

Trans-world Causation?^{*†}

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Abstract

According to Lewis (1973a), (1979), and (2000) causal claims must be analyzed in terms of counterfactual conditionals, and these in turn are understood in terms of relations of comparative similarity among single concrete possible worlds. Lewis (1986) also claims that there is no trans-world causation because there is no way to make sense of trans-world counterfactuals without automatically making them come out to be false. In this paper I argue against this claim. I show how to make sense of trans-world counterfactuals in a non-trivial way that can make them come out to be true, by appealing to relations of comparative similarity among concrete possible worlds (i.e., assuming modal realism). I argue that either merely making such sense of a relevant counterfactual is not enough to have causation, or that Lewis' modal realism must be given up.

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1 Counterfactual Theory

The central claim of the counterfactual account of causation is, of course, that causal claims of the form ‘C caused E’ must be understood in terms of counterfactual conditionals (from now on ‘counterfactuals’) of the form ‘If C had not occurred, E would not have occurred’. Following Lewis (1973a) and (1973b), some philosophers have used standard possible-worlds semantics to offer accounts of the truth-conditions for counterfactuals. From now on, I will use ‘counterfactual theory’ in general to refer to counterfactual accounts of causation that assume the standard possible worlds semantics for the needed counterfactuals.¹ What does it mean, then, to offer a possible-worlds semantics for counterfactuals?

Briefly put, possible-worlds semantics for counterfactuals rely on the following **fundamental** claim:

fundamental: Counterfactuals are true if “it takes less of a departure from actuality to make the consequent true along with the antecedent than it does to make the antecedent true without the consequent.”
(Lewis, 1973b, p.560)

To make sense of this **fundamental** idea, and its alleged link to causation, counterfactual theories embrace the following theses:

Thesis 1: One world is closer to actuality than another world if it *resembles* the actual one more than the second does.

Thesis 2: There is causal dependence between C and E iff if C were not to occur, E would not occur.

¹Some (see Maudlin 2007) argue that the needed counterfactuals are not well suited for a semantic analysis in terms of standard possible worlds semantics.

Thesis 1 constitutes the core of the counterfactual theory. It states the truth-conditions of counterfactuals in terms of similarity relations among worlds. **Thesis 2** simply equates causal dependence with counterfactual dependence.² Everything hinges, then, on how we understand **thesis 1** and, more specifically, the relations of comparative similarity (from now on RCS) among worlds.

According to Lewis (1973a) there is no absolute way to determine how close a world is to another. That is why it is a matter of comparative similarity. Thus, RCS are three-place relations where one thing is more similar to a second one than the third one is—I will typically be concerned with the special case where one of the relata is stipulated to be the actual world. These RCS cannot be further analyzed. Sometimes the laws of nature have more weight than the facts, and so a world with the same laws but different facts would be closer than a world with identical facts and different laws. Sometimes it is the other way around. At all times, we need to balance the different respects of similarity and weigh them with respect to their relevance for each case. There are, however, two formal constraints.

- (1) The ordering is weak: there can be ties, but any two worlds are comparable with respect to a third.
- (2) The ordering need not be finite: besides from the actual world, which is the closest one to actuality, there need not be any other world which is *the* closest one.

With these constraints, and theses, in mind, a counterfactual of the form ‘if C had not been the case, E would not be the case’ is non-vacuously true

²Some counterfactual theorists think this thesis must be modified to avoid problems that I will not be dealing with here (e.g., late preemption). For the purposes of this paper such complications of the theory can be set aside.

iff given an ordering of worlds in terms of RCS, the closest worlds in which C is not the case are also worlds in which E is not the case.

Counterfactual theory claims— skipping unimportant details (see Menzies, 2008, and Collins, Hall, and Paul, 2004)—that this machinery delivers a proper account of causal claims. Consider an ordinary case of causation: you throw a stone at a window and it shatters. So you go on to make the following true claim “My throw caused the window to shatter.” Counterfactual theories understand this claim of yours as asserting the counterfactual “If the throw had not taken place, the window would not have shattered”. Now, according to what has been said, there is an ordering of worlds—suppose all of them obey the same laws—which is such that this counterfactual will be non-vacuously true iff they are worlds where your throw does not take place and the window does not shatter either. In other words, causal claims are true in virtue of the actual world having a certain structure that generates these or those RCS among worlds.

2 Ingredients for a counterfactual account

It is important for us to be very clear about how Lewis’ counterfactual theory works. It is, briefly put, a theory of the truth-conditions of in-world causal claims. For this theory to work, one needs the following ingredients:

worlds: concrete possible worlds.

sets: set-theoretic objects such as sets, ordered pairs, triplets, functions etc.

rCs: relations of comparative similarity; possible worlds must be comparable.

There are, of course, several different views on what possible worlds are meant to be. Some consider them to be abstract objects. Lewis (1986) argues we must take them to be concrete.

If we want the theoretical benefits that talk of *possibilia* brings the most straightforward way to gain honest title to them is to accept such talk as the literal truth. [...] Modal realism is fruitful; that gives us good reason to believe that it is true.[p.4]

With these ingredients in hand counterfactual theory tells us that whether a given causal claim is true depends on whether, given a proper counterfactual translation of the causal claim, there is a privileged ordering of **sets of worlds** following certain RCS, brought forth by the structure of the actual world, such that the **fundamental** claim is verified:

fundamental: it takes less of a departure from actuality to make the consequent true along with the antecedent than it does to make the antecedent true without the consequent.

3 Trans-world causation?

Kripke (1980) objects that, on this view, possible worlds are things we can look at with powerful telescopes, or travel to with faster-than-light space ships (see Kripke, 1980, p.44). Lewis (1986) replies that

Telescopic viewing, like other methods of gathering information, is a *causal* process: a ‘telescope’ which produced images that were causally independent of the condition of the thing ‘viewed’

would be a bogus telescope. No trans-world causation, no trans-world telescopes.

Likewise, if there is no trans-world causation, there is no trans-world travel. You can't get into a 'logical-space ship' and visit another possible world. (Lewis, 1986, p.80)

This prompts the question: why is there no trans-world causation? Lewis seems to think that if we could make sense of a counterfactual analysis of trans-world causation, we would have trans-world causation. He (1986) claims that "under a counterfactual analysis of causation, the causal isolation of worlds follows automatically . . . No matter how we solve the demarcation problem, trans-world causation comes out as nonsense." (p.78). If Lewis is correct, we should have trans-world causation *if* we have a corresponding counterfactual analysis of it. Unfortunately we cannot get the latter, or so Lewis thinks.

Try to adapt [counterfactual theory] to a case of trans-world causation, in which the events of one world supposedly influence those of another. Event C occurs at world W_C , event E occurs at world E_E , they are distinct events, and if C had not occurred, E would not have occurred either. This counterfactual is supposed to hold—where? It means that at the closest worlds to —where?—at which C does not occur, E does not occur—where?—either. (Lewis, 1986, p.78)

I take these claims as setting up a challenge: to find a sensible counterfactual analysis of trans-world causal claims. Lewis (1986) describes one

Try this. As the one world is to ordinary causation, so the pair of

worlds is to trans-world causation. So put pairs for single worlds throughout:

- (3) at the closest world-pairs to the pair $\langle W_C, W_E \rangle$ such that C does not occur at the first world of the pair, E does not occur at the second world of the pair.

which he then rejects.

This makes sense, but not I think in a way that could make it true. For I suppose that the closeness of one world-pair to another consists of the closeness of the first worlds of the pairs together with the closeness of the second worlds of the pairs. We have to depart from W_C for the first world of a closest pair, since we have to get rid of C. But we are not likewise forced to depart from W_E for the second world of a closest pair, and what is so close to a world as that world itself? So the second world of any closest pair will just be W_E , at which E does occur, so (3) is false. (Ibid, p. 79)

Lewis seems to think we can make sense of trans-world counterfactuals in terms of relations among pairs of worlds. He rejects the possibility of trans-world causation not because he thinks that giving such an account is not enough but, rather, because he thinks that such an account cannot make true any trans-world causal counterfactual. In what follows I will show that Lewis is mistaken here. The alternative account does show how trans-world causal counterfactuals can be non-vacuously true.

4 The “ordered-pair” account

What exactly is missing for (3) to be true? Lewis (1986) admits that if we could aid ourselves with “significant” external relations among worlds, we would then have more respects of comparison that would, in turn, make (3) true. But, he claims, there are no such relations.

[F]irst, even if trans-world external relations are not absolutely forbidden by our solution to the problem of demarcation, the permitted ones would be such things as our imagined relations of like- and opposite- chargedness, which don’t seem to do anything to help (3) to come true: and second, that if our special world-pair counterfactuals are supposed to make for causal dependence, they had better be governed by the same sort of closeness that governs ordinary causal counterfactuals, but ordinary closeness of worlds does not involve any trans-world external relations that might make world-pairs close.(p.79-80)

So we are missing *significant* external relations among worlds, which must meet two conditions: (i) they must not be gerrymandered (e.g.,like-chargedness); and (ii) the resulting counterfactuals must exhibit the same kind of *closeness* as in-world counterfactuals. I believe Lewis has already given us some such *significant* trans-world relations that meet both (i) and (ii), namely, RCS between worlds. To see how RCS meet both (i) and (ii) and how they make instances of (3) come out true, we must first reflect on how we ordinarily compare pairs of things.

Consider a married couple, my wife and me, for example $\langle C,E \rangle$. She is a singer and a writer, I am a philosopher and writer, and we are married. Further respects might be relevant as well. I am six feet three tall, she is five

seven. She is light-skinned and I am not. Now consider the following three different pairs. First, we have Mary and Jon, $\langle M, J \rangle$. Mary is a singer and a writer, and Jon is a philosopher and a writer. They are siblings. Jon is six feet three tall, Mary is five seven. She is light-skinned, he is not. Next, we have George and Peter, $\langle G, P \rangle$. George is a composer and an a poet, Peter is a philologist and a painter. They are married. Peter is six feet tall, George is six two. They are both light-skinned. Finally, we have Rene and Bill, $\langle R, B \rangle$. They are married. He is a philosopher and a writer, she is a singer and a writer. He is six feet three, she is five seven. She is light-skinned and he is not. Which of these three pairs is closer to $\langle C, E \rangle$?

The answer seems intuitively to be the following. If we consider the relations that hold between the members of the original pair, then $\langle G, P \rangle$ is closer to $\langle C, E \rangle$ than $\langle M, J \rangle$. If we consider the properties that each individual has, then $\langle M, J \rangle$ is closer. Either way, $\langle R, B \rangle$ is closer to $\langle C, E \rangle$ than any other pair. This is so not only because the individual members of $\langle R, B \rangle$ are closer to those of $\langle C, E \rangle$ than those of $\langle G, P \rangle$ —in that respect $\langle M, J \rangle$ is just as close— but *also* because the relations that hold between B and R are closer to those that hold between E and C than those that hold between J and M.

It seems, then, that we have to consider, at least, two different kinds of respects of similarity when comparing pairs.

comparison 1: we must compare individual members against individual members. If we want, we can do this by taking the pairs to be ordered, so that the first member of a pair should be compared only with the first member of any other pair, and so on with the second member.

and

comparison 2: we must compare the pair against the pair. We need to take the relations that hold between the members of the first ordered pair and compare them against the relations that hold between the members of the second ordered pair.

I think **comparison 2** provides us with just the kind of *significant* relations we need to make trans-world counterfactuals true. This is so especially if, like Lewis (1973b), we take the RCS to be primitive, vague, relative, and what not.

To illustrate, consider the following example. The actual world and w_1 are such that to every event of human sneezing in the former there corresponds a death of a talking donkey in the latter. In particular, my sneezing here, at world @, caused_{tw}³ George, a talking donkey, to die there, at w_1 . Strictly speaking, what I have said is that there is a causal relation involving the pair of worlds $\langle @, w_1 \rangle$. The corresponding counterfactual says that *if my sneezing had not occurred, George would not have died*. What could this mean? Following Lewis' model

- (3) at the closest world-pairs to the pair $\langle W_C, W_E \rangle$ such that C does not occur at the first world of the pair, E does not occur at the second world of the pair.

in order to see if the counterfactual is nonvacuously true, we need to compare different pairs of worlds with respect to different respects of similarity. Closeness among pairs of world will be a three place relation involving three different ordered pairs, e.g., $\langle @, w_1 \rangle$, $\langle w_2, w_3 \rangle$, and $\langle w_4, w_5 \rangle$, where the second is more similar to the first one than the third one is. Thus, the similarity will be comparative, not absolute. The comparison could also be vague and could result from weighing-in different respects of similarity.

³I use the index '_{tw}' to make it clear that we are dealing with trans-world causal claims.

But, how could this be true? Answer: the counterfactual “If my sneezing had not occurred, George would not have died” is nonvacuously true if and only if at the closest world-pairs to the pair $\langle @, w_1 \rangle$, such that the sneezing does not occur at the first world of the pair, a talking-donkey-death does not occur at the second world of the pair either.

How do we determine which pair is closer? Answer: an ordered pair of worlds will be closer to $\langle @, w_1 \rangle$ the more each individual member of the pair resembles its corresponding member (**comparison 1**) and the more the relations that hold between the members of the resembling pair resemble those that hold between the members of the original pair (**comparison 2**).

But, there are no external relations (like being married) that hold between different, isolated possible worlds. What could the relations that hold between members of pairs of worlds be like? Answer: we do not need external relations. I never said we needed them and never did Lewis either. Any significant relations will do. We do have *some* relations, namely, those that Lewis (1973b) and (1986) talks about: *relations of comparative similarity among possible worlds* or RCS. The actual world, @, and the talking-donkey world, w_1 are related by some or other degree of closeness between them. The RCS do meet both requirements (i) and (ii): (i) they are not external relations such as like-chargedness—they are well behaved, trustworthy relations, or at least that must be the case if counterfactual theory is to be of any use at all; and (ii) they exhibit the same kind of “closeness” as with ordinary in-world counterfactuals, for they are the very same relations that make the latter true. Remember, counterfactual theory presupposes that possible worlds are comparable and, hence, that there are RCS among worlds. If an ordered pair is to be closer to a second one than a third one is, apart from individual resemblances across individual members, the RCS

that hold between the members of the first one must also resemble the RCS that hold between members of the second one.

Remember our candidates: $\langle w_2, w_3 \rangle$, and $\langle w_4, w_5 \rangle$. Which of them is closer to $\langle @, w_1 \rangle$? Well, if there is a privileged set of RCS with respect to which w_2 resembles $@$ more than w_4 does, w_3 resembles w_1 more than w_5 does, and the RCS between w_2 and w_3 resemble those between $@$ and w_1 more than the RCS between w_4 and w_5 do, then $\langle w_2, w_3 \rangle$ will be closer to $\langle @, w_1 \rangle$ than $\langle w_4, w_5 \rangle$. Counterfactual theory grants that there is an ordered pair such as $\langle w_2, w_3 \rangle$ (after all, we have an infinity of worlds to pick from). It follows that, if we have such privileged ordering of RCS, the counterfactual “If my sneezing had not occurred, George would not have died” will be nonvacuously true iff at $\langle w_2, w_3 \rangle$ the sneezing does not occur at w_2 and George (or his counterpart) does not die at w_3 .

5 Coin Tossing

Let me now present a more detailed example showing how, like the actual world, pairs of worlds can have the kind of structure that naturally generates a privileged similarity ordering of pairs of worlds.⁴ An ordering, that is, which can yield non-trivial truth conditions for the relevant trans-world counterfactuals.

Consider our initial ordered pair of worlds including $@$, the actual world, and w_1 . Suppose that a chancy coin is tossed in $@$ over a million times. Suppose also that w_1 is just like $@$ except that the outcome of each one of the million tosses is the opposite of what they are in the actual world. Except for this, $@$ and w_1 are the same, they even possess the same laws.

⁴I am grateful to an anonymous referee for this journal for describing this particular example, which I have further developed.

Furthermore, the differences in outcomes have no ramifications that may make for further differences between @ and w_1 . Thus, the pair $\langle @, w_1 \rangle$ has the following structure: for every outcome of the million tosses in the first member, the second member exhibits the opposite outcome (see Table 1).

	<i>T1</i>	<i>T2</i>	<i>T3</i>	<i>T4</i>	<i>T5</i>	<i>T6</i>	...	<i>T16</i>	<i>T17</i>	<i>T18</i>	...
@ :	<i>T</i>	<i>H</i>	<i>H</i>	<i>T</i>	<i>H</i>	<i>H</i>	...	<i>T</i>	<i>H</i>	<i>T</i>	...
w_1 :	<i>H</i>	<i>T</i>	<i>T</i>	<i>H</i>	<i>T</i>	<i>T</i>	...	<i>H</i>	<i>T</i>	<i>H</i>	...

Table 1: T_1 to T_n are individual tosses. ‘T’ stands for Tails and ‘H’ for Heads.

As you can see, toss 17 lands Heads in @ and Tails in w_1 , while toss 18 lands Tails in @ and Heads in w_1 . Consider then the following relevant counterfactual claims T_{17} and T_{18} :

T_{17} . If toss 17 in @ had landed Tails, then toss 17 in w_1 would have landed Heads.

T_{18} . If toss 18 in @ had landed Heads, then toss 18 in w_1 would have landed Tails.

Given the structure of the pair $\langle @, w_1 \rangle$ described in Table 1, what is the most natural way to come up with an ordering of pairs of worlds such that they are as similar as possible to the pair $\langle @, w_1 \rangle$, and toss 17 comes out Tails in its first member? And what is the most natural way to come up with an ordering of pairs of worlds such that they are as similar as possible to $\langle @, w_1 \rangle$, and toss 18 comes out Heads in its first member?

To answer the first question, let w_2 be the same as @ except that for toss 17 the chancy coin lands Tails in w_2 , all other tosses have the same outcome

as they do in @. Now, let w_3 be the same as w_1 , except that toss 17 in w_3 lands Heads. Why do we need w_3 to be such? Because only in this way would the pair $\langle w_2, w_3 \rangle$ exactly match the pair $\langle @, w_1 \rangle$ in relation to a privileged respect of comparative similarity between the pairs, namely: just like w_1 is the same as @ except that all the outcomes of tosses in w_1 are the opposite as they are in @, so is w_3 with respect to w_2 (see Table 2). This ordering makes T_{17} come out true.

To answer the second question let w_4 be the same as @ except that for toss 18 in w_4 the chancy coin lands Heads, while all other tosses have the same outcome as they do in @. Now let w_5 be the same as w_1 except that for toss 18 in w_5 the coin lands Tails. Why do we need w_5 to be such? Because only in this way would the pair $\langle w_4, w_5 \rangle$ exactly match the pair $\langle @, w_1 \rangle$ in relation to a privileged respect of comparative similarity between the pairs, namely: just like w_1 is the same as @ except that all the outcomes of tosses in w_1 are the opposite as they are in @, so is w_5 with respect to w_4 (see Table 2). This ordering makes T_{18} come out true.

	T_1	T_2	T_3	T_4	T_5	T_6	...	T_{16}	T_{17}	T_{18}	...
@ :	T	H	H	T	H	H	...	T	H	T	...
w_1 :	H	T	T	H	T	T	...	H	T	H	...
w_2 :	T	H	H	T	H	H	...	T	T	T	...
w_3 :	H	T	T	H	T	T	...	H	H	H	...
w_4 :	T	H	H	T	H	H	...	T	H	H	...
w_5 :	H	T	T	H	T	T	...	H	T	T	...

Table 2: The closest pair to $\langle @, w_1 \rangle$ had T_{17} landed Tails in @; and the closest pair to $\langle @, w_1 \rangle$ had T_{18} landed Heads.

Ordered pairs are comparable. There may be, as with individual worlds, several different respects of comparative similarity that may generate different orderings. What this example shows is that there is a natural and non-trivial way to compare ordered pairs, following privileged respects of comparative similarity among the members of the relevant pair, which delivers an ordering of pairs of worlds that make the relevant trans-world counterfactuals (i.e., T_{17} and T_{18}) come out true.

6 Ingredients for trans-world counterfactuals

We now have a counterfactual theory of **trans-world** causal claims such as “My sneezing caused_{tw} George (the talking donkey) to die”. It is in fact a theory of the truth-conditions of such claims. For this theory to work, one needs the following ingredients:

worlds: concrete possible worlds.

sets: set-theoretic objects such as sets, ordered pairs, triplets, functions etc.

rCs: relations of comparative similarity; possible worlds must be comparable.

It is important to note that there is no difference between the RCS that Lewis uses to understand in-world counterfactuals and the RCS we need to understand trans-world counterfactuals. The RCS that Lewis’ postulates indeed become *themselves* relevant points of comparison. There is, briefly put, nothing superficial about trans-world RCS. If one is comfortable to accept Lewis’ original RCS, then one has already accepted what is necessary

for comparison between ordered pairs of worlds.⁵

With these ingredients in hand our counterfactual theory tells us that whether a given trans-world causal claim is true depends on whether, given a proper counterfactual translation of it, we can come up with an ordering of **sets** of ordered pairs of **worlds** following certain RCS such that the **fundamental**_{*tw*} claim is verified:

fundamental_{*tw*}: it takes less of a departure from the original ordered pair to make the consequent true (in the second member of a resembling ordered pair) along with the antecedent (in the first member of the same pair) than it does to make the antecedent true (in the first member) without the consequent (in the second member).

7 Trans-world Telescopes...

It seems then (see section 2 above) that our counterfactual theory of trans-world causation is the same as our counterfactual theory of ordinary in-world causation. All we need is for our fundamental claim to be suitably adjusted to be about ordered pairs. As Lewis says, just as the world is to ordinary causation, the ordered pair is to trans-world causation. We have, then, a successful counterfactual analysis of trans-world causal claims. Lewis was wrong in thinking that we could easily argue against it on the grounds that the relevant trans-world counterfactuals automatically come out false.

⁵Note that this can include time comparisons among worlds. If BEING AT A CERTAIN POINT IN TIME may be a relevant respect of comparison among individual worlds, then it may also constitute a relevant RCS among pairs of worlds. Furthermore, it seems that Lewis needs this time comparison to be possible. For he would like to say that a world w_i at which E immediately follows C is closer to the actual world @ —where E immediately follows C— than a world w_l where E follows C later (say, ten years later).

Furthermore, this analysis suggests that there may be trans-world causation all over logical space. It shows that we can get a well motivated relation of comparative similarity between ordered pairs that will get the relevant trans-world counterfactuals to come out true. And it seems plausible to think that the alleged trans-world causal influences between the members of the relevant pair will *themselves* be privileged respects of comparison with which other resembling ordered pairs should align according to the **fundamental**_{tw} claim. The nature of logical space, with its plenitude of worlds, assures us that we will be able to come up with an ordering of ordered pairs following such privileged respects of comparison.

Logical-space Ships

As I said, Lewis seemed to think that all we needed to have trans-world causation was a counterfactual analysis of it. If this is correct, we now have reasons to accept that there can be trans-world telescopes, logical-space ships, and, hopefully, inter-world travel. Some may be happy with this result. To others, it may seem like a terrible consequence of counterfactual theory. They may think that it is a metaphysical fact about causation that there cannot be trans-world causation. Thus, that one can show that there are instances of trans-world causation by using RCS, may appear to cast doubt over the claim that ordinary causation is better understood in terms of privileged RCS that generate orderings of worlds according to which the relevant counterfactuals come out true.

Inter-world Travel

Thanks to Lewis' modal realism we got comparison 2 above (see page ??) which gave us a further respect of comparative similarity among pairs of

worlds that may make trans-world counterfactuals come out true. As I said in the previous section, this is compatible with there being several different such respects of comparative similarity. But it does not commit us to accepting that all such respects are equally relevant. Just as we do with RCS among single worlds, we should do for pairs of worlds: look for the privileged ones. Thus, we can avoid turning every regularity between pairs of worlds into a law of nature (or perhaps of trans-world nature). No such bad result is forthcoming.

Yet if we accept counterpart theory, assume a standard possible worlds semantics for the relevant counterfactuals, and Lewis' proposed modal realism, we will have to accept that there is trans-world causation. If this is such a bad result, then it is for Lewis' modal realism. For without modal realism it (e.g., if *possibilia* were just sets of sentences) it seems difficult to see how we could get the much needed comparison 2.

8 Concluding Remarks

Lewis (1986) believed that if we can have a pair-wise model of trans-world causation that could show how the relevant trans-world counterfactuals may come out true in a non-trivial way, we could have trans-world causation. We may try to fix things by simply rejecting this claim. But, is this quick fix really available?

Suppose we accept that we can extend causal counterfactuals to cover trans-world causal claims. We can offer an adequate analysis of such counterfactuals in terms of privileged sets of RCS generating orderings of worlds that make the counterfactuals come out true. But, are we forced to do so? Can we not simply take causation to be a matter of comparisons among single worlds, and make the single / pair-world distinction a principled one?

I think that doing so would not be justified. Such quick fix is tantamount to claiming that, as a matter of principle, there is no trans-world causation. Lewis in fact considers this as an optional principle of demarcation between worlds (see Lewis 1986, p.78). But he did so because he thought his account of causation could not give place to trans-world causation. Such principled move does not seem to be available anymore. If your account of causation has unacceptable results (e.g., that there is trans-world causation) you cannot defend it by claiming that, as a matter of principle, there are no such results. This would be *ad hoc* at best. We would need some further evidence to back the principled claim. Such principled claim cannot be backed up by claiming further that, after all, we are interested in causation because we are interested in what happens in the actual world and not anywhere else. That seems false. The very analysis offered by counterfactual theory requires that we care a lot about what happens at other merely possible worlds.

Either we let modal realism go or we let go the claim that in order to make sense of causation it is enough to describe the structure of the world in terms of privileged RCS among worlds, generating orderings of worlds that make the relevant counterfactual claims come out true.

Lewis' counterfactual theory of causation needs some rather substantial repair.

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