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## How True is Causal Closure?

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Abstract:

Within the study of philosophy of mind, a principle known as causal closure has been a controversial topic for many years. Causal closure is used to describe the nature of causality within our universe and the principle goes as follows: “all physical things can have only physical causes.” What this means is that our universe exists as a closed causal system where things of the physical nature such as atoms can only be influenced causally by other physical things. If this principle is to be believed, then any type of explanation that is not based in causal explanation cannot be used when describing the explanatory story of anything. Thus, explanations such as purposeful ones become impossible.

In this paper, I analyze the principle of causal closure and its application in materialist theory. More specifically, I seek to demonstrate causal closure’s importance to some materialist arguments and then show why the principle is being misappropriated. By the end of this paper, I seek to display the fundamental flaws in materialist justifications for causal closure while also advocating for the feasibility of purposeful explanation.

# How True is Causal Closure?

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## **Introduction**

Materialism is a school of thought that has become increasingly popular in philosophy over the last half-century. This popularity seems to be in part due to supporters' belief that the truth of materialism is backed by what we have learned from science. To them, science has made it evident that we are purely material beings. To put it simply, materialists believe that human beings are nothing more than a conglomeration of atoms that interact with other atoms. There is no immaterial mind that acts for purposes, but rather a brain that reacts to external stimuli and produces outputs. Even if a materialist philosopher does believe that the mind exists, he would not be able to conceive of it doing any explanatory work. If pressured to elaborate on why this is the case, many, if not most, would fall back on the principle that I will be focusing on in this paper: causal closure. In this paper, I seek to show the importance of causal closure to materialist theory. I will then try to tease out what is true about causal closure while advocating that the principle is being inappropriately used by materialists.

## **The Causal Closure Principle**

Before moving on, it is of utmost importance to set the parameters of this paper by defining just what I mean when I say, "causal closure." Jaegwon Kim defines the principle as: "all physical states have pure physical causes" (Kim 1993, 280). Let us now look at just what this means. Causality lies at the heart of this principle, meaning that the principle is concerned with what kinds of interactions make things happen (or in other words, do causal work). An example of an interaction would be a child hitting a baseball through a window. If we are to describe the causative story that outlines this interaction, it might go as such: the child caused the bat to

move, which caused the ball to go airborne, which in turn caused the window to be broken when the ball impacted it. Thus, the child caused the window to break.

Things begin to get more complicated if we are to further analyze this story. We would see that this causal story can be reduced even further. Instead of simply saying that the child caused the bat to move, we could instead say that nervous impulses sent from his brain caused his muscles to move, which in turn caused the bat to be swung. As we reduce things further, we will eventually be confronted with one of the most controversial topics in philosophy: the mind. Does a mind have any explanatory role in the story of the child swinging the bat? Most people would likely respond yes. It is quite easy for us to affirm that the child's mind influenced the body to swing the bat for the purpose of hitting the baseball. This is the way we typically describe how we do things. If we ask people why they picked bananas over apples at the local grocery, it is likely most would give a purposeful explanation for why they did so. They picked the bananas for the purpose of completing a recipe or for satiating hunger. However, materialists call these purposeful explanations into question. For example, instead of saying that the child swung the bat for a reason, they would instead try to reduce the explanation of the event down to a series of purely non-purposeful physical causes. This takes purpose and the mind out of the explanatory story and replaces it with a longer and more intricate line of physical causation. Instead of saying that the child swung the bat for the purpose of hitting the ball, materialists would assert that the brain and its communication with the nervous system can be explained by the firing of neurons, which in turn can be explained by cellular functions, which can be explained by the interactions of atoms, which can then be explained by the spinning of quarks. We see here that purpose is entirely removed from the explanation and is replaced with the pure physical interactions to which Kim was referring.

Here lies a major divide in the philosophy of mind. Those who support the view initially expressed have put forward a story where the mind has an essential role in the explanation of physical events. This implies that the causal story of the child hitting the ball originated with a purposeful explanation which is teleological and noncausal in nature. We see here that purposes are doing explanatory work because they can influence the mind that will then cause a brain event which in turn will cause reactions in the nervous system, culminating in the swinging of the bat. Therefore, the story of the child swinging the bat has instances of mental-to-mental causation (the child intends to swing the bat for a purpose), mental-to-physical causation (the mind causing brain events), physical-to-physical causation (the brain causing reactions in the nervous system), and physical-to-mental causation (the body communicating to the mind the dimensions of the ball and its location).

Many of those who endorse the materialist view would appeal to the principle of causal closure. This is because they believe physical events involving muscles and the brain can only have physical causes. Consequently, even if there is a mind with purposes for acting, it cannot do any explanatory work. Contrary to initial appearances, this would mean that the story of the child and the window describes events involving only physical-to-physical causation. There is no purpose in the swinging of the bat; the entire event is completely explained by atoms moving in specific ways, causing an exponentially large number of physical interactions to occur, resulting in the occurrence of anatomical mechanisms that make the body swing the bat. The atoms of the bat then connect with the atoms of the ball, transferring the kinetic energy necessary to give the ball enough lift and force to impact and break the window. Here, we see what a causally closed universe looks like. Causal explanations have been limited to physical-to-physical interactions. Since the universe is causally closed, these purely physical causes account for the entire

explanatory story, excluding any nonphysical explanation. The machinations within our heads are no different than the bat hitting that ball, in that they are both governed solely by the physical laws of the universe.

### **Causal Closure in Materialist Theory**

Now that I have defined the issue of the relationship between causal closure and purposes, I will move on to analyzing causal closure's essential role in materialist thought. I contend that, at the very least, many materialists will need to invoke the principle of causal closure in order to explain their reasoning for a purely physical universe. I will analyze Alex Rosenberg's reasoning in *The Atheist's Guide to Reality* to represent what I consider a common and well thought out materialist argument. Through the analysis of his argument, I hope to establish the importance of causal closure to the materialist dogma.

In *The Atheist's Guide to Reality*, Rosenberg argues for not only the reliability of science but also its claim to be the only source of true explanation. He believes that science is the only method by which we can accurately understand the explanatory story of an event and that all sciences are ultimately based on the laws of physics. According to Rosenberg, "when finished, it [physics] will leave nothing out as unexplained from physical first principles (besides those principles themselves)" (Rosenberg 2011, 24). In other words, if we understand physics in its entirety then we will understand the entire story of how all reality works. Rosenberg maintains that all events in the universe are completely material in nature and that physics completely excludes purposeful explanations from physical events. As a consequence of this, my striking of the keys right now is for no purpose. Instead, my typing is just the result of neurons firing in specific ways that communicate with the muscles in my fingers. These neurons are made of

atomic compounds that can be reduced all the way down to the base molecules that run the universe. These molecules and everything involving them are explained by the laws of physics.

Such a fact clashes with what we observe on a day-to-day basis. Many people would respond to Rosenberg and say that they do act for purposes. Such persons would likely say something along the lines of: “But when I type something on my computer, I do so with the purpose of writing a story or arguing a point. This purpose has to have *something* to do with why I strike some keys over others.” If pressured to provide an account for why they believe this, they would likely get to an answer that resembles “Well because of my awareness of the purpose for which I write, and the fact that my fingers move as I intend to fulfill this purpose.” What this means is that we introspectively observe the fact that we act for purposes. It is important to note that there is a fundamental difference in thinking for purposes and acting for them. Typically, when we purposefully intend to move our bodies, they move in accordance with these purposes. When I strike these keys, the belief that I do so for a purpose comes from what I observe about myself while I type. I intend to type a sentence that has a certain meaning (the purpose), and my body moves in a way consistent with that intent (the bodily response). If I intended to type these words and I instead made a sandwich, I may notice that I think purposefully but these purposes do not explain our actions. Hence, what justifies the belief in purpose is the inescapable introspective experience a person has every day. For what reason should humans distrust this experience?

Rosenberg address this question by attempting to invalidate our own introspective awareness with experiments that draw upon observations of the processes in our brain. His reasoning for this is derived from the scientific findings of these tests. He believes these findings show that our introspective beliefs and observations are unreliable in that they do not accurately

describe the way things are. He uses the examples of vision and willpower to support this argument. Take for instance the visual experience of color. Rosenberg cites an experiment in which people exhibited blindsight to color in order to help discredit our visual experiences. Researchers would ask a test subject who had lost his primary visual cortex to identify a particular colorful object. This colored object would be mixed in with other differently colored things. We would reasonably assume that this man would be unable to correctly identify the colored object, but instead the opposite was observed. It turned out that the subject was able to choose the correct object with startling levels of accuracy. This indicated that despite the fact the patient could not consciously experience color, he could still somehow identify it. The patient even believed that he was just guessing the whole time. This indicates that the patient's experience of a lack of color was inaccurate. The patient was mistaken in believing that he could not perceive the distinct colors of the objects, as he somehow had a nonconscious awareness of these colors. Rosenberg uses this example to indicate that even our most relied upon introspective experiences cannot be trusted: "after all, what could have been more introspectively obvious than the notion that you need to have conscious experiences of colors to see colors" (Rosenberg 2011, 151). According to Rosenberg, there seems to be a distinction between the experience of color and the external visualization of it. This is because we can see color even if we do not have a conscious experience of it as long as the correct biological functions are occurring. What this means is that when we conventionally "see" color, there is an external visual component to the experience (the color in the object) and an introspective experience that gives us some understanding of what we are seeing.

In a similar way, Rosenberg tries to discredit our understanding of willpower with another scientific experiment. He cites an experiment conducted by Benjamin Libet to elucidate

how science has proven that our willpower does not initiate our actions. In this experiment, Libet and fellow researchers monitored brain and muscle nerve activity of test subjects who were given a task. These test subjects were asked to push a button or flex their wrist at a time of their choosing within a certain time frame. The scientists would then collect the data and ask when the subjects made the conscious decision to push the button or flex their wrists. It was observed that the cortical processes supposedly responsible for wrist flexing occurred 300 milliseconds before the subjects reported an awareness of willing the wrist to flex. Libet concluded that our belief that free and purposeful willing ultimately explains our bodily movements is wrong since the causes of the action's motor processes occur before conscious willing does. Rosenberg uses this as further evidence that our conceptions about the inner workings of our mind are questionable. In his own words: "the results pull the rug out from under introspection as a source of much knowledge about choice. They completely undercut the evidence introspective experience might give us for free choice" (Rosenberg 2011, 153). From this, it is clear that Rosenberg believes that these scientific observations additionally challenge the reliability of our introspective reports.

Through these examples, Rosenberg attempts to make his case against introspective experience and the fact that we freely choose for purposes. Put simply, his argument goes as such: Science shows us that our beliefs derived from introspection are flawed and inaccurate, or at the very least are unreliable ways of acquiring knowledge. We observe that we act for purposes through introspection. Therefore, our belief that we act for purposes is suspect. According to Rosenberg the only reason that we have the illusion of purpose is because of cognitive adaptations that were advantageous to survival. This is evidence of the fact that Rosenberg's true target is purpose. Invalidating introspection is his way of progressing to a point where he can use both experiments to prove to the reader why he or she does not act in

purposeful ways. To him, what these experiments have in common is that fact that they invalidate introspection. While the Libet experiment addresses purpose more directly, the color experiment's contribution against introspection is ultimately aimed at purpose. Its disproving of our introspective notions about ourselves is used in turn to provide a reason to distrust our belief that we act purposefully. Thus, we see that his arguments against introspection, while important, are the bridge that eventually allows him to target purposeful explanation and how we interact with the world.

Before delving into my responses to Rosenberg, I would like to set the parameters of this discussion. I will grant to Rosenberg that all the physical events in the scientific experiments presented in his argument are accurately described. Each and every description of the physical processes outlined in his discussion of how our brains work is accurate. Despite this, I contend that purpose can still reasonably be said to do explanatory work.

I believe that Rosenberg's argument against introspective belief is self-refuting. It is important to note that his argument is entirely based on the accuracy of science. If for any reason the correct practice of science yields results that are inaccurate descriptions of how the world actually works, then Rosenberg's claims lose their foundation. With this being said, how will we now define the standard of accuracy? Luckily for us, Rosenberg gives us the guidelines with which to work, saying that "Because Physics is so accurate, the methods that produced the description must be equally reliable." (Rosenberg 2011, 24). We have our standard: physics and the methods (defined as the experiments done by scientists) that we use to discover its laws must be accurate. This means that we must now analyze scientific methods since they are the practice we use to discover physical laws.

Here is where Rosenberg's argument hits its first roadblock. These methods rely on experience and commonsense introspection. If the experience of color is a part of the process of conventionally seeing color, then it seems that we draw conclusions about the external world through internal experiences of it. To illustrate this idea, let us examine its role in conducting a litmus test. For those who may not know, a litmus test is a colored piece of paper that might change colors depending on the acidity or basicity of said solution. Red litmus paper will turn blue if a solution is basic and vice versa. Now, imagine you must manage a science lab. You cannot do any of the tests yourself, so you must hire staff. One position that must be filled is the litmus test station, where a worker must test solutions given to him and note their acidity or basicity. Would you hire someone who has had his or her prefrontal visual cortex removed? This is not to be ableist, but rather it is to demonstrate that it seems to me that not even Rosenberg would respond 'yes' to such a question. Why is this? The answer seems to be common sense. To start, the man tested in the blindsight experiment was accurate but not one hundred percent precise. Our conceptions of color are constantly correct as long as there are no limiting factors (such as disease, obstructing objects, etc.). His lack of complete certainty hurts his observational credibility. Also, the man with blindsight was never sure what he was choosing. He was fully under the conception that he was unable to determine the difference between colors. Even if you told him about his blindsight, he could never be entirely sure about the color he was selecting.

Thus, it seems to me that our internal experience of color during the litmus test is what gives us the evidence to come to the commonsense conclusion that whatever chemical being studied is either basic or acidic. Rosenberg himself cannot escape acknowledging common sense's role in science, saying that "science is just common sense continually improving on itself" (Rosenberg 2011, 167). If we accept Rosenberg's argument that common sense and

introspection are flawed, then the “methods that produced the description” must be called into question. If the scientific method is just the continual improvement of common sense, and our commonsense observations are flawed, then how can we say that our scientific observations are accurate? If we use common sense to reach conclusions about the results of scientific experimentation, then commonsense observation becomes a part of the methods. It follows then that if commonsense observations are not to be trusted, then neither is science, as we would have no confidence in the methodology that allows us to reach the conclusion in the first place. If I cannot trust my commonsense conclusion that normally red litmus paper is exhibiting a blue color after being put into a solution, then how can I come to any conclusion about the solution’s nature? How can I truly be certain of any commonsense conclusion that stems from how I introspectively interpret the outside world? As basic as the skills of conceptually interpreting sizes, shapes and colors may be, they seem essential to conducting any experiment. This makes Rosenberg’s argument about science being the only medium for discovering explanatory truth clash with his claim that humans’ commonsense introspection is unreliable. If we are to take the latter claim seriously, then how can we have any confidence in the descriptions that are spawned from scientific methodology?

The issue of introspective experience’s relationship to science does not stop here for Rosenberg. It also creates issues in his interpretations of the color tests and Libet experiment. What did both tests have in common? There may be more than one answer to this question, but I will be focusing on the fact that both tests used the communicated reports of introspective experience as accurate data. The color experiment relied on the reports of how its subject failed to experience the color of the items he was choosing and the Libet experiment relied on the testimony given by its subjects about when they introspectively observed that they decided to

push the button and flex their wrists. This is a huge problem for Rosenberg if he wants to use these experiments to disprove the accuracy of human introspection and our commonsense conclusions that are derived from it. If both experiments show the inaccuracy of human experience, then how can we trust the testimony that the test subjects gave? How can the researchers be truly sure that the information they received from their subjects is accurate to the standard that Rosenberg himself sets? Here we see how the methods that produced the description that Rosenberg uses would be flawed if we take his conclusion to be true. We once again run into the same logical roadblock. If the belief about the introspection that gives us our commonsense observations is flawed, and said introspection is essential to a scientific process, then how can we trust the process? As a result, if we trust Rosenberg's philosophical conclusions about these two experiments, then we are now unable to trust the results of either. These results would mean that our reports of what we notice about the goings on within our own bodies are not to be trusted, as they are inaccurate. Since these reports were the basis for scientifically describing a test subject's experience of his or her willpower or perception of color, we see again that the methods that produced the conclusions are flawed. The method is the communicated experience of a test subject, and Rosenberg seeks to call this method unreliable. This means that he has inadvertently invalidated the evidence he seeks to use to substantiate his conclusion. Therefore, it becomes clear that if these experiments are said to disprove our introspective beliefs about ourselves, then the experiments themselves become suspect.

The issues with interpreting the Libet experiment to disprove purpose also become apparent if analyzed further. Purpose seems to also play a major role in the scientific methods of these experiments. As I noted previously, Rosenberg looks to use the results of these two experiments to establish that our introspective experience is not to be trusted, and therefore

conclude that the commonsense notion that we act for purposes must also be illusory. However, Rosenberg's argument and Libet's experiment must both assume that the test subjects have acted for the purpose of truthfully reporting their introspective experiences to the researchers. Both must assume that these verbal reports are given with the purpose of being true. If not, then for what reason do we have to trust anything that was reported? If a researcher had any suspicion that a subject's testimony was purposefully or unintentionally falsified, then said report would most definitely be called into question. If the research subjects are unable to purposefully tell the truth, then what validity is there to their reports? They might as well have said a series of random words, as there is no way for us to theoretically trust any of the reported information once we take away their ability to act for truthful purposes. We see here that Rosenberg's conclusion once again undermines the results of the experiments. Once we remove purpose from the explanatory story of the test subjects, we are unable to reach any accurate conclusions on what they reported due to concerns of the reports' validity. The only way Rosenberg's argument could be considered consistent is if people either always purposefully told the truth, or if somehow we made truthful reports that were devoid of purpose. However, both alternatives seem implausible. Humans do seem to purposefully lie, and it staggers my imagination to try and conceive of people always making truthful reports for no purpose whatsoever.

Rosenberg now needs another reason for why purpose cannot do any explanatory work, despite the fact that we have observational experiences that tell us that they do. The experiments he used rely on introspective experience, so where can he go for support for his theory? I believe that no matter what kind of argument he gives, he will ultimately have to fall back on the principle of causal closure, according to which physical events can only be caused by other physical events. Due to the noncausal nature or purposes, they cannot do any explanatory work

on physical events. He would reject any kind of explanation that involves purpose since he believes such an explanation would violate the way we understand the methodology behind scientific experimentation. This, here, is the place where his argument must start; purposes cannot do any explanatory work. Any argument revolving around scientific experiments and what we have learned from them presupposes a causally closed universe.

### **Why Believe Causal Closure?**

Let us now look at how materialists justify the truth of the principle of causal closure before moving on to why I believe the justification is flawed. Once we hit the causal closure bedrock in the discussion of materialist belief, the question of why we should believe it is sure to arise. There are three arguments that I will address when considering the question of causal closure's veracity.

The first argument compares the nature of physical and mental laws and slots them into a layered view of reality. In his book *Philosophy of Mind: A Contemporary Introduction*, John Heil lays out a nice description of how causal layering indicates that our universe is causally closed. He begins by making a distinction between what he calls higher and lower-level properties and how our universe is layered in causal explanations. Higher-level science such as biology can be reduced to or replaced by lawlike causal explanations in chemistry, and lawlike explanations in chemistry can in turn be reduced to or replaced by lawlike explanations in physics. Imagine this structure like the layers of an onion, where the explanations that make up the outer layers are reducible to and replaceable by the more interior layers, with all explanation being reducible to the core. The point here is that while biology and chemistry may give us scientific explanations of how the physical world works, all lawlike causal explanations for these

sciences can be reduced to physics. Physics is then the foundation on which the other sciences stand. It can be said that higher-level studies like biology and chemistry are reducible to or replaceable by physics, where physics is itself considered irreducible and non-eliminable. Hence what makes a study higher level is the fact it is reducible to or replaceable by lower-level sciences.

Now it is appropriate to ponder where the mental or psychological laws of the universe come into play. Heil addresses this, stating that materialists typically regard the psychological as a higher level of explanation, saying “as you descend from psychology, through neuropsychology, to neurobiology, to chemistry, you refine these [psychological] approximations until you reach bedrock: fundamental physics” (Heil 124). So, since we know where materialists believe psychological laws fall in the overall scheme of causal layering, we must now ask why they fall there. What reason is there to believe that mental laws are higher level, and therefore reducible to or replaceable by a lower level of explanation and ultimately physics? Materialists answer this by saying that psychology is conditional in nature while physics has an unconditional, exceptionless nature. To them, this is evidence of the psychological being a higher-level explanatory system, since genuine (lowest level) laws must be exceptionless. Heil writes at one point about perceiving a bear on a path, saying “Think for a moment of your response to a given stimulus, the appearance of a bear in your path, for instance. Strictly speaking, it would seem not to be the *bear* that elicits your response (whatever it might be) but your *perceiving* or in some way *taking note* of the bear. If a bear appeared in your path, but you remained oblivious to it, you would be unmoved by the bear’s presence.” (Heil 2013, 66). We could theoretically create a mental law from this scenario:

*If Sally sees a bear blocking her path going forward, then she will try to avoid it.*

However, there seem to be exceptions to this law. For example, Sally may have an affinity for bears that leads her to do something different from fleeing. She may enjoy petting, feeding, or otherwise interacting with them, making her approach the animal. She may still also fear bears, yet still approach the bear as the result of a bet that would reap some form of meaningful benefit for her. Under these circumstances it is false that she will try to avoid the bear, hence the original law will have to be qualified with something akin to:

*If Sally sees a bear blocking her path going forward, she will try to avoid it provided she has no affinity for petting bears, feeding bears, etc.*

Materialists believe this difference between the conditional nature of psychological laws and the unconditional nature of physical laws indicates that physics ultimately does all the explanatory work, and that the physical world is fundamentally causally closed to explanations other than those found in physics. Even if the mental is epiphenomenal in nature (in that it is irreducibly real), it ultimately does not do any explanatory work in terms of explaining the occurrence of events in the physical world.

The second argument for causal closure is that its truth is necessary for the progression and advancement of science. Materialists claim that in order to properly do scientific research, it is necessary to assume that the universe is causally closed. When a scientist is studying a cell or a chemical, he must only consider physical explanations. At no point can a scientist throw up his hands if he fails to find a physical cause and say that something lacks a physical causal explanation. Thus, he can never present a purposeful explanation for a physical phenomenon for which he cannot find a physical cause. Rather, his discipline mandates that he look to other physical causal explanations, conduct more tests, or wait for further discoveries that may allow

him to continue his research should he find himself at an impasse. Due to this standard, materialists conclude that if we allow purpose into our explanations, then the way we conduct scientific research would be compromised. If we allowed purposeful explanations into the picture, then it is possible that scientific progression would be undermined, since researchers would no longer be forced to assume causal closure. For this reason, if we are to believe that science is a reliable medium for the acquisition of knowledge, then we must assume causal closure to be true if we want it to progress correctly.

The final argument for causal closure that I will address maintains that the concept of the nonphysical causally influencing something physical is nonsensical. By what mechanism can something such as a mind interact with something physical? Richard Taylor argues this point in in his book *Metaphysics* writing,

Conceive then, if possible, how an *idea* can effect such a change as this [the diffusion of sodium ions into certain brain cells], how an idea can render more permeable the membranes of certain brain cells, or how an *idea* can enter into a chemical reaction whose effect is the diffusion of sodium ions at a certain place... Try, I say to form a conception of this, and then confess that, as soon as the smallest attempt at any description is made, the description becomes unintelligible and the conception an impossible one. (Taylor 1992, 20).

We see here how Taylor argues that we can easily conceive of how bodily interactions can cause changes in sodium diffusion. However, the interaction between substances of separate types is harder to imagine. Take for instance Descartes' argument for mind-body interaction. Descartes says that the mind is immaterial, thinking, and nonspatial. The body, on the other hand, is the opposite in all regards; it is material, non-thinking, and spatial. How can it be feasible that a thinking, immaterial substance can cause an event in a material spatial thing or vice versa? There is no understandable mechanism for such a process happening, and the difference in substances

makes it clear that logically there is no way for any interaction to occur without breaking some rules of how we understand things to work.

### **Addressing Flaws in These Arguments**

Despite these arguments, I still believe that the materialist belief in a causally closed universe is questionable. First, consider Heil's argument. The main problem in this argument is that we never learn from him why explanations in physics are considered exceptionless. Instead, such a premise is asserted, and the argument moves forward. I would contend that doing so is a major issue with this line of reasoning. When analyzed, physics seems to be conditional in a similar way to psychological explanations. If we take the conditional nature of the bear thought experiment, it becomes clear that physics has similar exceptions. To make this point clearer, think of a pool table with a cue ball and an eight ball. Physics would tell me that if I am to strike the cue ball at a specific angle with a certain amount of force, then the cue ball will strike the eight ball. I will state the rule as:

*If a cue strikes a ball at angle  $x$ , with a force of  $y$ , then the ball will collide with the other ball provided this other ball is in the path of the ball originally struck.*

However, if we are to introduce a different variable to this example (just as we added provisional clauses to the example involving the bear), then suddenly physics has an exception to its above rule. For example, if there is a divot between the two balls then the ball struck by the cue will travel in a direction that ensures it will miss the other ball. No physical laws have been broken, yet there is clearly an exception to the rule given above. So, we need to amend the rule in the following way:

*If a cue strikes a ball at angle  $x$ , with a force of  $y$ , then the ball will collide with the other ball  
UNLESS there is a divot in the table that the ball crosses.*

Thus, if we are to define conditional and exceptionless laws in terms of their containing or not containing, respectively, provisional clauses, it seems as if everything would have to be higher level, resulting in the layered view of reality with its bottom-level exceptionless laws falling apart. This means that the materialists would have to give a separate reason for why the psychological must be a higher-level property since conditional statements apply even to things that they say are at the lowest level. What reason is there to then say that the universe is causally closed? In addition, now that physics has exceptions, what then is to stop someone from making the argument that purposeful explanations fall into this category of exceptions? What if we were to now add the exception that the balls will collide “unless person A causally intervenes for a purpose, sending the ball in a different direction for reason P?” What argument then can the materialist give that does not simply assume the principal that he is trying to prove? We see that the materialist argument becomes circular, meaning that the conditional nature of mental laws has no basis for proving that they must be based in physics. A materialist might try to counter this claim by admitting that physical laws have exceptions, yet he or she would run into the same problem as we have removed the limiting factor (conditionality). What do we have to define lower and higher-level studies once we remove conditionality from this argument? What reason would we have to trust materialists that our universe is causally closed? At this point, it is likely that the materialist who is defending causal closure would respond saying that while the layered view of reality may be flawed, we still need a causally closed universe to properly conduct scientific research.

With this being said, I believe the idea improperly uses the principle. I do agree that if we want to do science properly, then scientists must work under an assumption of causal closure. However, this does not necessarily mean that the universe itself is causally closed. Considering this, it is not very hard to imagine a universe where things like purposes do explanatory work, yet scientists can still accurately and reliably do science. Scientists are simply unconcerned with purposes in their own research. Science focuses on the causal interactions of physical things alone. Thus, they must use causal closure when studying the physical universe, but this does not necessarily mean the universe itself is causally closed. The belief that our universe is causally closed only seems to be asserted by materialists, not by science. Because of this, causal closure has been improperly applied. It must be assumed in the practice of science, but it need not be universally true. Researchers would never allow purpose into their studies (alleviating any worries about science not progressing), yet there exists an entirely different type of explanation for which science simply has no concern. Methodological approaches to science which invoke causal closure are nothing more than just that: methodological. It seems to me completely feasible that there exist things that lack complete physical causal explanations. Look back to the discussion that prefaced the arguments in this paper. Our everyday experience of introspection and purposeful explanation seem to indicate that the functioning of our minds is one aspect of reality whose explanatory story is not completely causal. A scientist studying, say, human neurons could consistently believe such a premise while simultaneously leaving his or her practice unharmed. He or she will continue to seek physical explanations for any and all phenomena relating to neuropsychology, yet personally believe that there exist purposeful explanations beyond what his or her field focus on.

With this being said, the only argument left for causal closure is the objection addressing the incomprehensibility of a mechanism for something like mental-to-physical causation. I would counter such a claim by asking why a mechanism must be provided for these types of explanations. Granted, if we were speaking of something such as an atom influencing another atom, then I could understand this criticism. However, when speaking of the mental and its ability to influence the physical, we are no longer dealing with physical substances. Instead, we have something purposeful influencing something physical. Since purpose is of a different nature than the physical, why do we hold it to the same mechanistic standard? The study of science focuses on mechanisms as that is how physical things causally interact with other physical things. Something such as purpose would lie outside of this rule. Because of this, it seems logically sound that someone arguing for the existence of purposeful explanations has no need to provide a mechanism, as the interaction they are advocating for has none. Therefore, to require a physical mechanism for something that is nonphysical is nonsensical in nature. Mechanistic thinking also presents some interesting questions for the physical as well. If we are to once again think of the causative rabbit hole of physical things, then is there a fundamental bedrock for physical things? This question seems to be tricky for a materialist. If he is to answer yes, then how can this fundamental thing be physical? This thing would have to be irreducible and therefore have no mechanistic parts like the physical things it makes up. Thus, it exists with different properties than physicality, making it nonphysical. If this nonphysical thing can influence the physical, then why would it be unreasonable to say that other nonphysical things like purpose can also do explanatory work? The other option would be a system with no fundamental physical thing, but this too raises problems for causal closure. It is apparent why a nonphysical fundamental thing would break this rule, but what of a system of infinite causal

regress? Such an idea also runs into problems as an infinite series of mechanistic interactions is almost incomprehensible due to how we understand infinity and causality. Consequently, it seems as if materialists must commit themselves to the fact that fundamental physical things do not exist. Such a thing would further invalidate a mechanistic view of reality as it would entail an inconsistency in how we think about physical mechanisms. Any idea beyond this would likely need to use an infinite series of mechanistic causal events, and thus further complicate the argument due to the problems with infinite systems.

### **Conclusion**

Together then, these points elucidate the flaws that underlie the principle of causal closure. Arguments such as those presented in this paper should be worrying for many materialist philosophies, as it is the bedrock of their arguments. I believe that if materialists are to take this principle seriously, they should focus more on logically substantiating why we should believe that causal closure is universally true. Until then, I see no reason to accept the principle as universal as opposed to a practice that works well with scientific research. Not only does it seem to be misapplied, but its mechanistic and layering arguments seem less than persuasive when scrutinized. For a principle that is so widely accepted as true it has, to say the least, a remarkably shaky foundation. As we have also seen in this paper, arguments made by materialists that involve causal closure must be called into question. For example, arguments like Rosenberg's must give us more convincing reasons to believe that what we conclude on the basis of introspection is false. Causal closure's apparent flaws also give the opportunity to open more discussions on the standing of so many key topics in the field of philosophy. With causal closure out of the way, we suddenly gain the ability to discuss the possibilities of an immaterial mind, a nondeterministic future, and the existence of a God. Therefore, with how important causal

closure is in philosophy, I believe that it requires more scrutiny before it can be considered an accepted fact.

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