

Strevens's Counterexample to Lewis's "Causation as Influence", and Degrees of Causation

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doi:[10.48106/dial.v74.i1.06](https://doi.org/10.48106/dial.v74.i1.06)

Joshua Goh. 2020. "Strevens's Counterexample to Lewis's
"Causation as Influence", and Degrees of Causation."
Dialectica 74(1): 125–137. doi:[10.48106/dial.v74.i1.06](https://doi.org/10.48106/dial.v74.i1.06).



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Sungho Choi has criticised Michael Strevens's counterexample to David Lewis's final theory of "token" causation, causation as "influence." I argue that, even if Choi's points are correct, Strevens's counterexample remains useful in revealing a shortcoming of Lewis's theory. This shortcoming is that Lewis's theory does not properly account for *degrees* of causation. That is, even if Choi's points are correct, Lewis's theory does not capture an intuition we have about the *comparative* causal statuses of those events involved in Strevens's counterexample (we might, for example, intuit that Sylvie's ball-firing is *as much/more/less* a cause of the jar's shattering as/than is Bruno's ball-firing).

Sungho Choi (2005, 106–13) has criticised Michael Strevens's (2003, 4–7, 11–17) counterexample to David Lewis's (2000) final theory of "token" causation, causation as "influence" (hereafter, "CaI"). I argue that, even if Choi's points are correct, Strevens's counterexample remains useful in revealing a shortcoming of CaI. This shortcoming is that CaI does not properly account for *degrees* of causation. This paper proceeds as follows. Section 1 articulates CaI. Section 2 articulates Strevens's counterexample to CaI, and Choi's criticism of Strevens's counterexample. Section 3 argues that, even if Choi's points are correct, CaI does not capture an intuition we have about the *comparative* causal statuses of those events involved in Strevens's counterexample (we might, for example, intuit that Sylvie's ball-firing is *as much/more/less* a cause of the jar's shattering as/than is Bruno's ball-firing).

1 CaI

CaI involves three ideas. The first idea is the “alteration” of an event. Consider this event E : the vase’s shattering. Lewis defines an “alteration” of E as “either a very fragile *version* of E or else a very fragile *alternative event* that is similar to E , but numerically different from E ” (2000, 188, emphasis mine).

To elucidate, an event is considered “fragile” if we impose stringent conditions for its occurrence (if we say that any change in one of its details turns it into a numerically different event) (Lewis 2000, 185–86). One alteration of E is E ’s *actual* alteration: exactly when and how the vase shattered. The other alterations of E are un-actualised (one example: the vase shattering one millisecond later, and into more pieces).

The second idea is “influence.” Let C and E be two single, distinct, actual events. Lewis holds that C “influences” E iff

there is a substantial range C_1, C_2, \dots of different not-too-distant alterations of C (including the actual alteration of C) and there is a range E_1, E_2, \dots of alterations of E , at least some of which differ, such that if C_1 had occurred, E_1 would have occurred, and if C_2 had occurred, E_2 would have occurred, and so on. (Lewis 2000, 190)

Idea three concerns the relationship between influence and causation. According to Lewis, C is a cause of E iff C directly influences E , or there is a chain of stepwise influence (hereafter, “I-CHAIN”) leading from C to E (that is, a sequence of (actual) events $C, D_1, D_2, \dots, D_n, E$, such that C influences D_1 , D_1 influences D_2 , ..., $D_{(n-1)}$ influences D_n , and D_n influences E) (Lewis 2000, 191; see also Lewis 1973, 563).

Let’s observe CaI in action. Consider this scenario: Sylvie throws a rock at a vase. Beside her, Bruno laughs. Here, CaI delivers the intuitive result that Sylvie’s throw is a cause of the vase’s shattering, while Bruno’s laughter is not. This is because Sylvie’s throw has substantial direct influence on the vase’s shattering. That is, there are many different, not-too-distant alterations of Sylvie’s throw (e.g. her throwing one millisecond later/with slightly more force) upon which alterations in the vase’s shattering (i.e. the vase’s shattering one millisecond later/into more pieces) counterfactually depend. Bruno’s laughter, however, has no substantial direct influence on the vase’s shattering. *Maybe* one distant alteration of Bruno’s laughter is so infectious that it delays Sylvie’s throw (and hence, the vase’s shattering) by a second. Nevertheless,

no not-too-distant alteration of Bruno's laughter appears to alter the vase's shattering.¹ Moreover, one cannot identify any I-CHAIN leading from Bruno's laughter to the vase's shattering.

2 Strevens's counterexample to CaI; Choi's criticism

Here is Strevens's counterexample to CaI (2003, 4–7, 11–17):

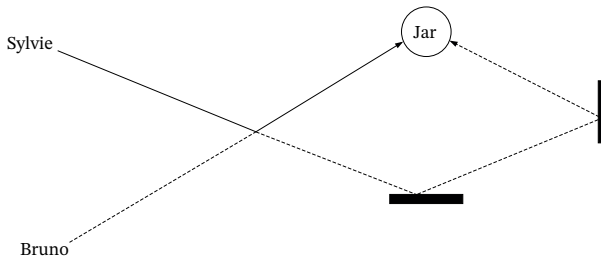


Figure 1: Solid line: actual trajectory of Sylvie's ball. Dotted line: actual trajectory of Bruno's ball.

SCE. At time t_1 , and using identical rifles, Sylvie and Bruno fire at a jar intrinsically identical, minute lead balls. Sylvie, who never misses, shoots so that her ball will ricochet two times prior to striking the jar. Bruno shoots directly at the jar. The balls, however, collide in mid-air at time t_c . Consequently, they *perfectly* exchange trajectories and spin (we thus take the motion of the balls to be that of two point particles; this admittedly requires something like a fortuitous gust of wind at t_c) (2003, 5, fn. 2). Stipulate moreover that the speeds of the two balls are always identical (and extremely high). Ultimately, Sylvie's ball shatters the jar, and Bruno's ricochets, then flies through thin air.²

1 Unfortunately, Lewis is vague about what it takes for an alteration of an event to qualify as "not-too-distant." He says that, for some particular alteration of an event, whether or not we think it to be "not-too-distant" may be a matter of "mood" (2000, 197).

2 Strevens, I think, mistakenly calls SCE a case of "late cutting" pre-emption (2003, 17, fn. 11). Standard late cutting involves the following: an effect; one pre-empting cause; one (non-causal)

Let SF stand for Sylvie’s firing, BF for Bruno’s firing, and JS for the jar’s shattering. For two reasons, Strevens argues that CaI delivers this *unintuitive* result: SF is not *at all* a cause of JS. First, SF has no substantial direct influence on JS (2003, 4–5, 12–13). After all, hold fixed BF, and consider an alteration of SF in which Sylvie fires one millisecond earlier/later, or one in which her rifle points one degree to the left/right. Given the properties of both balls, these alterations result in: no collision → Bruno’s ball striking the jar (before Sylvie’s ball finishes ricocheting) → *no* alteration to JS. Second, there appears no I-CHAIN leading from SF to JS (2003, 5–7, 13–14). This second point, however, is where Choi (2005, 110–13) most seriously disagrees.

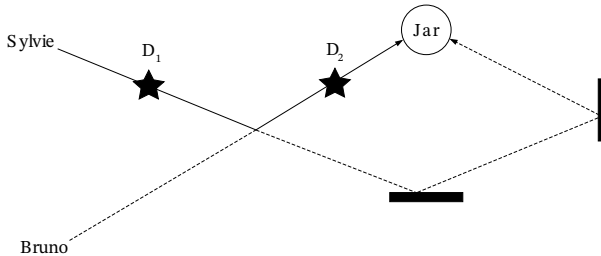


Figure 2:

Referring to Figure 2, and using both Choi’s and Lewis’s terminology (Choi 2005, 110–11; Lewis 1986a, 2:244–49), let D_1 and D_2 be the (fragile) events whose occurrence conditions consist of all the intrinsic and spatio-temporal properties satisfied by the region that Sylvie’s ball occupies at, for D_1 , time t_2 before t_c , and for D_2 , time t_3 after t_c .

Strevens claims that D_1 has no substantial influence on JS. After all, alter, say, the spatio-temporal properties of Sylvie’s ball at t_2 . This results in: no collision → no alteration to JS. Strevens also claims: SF has no substantial influence on D_2 . After all, alter, say, the timing, or direction of SF. This results in: no collision → the occurrence condition of D_2 being satisfied by *Bruno’s* ball (Strevens notes that, on Lewis’s metaphysics, it isn’t a violation of the occurrence condition of D_2 if the ball at D_2 ’s spatio-temporal region loses the property of “belonging to” Sylvie (2003, 7); said property, after all, is extrinsic).

pre-empted alternative (see Lewis 2000, 182–84). SCE involves an effect that has, intuitively, *two causes*.

Choi, however, claims that Strevens is twice mistaken. (i) D_1 *does* influence JS. After all, alter the *mass*, or *shape*, of Sylvie's ball at t_2 . Admittedly, if t_2 were, say, right after t_1 , then these alterations result in: Sylvie's ball taking a different post- t_2 trajectory (balls of different mass/shape encounter different amounts of air resistance) \rightarrow no collision. However, stipulate that t_2 is *right before* t_c . Then, neither alteration prevents the balls' collision. Both, however, alter the manner of the collision, and resultantly the manner of JS. Furthermore, (ii) SF *does* influence D_2 . After all, alter the *surface properties*, or *electrical charge*, of the ball Sylvie fires. Neither alteration prevents the balls' collision. Both, however, in altering an intrinsic property of Sylvie's ball at t_3 , alter D_2 .

Combining (i), the fact that D_1 influences JS, with the (safe) claim that SF influences D_1 , and combining (ii), the fact that SF influences D_2 , with the (safe) claim that D_2 influences JS, Choi concludes that there are (at least) two I-CHAINS leading from SF to JS—one "via" D_1 (I-CHAIN₁), and one "via" D_2 (I-CHAIN₂). Thus, CaI delivers the intuitive result that SF is a cause of JS, and "[SCE] spells no trouble whatsoever for [CaI]" (2005, 113).

3 CaI, SCE, and Degrees of Causation

I think, however, that even if Choi's points are correct, SCE still spells some trouble for CaI. In what follows, I argue that, even if Choi's points are correct, CaI does not capture an intuition we have about the *comparative* causal statuses of SF and BF. Thus, insofar as my argument succeeds, SCE remains useful in revealing the failure of CaI to properly account for *degrees* of causation.^{3 4}

Here is the intuition I have in mind:

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- 3 In the contemporary literature, there exists the idea that CaI can account for, or at least play a role in our understanding of, degrees of causation. Lewis himself, for example, thinks that degrees of causation track degrees of influence (2000, 191). Another example is found in Woodward (2010). Woodward doesn't find CaI promising as an analysis of "causation *simpliciter*" (2010, 304). Nevertheless, he suggests that CaI can play a role in "distinguish[ing] [...] among causal relationships" (2010, 304). In more detail, Woodward connects the "specificity" of causal relationships in biological contexts to influence (2010, 301–8). And while he doesn't explicitly state that degrees of causation track degrees of "specificity", he does state that where C_1 and C_2 are both causes of some effect E , if the causal relationship between C_1 and E is more "specific" as compared to the causal relationship between C_2 and E , then possibly we are justified if we "single out or 'privilege' the causal role of [C_1]" (2010, 316). See also Braham and Van Hees (2009, 331, n16), who discuss one point of similarity between their measure of degrees of causation, and CaI.
- 4 There is another scenario in which, even if Choi's points are correct, SCE spells trouble for CaI. Say we modify SCE so that both balls detect and decimate balls that aren't intrinsically similar to

COMPARATIVE INTUITION. SF is (*at least*) as much a cause of JS as is BF.⁵

I think that Comparative Intuition is, and should be, held as strongly as is the (absolute) intuition that SF is a cause of JS. A question arises: what buttresses our intuition in Section 1 that Sylvie's rock-throw is a cause of the vase's shattering, while Bruno's laughter is not? One answer is the following: informed (only) of Sylvie's rock-throw, I can *predict*, *explain*, and *blame* someone for the vase's shattering. Informed (only) of Bruno's laughter, I can do none of these things. However, and to use Jonathan Schaffer's terminology, note that "the core *epistemic*, *explanatory*, and *ethical* connotations of causation" (2001, 12–13, emphasis mine) are no *more* present in the claim that "BF caused JS," than they are in the claim that "SF caused JS." Suppose the jar were a national treasure. First, and to endorse Lewis's view that we *don't* ordinarily consider events fragile (2000, 185–86; 1986b, 198), comparing a scenario in which I'm informed (only) of BF with one in which I'm informed (only) of SF, it's not as if I can only predict JS (here taken as a non-fragile event) in the former. Second, consider the question, "Why did the jar shatter?" It is likely that most would find the answer "Because Sylvie fired" to be no more lacking than the answer "Because Bruno fired." Third, it'd be surprising if Judge blamed Bruno more than she did Sylvie. More likely, liability for the jar's damages would be apportioned equally.

Nevertheless, two considerations might motivate

COUNTER INTUITION. BF is more a cause of JS than is SF.

Consideration₁ is this asymmetry: had Sylvie not fired, nothing about JS would have changed. However, had Bruno not fired, the jar would've shattered slightly later, and in a slightly different manner. Consideration₂ is that JS occurred at a time, and in a manner more (and, in fact, exactly) in line with Bruno's, rather than Sylvie's, intention.

If, however, Consideration₁ and Consideration₂ are what motivate Counter Intuition, then Counter Intuition is misleading. Consider this scenario:

them. Then, D_1 's influence on JS, and SF's influence on D_2 , are eliminated. Consequently, CaI must deliver the *unintuitive* result that SF is not *at all* a cause of JS.

⁵ One may worry that, as stated, Comparative Intuition (absurdly) implies that JS was caused twice over (once by SF, and once by BF). If so, one may read Comparative Intuition as saying that SF and BF contributed to *the* causing of JS to the same degree. On this reading, "degrees of causation" should be read as "degrees of causal contribution" (see [Kaiserman 2016, 387–89](#)).

UNLUCKY PRESIDENT. At time t_1 , Assassin_H and Assassin_R poison President's coffee. Assassin_H uses poison *H*, which will induce heart failure at time t_4 . Assassin_R uses poison *R*, which will induce respiratory failure at time t_5 . At time t_2 , President drinks her coffee. At time t_3 , however, poison *H* and poison *R* interact in President's system—poison *H* neutralises the respiratory-failure-inducing elements of poison *R*; poison *R* neutralises the heart-failure-inducing elements of poison *H*. But President isn't so lucky—she happens to be fatally allergic to some other element *e* of poison *H*. Element *e* induces in President respiratory failure at t_5 , and she dies.

Considerations parallel to Consideration₁ and Consideration₂ are present in Unlucky President. In Unlucky President, we have Consideration₁*, which is this asymmetry: had Assassin_H not poisoned President's coffee, nothing about President's death would have changed. However, had Assassin_R not poisoned President's coffee, President would've succumbed to heart failure at t_4 , and not respiratory failure at t_5 . In Unlucky President, we also have Consideration₂*: President's death occurs at a time, and in a manner more (and, in fact, exactly) in line with Assassin_R's, rather than Assassin_H's, intention. However, does either Consideration₁* or Consideration₂* push us to think that "Assassin_R's poisoning caused President's death"? No. Most intuitively, Assassin_H's poisoning caused President's death. This shows that considerations like Consideration₁ and Consideration₂ aren't substantially relevant to causation. Thus, if Counter Intuition is motivated by Consideration₁ and Consideration₂, then Counter Intuition should be suppressed.

Comparative Intuition, then, is justifiably strong. But I now argue that CaI violates this intuition: it counts SF as (significantly) *less* a cause of JS than is BF.

What determines how much a cause BF is of JS? On CaI, it is (roughly) the amount of influence that BF has on JS (Lewis 2000, 92). What determines this amount? Centrally, it is the size of the range of alterations to BF that lead to changes in JS. Accounting for those types of alterations that Strevens and Choi consider, there are (at least) *four* types of alterations to BF that lead to said changes: alterations to the *timing* and *direction* of BF, and to the *mass* and *shape* of the ball Bruno fires.

What determines how much a cause SF is of JS? Because SF has no substantial direct influence on JS,⁶ CaI must appeal to I-CHAIN₁/I-CHAIN₂. For each of these I-CHAINS, however, CaI is silent on whether the determinant is (A) the amount of influence that SF has on D_1/D_2 (the amount of influence present in “link”₁ of the I-CHAIN), (B) the amount of influence that D_1/D_2 has on JS (the amount of influence present in “link”₂ of the I-CHAIN), or (C) some weighted average of [(A)+(B)]. Nevertheless, let’s first determine (A) and (B):

“LINK”₁ OF I-CHAIN₁ (At least). *six* types of alterations to SF lead to changes in D_1 (alterations to the *timing* and *direction* of SF, and to the *mass*, *shape*, *surface properties* and *electrical charge* of the ball Sylvie fires);

“LINK”₂ OF I-CHAIN₁ (At least). *two* types of alterations to D_1 lead to changes in JS (alterations to the *mass* and *shape* of the ball at D_1 ’s spatio-temporal region);

“LINK”₁ OF I-CHAIN₂ (At least). *two* types of alterations to SF lead to changes in D_2 (alterations to the *surface properties* and *electrical charge* of the ball Sylvie fires);

“LINK”₂ OF I-CHAIN₂ (At least). *four* types of alterations to D_2 lead to changes in JS (alterations to D_2 ’s *spatio-temporal* properties (this counts for two), and to the *mass* and *shape* of the ball at D_2 ’s spatio-temporal region).

Let the “strength” of an I-CHAIN “link” be the amount of influence present in that “link.” I now claim that, for I-CHAIN₁ and I-CHAIN₂, CaI must say that what determines how much a cause SF is of JS is the strength of the I-CHAIN’s *weaker* “link.” This follows from my next, more general, claim that if an event C is a cause of another event E because there is a (two-“link”) I-CHAIN leading from C to E , then how much a cause C is of E supervenes upon the strength of said I-CHAIN’s weaker “link.” I will now evidence the just-mentioned general claim by constructing one (two-“link”) I-CHAIN in

6 Admittedly, if Sylvie fires early enough, her ball will ricochet and shatter the jar before Bruno’s ball can. We can, however, all but eliminate this small amount of influence by adding to SCE that the jar is placed at its location right before it actually shatters.

each of two causal scenarios. I will then show that, in these I-CHAINS, varying the strength of the stronger “link” (while holding fixed that of the weaker “link”) *doesn't* vary our intuitions about how much C is a cause of E . Varying the strength of the weaker “link” (while holding fixed that of the stronger “link”), however, *does*. The first I-CHAIN I construct will possess I-CHAIN₁'s *strong-weak* pattern of influence (i.e. C (SF) has no substantial direct influence on E (JS); C strongly influences some intermediate event D (D_1); D weakly influences E). The second will possess I-CHAIN₂'s *weak-strong* pattern of influence (i.e. C (SF) has no substantial direct influence on E (JS); C weakly influences D (D_2); D strongly influences E).

Scenario 1. Divorce. Only two things elicit in Wife hatred for Husband (the first significantly more so than the second): (1) the memory of their first fight, which occurred in the rain; (2) the memory of their second fight, which occurred in the fog. Wife, nevertheless, has fallen for Paramour. Thus, she has decided that she will file for divorce from Husband on Thursday afternoon. On Wednesday afternoon, Husband goes on a drinking binge. Late Wednesday night, Husband arrives home. His drunkenness annoys Wife, and the two fight in their driveway. Because fog happens to descend, the fight is so serious to Wife that it (temporarily) lays her thoughts of Paramour to rest, and independently drives her to file for divorce on Thursday afternoon.

We can construct a *strong-weak* I-CHAIN_{Divorce} with these three events: (C) Husband's drinking binge on Wednesday afternoon; (D) the fight late Wednesday night; (E) Wife's filing for divorce on Thursday afternoon. (1) C has no substantial direct influence on E —altering whether or not/how/what/how long Husband drinks changes nothing about Wife's filing for divorce. (2) C strongly influences D —altering whether or not/how long Husband drinks changes whether or not/at what time the fight occurs. (3) D weakly influences E —altering whether or not/how long Wife and Husband fight changes nothing about Wife's filing for divorce. However, if the fight had occurred in the rain, then Wife would've filed for divorce, say, earlier.

Does strengthening I-CHAIN_{Divorce}'s stronger “link” (C 's influence on D) make us intuit that C is more a cause of E than before? No. Add to Divorce that the fight's topic is sensitive to the type of alcohol that Husband consumes—this *doesn't* make us intuit that Husband's drinking binge is more a cause of

Wife's filing for divorce than before. But what if we strengthen I-CHAIN_{Divorce}'s weaker "link" (*D*'s influence on *E*)? Add to Divorce that the timing of Wife's filing for divorce is sensitive to whether or not (but not the extent to which⁷) Husband is drunk during the fight (perhaps Wife takes sober fights most seriously, and would've filed for divorce earlier if Husband had been sober during the fight⁸)—contrary to before, this *does* make us intuit that Husband's drinking binge is more a cause of Wife's filing for divorce on Thursday afternoon (and not, say, early Thursday morning).

Scenario 2. Resolve. Colonel is testing Recruit's resolve. Recruit possesses a button which, if pressed, activates a light which Gunman takes as a signal to shoot Prisoner. Gunman will only ever shoot at time t_2 . Also, iff Recruit doesn't press the button by time t_1 , Colonel will shoot Prisoner at t_2 . The following three events occur: (*C*) Recruit presses the button at t_1 ; (*D*) Gunman fires at t_2 ; (*E*) Prisoner dies at t_3 .

C-D-E form weak-strong I-CHAIN_{Resolve}: (1) *C* has no substantial direct influence on *E*—altering whether or not/how/when Recruit presses the button changes nothing about Prisoner's death at t_3 . (2) *C* weakly influences *D*—altering how Recruit presses the button changes nothing about Gunman's firing at t_2 . And neither does having Recruit press the button *before* t_1 . However, if Recruit hadn't pressed the button (by t_1), Gunman wouldn't have fired. (3) *D* strongly influences *E*—altering whether or not/how Gunman fires changes whether or not/how Prisoner dies.

Consider these two possible additions to Resolve: (1) Gunman possesses many rifles to choose from, each of which inflicts death differently; (2) Recruit possesses another button which, if pressed, *prevents* Gunman's firing (Colonel will nonetheless shoot Prisoner at t_2 if this button is pressed⁹). Again, only that addition which strengthens the I-CHAIN's weaker "link" (addition (2)) makes us intuit that *C* is more a cause of *E* than before.

There is evidence, then, that in (two-"link") I-CHAINS, how much *C* is a cause of *E* supervenes upon the strength of the I-CHAIN's weaker "link." Consequently, unless one (a) reasonably explains why this doesn't apply to

7 This stipulation denies the substantial direct influence of *C* on *E*.

8 I think that an alteration of the fight in which Husband is sober requires no bigger a Lewisian "miracle" (1979, 468–69) than do those alterations of D_1 that Choi appeals to.

9 This stipulation denies the substantial direct influence of *C* on *E*.

I-CHAIN₁ and/or I-CHAIN₂, or (b) denies that the causal status of *C* has something to do with I-CHAINS (or counterfactual dependence in general), then how much SF is a cause of JS supervenes upon the strength of “link”₂, for I-CHAIN₁, and “link”₁, for I-CHAIN₂.

This result, however, likely forces CaI to (counterintuitively) count SF as (significantly) *less* a cause of JS than is BF. After all, *four* types of alterations to BF count towards the influence that BF has on JS. Only *two* types of alterations to *D*₁ count towards the influence that *D*₁ has on JS. And only *two* types of alterations to SF count towards the influence that SF has on *D*₂. Certainly, it remains possible that for, say, I-CHAIN₂, the *total number* (as opposed to the number of *types*) of alterations to SF that lead to changes in *D*₂ is greater than the *total number* of alterations to BF that lead to changes in JS. But this would be surprising. Why think, for example, that there are (significantly) more surface properties that Sylvie’s ball might have had, than there are angles at which Bruno might have fired? It also remains possible for the defender of CaI to try to identify more *types* of alterations to SF that lead to changes in *D*₂. This strategy, however, can only be a stopgap, unless it can be shown that, for each such newly-identified type of alteration to SF, there is no not-too-distant, hitherto-unidentified, type of alteration to BF that leads to changes in JS. Showing this would be difficult. After all, there appear many examples of the latter (e.g. altering properties like the muzzle velocity and barrel length of Bruno’s rifle will affect the travel of his ball).

I end by blocking one last maneuver that the defender of CaI might perform. Consider:

“THRESHOLD” OPERATION OF CAI. Causation isn’t a scalar relation. That is, there are no degrees of causation—either an event *C* is a cause of another event *E*, or it isn’t. Thus, if the strength of the weaker “link” of I-CHAIN₁/I-CHAIN₂ determines anything, it’s simply *whether or not* SF is a cause of JS. That said, in both I-CHAINS, said strength meets that minimum amount of influence *x* required to establish causation. So there is a sense in which CaI *does* capture Comparative Intuition—SF is “as much” a cause of JS as is BF in that neither firing can be said to be more or less a cause than the other. (On “Threshold” Operation, then, any influence that *C* has on *E* exceeding *x* is ignored.)

Besides its diverging from Lewis's writing¹⁰, there are (at least) two reasons to reject "Threshold" Operation.

First, causation *is* plausibly a scalar relation. After all, this appears to be the "common sense", or "ordinary", view. For one thing, Hitchcock and Knobe offer experimental evidence for their claim that "ordinary causal judgments of subjects" come in degrees (2009, 602). For another thing, Michael Moore argues that the *law* treats causation as scalar (2009, 71, 118–23; see also Braham and Van Hees 2009, 324). Thus, in tort law, the idea of "degrees of causal contribution" is both taken as sensible, and employed widely. We see this especially in negligence cases in which the doctrine of *divisible harm* is invoked so as to apportion liability amongst several defendants according to the degree of causal contribution each makes to some *indivisible harm* (Moore 2009, 118–19). In one such case¹¹—*Moore v. Johns-Manville Sales Corp* 781 F 2d 1061 (5th Cir 1986)—liability for each plaintiff's asbestosis was apportioned according to the degree to which each (defendant) manufacturer's (asbestos-containing) products caused the plaintiff's asbestosis (i.e. each defendant's "degree of relative causation"). Therefore, if we think that our concept of causation should accord with how causation is employed "ordinarily," we should also think that causation *is* a scalar relation.

Second, determining the value of x appears impossible. After all, x cannot be some one particular value. This is because we can easily conceive of one pre-emption case in which (the event intuited as) the pre-empting cause *doesn't* exhibit x amount of influence on the effect, and another pre-emption case in which (the event intuited as) the (non-causal) pre-empted alternative *does* (see Dowe 2000, 6–7). One may then suggest that one determine x on a case-by-case basis. This, however, would require one to establish some standard set of case features relevant to determining x (so as to ensure that our determinations of x are not *ad hoc*). At this point, however, I simply cannot see what these features might be.*

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¹⁰ (2000, 191) indicates that Lewis thinks causation *is* a scalar relation; (2000, 188–89) sees Lewis establish causation with reference to comparative, and not absolute, standards.

¹¹ Moore (2009, 119, fn. 36) contains more case examples.

* For invaluable input, thanks to Arif Ahmed, Luke Fenton-Glynn, two anonymous referees from the University of Cambridge, and three anonymous referees for *Dialectica*.

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