

Transference, or identity theories of causation?

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ABSTRACT. Transference theorists propose to explain causation in terms of the transference of a physical element. I argue, in two steps, that this is not possible. First, I show that available accounts of ‘transference’ ultimately convey that transference —and, consequently, causation— is the (non-relational) identity over time of the transferred element (a universal, a trope, or even an absolute substance). But, second, I try to defend, it is conceptually impossible that causation is (non-relational) identity.

Keywords: transference, causation, identity, universal, trope.

1. *A Summary of Transference Theories*

Two ideas join together to conform the soil of transference theories. *First*, there is the old philosophical thought that the effect preexists in its cause, or that something in the cause persists as its effect. This idea can be traced to Aristotle’s account of the formal cause and is transmitted through scholastics to modern philosophers like Spinoza, for example:

Of things which have nothing in common with one another, one cannot be the cause of another. (Spinoza *Ethics* I, prop. 3: 77)

The *second* idea is the naturalization of causality. Most contemporary naturalist philosophers, adducing the abandonment of causal terminology in the discourse of physical sciences, argued for eradicating the use of causal concepts in a well-grounded philosophy:

[T]he reason why physics has ceased to look for causes is that, in fact, there is no such thing. The law of causality, I believe, like much that passes muster among philosophers, is a relic of a bygone age, surviving, like a monarchy, only because it is erroneously supposed to do no harm. (Russell 1912: 1)

Now it is an ironical but familiar fact that though the business of science is describable in unscientific language as the discovery of cause, the notion of cause itself has no firm place in science. The disappearance of causal terminology from the jargon of one branch of science and another has seemed to mark the progress in understanding of the branches concerned. (Quine 1954: 229)

Against these conclusions, but within a similar naturalistic framework, transference theorists of causation react in the following way. They accept that physical level is the founder of the real par excellence and that natural science is the test for well-grounded concepts. But then, they reason, the use of the traditional causal terminology will be legitimized if the causal jargon of ordinary language and philosophy can be transcribed somehow into scientific terms. Transference theorists will work to show how “statements of causation in science are quite on par with many causal locutions in ordinary language” (Aronson 1971: 417); they will work to show how, in fact, causality survives



in a privileged manner in the physical level, and science “discovers the nature of causation” (Fair 1979: 220).

These two ideas lay the foundations for a basic analysis of causation in transference terms, as follows:

(T₁) *A* and *B* (where *A* and *B* are distinct objects, or distinct temporal parts of the same object) are causally related iff there is a *physical connection* between them.

(T₂) A physical connection is the transference of a physical element.

The naturalization of causation is reflected in (T₁). The causal nexus is a real, objective, measurable, and purely physical happening explained by current scientific theories. (T₂) is a rewriting of the thesis of the conservation of the cause in the effect. When heat causes that water boils, calorific energy is transferred to the molecules of water and manifests itself as kinetic energy. When somebody throws a ball, some quantity of movement is transferred from his hand to the ball. When two billiard balls collide, a quantity of movement is transferred from the first to the second... The cosmic glue, the cement for the construction of the universe, is transmission of a physical element: energy, movement, charge... Following Castañeda (1980) I will call this element, generically, *causity*. Causation is, then, transference of causity.

(T₁) and (T₂) provide a basic analysis of causation, at least, as it is in the actual world. Some theorists, like Castañeda (1984: 23), believe that it is a contingent matter that causity is the actual physical stuff it is. As it happens. causity is energy, but it would have been another element if, say, the laws of nature had been different, or the world made of different materials. Yet, causality is in every world the transference of causity, of some physical entity. (T₁) and (T₂) provide an essential account of causation. Others, like Dowe (2000a, 2000b), take the reduction to be just contingent and *a posteriori*, an account of causation in the actual world. For Dowe, then, there are worlds where causation is not transference. However, whether (T₁) and (T₂) are intended as a necessary or just as a contingent account of causation does not affect the following discussion.¹

With different amendments, the transference view has been supported by Aronson, Fair, Byerly, Castañeda, Salmon, Dowe, Ehring, Krajewski, Kistler, or Collier.²

¹ I will be back to this at the end of the paper, sec. 6.

² These are some of the definitions of causation they have offered. Object *A* is cause of the effect object *B* iff *A* possesses a quantity (e.g. velocity, momentum, kinetic energy, heat, etc.) which is transferred to *B* (Aronson 1971). *A* is the cause of the change or effect in *B* iff a physical quantity is transferred from *A* to *B* (Byerly 1979). *A* is the cause of the change or effect in *B* iff a quantity of energy and/or momentum is transferred from *A* to *B* (Fair 1979). *A* is the cause of the change or effect in *B* iff a quantity of causity is transferred from *A* to *B* (Castañeda 1980, 1984). *A* and *B* are causally related iff a mark is transmitted between *A* and *B* (Salmon 1984). *A* is the cause of *B* iff an invariant quantity is transmitted from *A* to *B* (Salmon, 1994). *A* and *B* are causally related iff a conserved physical quantity is transmitted between *A* and *B* (Salmon 1997). *A* and *B* are causally related iff there is persistence of a conserved physical quantity between *A* and *B* (Dowe 1992a, 2000b). *A* is the cause of the change or effect in *B* iff there is persistence of a trope of *A* in *B* (Ehring 1997). *A* is the cause of the change or effect in *B* iff there is transference of energy or information from *A* to *B* (Krajewski 1997).

My aim here is to argue that transference theories of causation do not offer, nor can offer, a proper reductionist account of causation. The argumentation is developed in two steps. In the first part, I analyse the notion of transference in causal contexts. Thus, sec. 2 presents a primary idea of transference and its goals as an account of causation. Sec. 3 considers the analysis of transference as the persistence of a universal, and its unfulfilled goals as an account of causation. Sec. 4 considers the analysis of transference as the persistence of a trope or an absolute substance, and its unfulfilled goals as an account of causation. As a whole, this first part aims to show that, in transference terms, causation turns to be endurance or (non-relational) identity over time of causity between the, consequently, causally related elements. But, as I try to argue in a second part, it is impossible that causation is (non-relational) identity, and this impossibility is the final reason for the problems transference theories face as accounts for causation.³

I

2. *The Naive Approach*

If transference theorists claim that physics discovers the nature of causation then they have to demonstrate that what physics discovers is causation, and not something else—say, the conservation of a physical element. That is, they have to convince us that physical transference *is* causation and, for this, it seems they must show that at least the main and defining characteristics of causation are displayed and explained in transference terms.

Contemporary pioneers of transference thought this was an easy task. In the first place, causation is asymmetric, and it really looks as if transference conveys a direction. Causity Q is transferred *from... to...* As Aronson (1971: 422) puts it, cause and effect are identified simply by noting the direction of transference between bodies: the cause will be identified as the object that loses Q , and the effect as the change that the gaining of Q involves.

Second, the transitivity of causation also appears to be easily captured in terms of transference. As Fair (1979: 345) maintains, if causity Q is transferred from A to B and from B to C , then Q is transferred from A to C .

A and B are causally related iff there exists a conserved quantity of which a trope amount is transmitted between A and B (Kistler 1998). Causation is the transfer of a particular token of a quantity of information from one state of a system to another (Collier 1999).

³ I will not consider here three problems that have been classically alleged against these theories. First, their impossibility to account for, supposedly, causal interactions between absolutely different substances like, in the Cartesian program, interactions between mind and body, or interactions where causation seems to depend precisely on the elimination of transference, like when a switch is turned off causing the light to go out (Ehring 1986: 250)—but see Dowe (2000b: ch. 6). Second, Leibniz's complaint that properties cannot be transferred because they cannot exist without the substances that possess them (*Philosophical Essays*, 148). And third, the much discussed possibility of action at a distance which these theories seem to exclude, and that Aronson (1982) identified as their major problem.

And third, there is an important test that a good analysis of causation should pass: a proper account of causation should not give rise to insoluble preemption situations. Transference theorists believed they had found a solid support in preemption problem solving:

Suppose a hoodlum throws a baseball through a window. But suppose, unbeknownst to him, a second hoodlum lies in wait and would have thrown a baseball through the window if the first had not. The first hoodlum is the source of the energy that the baseball transfers to the window; the second is not. And the first *causes* the window to shatter; the second does not. Just when and only when there is a flow of energy between objects (or events or whatever) do they seem to be causally connected. (Fair 1979: 230. His italics)

Transference seems to succeed where other accounts fail. For example, as Fair claims, a primitive counterfactual analysis of causation cannot tell which one of the two hoodlums is finally responsible for the breaking of the window. For any hoodlum, it is false that if (s)he had not thrown the baseball the window would have not been broken. But, if causation is transference of causity, e.g., energy, the situation is easily solved. There is a flow of energy between the preempting cause and the effect, but there is a flow of nothing between the preempted “cause” and the effect. Only one of the hoodlums can be the source of energy that results in the breaking of the window.

Castañeda (1980, 1984) argues in a similar way in favour of transference and leans on preemption for exhibiting the causal nexus that would render Hume’s account definitively surpassed. He proposes us to consider the following situation. A billiard ball *B* lays on a table while a distinct billiard ball, *A*, moves towards *B*. Under the table there is a mechanism, *M*, whose function is to stop *A* at the instant point at which *A* reaches *B*. This manoeuvring would prevent *B* from moving if under the table there were not another mechanism, *M**, which, at the time *A* stops, sets *B* in motion. As things happen, *B* moves because of *M**’s action at the same speed it would have moved had *A*’s action not been preempted by *M*.

The Humean analysis of causation cannot solve this situation of causal preemption. *A*’s motion would be the cause of *B*’s motion, for (i) *A* is spatio-temporally contiguous to *B*, (ii) *A*’s motion precedes *B*’s, and, we may suppose, (iii) the facts in the situation repeat with regularity. So, Castañeda concludes, the Humean analysis fails because it misses the causal nexus itself. *A* is not the cause of *B*’s motion, though it would have been if *M* has not acted. And what would have occurred if *M* had not acted, what *M* has preempted, is the transference of a certain quantity of momentum from *A* to *B*. Impeding this transference, *M* has preempted *A* to cause *B*’s motion. Causation is, consequently, transference of causity from the cause to the object that changes.

It seems, then, that a basic, intuitive idea of transference is able to reduce and explain causation. But this ordinary idea of transference stands in the need of analysis itself. And, as we will see, problems emerge at the very same moment one tries to elucidate the nature of transference. Two main accounts of transference have been proposed depending on the ontological nature defended for the transferred element, causity. I consider these in the next two sections.

3. *Causity is a Universal*

[A]t the surface ontological level, the level at which we deal with causes either in daily experience or in scientific research, it really does not matter whether we suppose that something passes, so to speak, bodily across time from the cause to the effect, or we merely suppose that something in the cause is destroyed at the moment of causation while a counterpart, even replica, is created in the effect. (...) [When] we speak of *transference of causity* (...) we allow that there may not be a literal transfer across time of some selfsame item, but only an appropriate matching of a vanishing causity at a given spatiotemporal position and a contiguous creation of causity. (Castañeda 1984: 22-3. His italics)

Castañeda presents here two ways, which he takes to be equally valid, of understanding transference. In a first one, causity is transferred between two points t_1 and t_n when it *passes as a whole* body, so to speak, through the intervening points of the interval (t_1, t_n) . Call this, *absolute* transference. In the second way, causity is transferred between t_1 and t_n when *contiguous disappearances and appearances of it* succeed themselves at the intervening points of the interval (t_1, t_n) . Call this, *twinkling* transference.

Consider first the twinkling way. Transference of causity is the vanishing and creation of causity at the appropriate space-time points. So the nature of causity is such that it can disappear and reappear at different space-time points without any loss of identity. Causity appears to be, then, a universal, a quantity of some physical element, instantiated at relevant space-time points by some objects. That causity is a universal is, I think, what Fair has in mind when he writes that the “identity conditions for energy and momentum are singularly perspicuous among the class of properties in general” (1979: 234). Dowe’s account of causal processes and interactions in terms of transference of conserved quantities also includes the presupposition that conserved quantities are universals, possessed or instantiated by objects:

A *causal process* is a world line of an object that possesses a conserved quantity. (...) A *causal interaction* is an intersection of world lines that involves exchange of a conserved quantity. (...) ‘Possesses’ is to be understood in the sense of ‘instantiates.’ An object possessing a conserved quantity is an instance of a particular instantiating of a property. We suppose that an object possesses energy if science attributes that quantity to that body. (Dowe 2000b: 90, 92. His italics)

And in Salmon’s view (1994, 1997) that there is causation whenever there is transmission of invariant quantities (i.e., physical quantities that do not vary with the frame of reference), quantities are also understood as universals. Salmon’s idea of transmission invokes his *at-at theory*: an invariant quantity is transmitted between two spatiotemporal points A and B of the world line of an object when a fixed amount of this quantity is possessed by the object *at A*, *at B* and *at every stage between A and B* (and no causal interactions occur). Equally, the exchange of an invariant quantity between distinct objects should be understood as transmission, in terms of the at-at theory, of invariant quantities. Salmon originally introduced this theory as a solution to Zeno’s paradoxes of movement, and we can see that the at-at theory of causal transmission easily fits the twinkling way of transference:

According to the ‘at-at’ theory, to move from A to B is simply to occupy the intervening points at the intervening instants. It consists in being *at* particular points of space *at* corresponding moments. There is no *additional* question as to how the arrow *gets from* point A to point B ; the answer has already been given —by being *at* the intervening points at the intervening moments. The answer is emphatically *not* that it gets from A to B by zipping through the intermediate points at high speed. Moreover, there is no additional question about how the arrow gets from one intervening point to another —the answer is the same, namely, by being *at* the points between them at the corresponding moments. (...) The fact that this solution can —if I am right— be

extended in a direct fashion to provide a resolution of the problem of mark transmission [or the transmission of invariant or conserved quantities] is an additional laurel. (Salmon 1984: 153. His italics.)⁴

Causity, a conserved quantity like energy or an invariant quantity, is transferred between distinct temporal parts of the same object (in the case of causal processes) or between distinct objects (in the case of causal interactions), when contiguous disappearances and appearances of it succeed themselves at the appropriate times and places.⁵ That is, being a universal, causity is transferred when successive instantiations of it occur at appropriate places. But if this is how causity is transferred, its transference is neither asymmetric, nor transitive, nor avoids irresolvable preemption.

Take asymmetry and think of the transference of the universal causity Q between A and B . That A and B are causally connected implies that, in different places and times, A and B instantiate the same universal Q . But, obviously, this does not point to any of them as the cause or the effect in the situation. There is nothing in A 's and B 's possession of Q that signals either of them as cause, or effect. To grant a direction to the process, it is necessary to take into account external factors to the successive instantiation of Q . Moreover, among these external factors, temporal data are useless. As Beauchamp & Rosenberg (1981: 210), Dieks (1986: 86), Ehring (1986: 255), and Dowe (1995b: 365) have argued, if backwards causation in time is possible, i.e., if it is possible that effects precede their causes in time, then, even if A 's instantiation of Q is temporally prior to B 's, B could still be the cause in the situation. Transference, not being intrinsically asymmetric, cannot display the causal direction.^{6, 7}

Second, as Ehring (1986: 256) has argued, twinkling transference gets into trouble if causation is transitive. Suppose that object A has a quantity Q of causity at the time object B has the same quantity Q of causity. Suppose, furthermore, that immediately after A is dispossessed of Q , B has $Q + Q$. Later on, B is dispossessed of Q and another object C acquires Q . Transference alone does not settle whether A is causally related to C . The Q that C acquires could be the Q that is transferred from A to B as

⁴ Salmon substitutes his theory of causation in terms of the transmission of invariant (1994) or conserved quantities (1997) for the transmission of a mark (1984), but he keeps his at-at theory of causal transmission for all cases. This explains my brackets.

⁵ Dowe calls 'persistence' the transference of causity between temporal parts of the same object and reserves the term 'transference' for the exchange of causity between distinct objects. His reason to use a different name for what seems to be the same kind of process is that, in the first situation, "it does seem odd that the quantity is said to be transferred when in fact it is retained" (Dowe 2000b: 54). But the point is that even if it seems to be retained, as it is not transferred to a different object, it is clearly transferred to a different temporal part of the object. Nevertheless, as we will see, transference is finally the identity over time of the transferred element. So it does not make much difference whether the quantity exists between distinct objects or between their temporal parts.

⁶ Note that, contrary to Aronson's complaint (1982: 295-6), this problem does not rest on a confusion between the ontological and the epistemological level. The problem is not that we cannot tell which is the cause, or the effect, in the situation. Rather, the problem is that the transference of causity cannot make the difference.

⁷ Conceding that transference is not asymmetric, Dowe (1992b) proposes an extrinsic account of the asymmetry of causation taking into consideration the entropic arrow, or the kaon arrow. But see also Dowe (1996, 2000: ch. 5).

much as the Q that B already possessed. In fact, all the Q 's in the situation are one and the same universal Q . So, the transitivity of causation presents a problem for this account of transference. Q , being ubiquitous, can be possessed by different objects at the same time, and thus, the question whether Q is transferred from *every* point at which it disappears to *every* subsequent point at which it is instantiated again, has no definite answer.

For the same reason, this way of understanding transference gives rise to unsolvable situations of preemption similar to those that Castañeda employed against the Humean analysis. Remember Castañeda's preemption case. Due to a mechanism M^* , billiard ball B moves exactly as it would had, if ball A had influenced B . The transference of a universal physical quantity Q (of motion, in this case) is the disappearance of Q in the cause and the appearance of an exact replica of Q in the object that changes. So, given that at the next instant point at which A stops an exact replica of A 's Q — Q itself—is manifested by B , transference alone cannot conclude, that A is not the cause of B 's motion.

The situation is, roughly, this —where AQ_1 represents that A instantiates Q at instant t_1 , BQ_5 that B instantiates Q at instant t_5 , and so on:

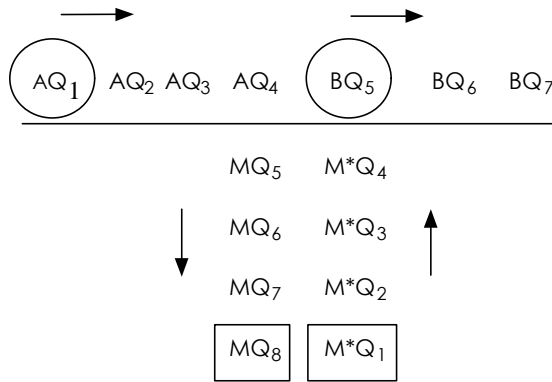


Figure 1

So the same difficulties that Castañeda finds in the Humean analysis arise in his own.⁸ Dowe seems to be aware of this problem:

[C]onsider four hanging balls. Two swing towards the other two, which are stationary and touching. They all collide at the same instant. The collision leaves the first two stationary and touching, and the other two move off. Which motion was given to which ball? It seems that whenever we move to many body problems the conservation laws leave the question indeterminate. (Dowe 1995b: 370)

⁸ The possibility that some, but not all, contiguous instances of Q are themselves causally related is not available. One reason, powerful enough, for this is that the account would be circular. Moreover, in sec. 5, I shall argue that Q at t_1 and Q at t_2 —irrespective of whether Q belongs to the same substance, to different substances, or to none— cannot define the terms of a causal relation.

Given the nature of the laws that govern the transference of causity, it is not absolutely determined “where” causity is. We know that the total amount of causity in a closed system is the same in every moment of its evolution, and this seems enough to measure its quantity in the system. This also suffices to offer a basic account of causation. There is a causal connection between A and B iff, in the absence of any other interaction, the quantity of causity remains constant during their interaction or exchange of causity. But, when other interactions occur, when, as in cases of preemption, more than two objects are involved, the causal connections will be irreducibly undetermined. (This could be the reason why Dowe (1995: 371, 2000b: 58) says, strangely, that conserved quantities do not have identity proper.)

However, the difficulty here is not only that conservation laws do not follow the exact trajectory of a given quantity of causity when more than two objects are involved. Rather, the difficulty is that the nature of causity impedes its localization when more than two objects are involved in a causal interaction. Physical quantities, being universals, are ubiquitous. They can be instantiated at different places at the same time and, then, the question whether they are transferred from *every* point at which they disappear to *every* subsequent point at which they are instantiated again, has no definite answer.⁹

To conclude, then, if causation is twinkling transference, it is not clearly transitive, it is not intrinsically asymmetric, and it gives rise to irresolvable situations of preemption. These seem to be sufficient reasons to rule out the twinkling way of transference as an account of causation. But this is not the point I want to emphasize. For I believe that these problems are consequences of a more general and deeper characteristic of the account: that transference is identity over time. The consideration of the twinkling way of transference shows that to elucidate the notion of transference is to offer an account for the identity conditions of the transferred element, causity. Under the twinkling way, causity is a universal; thus, the identity of causity over time is defined in terms of its contiguous instantiations, and these conditions do not easily reflect the properties one expects of the causal relation. But the main point remains that an account of transference is a way of spelling out the identity conditions for causity. Depending on the ontological nature of causity its identity conditions vary, but the analysis of causality in terms of transference turns into the task of finding the kind of element that, existing in time, appropriately displays the characteristics of the causal relation. However, as we will see, in the end no persisting entity can defeat causation.

4. *Causity is an Absolute Entity*

Consider now absolute transference. Causity is transferred between t_1 and t_n when it *passes as a whole* through the intervening points of the interval (t_1, t_n) . Causity does not

⁹ Dowe (2000b: 118) maintains that it is not even necessary that the quantity is possessed at every moment of the relevant interval, so that not even spatio-temporal continuity is required for the process of instantiation. This means that the problem on Castañeda’s table could be generalized to situations where spatio-temporally distant objects will compete without solution for the same effect.

have temporal stages, and so, its persistence consists in its being wholly and continuously present during every moment of its life. Causity persists or is transferred between t_1 and t_2 , not when its parts or its instances are at the appropriate places at the appropriate times of this interval, but when it is bodily present, as a whole, along this period. This is what Aronson seems to have in mind when he says that momentum is transferred from object to object “in a single instance”:

In the case of a causing b to move, b 's momentum at time₂ is the same as a 's at time₁. Denying this would lead to quite a mystery, for then we would have to say that somehow a lost all its momentum at time₂ and b acquired the exact same amount at the very moment! It would be more natural to regard a 's loss and b 's gain as stages of a single process of transference of one and the same quantity rather than, *à la* Hume, separate and distinct events. (...) b moved at time₂ because, at time₂, a 's momentum was transferred to b in a single instance. (Aronson 1982: 294-5. His italics)

Ehring (1997) and Kistler (1998) also understand transference in the absolute way when they maintain that causality is transference of tropes or particular properties:

The singularist process that connects causes with effects consists in the persistence of tropes over time. (...) The redness of a chair at t' is causally connected to the redness of the chair at t if the redness of the chair at t' is the same trope as the redness of the chair at t . (Ehring 1996: 116, 122)

For a and b to be causally related, it is not sufficient that they possess amounts of some given conserved quantity which are *equal in magnitude*, but it is necessary that the amount present in a be *identical as a particular* with the amount present in b . (Kistler 1998: 2. His italics)

Given the identity conditions over time for tropes, causal transference as persistence of tropes is transference in the absolute way. For a trope is not an instance of a universal property. It is a particular, singular property with an identity of its own. It cannot disappear and reappear in a different place or time. Once vanished, it goes out of existence.

Again, transference —and, then, causation— is defined as the identity of causity in time. But now, the nature of causity differs significantly from the nature of universals. Like universals, the substance-energy of Aronson¹⁰ and the particular properties of Ehring and Kistler are wholly present at any time and place in which they exist: they do not have temporal stages. But, contrary to universals, tropes and Aronson's “single instance” cannot be at different places at the same time, nor can they be possessed by different things simultaneously. These characteristics explain why, and how, absolute transference evades the problems of preemption and transitivity.

Transference so understood gives us the following rough picture of the situation on Castañeda's table —where AQ_1 represents A possessing Q at time t_1 , BQ^*_5 represents B possessing Q^* at t_5 , and so on:

¹⁰ I believe that Aronson's “single instance” could be read in terms of tropes, but it is usually assumed (Dieks 1986: 88, Dowe 1995b: 369) that he has in mind an absolute substance.

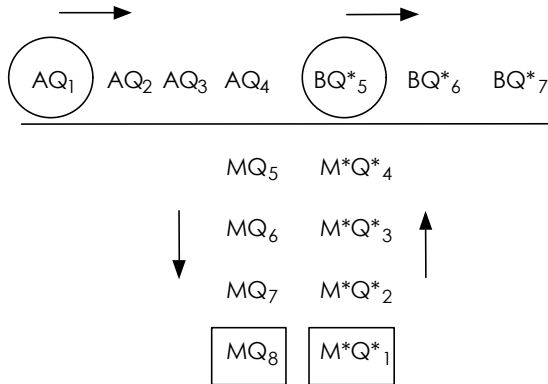


Figure 2

Q^* in M^* and Q^* in B is *the same* identical trope or substance. And, though Q^* in M^* and Q in A are *indiscernible*, Q^* in M^* and Q in A are *other and distinct* entities. So, as B finally has Q^* , A is not the cause of its motion but M^* is.

In a similar way, the transitivity of causation does not raise problems for this account. A and B might have indiscernible particular properties, or “singular instances” of causity, at the same time. But they could never have *the same identical* property or causity at the same time. So, it might be that A has Q when B has an indiscernible Q^* . It might also be that A is dispossessed of Q just before B has $Q + Q^*$. And if, later, a third object C acquires Q , then A is causally related to C . If, on the other hand, C acquires Q^* , only B is causally related to C . So transitivity does not seem to present a problem for this account of transference. However, that causation is transitive still means just that everything in which the same causity, trope or substance, exists will be causally related. There seems to be something unnatural about this.

This account faces other problems.¹¹ *First*, as Ehring (1986: 251) acknowledges, it is not easy to see how absolute transference could convey a direction without taking into account external considerations —of which, again, and accepted the possibility of backward causation, time is already discarded. Given a transference of Q between A and B , it cannot be decided whether Q is being transferred from A to B , or vice versa. The transference of Q , irrespective of whether Q is a universal, a trope, or any enduring entity, is symmetric.¹²

Second, transference thus understood has been strongly criticized on grounds of falsity and incompatibility with contemporary physical theories:

¹¹ Dowe (2000b: 57) presents as a problem, against Aronson’s account of causity as a substance, that causity could exist unpossessed. Now, even allowing that causity cannot be a substance, the metaphysical thesis that tropes and universals cannot exist unpossessed, needs to be argued on independent grounds. Moreover, Dowe does not say why it should be a problem for transference theories that causity could exist unpossessed.

¹² This is why Ehring (1997: ch. 7) will propose an external account of the asymmetry of causation with the aid of the circumstances or conditioning factors accompanying the cause.

[W]hen a moving particle hits two resting particles and sets them in motion, it is never asked which part of *the* incoming particle's original energy has been transferred to the one of the other particles and which part to the other. The question has even a ring of absurdity. (Dieks 1986: 88. My italics)

[T]he notion that *the same* energy is given from one object to another is empirically unverifiable in classical physics, and inconsistent with quantum mechanics. (Dowe 1995b: 370. My italics)

Absolute transference, then, loses one of the main and defining original goals of transference theorists, namely, the naturalization of causation.

But, and more important for our purposes, the account of causation in terms of absolute transference is also an account of causation in terms of identity over time. It differs from twinkling transference precisely in the identity conditions it offers for the element that, existing in time, stands for the causal nexus: instead of the successive instantiation of a universal, transference is here the continuous existence of an indivisible and non-ubiquitous particular. In the rest of this paper, I argue that, in fact, transference is not causation but identity over time, and that it is impossible that causation is identity in the sense that these theories demand. Moreover, the problems we have seen that transference accounts face when attempting to explain the main characteristics of causation are direct consequences of this impossibility.

II

5. *Identity as Causation*

To define transference is to determine the identity conditions over time of the entity—a universal quantity, a particular quantity, or even an absolute substance—that is transferred. The transference of causity from object to object, or from temporal stage to temporal stage of the same object, is the permanence or identity of causity between these objects, or these stages, or the times and places where they are located. So the defense that causality is transference turns out to be the search for the kind of entity whose identity conditions satisfy the characteristics of the causal relation. In transference terms causation becomes identity.

The general question is, then, whether identity can replace and explain causation. We are all by now familiar with causal theories of identity, or accounts of identity based on causation.¹³ The impact of causation in these theories is especially patent in the subsequent treatment of identity as a relation that holds between distinct and different entities, that is, temporal parts or stages of objects, which differ in their intrinsic properties. Transference theories follow the opposite direction. They spell out causation in terms of identity. And this identity, the identity of causity, cannot be understood relationally. It cannot be explained from a relation that holds between different elements, like temporal parts of causity. Because if it were a spatio-temporal relation, the transference account would be just reproducing the Humean account and, then, the physical causal connection that transference theorists so proudly claim to have found against Hume, would dissolve. And no other relation is available, for if the per-

¹³ The account of identity in terms of causation could be traced back to Hume, though it has been lately, and masterfully, defended by David Lewis (1976).

sistence of causity in time is the holding of causal or non-just-regular nomological relations between different temporal stages of causity, the account would be circular.

So the identity of causity in time has to be understood in a non-relational way. This is precisely how transference theories understand it. Universals wholly exist at any place and time where they are. Spatio-temporal relations between their instances are not spatio-temporal relations between different entities, for spatio-temporal relations between instances of the same universal are spatio-temporal relations between the universal itself. Equally, a trope, or the kind of substance proposed by Aronson, also exists wholly at any place and time where it is present. So its persistence over time cannot be explained in terms of relations between its parts either. Following Lewis's terminology: all of them, universals, tropes, and the substance-energy of Aronson, *endure*, when they persist in time.¹⁴

The question is: can endurance, non-relational identity, be the causal nexus? I think the answer is no. For identity does not minimally do what causality does. Causation *distinguishes* two elements, one as the cause and the other as the effect. Causation relates, basically, two elements, one of them being ontologically —causally— dependent on the other. It does not make any difference whether these elements are objects, facts, events, properties, temporal parts... All the same, they are supposed to explain change in the world *by means of the way they are related* to each other. The causal nexus is a relation of ontological dependence between elements, i.e., the relation between a cause and its effect, a producer and its product. Causation is hardly more than the occurrence of these elements, when their nature is fully understood.

If I am not wrong, the fact that causation distinguishes its elements as having different roles —those of cause and effect—, should not be confused with the asymmetrical character of causation. That causation is asymmetric means that its terms are ordered, and that this order cannot be reversed. But the fact I am trying to clarify runs deeper than the direction in the relation. It is the intuition that causation involves, at least, two different terms. Causation is, so to say, the displaying of the causal features of its terms.

This fact is a necessary condition for the non reflexive, asymmetric and transitive character of causation, but it is not to be reduced to any of them. Only if causation distinguishes its elements, the same thing cannot be its own cause and effect. And only if causation distinguishes its elements, it can have a direction or be transitive.

Now, this basic being of causation is lost if causation is non-relational identity of causity over time. Consider these words of Dowe:

A temporal stage of a causal process is the cause of a later temporal stage. Take, for example, the movement of the a particle through space from a point *a*, through a point *b*, to a point *c*. (...) The particle possesses a

¹⁴ "Something *perdures* iff it persists by having different temporal parts, or stages, at different times, though no one part of it is wholly present at more than one time; whereas it *endures* iff it persists by being wholly present at more than one time. Perdurantism corresponds to the way a road persists through space; part of it is here and part of it is there, and no part is wholly present at two different places. Endurance corresponds to the way a universal, if there are such things, would be wholly present wherever and whenever it is instantiated." (Lewis 1986a: 202)

conserved quantity such as its kinetic energy. Then we can say that the *ab* segment of the process is the cause of the *bc* segment. (Dowe 1992a: 212)

Endurance of the relevant entity suffices for causation. Causity, here kinetic energy, connects causally the places where it is, by the mere act of its existence. Because causity persists between the *ab* and *bc* segments of a process, the *ab* segment is the cause of the *bc* segment. For the same reason, the space-time point *a* of the process is the cause of the space-time point *b* of the process. (And are we not equally entitled to conclude that the *ab* segment is also causally connected with the *ab* segment?) We may go on, randomly dividing the process, creating new causes and effects from the mere existence of the same entity in time. But, then, causation is no more a relation that distinguishes the role of its elements. What is the difference, determined by the causal relation that supposedly holds between them, that exists between the *ab* segment of the particle and its *bc* segment? To say that the *ab* segment causes the *bc* segment *because* both segments possess the same causity is as bizarre as maintaining that two temporal stages of the same person are causally related *as a result of* having, say, the same blue eyes. At best, (s)he has the same blue eyes because the relevant stages are causally related. But if any causal relation holds between the stages, it is not *determined* by their sharing some favoured property.

Note that the problem here does not concern the identity of the person, of the particle, or of any other object(s) that might possess causity. Transference theories like, explicitly, Dowe's theory (2000a: 22-7, 2000b: 101-7), presuppose the identity of the objects that possess causity. Causity, says Dowe, cannot exist without being possessed. So the identity of the objects that possess causity is a primitive ingredient of his causal theory. But this problem, if such, does not concern us here.

Neither the problem is that (some) transference theories¹⁵ allow temporal parts of the same object to be causally related. Aronson (1971) maintained that only unnatural changes, i.e., those that involve more than one object, can be causal. Fair (1979) and Castañeda (1980, 1984) also thought that causes and effects should be distinct *objects*. Maybe they thought this so as not to violate the condition that causes must be external to their effects. Such condition is violated if it is presupposed, as they did, that only objects constitute the ontology of causation. In that case, to allow that two parts of the same object are causally related is just to allow that the object is cause of itself. (Of course, if temporal parts, being—as they are—intrinsically different, could constitute the ontology of causation, the condition of the externality of the cause would not be violated.) But, again, we are not dealing with the identity of the object, if any, that possesses causity—though the problem I am trying to evince is also related to that of the violation of the condition of the externality of the cause.

The identity that concerns us here is the identity of the transferred element, causity. If *this* identity defines a causal relation, causation does not distinguish its causal elements. For the existence of causity in time is independent of the elements where it exists. Ehring (1997: 122) writes that, in transference terms, “unchange as well as

¹⁵ Like those of Salmon (1984, 1994, 1997), Dowe (1992a, 200b), Ehring (1997), or Kistler (1998).

change falls within the causal structure of the world.” In fact, in transference terms, change is a derived form of causation without change. The existence of causity is the basic causal fact, and transient causation between distincts is dependent upon it. *Everything, and only that, in which the same privileged entity exists, is causally related.* The causal nexus turns alien to the elements it relates, for the existence of “the same” is independent of the elements where it exists. But this is contrary to the very idea of causation.

Transference theories, by now understood in terms of the (non-relational) identity over time of the transferred entity, misfire as a reductionist approach to causation. But the main reason for their failure is not that they cannot account for asymmetry or transitivity or solve preemption. The main reason for their failure is that they cannot account for causality understood as a relation between (causally) different terms. This *explains* why any property of causation as a relation between different terms becomes a problem. If causation among different terms is derived from (non-relational) identity, any property of causation as a relation between different entities has to become dependent on external elements: non-relational identity does not relate distinct terms.

The asymmetry problem illustrates what I mean here. Asymmetry is, characteristically, one of these properties that causation can have only if it distinguishes its elements. We have seen how, in transference terms, causation is not asymmetric unless problematic temporal, or some other external, considerations are taken into account. Now, it could be the case that causation is *not* after all objectively asymmetric. It could be that, as Price (1996) has defended, any direction (temporal, or causal) in the world is an illusion provoked by our own asymmetric and subjective perspective as agents. That transference is not asymmetric, then, is not an insurmountable problem, but revisionary philosophy.

However, the problem is not only that transference fails to be asymmetric. If the causal nexus is (non-relational) identity over time, the difficulty is not just that the terms of the causal relation could be in principle interchangeable in their causal roles, but that the causal relation would not distinguish its essential terms. Consider this analogy. In terms of transference, causation is like a car travelling between distinct cities. The permanence, between cities, of the car conveys no direction in itself: this is the asymmetry problem. What I am trying to convince you is that the reason why the spatio-temporal positions of the cities are necessary to have a minimal asymmetry here, the underlying difficulty, is that relation that holds between the cities, as a consequence that the same car crosses them, is tangential to the cities. After its departure, we are allowed to suppose, the car leaves no trace of its presence in the cities. The movement of the car is independent of the cities it crosses. But causes and effects are not external to causation: causes and effects *define* causation. So causation is not like a car passing through different cities.

The same goes for transitivity. If causation is transference, transitivity seems unnatural. If causation is a matter of possessing something, every thing that possesses the same something will be causally related. The transitivity of causation becomes as plain as the transitivity of identity. Even worse, if spatio-temporal discontinuity is al-

lowed (Dowe 2000b: 118, Ehring 1997: 137) an object possessing the relevant entity would be causally connected with *every* thing, no matter how distant in time or place, that possessed the same entity. Again, it could be argued that causation is *not* transitive. So that transitivity does not seem as straight as expected is not an insurmountable problem, but revisionary philosophy.

However, the real trouble is not transitivity itself, but how its failure reveals the conditions under which causation is supposed to hold when it is defined in terms of transference. Under the transference account causal transitivity results in the changing of place, more than twice, of the cause. But the new position of the cause cannot be its effect. Again, persistence of something in time cannot *define* the terms of a causal relation.

Step by step, theorists of transference have reconstructed the main lines of the Spinozean system. As Dowe (1995b: 368) writes, “the Transference Analysis becomes the Spinozean Disjunction.” But, then, the very same difficulties that threaten this system threaten the transference account of causation. Replacing the Substance-God of Spinoza by a basic element whose main condition of acceptance is to be part of the physical language, we encounter the replica of a system that presumed a double causation: one real and immanent, that is, the existence of the substance; the other, transient between different entities and derived from the first. But, from the existence of something whose own existence remains a mystery, one cannot derive the diversity that causation and change convey. Causation is not the identity of any Ariadna’s thread piercing reality. As Hegel argued against Spinoza:

[E]verything turns on grasping and expressing the True, not only as *Substance*, but equally as *Subject*. (...) The Substance is, as Subject, pure, *simple negativity*, and is for this very reason the bifurcation of the simple; it is the doubling which sets up opposition, and then again the negation of this indifferent diversity and of its antithesis. Only this self-restoring sameness, or this reflection in otherness within itself—not an *original* or immediate unity as such—is the True. (Hegel *Phenomenology of Spirit*, par. 18 & 19: 9-10. His italics.)

Translating the difficult Hegelian language into more familiar terms, we can read Hegel as saying that, without negation, without difference or diversity, there is no creation. Causation needs a variety that is missing in (non-relational) identity. The defence that causation is transference, making causation (non-relational) identity, conveys in the end the dissolution of difference and, therefore, of causation.

6. *A Short Note on the ‘We Don’t Do Metaphysics’ Complaint*

As the transference of some privileged physical element or causity is just its identity in time, in transference terms, causation becomes identity. But causation cannot be identity. For the very concept of causation conveys that it distinguishes, holding between them, its essential elements: the cause and its effect. Defined in terms of persistence of causity, the idea of causation would lose its essential meaning. These are conceptual *a priori* conclusions.

Dowe (2000b: 2-3) has argued that there are two ways of doing philosophy of causation. There is, on the one hand, conceptual analysis which “is a meaning analysis that begins with our everyday, common sense understanding of the concept [of cau-

sation].”¹⁶ And there is, on the other hand, empirical analysis which “seeks to establish what causation in fact is in the actual world.” These two ways of doing philosophy of causation, says Dowe, might have nothing to say to each other: empirical analysis could be so highly revisionist that it would not be affected by conclusions reached by conceptual analysis. Thus, if Dowe is right, the purely conceptual problem that has been presented here could be dismissed on the ground that transference analysis of causation is only of the empirical sort. Call this the ‘we don’t do metaphysics’ complaint.

The main difficulty with this complaint is that it is sustained by a false assumption. In the end, empirical analysis, if philosophy, cannot do without conceptual analysis. Dowe writes that:

We certainly want to avoid assuming a priori that for any feature X of our everyday [i.e., a priori philosophical] concept of causation, causation actually has feature X. (...) [W]e must urge that no assumption can be made about the extent to which the common [i.e., a priori philosophical] use of the term will match the empirical analysis. (Dowe 2000b: 10-1)

As empirical analysis could be highly revisionist, it does not need to match conceptual analysis and, then, no constraints should be imposed to it by conceptual analysis. But note *first* that, if Dowe is right here, the “restrictions” with which the empirical analysis of a philosophical concept like the concept of causation can work are so open that there seems to be no way of determining whether empirical analysis is philosophy of causation or something else, like some kind of theorizing on empirical concepts. That “scientists are competent users of English” and their everyday use of the word ‘cause’, do not suffice, contrary to Dowe (2000b: 10), to establish that what scientists do when they work has anything to do with the philosophical notion of causation.¹⁷

But, *second* and more definitive, even as Dowe defines it, “[conceptual] analysis is *a priori*, and if true, will be necessarily true” (2000b: 2). Thus, if it is conceptually true that causation is not (non-relational) identity, and therefore, if it is impossible that causation is (non-relational) identity then there is *no* world, including the actual world, in which causation is identity. Yet, the account of causation in terms of transference makes causation, at least in the actual world, the (non-relational) identity of a (physical) entity. So transference theories fail even as contingent accounts of causation.¹⁸

¹⁶ But how can more than 2.000 years of philosophy of causation be irrelevant when doing conceptual analysis of causation?

¹⁷ And note that our only clue would be their everyday use of the word ‘cause’, for Dowe acknowledges that the language of causation has no place in the language of physical sciences.

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