Taking Up the Cause of Causality

Raam P Gokhale
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A Dialogue Exploring the Basis of Causal Reasoning

“From causes which appear similar we expect similar effects. This is the sum of our experimental conclusions.” – David Hume

“The mechanics of the real cause, the true cause, the only cause – I mean ‘God’ – is beyond human logic and intellect.” – Kedar Joshi

“Necessity is the mother of causation; invention is merely the grandchild” – Raam Gokhale

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**Scene & Players:** At his new apartment in Pune, Ram has invited his friends Kedar and Sushama for a little philosophy. Over tea, they’ve just finished discussing the quotes with which they’ll preface their new dialogue.

**Kedar:** You know it’s bad form to quote yourself.

**Ram:** It’s OK. For the attribution, I’ll use my real name instead of the Indianization I’ve come to use in the dialogues.

**Sushama:** I’ve been meaning to ask you: why is the official spelling ‘R-A-A-M’?

**Ram:** Like any cause we want to manipulate, spelling must be devised to produce the desired effect. In America, ‘R-A-M’ was pronounced like battering ram or random access memory, neither of which was the effect I was going for.

**Kedar:** I like the way your spelling segue-way leads to the subject we’ve come to discuss, especially now that the niceties of the tea are over.

Let’s stick with the analogy. Picking out say smoking as the cause of lung cancer is like isolating the extra ‘a’ in ‘Raam’ as the cause of how your name is pronounced. Just as the cause of a pronunciation is the complete arrangement of letters in the spelling, the peculiarities of a speaker’s larynx as well as the phonetic rules that agents follow, so the real cause of lung cancer includes all the physical factors from environmental pollution to heredity to smoking. But even if you assemble all the physical factors, it’s logically conceivable that lung cancer won’t occur. To make the connection necessary you need an agent with a
purpose and a power and that agent is God. Otherwise you only have coordination not causation.

Sushama: Interesting. It sounds a lot like the medieval Muslim philosopher Al Ghazali who, prefiguring Hume, argued that there is no necessary connection between cause and effect, that in any causal relationship, the transition from cause to effect could be impeded by God. I think his example was how asbestos can stop fire from burning.

Ram: I remember Al Ghazali from my graduate school days. I was always puzzled by his example: asbestos just shows that the necessary connection between fire and burning is more complex than we realized. It requires the absence of asbestos. It doesn’t show there are no necessary connections.

Sushama: I think Al Ghazali’s point was that God could impede any causal chain. If you wear asbestos to keep fire from burning you, God could create some ‘fasbestos’ to burn you in spite of the asbestos.

Ram: Yes, but even in your modified example, God doesn’t really impede causality; he merely creates another instance of it. Another way of stating this is God’s works his ‘miracles’ by means of physical things be it asbestos or ‘fasbestos’. It would be different if he simply suspended the relevant causal connection. That would be a true miracle.

Ultimately, Al Ghazali, no doubt a devout Muslim, thinks God is capable of what I’ve called true miracles. Just his examples suggest that God works within causality instead of turning it on and off like a light switch. He might’ve thought it more majestic of God to work within the causal order he’s created though he’s not bound by it. Still it’s unclear whether Al Ghazali is denying necessary connections in the real world.

Sushama: You have a similar problem in Hume. Whether you consult the Treatise or the Enquiry, Hume only seems to address the epistemological question, saying we don’t observe any necessary connection between cause and effect only constant conjunction. It’s an open question what he thought of the metaphysical question, i.e. whether there exist any necessary connections. Perhaps Hume intended to remain agnostic about this question.

Kedar: That’s the most philosophical position. If we can’t know there are any necessary connections, we have no business asserting or denying them.

Ram: But we should remember: some coordinations are ‘more equal’ than others. The question is how do we distinguish coordinations like gravity which
presumably exist for all time in all places from mere coincidences like hemlines and stock markets. We need a notion of physical necessity. That’s why I said necessity is the mother of causation.

**Kedar:** What’s necessary about physical necessity? The only necessity is logical necessity, like the law of excluded middle for example. It’s necessary because its negation is inconceivable. The same could not be said about gravity.

**Sushama:** I think Ram is saying we have two sources when we look for necessity in the real world: logical necessity and physical necessity. If we use Lewis’s possible world terminology, logical necessity dictates what obtains in all possible worlds and physical necessity dictates what obtains in an appropriately-sized neighborhood of the actual world, the size depending on how strong is the connection between the particular cause and effect under consideration.

**Ram:** I am glad you brought up the notion of a strong or not so strong connection between cause and effect. This is clearly how we think and speak about these things. Common sense supports that there are gradations of necessity, not black and white as Kedar would have it—logical necessity and no necessity.

**Kedar:** I think common sense is a common muddle—for example, it also supports the law of excluded middle applying to necessity: things are either necessary or they aren’t—there are no gradations.

And this possible worlds talk which sanctions gradations is just a complicated muddle. If gravity is necessary because it obtains in all ‘close’ possible worlds, we as philosophers have to ask who has ordered the entire array of possible worlds in this manner. Your only answer is that they are that way. But regularities have to be explained. Order suggests an order-er, or God who is the ultimate cause—really the only cause in what is otherwise an inert world.

**Sushama:** Interesting. The pendulum swings between teleological and mechanistic explanations of change are as old as the Greeks with Plato and Aristotle favoring the former while preSocratics like the atomists had favored the latter. Each typically have their own pet examples, teleological theorists regarding an acorn becoming a tree as exemplar of change, mechanical theorists asking us to visualize billiard-ball-like collisions. Each typically has trouble with the other’s example, for example, Aristotle’s notion of a natural place or end for material objects for an explanation of gravity seems quite tortured today.

Your view uses the Humean point about the unobservability of necessary connections to support a teleological explanation about even billiard balls, the traditional stronghold of mechanistic explanations. Being up-to-date with
developments in physics, you probably visualize billiard-ball-like atoms being involved even in the acorn-tree type examples—just that without God arranging all coordinations be they acorn-tree or billiard balls, you don’t believe we have a true explanation of either type of cause. I find your view interesting for that reason alone.

Ram: Yes, madmen are interesting…

Kedar (donning a mad look): Whatever do you mean?

Ram: I was just thinking of what Hamlet says to let the audience know he’s not really mad: "I am but mad north-northwest: when the wind is southerly I know a hawk from a handsaw."

Being able to distinguish things, be they hawks and handsaws or for that matter fire and ice is an essential feature of sanity. Kedar, if he’s serious about all physical things lacking any causal powers, doesn’t know the difference between even fire and ice, since it is in virtue of causal powers that we tell them apart. In general for any two things we know they are different in virtue of the difference they make to us, i.e. in virtue of their causal powers. If you deny that things have causal powers, they are not in themselves different. Our Hamlet here doesn’t know the difference between a hawk and a handsaw.

Kedar: As usual your reductio doesn’t work. I can deny causal powers to fire and ice but still hold that very different events are coordinated with them though uncaused by them. That’s how I can distinguish between your hawk and handsaw.

But I should point out, I don’t accept that the indistinguishibility is absurd. Echoing Kant, I would say we don’t know what things are in themselves; they may in fact be the same stuff, differing perhaps in quantity not quality. And numerical differences alone don’t imply causal powers.

Leaving out the part about God, my views are quite consonant with physicists like Bohm who also compare the universe to a video game: what you see as causation is merely coordination prearranged by the programmer of the game. Einstein’s EPR argument also supports the same conclusion, though he didn’t take it as far as I do. If I’m mad I’m in good company—present company included by the way, since you have to be a little mad to be a philosopher.

Sushama: Thank you for the backhanded compliment but on a historical note I feel obliged to point out Kant’s Ding an sich seems more motivated by a Berkeleyian skepticism about our inability to get beyond experience. Your ‘same
stuff’—you really need a catchier, more Germanic phrase—can also be motivated as Ram pointed out by your Humean agnosticism about necessary connections. If there’s no necessary connection between fire and burning or fire and illumination, we don’t know what fire is in itself. It’s interesting to see that both roads—Berkeley and Hume—lead to the same destination.

**Kedar:** FYI, my own *ding an sich* is also motivated by our inability to get beyond experience. But if Hume gets you there too, more power to Hume. All roads eventually lead to the truth if you take them far enough.

**Ram:** It would be weird if all roads led to this ‘Rome’. Sushama, earlier you were saying Indian philosophy has a strain that is skeptical about causation. What road does it take?

**Sushama:** There is considerable Buddhist literature about causation. For example, Nagarjuna writing around 200 AD is skeptical about causation for reasons reminiscent of Parmenides. He says: a thing can originate neither out of itself nor out of a not-self nor out of both nor out of neither.

If the effect is already existent in its cause, it is already an existing fact requiring no further production; if the effect does not exist in its cause, nothing can produce it, for nothing can produce a hare’s horn or a barren woman’s son. And if a thing cannot arise out of itself, how can it arise out of not-self? Again, to say that a thing can arise out of itself and not-self is to maintain that light and darkness can remain together. And certainly nothing can arise at random and be uncaused. So Nagarjuna’s view is described as non-origination, which perhaps sounds even more radical than Kedar’s view.

But there are other strains in Indian philosophy like the effect preexisting in the cause held by the Mimansa, Sankhya and Advaita Vedanta schools. This is in contrast to the view that an effect does not preexist in the cause—it is a new beginning—which is held by the Charvaka and Nyaya-vaisheshika schools...

**Kedar:** Enough history. Earlier I Googled ‘causation’ and the only remotely philosophical entry I got was a Stanford Encyclopedia of Philosophy article about probabilistic causation. Did you see it Ram? Is Google championing a particular philosophical position?

**Ram:** I think Google is a work in progress. When I first Googled ‘causation’, only the probabilistic causation article appeared. But yesterday, a whole slew of other articles appeared, almost like Google could tell my interest was more than a passing one. Still Google may be recommending the probabilistic causation as
the most clickable article. After all, it cites people like Clark Glymour, the notable
philosopher of science, as commentator/contributer.

**Sushama:** What did the most clickable article say?

**Kedar:** The central idea of the article was that causes increase the probability of
their effects. While this sounds initially plausible, the example they gave was
unfortunate. It was the example I gave at the beginning of our discussion, that
smoking causes lung cancer. There are no probabilities in this. If we knew all the
factors that determined that a smoker would develop lung cancer, the total cause
would be a sufficient condition for the effect. They should’ve given an example
from quantum mechanics, though there too I believe probabilities only reflect our
ignorance about all the factors. If all the factors were known, the effect would be
logically entailed by them.

**Ram:** Kedar brings up an excellent point. When analyzing the metaphysics of
causation we should distinguish between probabilities which reflect our
uncertainty and those which reflect a genuine random element in nature as
quantum mechanics maintains.

As an aside, we should perhaps call QM’s uncertainty principle, the
indeterminancy principle. This is because according to the standard
interpretation of QM, the probabilities of finding an electron at particular
positions given certain momentums don’t reflect our ignorance or uncertainty
about its location; the probabilities are metaphysical in that all the knowledge in
the world won’t give you a precise location; in fact the electron has no precise
location; it’s not merely uncertain—it is indeterminate.

That aside, in defining causation, we should not use probability in the sense of
subjective uncertainty. This is because in doing philosophy our actual
knowledge or lack of it isn’t a constraint, for look at how far the Greeks, Moslems
and Indians got.

**Sushama:** OK, I won’t let my ignorance affect my ability to do philosophy.
Where does that lead us?

**Ram:** To the correct account of causation, of course. My account—I say my
account though it seems so straightforward others must’ve thought of it—is
motivated by the observation that any causal reasoning, or inductive reasoning
for that matter, can be made deductive by adding appropriate implicit premises.
No doubt it needs to be cleaned up a little, but let me explain it in broad outline.
Let’s first consider an example of deterministic causation, that a struck match
will light.
We can make the argument deductive by adding initial conditions such as the match isn’t wet, it’s not coated with asbestos, there is sufficient oxygen, etc. and lastly we would stipulate a law such as ‘under these conditions, a match will light’.

In this sense, every determined effect has a total cause in Kedar’s sense of being a sufficient condition for the effect, the sufficient condition being a conjunct of all true initial conditions, laws of nature and subsidiary laws necessary to logically entail the effect. Yes I said entail, Kedar—I’ll have more to say about the distinction between logical necessity and physical necessity later.

Now any of the initial conditions maybe identified as the cause of the effect, which conjunct is chosen depending on pragmatic considerations like which occurred last, which was subject to experimenter control, which was a surprise, etc. The cause will then be a necessary condition within that sufficient condition which is the effect’s total cause.

Note: there may be other jointly-sufficient conditions which entail the same effect. The real total cause is picked out by which one’s initial conditions are true and are spatio-temporally contiguous with the effect.

On this analysis, smoking is a cause of lung cancer not because it increases its probability but because it is a subset of the initial conditions of one sufficient condition for getting lung cancer. Smoking raises the probability of lung cancer but identifying that fact as the criterion of the causal link damns the degree of necessity involved by faint praise. This is because given the appropriate hidden premises the argument from smoking to lung cancer can be made deductive if the effect is determinate.

**Sushama**: Of course, the effect may not be determinate.

**Ram**: Sure. In that case, the increase in probability observation captures the right idea. That’s the only other alternative if you’re committed to the cause making some difference to the truth-value of the effect. I would just say the initial conditions and laws entail that the probability of the effect is higher than without the cause. This is consistent with our account of deterministic causation: we may say the effect always follows the total cause, just that in this case the effect is a higher probability. This gives a clearer exposition of what is meant by probability-raising.

**Kedar**: Interesting account. I think it addresses all the usual difficulties of regularity theorists such as asymmetry and spurious causation and it seems less ad hoc than the probability theorists’ answer to the probability lowering cases.
Sushama: Hold on. Presumably this is from the probabilistic causation article which I have yet to read. Someone will have to bring me up to speed on asymmetry, spurious causation and probability lowering cases.

Ram: Sure. Regularity theorists have to be able to deal with the fact that if causes and effects are simple correlations, why don’t we regard effects as causes and vice versa. Regularity theorists typically stipulate that causes precede their effects temporally. But it’s desirable to have some explanation of this rather than merely stipulate it. Probability theorists have an explanation which I won’t go into. But I think my account explains the asymmetry better: causality is asymmetrical because laws of nature typically distinguish between antecedent conditions and consequent conditions.

And spurious causation is when regularities are explained by a common cause. The standard example is the drop in the mercury column in a barometer is not a cause of a storm though it may be perfectly correlated with that. My account rules out such cases since there is no law of nature with barometer mercury dropping as an initial condition and a storm as the effect entailed—though that the two are correlated is a true statement. This is considerably simpler than the ‘screening-off’ approach that Reichenbach has suggested.

In both cases, regularity theorists have problems that probabilistic theories of causation solve. I just think my account solves them better.

Sushama: What about probability lowering cases? Can a cause actually lower the probability of its effect?

Ram: As unlikely as that sounds, an example can be given. For example, suppose it’s Thanksgiving and you’re either going to your paternal grandmother’s house for turkey or maternal. The probability of catching a cold from the relatives at your paternal grandma’s house is .8. At your maternal, it’s .9. If your going to either is 50/50, then the prior probability of your getting sick was .85 which is higher than the .8 probability of getting sick if you go to your paternal grandma’s house. But if you go to your paternal grandma’s house and get sick, we would certainly say that going there made you sick even though it lowered the probability.

Probabilistic causation theorists would say that the probability of getting sick increased (from .8 to .85) along one of the routes connecting the two events. But I would say this talk of routes is highly suggestive of our account of total cause as a sufficient condition among possibly other sufficient conditions. Why not stick with an account that jibes with our intuition that causal reasoning could be made deductive with the addition of implicit premises?
Kedar: I would agree with your account, only substituting something like the program of the universe for laws of nature. The program idea makes it clear that the ultimate source of necessity is the Programmer who has made the program or the laws what they are.

But I must say I’m surprised at your account, since earlier you made the dubious distinction between physical necessity and logical necessity. Now you’re saying the total cause entails the effect. Are you admitting that if something is logically unnecessary it is physically unnecessary?

Ram: Not at all. Physical necessity—like an apple falling when released close to the earth—means ’entailed by the laws of the actual universe’. Logical necessity means ‘entailed in all possible universes’—like 2+2=4.

Sushama: I get the distinction but wouldn’t Kedar be right to point out that the necessity in both cases is due to logical entailment?

Ram: That an apple will fall is not a logical truth as is 2+2=4. That it is entailed by the law of gravity is a logical truth. In general a cause and effect relation entailed by laws of nature is physically necessary though logically unnecessary because the laws themselves are logically unnecessary. What is logically necessary is that the logically unnecessary laws entail the cause and effect relationship. What makes their consequences physically necessary is that the laws obtain in our universe for all time.

Sushama: On your view things are either logically necessary or physically necessary or not necessary in either sense. I think Kedar would say that there is nothing which is neither entailed by the laws of logic nor the laws of the universe; it’s a determinate world on his view—it just sometimes appears to have a random element because we’re ignorant of all the factors.

But necessity needs something which is not necessary to be distinguished from. If as Kedar would have it, there is no metaphysical randomness, isn’t there only the logically necessary and the unnecessary?

Ram: I think any theory of causation should allow for the possibility of randomness existing in the real world, especially since our best theories to date seem to assert it. Once you recognize that there is the logically necessary and the possibly random, you have to allow that there are things which are necessary in the sense that the laws of nature entail them. They are necessary because the laws of nature can’t be changed.
**Kedar:** The laws or the program can be changed. Because we may be unable to change them, they may remain the same for all time. That doesn’t make them necessary however.

**Ram:** Even if laws of nature can be changed, it would’ve been a law of nature all along that it could’ve been changed in that way. Then that truth would be physically necessary. The possibility of changing a particular law of nature doesn’t remove all traces of physical necessity; it just creates an alternative instance of it. It’s just like Al Ghazali’s asbestos.

**Kedar:** That’s where the program idea is most suggestive. The programmer can effect changes without some asbestos or fasbestos—he can merely change the code. The struck match may not light even if you put in the kitchen sink full of initial conditions and laws as premises.

**Ram:** You’re forgetting I can add as a premise that the laws of nature are not now being changed by the programmer. Then striking causes the match to light because it is a necessary component of a particular way of lighting it, the way being a deductively sufficient condition for lighting it.

**Sushama:** Hold on. I’m still unclear about the source or force of the physical necessity. Is it ultimately due to logical necessity?

**Ram:** Our formulations of the laws of nature are justified by the fact that they entail the cause and effect relationships we accept as necessary. So the cause and effect relationships are necessary in a more primary sense as far as we’re concerned.

The situation is analogous with legal laws. Murder is not wrong because the laws say so or entail it. Rather the laws are formulated to express our feeling that murder is wrong. Once the laws are formulated we can speak of a difference between the legally wrong—which means entailed by the legal laws—and the morally wrong. Just so we can speak of the logical necessity of the laws of nature entailing a cause and effect relationship and the physical necessity of the causal relationship itself which is mirrored in the logical relationship but is not identical to it.

**Sushama:** Interesting analogy, but there is one crucial difference: when legal laws forbid something there is a penalty for transgression; when laws of nature forbid something there is no possibility of transgression. I think you made this observation on the Pune Journal of Philosophy facebook page. If I may quote: “The laws of nature require no enforcement agent. There’s no cop waiting to give you a speeding ticket if you go faster than the speed of light.” I love that one.
Paradoxically, necessity reveals itself just where it isn’t absolute, in the person of the cop for example. Where it is absolute, we’re left only with constant conjunction.

**Ram:** Wouldn’t it be funny if in all instances of causation, we saw a little phantom policeman connecting the cause and effect. Hmm…that suggests another argument against Hume. Hume points out that we observe no necessary connection between cause and effect only constant conjunction, but what would it be to observe a necessary connection?

To take it more seriously than the phantom policeman, imagine that we see a blue light between cause and effect which is supposed to be the necessity we observe. Why shouldn’t we consider the light another effect of the cause, requiring an additional blue light and so on ad infinitum? If necessity is something that can be observed, it would be another effect of the cause requiring another observation of necessity. This shows that the demand to see a necessary connection between cause and effect is misguided.

Nature doesn’t need to show us that cause and effect are necessarily connected, or rather it does show it in the most parsimonious way possible: by having the effect invariably follow the total cause in the case of deterministic causation and the probability of the effect invariably increasing following the total cause in the case of probabilistic causation.

**Kedar:** Cute. It must feel nice to have framed your own infinite regress argument. But if we saw a blue light in all cases of causation, we wouldn’t think it was an effect of any particular cause so an regress needn’t commence. Observing it in general, we could take it as an indication of necessity so the demand to see a necessary connection is not misguided.

**Sushama:** Oh come on, Kedar…this is as good an infinite regress argument as any. Personally, from Plato’s Third Man argument onward, I’ve never found such arguments very persuasive. But Ram only needs to show the demand to see necessary connections itself isn’t necessary and this, given his ‘parsimoniousness of nature’ point, I think he’s adequately done—at all, parsimony weighs against even one flash of light.

**Kedar:** Hume’s point still stands. We either observe necessity or we intuit it. Your infinite regress argument may show we shouldn’t expect to observe it. That leaves only intuition. Hume would say if we search our intuition, we would only find two sources of necessity: logic and the cumulative weight of experience or habit; and since the connection between cause and effect cannot be logical, the necessity we feel must be due to the force of habit.
Ram and I agree that the connection between total cause and its effect is logical. Ram says the logic is chosen to mirror an inanimate metaphysical necessity—i.e. ‘things’ have powers. I would say it reflects the intentions of the programmer. The difference is on Ram’s view it’s a total mystery how things have causal powers. Since on my view it is only the agents that have powers—even we may have the power to write the code someday—, there is no such mystery.

**Ram:** There is a mysterious aspect of your view: how is it that the code, or language, affects reality rather than merely mirror it.

**Kedar:** The code doesn’t affect reality it is the reality. The rest is mere appearance.

**Ram:** OK, I’ll stick with your game analogy. The code by itself is powerless without the hardware. Things do have powers if only to produce what you call appearances.

Moreover on your view there is the added mystery of how non-material agents can affect material things. This has traditionally been a problem for dualist philosophers of mind but I don’t see how for you it’s not a problem for God.

**Kedar:** Well I said at the outset, God is beyond human logic or intellect.

(Silence)

**Sushama:** After our ‘Are We Three?’ philosophy of mind dialogue, I think I can intuit when you two have reached an impasse. I say let’s get back to the account of causation Ram developed.

A lot hinges on the laws of nature which are the hidden premises in the deductive argument. Aren’t laws of nature themselves a subject for extended philosophical discussion and therefore shouldn’t be presumed in developing an account of causation?

**Ram:** You’re right to point out that laws of nature generate their own philosophical controversies. But clearly such laws should play a role in any account of causation—don’t we think they do? In fact I think it’s a lacuna of the probabilistic theory of causation that it doesn’t directly refer to them. Moreover, Kedar and I haven’t really left you hanging: we deal with laws of nature extensively in our ‘Just-if-ication’ dialogue which you can look up when you get home.

**Kedar:** And don’t forget: that dialogue also deals with the issue of a justification for induction which is another huge topic. That’s the problem with philosophy:
very few problems are standalone. I know when Ram and I argue it’s often a tangled mess of related issues. I swear, we’ve talked necessity to death from the first dialogue, ‘Slumdog Philosopher’ onward.

**Ram:** Yes Sushama, you’ve formed a necessary buffer between us for this our causation conversation. I may say you—as are we all—necessary and jointly sufficient conditions for this conversation to turn into ‘dialogue’. So much for causes—we just seem to be missing the law of nature.

**Kedar:** No we have a law of nature: three philosophers can’t get together for tea without writing a dialogue.

(They laugh and leave off philosophy for the remaining duration.)