluation of an argument in the way Brogaard and Salerno require.

Keywords: Counterfactuals, Lewis, Contraposition, Strengthening the Antecedent, Hypothetical Syllogism

KARŞIOLGUSAL ÖNERMELER VE BAĞLAM:
BROGAARD VE SALERNO'YA BİR CEVAP

Öz: Karşıolgusal önermelerin Lewis tarafından geliştirilen standart yorumuna göre, normal şartlı önermeler kullanıldığında geçerli olan bazı çıkarsama kuralları karşıolgusal önermeler kullanıldığında geçersiz olmaktadır. Bu çıkarsama kurallarından öne çıkanlar şunlardır: tersevirme, önbileşen güçlendirme ve varsayımsal kıyas. Brogaard ve Salerno (2008), literatürde genel kabul gören standart yorumun aksine, bu bahsi geçen çıkarsama kurallarının karşıolgusal önermeler kullanıldığında dahi geçerli olduğunu iddia etmektedirler. Brogaard ve Salerno'ya göre bu çıkarsama kurallarının kullanıldığı argümanları değerlendirirken eğer bağlama dair özellikler sabit tutulur ise bu durum açıkça görülecektir. Yani Brogaard ve Salerno'ya göre bahsi geçen çıkarsama kurallarının karşıolgusal önermeler için geçerli olmadığının düşünülmesi, argümanların değerlendirilmesinde

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bağlam özelliklerinin farkında olmadan değiştirilmesinden kaynaklanmaktadır. Brogaard ve Salerno'nun bu iddiası, eğer doğru ise, çok önemlidir. Çünkü karşıolgusal önermeler üzerine olan literatürün tümü standard yoruma ve onun doğurduğu sonuçların kabulüne dayanmaktadır. Brogaard ve Salerno'nun iddiası doğru ise bu literatürün tümü anlamsızlaşacaktır. Bu makalede Brogaard ve Salerno'nun iddiası detaylı olarak incelenmektedir. Brogaard ve Salerno'nun belirttiği gibi argümanlar değerlendirilirken bağlama dair özellikler sabit tutulmalıdır. Ancak bağlama dair özellikler sabit tutulduğunda dahi karşıolgusal önermeler bahsi geçen çıkarsama kurallarını geçersiz kılmaktadır. Yani, Brogaard ve Salerno'nun ana iddiası yanlıştır. Bu makalede bu yanlışlık gösterilmektedir.

Anahtar Kelimeler: Karşıolgusal Önermeler, Lewis, Varsayımsal Kıyas, Tersevirme, Önbileşen Güçlendirme

1. Introduction

Counterfactuals have been an important topic in the philosophy literature since the early 1970s and they have been put to diverse philosophical use ranging from causality to semantic theories of information. According to the standard interpretation developed by Lewis, counterfactuals fail to satisfy the following inference rules: contraposition, strengthening the antecedent and hypothetical syllogism. Contrary to the standard interpretation, Brogaard and Salerno (2008) argue that counterfactuals do satisfy these inference rules when context features are kept fixed in evaluating arguments with counterfactuals. And contextual features must be kept fixed when evaluating such arguments for validity. Otherwise, even the most basic inference rules, such as modus ponens, will fail. I agree with Brogaard and Salerno that contextual features must be kept fixed. However, I disagree with their conclusion regarding counterfactuals. As I show in this paper, counterfactuals fail to satisfy contraposition, strengthening the antecedent and hypothetical syllogism even when contextual features are kept fixed throughout the evaluation of an argument in the way Brogaard and Salerno require. It should be noted that Brogaard and Salerno's claim about counterfactuals is of paramount importance because, if they are right, then most of the work done on counterfactuals in recent decades will either have to be rewritten or thrown into the garbage can. Because there is a lot at stake, a close scrutiny of their claim is necessary.

It should be noted that Brogaard and Salerno's article led to some discussion in the literature. Some agreed with their assessment of the inferential properties of counterfactuals; some disagreed. Ichikawa (2011), for example, agrees that counterfactuals do satisfy strengthening the antecedent and contraposition with reasons quite similar to those of Brogaard and Salerno. He, however, goes a bit further than Brogaard and Salerno, and proposes a contextualist approach for counterfactuals within the framework of Lewis's contextualist epistemology. Developing on Ichikawa's contextualist approach, Hui (2015) analyzes different roles that context may play in determining the meaning of a counterfactual statement. On the side of disagreement, Cross (2011) provides an analysis of the notion of a background fact and argues that counterfactuals do not satisfy hypothetical syllogism even when the context is kept the same, because even under the same context, background facts for different counterfactuals may vary. He states that the following claim of Brogaard and Salerno is false: "if context must remain fixed when evaluating an argument for validity, the set of contextually determined background facts must remain fixed when evaluating an argument involving subjunctives for validity" (Cross 2011, p. 94). Thus, Cross's

disagreement is mainly based on his different understanding of the relation between a context and background facts. My analysis in this paper is quite different than Cross's. I agree with Brogaard and Salerno in that sameness of context implies sameness of background facts. I then proceed to show that even under these conditions counterfactuals fail to satisfy strengthening the antecedent, contraposition, and hypothetical syllogism. The criticism that is presented against Brogaard and Salerno in this paper is not that context may vary from one premise to another, or that context may play different roles in determining the meaning of a counterfactual statement or the relation between context and a background fact must be analyzed differently. My charge, which is more basic, is misapplication of the truth-condition for counterfactual statements. In this paper, for each of the arguments, I construct a minimal model given Lewis's truth condition, and in the minimal model, the argument form in question turns out to be invalid. Thus, the claim here is that Brogaard and Salerno's use of Lewis's truth condition for counterfactuals is not accurate[1].

2. Context and Counterfactuals

As Brogaard and Salerno point out, it is commonly accepted that the context must be kept fixed when evaluating an argument for validity. Their examples clearly show that none of the classical inference rules would be valid if the context were not kept fixed. There is no apparent reason for arguments with counterfactuals to be an exception to this rule. Shifting context in the middle of an inference, regardless of whether the argument in question includes counterfactuals or not, is clearly a fallacy. Sometimes our pre-theoretical intuitions fall into such a trap. The skeptical argument from closure is a good example of such an unwitting shift in context (Brogaard & Salerno, 2008, p. 42). So, it is possible that some of our pre-theoretical intuitions about counterfactuals also commit this contextual fallacy. This possibility calls for extra care when evaluating arguments with counterfactuals. The way to avoid such illicit shifts is to clearly identify the contextual features and keep them fixed throughout the evaluation process.

There are four commonly accepted features of the context: speaker, location, time and world. Although the completeness of this set is controversial, it is sufficient for our purpose of evaluating the truth value of counterfactuals to say that *context* includes the list of all relevant possible worlds and their ordering in terms of their similarity, or closeness, to the actual world. As Brogaard and Salerno point out, the closeness of possible worlds is contextually determined. This contextual determination is based on the relevant background facts of a given argument. Thus, an analysis of background facts is sufficient for identifying the relevant possible worlds and their ordering with respect to closeness to actuality (2008, p. 40).

Our pre-theoretic intuitions tell us that counterfactuals fail to satisfy contraposition, strengthening the antecedent and hypothetical syllogism. Lewis's possible worlds account is in line with our pre-theoretical intuitions. However, Brogaard and Salerno claim that "the ability of the possible worlds account to explain the failure of these inferences… rests on a contextual fallacy" (p. 40). The fallacy here is an illicit mid-inference shift in the context. If the context is kept fixed, they argue, "contrary to what is commonly believed, contraposition,

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[1] Pynn's assessment of Brogaard and Salerno's claims in his 2014 "Assertibility and Sensitivity" comes very close to my position, but unfortunately Pynn mentions his assessment in a footnote and only very briefly (footnote 29).

antecedent strengthening and hypothetical syllogism for subjunctive conditionals are valid inference rules after all" (p. 45). To prove their claim, they use three commonly cited arguments: *Reliable John* for contraposition, *Wet Match* for strengthening the antecedent, and *Hoover* for hypothetical syllogism. For each of these arguments, they attempt to show the alleged illicit context shift. However, their reasoning is faulty in all three cases. In their analysis of context features, they either make one of the statements in the argument counterpossible (Reliable John) or true in all relevant possible worlds (Wet Match and Hoover), and neither of these moves is justified. Before critically examining these arguments one by one, it is helpful to specify the truth condition of a counterfactual in order to avoid any possible ambiguity. It is best to proceed with Lewis's original definition[2]:

> If A had been the case, C would have been the case' is true (at a world w) iff (1) there are
> no possible A-worlds (in which case it is vacuous), or (2) some A-world where C holds
> is closer (to w) than is any A-world where C does not hold. (Lewis, 1973, p. 560)

Given this specification of the truth condition of a counterfactual, now let me analyze the arguments that Brogaard and Salerno use one by one.

3. Reliable John (Contraposition)

As we know from basic logic, the following argument form, which is the form of contraposition, is valid for indicative conditionals.

> If **P**, then **Q**.
> Therefore, if **not-Q**, then **not-P**.

This argument form, however, becomes invalid when a counterfactual statement is used as its premise. The following argument is commonly used as an example for showing that:

> If John had made a mistake, it would not have been a big mistake.
> Therefore, if John had made a big mistake, he would not have made a mistake.

Brogaard and Salerno use this example for justifying their claim. For them, the argument becomes valid when the contextual features for evaluating the argument are kept fixed throughout the evaluation. In order to see whether Brogaard and Salerno are right in thinking that this argument turns out to be valid when the context features are held fixed, we need to identify those features by analyzing the background facts.

3.1. Background facts and the context

> **Fact 1:** John is highly reliable.
> > **Corollary 1:** John rarely makes mistakes.
> > **Corollary 2:** When he makes mistakes, his mistakes are usually not big ones.

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[2] Lewis developed his view of counterfactuals in 1973 with two papers (1973, 1973b) and a book *Counterfactuals* (1973a). But the main idea behind his view goes back to Stalnaker's "A Theory of Conditionals" (1968). This is why his view is known as the Lewis-Stalnaker semantics for counterfactuals in the literature.

The possible worlds in which John does not make a mistake are not relevant for evaluating this argument since in such worlds both the premise and the conclusion are vacuously true. But, any world in which John makes a mistake, regardless of whether it is a big mistake or not, is a relevant possible world. For the sake of simplicity, assume that there are only ten such worlds $\{w_1, w_2...., w_{10}\}$. Corollaries 1 and 2 help us to put these worlds in order with respect to their closeness to actuality. Corollary 2 clearly states that John's mistakes usually are not big. Thus, there are some possible worlds in which he makes big mistakes, but these worlds are significantly fewer in number and further away than the worlds in which he makes small mistakes. Consistent with these observations, let us assume that there are eight possible worlds in which John makes a small mistake (S-worlds), and two worlds in which his mistake is big (B-worlds). The S-worlds are closer to the actual world than the B-worlds. Let w0 be the actual world. Hence, the context for this argument is as follows:

Actual World		S-Worlds		B-Worlds
w_0	→→→→	$\{w_1, w_2, w_3, w_4, w_5, w_6, w_7, w_8\}$	→→→→	$\{w_9, w_{10}\}$
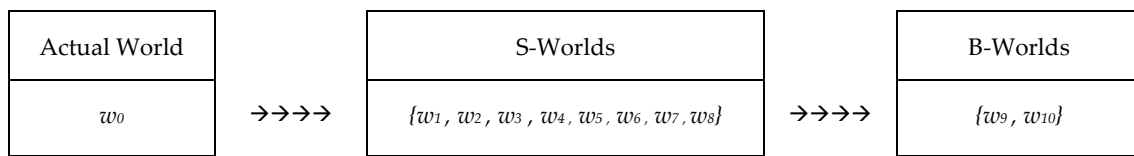
3.2. Evaluation

The premise of the argument is true in this context because the closest world in which John makes a mistake is a world in which the mistake is not big. This world could be any of the S-worlds, since the background does not tell us how to order S-worlds, but it does tell us that S-worlds are closer to the actual world than the B-worlds. The conclusion, however, is false, because the closest world in which John makes a big mistake (any of the B-worlds) is a world where he makes a mistake. Thus, as this counterexample shows, counterfactuals do not satisfy contraposition even when the context is kept fixed. Brogaard and Salerno, however, reach a different conclusion. Their mistake lies in the way they analyze John's reliability. They say, "John is highly reliable.... All the relevant worlds in which highly reliable John makes a mistake are worlds where he makes *no* big mistake (2008, p. 43, emphasis added)." In other words, according to Brogaard and Salerno, the context for this argument must not include any B-worlds, because John is highly reliable. This is clearly false. John's being highly reliable does not mean that he *never* makes a big mistake. Rather, it means that it is very unlikely that he would make a big mistake, but still possible. Even highly reliable experts make big mistakes once in a while in their areas of expertise.

Brogaard and Salerno's analysis of the argument continues with the following dilemma:

> If the closest worlds are worlds in which John is highly reliable and so makes no big mistake, then there is no accessible world in which the antecedent of the conclusion is true. The conclusion is a counterpossible, and so, the consequent is implied vacuously. If, on the other hand, there are contextually relevant closest worlds in which John made a big mistake, then the premiss is false. (2008, p. 43)

The first horn of the dilemma in this quotation is problematic. Although it is true that the closest worlds are S-worlds in which John makes a small mistake, there are still accessible B-worlds in which John's mistake is a big one. Thus, the conclusion is not a counterpossible. As for the second horn of the dilemma, it is correct that there are contextually relevant

B-worlds, but they are not closer than the S-worlds. Thus, the premise is true. In both cases that Brogaard and Salerno consider, their verdict is wrong. Contrary to what they say, the Reliable John argument is invalid even when the context is held fixed.

4. Wet Match (Strengthening the Antecedent)

Again, as we know from basic logic, the following argument form, which is the form of strengthening the antecedent, is valid for indicative conditionals.

> If *P*, then *Q*.
> Therefore, if *P and R*, then *Q*.

This argument form, however, becomes invalid when counterfactual statements are involved. The following commonly cited argument is used as an example for showing that.

> If this match had been struck, it would have lit.
> Therefore, if this match had been soaked in water overnight and struck, it would have lit.

Clearly, under the Lewis's standard interpretation, this argument is invalid. But Brogaard and Salerno claim it to be otherwise. Before presenting their reasoning for this claim, let me specify the background facts first so that we can keep the context features fixed throughout the evaluation of the argument as Brogaard and Salerno require.

4.1. Background facts and the context

> **Fact 1**: Typically, dry matches are struck.
>> **Corollary 1**: Although it is not very common, sometimes a wet match is struck.
> **Fact 2**: Wet matches do not light when struck.
> **Fact 3**: When soaked in water overnight, matches get wet.

The relevant possible worlds are the ones in which a match is struck. In most of these worlds, the match would be a dry one (Fact 1). Although significantly fewer in number (Corollary 1), there are also some worlds in which the struck matches would be ones that had soaked in water overnight, and they would not light (Facts 2 and 3). For the sake of simplicity, assume that there are eight "dry match" worlds (D-worlds), and two "wet match" worlds (W-worlds). Since matches that are struck are typically dry, the W-worlds are further away than the D-worlds (Corollary 1). Thus, the context is as follows:

Actual World		D-Worlds		W-Worlds
w_0	→→→→	$\{w_1, w_2, w_3, w_4, w_5, w_6, w_7, w_8\}$	→→→→	$\{w_9, w_{10}\}$
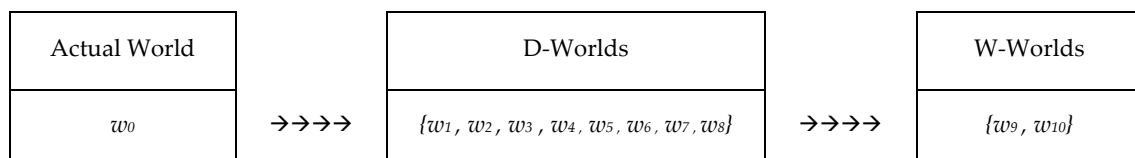
4.2. Evaluation

In this context, the premise is true because the closest world in which a match is struck is a D-world, which means that the match would light. The conclusion, though, is false, because

in the closest W-world, the match would not light. Brogaard and Salerno, however, think otherwise.

> If the context for evaluating the true premiss of (Wet Match) requires us to consider *only* worlds where a typical dry match is struck, then it will be precisely those worlds that figure in our evaluation of the conclusion. But none of those worlds are worlds where the match was soaked overnight… [T]here are in that context no closest worlds where the match soaked and struck. Evaluating the conclusion in that same context, the conclusion is vacuously true. If, on the other hand, the relevant closest worlds include worlds in which the match has been soaked and struck, then the premiss is false. For the match fails to light in these worlds. (2008, p. 43, emphasis added)

The antecedent of their first conditional statement in this quotation is false. The context for evaluating the true premise does *not* require us to consider *only* D-worlds. The only requirement for the truth of the premise is that there is at least one D-world closer than any other W-worlds (see the second clause in Lewis's truth condition). Given this, there are relevant worlds in which the match was soaked overnight. Thus, the conclusion is not vacuously true; rather, it is non-vacuously false. A similar reasoning applies to Brogaard and Salerno's second conditional statement. The relevant worlds do include W-worlds, but these worlds are not closer than the S-worlds. Thus, contrary to what they say, the premise of the argument is true. The problem in Brogaard and Salerno's reasoning is that they unjustifiably manipulate the context in both of the cases that they consider.

5. Hoover (Hypothetical Syllogism)

Hypothetical syllogism, which has the following form, is a valid inference rule for indicative conditionals.

> If *P*, then *Q*.
> If *Q*, then *R*.
> Therefore, if *P*, then *R*

This argument form, however, becomes invalid when counterfactual statements are used as its premises. The following argument is commonly used as an example for showing that:

> If J. Edgar Hoover had been a communist, he would have been a traitor.
> If he had been born a Russian, he would have been a communist.
> Therefore, if he had been born a Russian, he would have been a traitor.

This argument seems to be invalid and the standard interpretation of counterfactuals confirms this assessment. As stated above, however, Brogaard and Salerno claim that the argument becomes valid when the context features are fixed throughout the evaluation of the argument. In order to assess their claim, we need to specify the background facts first.

5.1. Background facts and the context

> **Fact 1:** Typical American citizens are not communists.
>   **Corollary 1:** Although not common, some Americans are communists.
> **Fact 2:** If the director of the FBI is a communist, then he is a traitor.

Fact 3: Hoover is the American-born director of the FBI.
Fact 4: Typical Russian citizens are communists.
    Corollary 2: Although not common, some Russians are not communists.
Fact 5: Non-communist Russians are traitors.

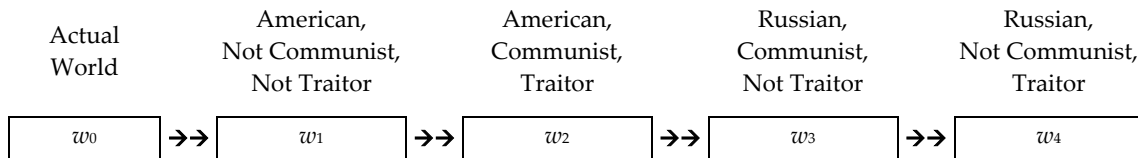These background facts lead to four relevant possible worlds.

w_1: Hoover is an American and not a communist. (He is not a traitor, Fact 1.)
w_2: Hoover is an American and a communist. (He is a traitor, Fact 2.)
w_3: Hoover is a Russian and a communist. (He is not a traitor, Fact 4.)
w_4: Hoover is a Russian and not a communist. (He is traitor, Fact 5.)

w_1 and w_2 are closer to the actual world than w_3 and w_4 because of Fact 3. w_1 is closer than w_2 because of Fact 1, and w_3 is closer than w_4 because of Fact 4. These observations give us the following context.

Actual World	American, Not Communist, Not Traitor	American, Communist, Traitor	Russian, Communist, Not Traitor	Russian, Not Communist, Traitor
w_0 →→	w_1 →→	w_2 →→	w_3 →→	w_4

5.2. Evaluation

According to Lewis's truth condition, the first premise of the argument is true because in the closest world in which Hoover is a communist (w_2), he is also a traitor. And this world is closer than any other world in which he is a communist (w_3). The second premise is also true. There is a world in which Hoover is born in Russia and is a communist (w_3), and this world is closer than any other Russian-born world (w_4). However, the conclusion is false because in the closest world in which he is born in Russia (w_3), he is not a traitor. Thus, the argument is invalid. Brogaard and Salerno reason differently. They consider two natural cases for evaluating the argument. First:

> [S]uppose that [in] the closest worlds where Hoover is a communist he is also the American born director of the FBI. Then there are no closest worlds where the American born director of the FBI is born in Russia. Hence, the second premiss and the conclusion are vacuously true, and (Hoover) is not a counter-example to hypothetical syllogism. (2008, p. 43)

It is true that the world in which Hoover is a communist and American-born (w_2) is closer than any Russian-born worlds (w_3, w_4). However, this has no effect on the truth values of the second premise and the conclusion. According to Lewis's truth condition, as long as there is a Russian-born world in which Hoover is a communist, and this world is closer than any other Russian-born worlds, the second premise is true, but not vacuously. The conclusion is not vacuously true, either. As long as there is a Russian-born world in which Hoover is not a traitor (w_3) and this world is closer than any other Russian born-worlds (w_4), the conclusion is false. Thus, contrary to what Brogaard and Salerno claim, neither the second premise nor the conclusion is vacuously true.

For the second case that they consider, Brogaard and Salerno say, "suppose that the closest worlds where Hoover is born in Russia are worlds where Hoover is a typical Russian citizen. Then the first premiss is false, since not all of the closest worlds where Hoover is a communist and a typical Russian citizen is he also a traitor." (2008, p. 43) The fact that the closest worlds in which he is born in Russia are the worlds in which he is a typical Russian citizen does not have any effect on the truth value of the first premise, provided that there is a closer world in which he is born in America and is also a communist. In the context stated above, this is exactly what occurs. w_3 is the closest world in which Hoover is born in Russia and is a typical citizen, but there is also w_2, a world in which he is American-born and a communist, therefore a traitor. Thus, according to Lewis's truth condition, the first premise is true.

6. Conclusion

Brogaard and Salerno rightly claim that the context features must be kept fixed when evaluating arguments in which counterfactuals occur for validity. However, the conclusion about counterfactuals that they derive from this claim is false. As shown above, when all the factors for identifying context features (i.e., listing and ordering the relevant possible worlds) are carefully taken into account, it turns out that there is nothing new under the sun: counterfactuals still fail to satisfy contraposition, strengthening the antecedent and hypothetical syllogism[3].

It is quite difficult to provide a satisfactory semantics for conditionals, especially for counterfactual ones. Because of this difficulty, many turned to new approaches in order to account for semantic properties of counterfactuals. Brogaard and Salerno appealed to the idea of contextualism for this purpose, but, as argued in this paper, this does not seem to be the right move. Thus, new avenues must be explored. As an example of such avenues, Iacona's work (2011; 2015) could be given. Iacona, contrary to the common wisdom in the literature, constructs a theory in which counterfactuals are treated as strict conditionals. Interestingly, in Iacona's theory, counterfactuals do satisfy hypothetical syllogism and contraposition, but for reasons different from Brogaard and Salerno's. The upshot of all this is that we still do need a semantics for counterfactuals, but the analysis in this paper shows it is unlikely that we will get that from a contextualist approach.

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[3] To recap the main point of my argument briefly might be helpful here. Brogaard and Salerno allegedly show that counterfactuals satisfy strengthening the antecedent, contraposition, and hypothetical syllogism. They do so by limiting the set of relevant possible worlds for evaluating the argument examples that they analyze. For each of the arguments, I argue that they are not justified in limiting the set of relevant possible worlds in the way they do. In other words, they limit the set of relevant possible worlds in an ad hoc manner. After stating the accurate set of possible worlds, I construct a model in which the premises are true and the conclusion is false for each argument, therefore proving their invalidity. In that respect, it would not be false to say that Brogaard and Salerno's reasoning is neither sound nor valid, and this is true for each of the three arguments that they consider.

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