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9 Is Causation a Relation?

Boris Hennig

Hume thinks that if causation is anything at all it must be a relation between two distinct items. So does almost everyone after Hume. It is debated what kind of relation causation is and among what kinds of items it obtains. For instance, it has been argued that two items stand in a causal relation if there is a law of nature that connects them, or if one of them can be manipulated by manipulating the other, or if some underlying mechanism can be specified that ties them together, or if conserved quantities are transferred from one to the other. As for the related items, some think that they must be two distinct events; others claim that they are rather facts or properties.

In any case, it is assumed that causation is some kind of relation between two distinct items of some sort. This assumption has only rarely been questioned. One good reason for this is that given any causal process, it seems easy to come up with definitions of R, a, and b, such that the relational statement R(a,b) is true if and only if the causal process occurs. For instance, if one ball pushes another one, there is a relation between the two balls and their movements. This is why D. H. Mellor, for instance, begins his argument against the assumption that causation is a real relation by distinguishing between relations and real relations. According to Mellor, R(a,b) stands for a real relation only if both a and b exist. Thus he agrees with the general assumption that all causal processes may be represented by statements of the form R(a,b), and only objects that some things that may be represented by R(a,b) are not real relations. David Lewis does the same in his argument against the claim that causation is a relation. He argues that even though the void is nothing, it has causal properties. Since he also assumes that relations cannot hold among absences, he concludes that causation cannot be a relation. I do not find this argument convincing. It seems to me that ‘better than’, for instance, is a real relation, even though there are many things that are better than nothing. So it cannot be true that real relations cannot hold among absences. Nonetheless, I agree with Lewis’s conclusion: Causation is not a relation.

Causation is not a relation because it must be more than a relation. If it were just a relation, it would be possible to obtain an adequate representation of a causal process by merely sticking two independent representations of the two related items together. For in general, relations may be identified with n-tuples of items, and this should also be true for causal relations. They should be adequately representable by pairs of items. I maintain that causal processes cannot be adequately represented by pairs of items. There may be causal relations, for which this is true. But causations (i.e., causal processes) are not causal relations, because it is not true for them. It is one thing to be able to split up a process into distinct parts, another to be able to adequately represent the process by simply putting these parts together. I believe that although one may decompose causal processes into parts that stand in causal relations, causal processes are not simply the result of putting these parts together. The causal relation between a cause and its effect is not the same as the causal process of which they are parts.

I will show this by first arguing against what seems to be Hume’s argument for the assumption that causation is a relation. Then I will demonstrate that in an example case that Hume discusses, causation cannot be understood as a mere relation between two distinct items. That is, either the two related items are indeed distinct and separable, in which case their causal relation will not be apparent and the items will not be seen as parts of a causal process, or, on the other hand, the two items are represented as causally related, but then their representations are not separable. By Hume’s standards, the latter means that there were no two distinct items to begin with, but only one.

Some authors may seem to also deny that causation is a relation. For instance, Norwood R. Hanson claims that the ‘causal chain analogy’ is misleading. However, since not every relation is a chain, this does not amount to rejecting the idea that causation is a relation. Also, Richard Taylor denies that causation generally is a relation between two events, but he does not deny that it is a relation. Further, David Fair, Wesley Salmon, and Phil Dowe argue that causation is a certain kind of process. If there were a generally accepted distinction between processes and relations such that no relation can be a process, this would imply that causation is not a relation. But Fair, for one, does not draw any such distinction. He has no difficulties writing that causation is ‘a physically specifiable relation of energy-momentum flow’, and thus thinks that a process such as energy-momentum flow can also be a relation. I do not think so.

Anjan Chakravartty likewise seems to use ‘relation’ in a way so that it can also refer to causal processes. He writes that although one should conceive of causation ‘not as a relation between discrete entities’, causal processes still are ‘systems of continuously manifesting relations between objects with causal properties and concomitant dispositions’. If by ‘continuously manifesting relation’ he means something that is a process rather than a relation between distinct items, he might be making the claim that I am going to defend here, except that he sticks to the label ‘relation’. However, the other elements of his characterisation of causal processes
are rather obscure to me. For instance, in order to understand this characterisation, one needs to understand what 'causal properties and concomitant dispositions' are. According to Chakravartty, causal properties are properties that confer dispositions for behaviour on objects. However, since actualisations of dispositions are conceptually prior to dispositions, one must know in what ways these dispositions are actualised in order to know what kinds of dispositions they are. Presumably, they are actualised by some kind of causal process. This means that in the end, causal properties must be understood to be properties that dispose things to take part in causal processes. If this is so, it is no wonder that Chakravartty can define causal processes in terms of causal properties. Causal processes turn out to be systems of relations among objects that dispose each other to take part in causal processes. If this is what Chakravartty wants to say, it is circular.

HUME ON CAUSATION

According to Hume, causation is not only a relation, but what he calls a 'philosophical relation'. A philosophical relation can be any 'circumstance, in which, even upon the arbitrary union of two ideas in the fancy, we may think proper to compare them'. Philosophical relations can thus also hold among absences. In order for two items to stand in a philosophical relation, they need not both exist, and there need not be a real connection between them. There is only one thing that Hume will not allow: Nothing can stand in a philosophical relation to itself in one and the same respect. Philosophical relations can only hold among distinct items. They are irreflexive. Even the relation that Hume calls 'identity' is not actually a relation between a thing and itself, but only a relation between two different stages of the same thing (Treatise I,iii,2, p. 74). This is why the relation of identity is common only to all things 'whose existence has any duration' (Treatise I,i,5, p. 14). Since all transitive and symmetric relations must also be reflexive, this also implies that philosophical relations cannot be transitive and symmetric. If causation is a transitive philosophical relation, it must be asymmetric.

In any case, causation can only be a relation between two distinct items, or two distinct parts, aspects, or moments of one item. For Hume, this has important consequences. He thinks that whenever two items are in any way distinct, they must also be completely separable from each other. He writes that 'there are not any two impressions which are perfectly inseparable' (Treatise I,i,3, p. 10). This is sometimes referred to as the Separability Principle. It implies that if cause and effect are two items rather than only one, our ideas of them must be distinct, separable, and independent. In this way, the Separability Principle straightforwardly leads from the assumption that causation is a philosophical relation to Hume's claim that 'the effect is totally different from the cause, and consequently can never be discovered in it'.

Hume's assumption that causation is a relation thus implies one of his main claims: that nothing about the effect can be discovered in the cause. As far as I can see, there is only one passage where Hume comes close to defending the assumption that causation is a relation. He writes:

Let us therefore cast our eye on any two objects, which we call cause and effect, and turn them on all sides, in order to find that impression, which produces an idea of such prodigious consequence [as the idea of causation]. At first sight I perceive, that I must not search for it in any of the particular qualities of the objects; since, which-ever of these qualities I pitch on, I find some object, that is not posset of it, and yet falls under the denomination of cause or effect. And indeed there is nothing existent, either externally or internally, which is not to be consider'd either as a cause or an effect; tho' 'tis plain there is no one quality, which universally belongs to all beings, and gives them a title to that denomination. The idea, then, of causation must be deriv'd from some relation among objects; and that relation we must now endeavour to discover. (Treatise I,iii,2, p. 75)

If this is an argument for the claim that causation is a relation, it proceeds as follows. First, it is assumed that causation must be either a quality or a relation. Then it is argued that since we cannot discover a quality that all causes or effects share, causation cannot be a quality. Therefore, Hume concludes, it must be a relation. Every one of these steps is questionable. As for the first, it does not seem to be true that causation can only be a quality or a relation. For instance, causation might also be a process or an event. Further, there are in fact qualities that all empirical objects share, and it is not obviously wrong to suppose that these qualities are somehow related to the fact that all empirical objects are causally related to further empirical objects. There might be ways of construing what Kant says about causality in this way. For now it only matters that Hume's claim, that there are no qualities that all causes share, does not seem obviously true. Finally, Hume infers that causation cannot be a quality from our inability to discover a quality that all causes share. Later, however, he also argues that we cannot discover a relation that holds between all causes and their effects. By parity of reasoning, he should infer from this that causation is also not a relation. However, Hume does not do this. He rather claims that although we cannot discover a causal relation between a single cause and its effect, we can discover such relations by considering not only one but many instances. The same could be said in order to defend the claim that causality is a quality: We may not be able to observe such a quality in a single instance, but we may get to know the causal qualities of things when we get accustomed to dealing with many instances of their kind.
DROWNING

Hume does not provide a convincing argument that if causation is anything at all it must be a relation. This does not imply that causation is not a relation. In order to show this, I will now consider the following instance of a causal process given by Hume:

The idea of sinking is so closely connected with that of water, and the idea of suffocating with that of sinking, that the mind makes the transition without the assistance of the memory. (Treatise I,iii,§, p. 104)

According to Hume, we cannot observe causal connections in one single instance, but given enough experience, we do get to associate effects with their causes. In the present case, we get to associate suffocation with water. Since there is no necessary or conceptual connection between water and suffocation, we cannot discover this connection by merely considering our idea of water. As Hume writes, the first man on earth "could not have inferred from the fluidity and transparency of water that it would suffocate him" (Enquiry IV,i, §23, p. 27). We need experience in order to know that water causes suffocation.

The problem with this is that water, as such, does not actually cause suffocation, any more than its concept implies suffocation. It is simply not true that whenever human beings encounter water, they suffocate. This is not even true in the majority of cases. Humans drink water, step into puddles, water their plants, brush their teeth, and so on, without the slightest danger of suffocation. Hume cannot possibly mean that when we get to know the causal properties of water, we come to associate water with suffocation, for it is wrong to generally associate water with suffocation. Someone who thinks that water in itself causes suffocation does not have a reasonable causal belief, but a serious problem. Water may be a cause of suffocation, but this does not mean that water usually leads to suffocation. The idea of suffocating with that of sinking, that the mind makes the transition without the assistance of the memory.

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A small selection: scrape, push, wet, carry, eat, burn, knock over, keep off, squash, make (e.g. noises, paper boats), burn.20

If I am right, one should not think of any of these as a relation between distinct items. If pushing has the same logical structure as drowning, it is wrong to split it up into distinct stages and then say that the pushing is really only a relation between these stages. Rather, the beginning of a causal process may generally be taken to cause the rest of it, and to represent something as a cause of something else B is to represent A as the beginning of a process of which B typically is a later stage. At the time at which an encounter with water causes suffocation, the drowning of which both the encounter with water and the suffocating are parts is already going on. To separate the encounter with water from the drowning and its later stage, suffocation, is to conceal the fact that it causes suffocation. To bring out this fact is to describe it as a part of an instance of drowning, which leads to suffocation.

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Causation is not a relation because, in order to describe a causal process, one must do more than merely refer to two independently described items and add the information that they are causally related. In the case described by Hume, this is not enough because it is not the case that water, as such, causes suffocation. What causes suffocation is something more specific, which is also conceptually related to suffocation. (It is an encounter with water that impairs respiration for a sufficiently long time.)

This can also be seen by considering deviant causal chains. Suppose someone proposes to define drowning as an event that occurs when a living being first gets wet and then ends up dead. This is obviously not a good definition, and one of the main reasons for this is that many cases that are not instances of drowning also satisfy this description. Someone might get stabbed in a shower. This situation is not improved by inserting a further distinct stage and saying, for instance, that drowning is an event that consists of someone getting wet, then suffocating, and then being dead. Someone might get strangled in a shower, and this is still not an instance of drowning. Such deviant causal chains are possible as long as the items in the sequence are not conceptually related. As long as they are described in independent ways and not as parts of the same larger process, that they happen one after the other might as well constitute something other than an instance of drowning.

I have argued that cause and effect are parts of one process, and that to describe them as cause and effect is to describe them as parts of the same. Gerard Heymans has claimed something very similar. He argues that whenever we discover causal connections between two apparently distinct items, we discover that, in fact, these items are ultimately only 'two different sides of a singular fact'. If this is true and if all things in the universe are somehow causally interrelated, it follows that ultimately all things in the universe are only so many different sides of a singular fact.

CAUSATION AND NECESSITATION

Let me point out some ways in which my argument should not be understood. The problem with Hume’s example is not that an encounter with water does not necessitate suffocation. Necessitation is neither sufficient nor necessary for causation. Even in cases where a particular encounter with water is inevitably followed by suffocation, the first need not be the cause of the second. That is, the problem is not that the relation between water and suffocation is contingent—it is that, in itself, water does not at all cause suffocation. Other factors must be present, and to represent these factors is to represent the encounter with water as (the beginning of) an instance of drowning. Still, the kind of encounter with water that causes suffocation need not at all necessitate suffocation. For instance, someone may be drowning but then be rescued, so that she did not drown after all. In such cases, there will be a cause of suffocation without its effect (i.e., the beginning of an instance of drowning without the typical end of drowning).

In an early paper, Bertrand Russell has argued that the notion of a cause should be given up, and his argument might seem to resemble mine. However, it depends on the assumption that I have just rejected: that causes must necessitate their effects. Russell argues roughly as follows. Cause and effect are either (a) contiguous in space and time or (b) not. They cannot be (a) contiguous in space and time because this would imply that at least one of them must be temporally extended. However, Russell argues, if the cause is temporally extended, then only the very last bit of it can be actually causally relevant, and if the effect is temporally extended, only the very first bit of the effect can result from the cause. This argument is of dubious validity, but I will not be concerned with it here. I am interested in the argument that applies to case (b), where cause and effect are supposed not to be spatiotemporal contiguous. In this case, Russell argues, something might intervene so that there is no necessary connection between cause and effect. From this he infers that there is no causal connection between cause and effect, which contradicts the assumption that they are indeed cause and effect. Russell thus assumes that an event cannot be the cause of suffocation unless it necessitates suffocation. I do not share this assumption. I do not argue that an encounter with water cannot be the cause of suffocation unless it is necessary that suffocation follows upon it. I only argue that to represent an encounter with water as the cause of suffocation is to describe it in terms that are conceptually related to suffocation, that is, as the beginning of a drowning. Since drownings may be interrupted, I do not suppose that an encounter with water that constitutes the beginning of a drowning necessarily leads to suffocation.

R. G. Collingwood has put forward an argument that resembles Russell’s. He argues that an event A only qualifies as the cause of another event B, in a certain sense of ‘cause’, if A leads all the way to B. That is, in order to qualify as a cause of suffocation, an encounter with water would have to lead all the way to an instance of suffocation. Before someone actually suffocates, Collingwood argues, the event in question should not be called a cause of suffocation. Again, my argument does not depend on any such assumption. Something might be a cause of suffocation without actually leading to anyone’s death, for instance, when someone is drowning but is rescued. Still, that the event in question is a cause of suffocation means that it is the beginning of a drowning.

One might object that an interrupted drowning is not a drowning after all, and if no drowning occurs, nothing can be the beginning of a drowning. So it may seem as though the description of an event as the beginning of a drowning can only be true if the drowning is not going to be interrupted, that is, if someone will indeed suffocate. Therefore, if the cause of suffocation is to be the beginning of a drowning, it would have to necessitate suffocation. However, this objection involves the assumption that a process either is a drowning, and then it must lead to suffocation, or it is not a drowning after all, but only an instance of sinking into water so that one would almost have drowned. If this were true, no one could ever be
saved from drowning. Either the person is drowning and therefore nothing will prevent suffocation, or she is not drowning, and then there would be no reason to rescue her. In order to avoid such consequences, we had better assume that someone may be drowning but then not have drowned after all. 25 If we assume this, there may be beginnings of drownings that are not followed by endings of drownings and more generally, causes will not always necessitate their effects.

Note that I also do not suppose that one can only reasonably expect something to happen when this very thing has already started happening. I have argued that the kinds of encounter with water that license the expectation that someone will suffocate are already beginnings of a process of which suffocation typically is a later stage. But of course one may also expect someone to drown before an actual instance of drowning has begun. For instance, someone might be falling off a cliff, and the circumstances might be such that this person will certainly drown. Note, however, that in this case, we may expect the person to drown only because a larger process is already going on, of which drowning is a later stage. Again, our expectation is justified because what we expect is a later stage of some process that is already taking place.

CAUSAL AND CONCEPTUAL CONNECTIONS

I have claimed that an encounter with water that entitles us to expect suffocation, and thus the kind of encounter with water that causes suffocation, must already be the beginning of a process of which suffocation is a typical later stage. This implies that cause and effect must be conceptually related, at least in the sense that the description of a cause as a cause must involve a description of its effect.

Many authors believe that causal connections must be contingent. They take for granted that causes cannot logically imply their effects in the same respect in which they cause them. Moritz Schlick writes, for instance, that the amputation of a limb should not be taken to cause the loss of a limb, because it is the loss of a limb by certain means. 26 He seems to assume that because the concept of amputation already involves the loss of a limb, this cannot any longer be a causal consequence of amputation. Likewise, John L. Mackie writes that the movement of a cricketer's bat should not be said to cause a drive because it is a drive. 27 Again, conceptual relations are thought to preclude causal connections.

The idea that causes and effects must not be conceptually related is often attributed to Hume. Anthony Dardis, for one, writes that 'Hume taught us that causal connections are not necessary connections'. 28 However, what Hume taught us can hardly be that necessary connections cannot also be causal ones. Hume starts by assuming that there should be some necessary connection between cause and effect and fails to find any such connection. Then he suggests that even in the absence of a necessary connection, there may be good reasons to associate causes with effects. This does certainly not imply that if there were a necessary connection, there could be no causal connection. Hume never demonstrates that causal connections cannot be necessary. He only argues that they need not be necessary.

Further, if conceptual connections would preclude causal ones, it would be contradictory to say that the cause of B causes B. For it is a conceptual truth that the cause of B causes B, but by assumption, since the cause of B and B are conceptually related, B cannot actually cause B. This shows that the assumption that causal connections must be contingent is false. Calling the cause of B 'the cause of B' cannot make it so that the cause of B is not any longer the cause of B.

Of course, Dardis does not actually want to claim that once we call the cause of B 'the cause of B', it must cease to be the cause of B. He is concerned with explanatory, not causal, relevance. Obviously, when we are looking for the cause of B, we are not interested in the information that it is 'the cause of B'. We want to know something further about it. To merely say that the cause of B is the cause of B is not to provide a causal explanation. This, however, does not mean that the cause of B is not actually the cause of B. I am here interested in causal, not explanatory, relevance, and although we cannot explain B by merely referring to 'the cause of B', the thing we refer to as 'the cause of B' remains the cause of B.

There is another possible reason for demanding that causal connections preclude conceptual connections. Some accounts of causation start from the basic assumption that something A is a cause of another thing B if B occurs as a consequence of A. If one does not restrict the notion of a consequence so that logical and conceptual consequences are excluded, such accounts may entail that a thing causes everything that it implies. Since A implies A, for instance, it may then seem that everything is a cause of itself. Such consequences can be easily avoided by demanding that conceptual connections do not qualify as causal ones. 29 However, it is important to keep in mind that this restriction is only needed in order to exclude certain cases that do not seem to be cases of causation. If it should turn out that there are instances of causation where causes and effects are inevitably conceptually related, the restriction in question should be given up. For it would then rule out cases that should not be excluded. This means that there is no generally valid principle to the effect that causal connections must be contingent.

Cause and effect are indeed separable in that there need not be a conceptual connection between the description of the cause and the effect. For instance, one may describe an instance of sinking into water so that nothing about suffocation is implied. However, if one does so, one does not describe the sinking in question as a cause of suffocation. Rather, one describes the cause of suffocation as something other than a cause of suffocation. Further, if one describes the sinking as a cause of suffocation, the occurrence of the sinking need not necessitate an occurrence of drowning.
The beginning of a drowning is conceptually related to the typical end of a drowning, but the end of a drowning does not necessarily follow upon its beginning. An instance of drowning may be interrupted and suffocation may be prevented. There is thus no tight and direct logical connection between the cause and the effect. Still, they are conceptually related, because in order to describe them as cause and effect, one must describe them as parts of the same.

Mackie argues that although it is possible to describe causes and effects in a way so that they are conceptually related, this does not imply that causal connections are conceptual connections. ‘What matters’, he writes, ‘is that there are no logically necessary connections between the events themselves, or between any intrinsic descriptions of them, however detailed and complete.’ He is right. It is possible to describe a cause and its effect in a way so that there is no logical connection between the two descriptions. (When one does this, one does not describe them as cause and effect.) Mackie concludes that therefore, the fact that logically related descriptions can be given does not imply that cause and effect themselves are logically related. I agree and add: by the same token, the fact that two conceptually independent descriptions can be given of cause and effect does not prove that they are in fact conceptually independent. Further, since a description of the cause that is conceptually independent of its effect also must conceal the fact that the cause has this effect, I maintain that the description of a cause as cause cannot be conceptually independent of the effect. It must be conceptually related to the effect, not in the sense of making it necessary, but in the sense of describing the cause as the beginning of something that includes the effect as a typical later stage.

CONCLUSION

Hume argues that cause and effect must be separable because causation is a philosophical relation, and no philosophical relation can hold between a thing and this very thing itself, in the same respect. Therefore, cause and effect must be distinct things, and since every two distinct things can be separated, they must be conceptually independent. I do not object to the idea that one may give separate and conceptually independent descriptions of causes and their effects. I also do not deny that causes and effects, thus independently described, may be said to stand in causal relations. However, when we conceptually separate cause and effect, we also conceal the fact that the cause is the cause of the effect, and that the effect is the effect of the cause. These concealed facts, I argue, cannot be brought back in by establishing a contingent relation between the two distinct and separate items. Rather, in order to bring out the fact that one thing causes another thing, one must describe both of them as parts of one process, and thus establish a conceptual relation among them. For instance, one must describe an encounter with water as the beginning of a drowning and suffocation as the end of the same instance of drowning in order to make clear that the first causes the second. When one describes cause and effect in this way, they cease to be seen as independent items. They are only two distinguishable parts of the same.

I conclude that causation is not a relation between two distinct items. It is not a relation because it cannot adequately be described by an expression of the form R(a,b), where a and b are distinct and separate items. If at all, causal processes could be described by expressions of the form R(a,b,c), interpreted as 'a is an early stage of process c, of which b is a later stage'. (More will have to be added, because it is not true that every early stage of a process is a cause of every later stage of this process.) Here, the related items are more than two, and more importantly, they are not distinct. I have pointed out that, at best, causation is a relation similar to Hume's relation of identity: a relation between two stages of the same. We have now seen that these two stages can only be kept apart as two conceptually independent and distinct items by abstracting from the fact that one is the cause of the other. The result is not, as Hume has it, that the effect 'can never be discovered' in the cause. The only reason why the effect cannot be discovered in the cause is that the cause is not described as its cause. Hume's trick is that he still uses the word 'cause' for something that is clearly described as something other than a cause, so that he seems to be making a general point about the relation between a cause and its effect. In fact, his point is only that when we consider causes and effects in complete separation from each other, we cannot see them as causes and effects. Contrary to Hume, I infer from this that causation cannot merely be a relation between separate items.

We should therefore admit that besides causal relations among separable items, there are also causal processes, which are something more than mere relations among distinct things or stages. Within a Humean framework one usually asks: What is the difference between causal relations and noncausal ones? We should still ask this question, but there is now also another question to be answered: What is the difference between causal processes and processes that are not causal?

NOTES

5. Davidson, Essays on Actions and Events, Ch. 7.
Kant is well-known for his transcendental conception of causality. In the Critique of Pure Reason, he famously presents the causal law as an a priori principle of human understanding rather than an empirically discoverable fact about the world. According to this principle, as Kant argues in the "Second Analogy of Experience", every change in nature has a natural cause.1 We can thus know a priori that relations of cause and effect thoroughly determine all events that occur in the world. Discussions of Kant's conception of causality usually focus on this transcendental principle.2 In other parts of his writings, however, Kant's discussion of the possibility of attaining causal knowledge of the world takes a rather different focus. In particular, in the second part of the Critique of Judgment, the Critique of Teleological Judgment, Kant is concerned not with causality as the transcendental conditions of experience in general but with the possibility of causally explaining concrete parts of nature and, more specifically, corporeal nature. Kant phrases this discussion in terms of the mechanical explicability of the natural world, where the mechanism of nature, as he tells us, is the determination of nature 'according to the laws of causality'.3 Kant presents his account of the mechanism of nature in the context of his theory of living beings. Organisms, he suggests, raise a difficulty for any mechanistic account of the world: they do not seem to be amenable to mechanical explanation. Kant concludes in the Critique of Teleological Judgment that we cannot know, but can only assume, that nature is determined mechanically. The principle according to which material nature is thoroughly determined by merely mechanical laws, Kant claims, is a purely regulative and subjective maxim that tells us something about how we must approach nature rather than about the objective character of nature itself.

The combination of these two claims, one developed in the Critique of Pure Reason, the other in the Critique of Judgment, may seem problematic. For how can we know a priori and with apodictic certainty that every

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5. One may define a binary relation \(R(a,b) = R(a,b,c)\). However, this does not show that causation is a relation between two distinct items, since the definition of \(R(a,b)\) still presupposes the notion of a causal process \(c\) of which \(a\) and \(b\) are parts. Here, causation is not a relation but rather one of the related items, namely \(c\).