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Abstract

We largely describe our lives in terms of cause-and-effect relationships; in fact, we often struggle to find another way to characterize events. Do these descriptions really reflect the true nature of the relationship between events? Causation is seen as a concept that is necessary for explanation within the sciences. However, philosophers like Bertrand Russell assert that this default assumption may not be correct. My paper considers the question of whether the concept of causation entails a necessary relationship between events and whether causation can be removed from scientific explanation. First, causation and its current role in science are explained. Then, different ontological positions on causation are presented and compared. I follow this section with an explanation of Bertrand Russell's arguments for eliminativism. Finally, using a deductive logical method, I refute Russell's arguments in favor of eliminating causation to show that causation is necessary in science, regardless of whether there is a necessary relationship between "causes" and "effects." My research provides an opportunity to rethink a philosophical theory and examine its validity.

Keywords
Causation, intrinsic, extrinsic, eliminativism, Russell.

1. Introduction

Most believe that science cannot function without the concept of causation, or the idea that one event results in another. However, many philosophers hold different ontological positions on the problem of causation. Specifically, British philosopher Bertrand Russell argues that the causation is incompatible with science and should be dropped entirely. In opposition to Russell's stance, I will argue that causation should continue to be used in science, regardless of whether or not it exists as an intrinsic quality of events. I will first describe the way that we currently use the concept of causation in science. Then, I will explain different ontological approaches to the problem of causation, focusing on causal realism and nominalism. I will follow this with an explanation of Russell's eliminativist arguments. Finally, I will respond to Russell to demonstrate that causation is indispensable for scientific explanation.

2. Explaining Causation and Ontological Stances on Causation

The word "causation" is generally taken to mean the influence that one event (deemed the cause) has on another event (deemed the effect). "Causation" describes a relation between events. In a causal relationship, a property of the first event produces an instance of a property of the second event. In science, we use this idea of causation (cause and effect) to explain phenomena.

There are two major stances taken on the ontological[1] question of causation: realism and nominalism. Peter Menzies describes causal realists as those that view causation as intrinsic to related events, and nominalists as those who view causation as reducible and extrinsic to related events.[2] Causal realists believe causation to be a fundamental feature of reality that cannot be

[1] Ontology is the philosophy of reality and existence.
[2] Menzies, Peter. "Intrinsic Versus Extrinsic Conceptions of Causation." *Causation and Laws of Nature*, edited by Howard Sankey, vol. 14, Springer, 1999, pp. 313–329, doi.org. /10.1007/978-94-015-9229-1_21.

further reduced to constituent properties. Realists view the properties in causation to be causal within the properties themselves[3]; in other words, they believe that "being a cause" and "being an effect" are properties that events can have. Realists argue that there is a necessary relation between causes and effects.

Causal nominalists, in contrast, do not believe that there is a necessary relation between causes and effects. According to nominalists, abstract properties are not "the basic entities of our ontology" (Handfield 245).[4] The abstract idea of causation therefore does not exist but is rather a word that we use to categorize and understand phenomena. Thus, events cannot have the properties of "being a cause" or "being an effect." Further, nominalists believe that causation is extrinsic to events because it depends on regular occurrences. What we call causation is merely a recurring pattern of "causes" and "effects."

2.1 Eliminativism and Bertrand Russell

A third view of causation is eliminativism: an approach to causation that advocates for the elimination of the concept of causation, as it claims that our understanding of causation is fundamentally flawed and thus should not play a role in science. Like nominalists, eliminativists oppose the "necessary relation" that realists argue for, and they generally agree that abstract properties do not exist. However, eliminativists reject the nominalist idea that causes and effects occur in a pattern.

Bertrand Russell was an eliminativist and denied the existence of causation, arguing that the concept should be abandoned altogether. In *On the Notion of Cause*, he begins by pointing out that we hold the laws of physics as fundamental to science. He argues that causation has no

[3] Esfeld, pg. 1.
[4] Handfield, pg. 245.

place in physics because causality requires a "cause" and an "effect," and these labels are not applicable to the physical world.[5]

Further, causation assumes time directionality, which does not hold ground in the realm of physics. In a cause-and-effect relationship, it is generally assumed that one event causes another. For example, a child throws a baseball that strikes a window and shatters it. In this example, we do not say that the shattering of the window caused the child to throw the baseball. Our concept of causation requires the cause to precede the effect.

However, the core of Russell's argument states that the laws of physics do not make the distinction between what is "earlier" or "later." Thus, physics allows us to "predict the past" as much as it "predicts the future." Because our understanding of causation is seemingly incompatible with the laws of physics, which he claims how we explain phenomena, Russell concludes that causation is fundamentally flawed.[6]

Russell's second argument holds that the "cause" of an effect can never be truly found because there is an infinitely broad range of roughly contemporaneous influences. Any event in the universe close enough in spacetime to the "effect" event could have some impact on the "effect." In the case of a child shattering a window with a baseball, the cause could be traced back to the baseball hitting the window. It takes roughly eight minutes for light from the sun to reach the earth. If a solar flare erupted eight minutes before the window was broken, the solar flare could be a potential influence on the window's breaking. Hence, the influence of the solar flare would have to be taken into account when investigating the cause of the broken window. Consider another example: if it began raining in a neighboring city right before the window shattered, the event of the rainstorm must also be accounted for. Because there is an infinite

[5] Russell, pg. 14.
[6] Russell, pg. 15.

number of potential influences on an "effect," Russell argues that the concept of causation is problematic.

3. Argument Overview

The objections raised by Russell may lead us to conclude that scientists ought to dispose of the idea of causation. However, I will argue that we should not succumb so easily. As an overview, my argument will follow this form:

Premise 1: Causation is either intrinsic or extrinsic.

P2: If causation is intrinsic, then causation is indispensable for scientific explanation.

P3: If causation is extrinsic, then causation is indispensable for scientific explanation.

∴ Causation is indispensable for scientific explanation.

4. Premise 1 and 2

The first premise of my argument is that causation must be either intrinsic or not intrinsic to the functioning of the world, which is a necessary truth. If causation is not intrinsic to events, it would be extrinsic. My argument's second premise, the foundation of realism, expresses the idea that is generally held to be true. The assumption that causation is real and is a part of the functioning of our world can be considered our null hypothesis, or default stance. Thus, the burden of proof falls upon Russell to show that causation is extrinsic and should therefore be eliminated from science.

5. A Refutation of Bertrand Russell

5.1 Responding to Russell's First Argument

To support my third premise, I will provide counterarguments to Bertrand Russell's eliminativist arguments, showing that causation is necessary for scientific explanation. Russell's first argument in favor of the elimination of causation in science is that the ideas of "cause" and

"effect" have no place in physics. I concede that it is true that these labels are rarely used in describing the laws of physics, but these are not grounds to eliminate causation entirely from science.

Russell states that time is bi-directional, so causation fails. However, even if he is correct in that time is symmetric, I argue that the symmetry of time is irrelevant to our application of causation. Time may be symmetric, but we do not live or experience time symmetrically; we experience it with direction. A goal of science is to explain phenomena, and phenomena are explained in terms of the way that they are observed or experienced.

Furthermore, Russell argues that the laws of physics allow us to use events to "predict" the past (or retrodict) as much as they are used to predict the future, so our current understanding of causation is flawed. The information that the laws of nature give us about the past or the future derives from metaphysical assumptions about what events "cause" other events. From this understanding, we can then make retrodictions and/or predictions about how things were or will be. Therefore, the epistemological point that Russell is making depends on the metaphysical concept of causation (the idea that things in the real world make other things happen in a particular way and in a particular order). While physics may not include the concept of causation, it depends on that concept as a presupposition.

5.2 Responding to Russell's Second Argument

Russell's second argument concerning the problem of implausibly enormous causes can be resolved with Jonathan Mackie's INUS (which stands for "insufficient, necessary, unnecessary, sufficient"), which clarifies what may be considered as a cause. Mackie, a reductive nominalist, redefines the cause as "an insufficient but necessary part of an unnecessary but

sufficient condition for the effect."[7] INUS can be demonstrated in the example of a ball being thrown and breaking a glass window. The ball hitting the glass window is an insufficient but necessary condition for the ball to break the glass. The action of the ball being thrown alone is *insufficient* for the window to break; for example, there must not be physical obstructions in front of the window (like metal bars). However, even if all the other physical conditions are right for the window to break, the ball being thrown is still *necessary* for the glass to shatter. The window could be broken in other ways (for example, it could be shot at), so the circumstances that led to the window's breaking (including the ball hitting the window) are *unnecessary* for the breaking of the window. This set of circumstances, however, is *sufficient* for the window to break. Mackie's INUS solves Russell's problem of impossibly enormous causes by explicitly defining what is included in the "cause" event.

6. Summary of Argument

If causation is an intrinsic feature of events, real relations between events are required to explain how the world works. Thus, we should continue to frame scientific explanations around causation. However, if causation is not a fundamental feature of the world and is instead reducible to patterns of conjunct events, the concept of causation is still necessary as the term describes the relationship between these events. Eliminating the concept of causation reduces our ability to draw connections between events and to explain scientific phenomena.

7. Conclusion

In this paper, I argued that causation should continue to be used in the sciences, as it is a necessary component of scientific explanation. First, I defined causation and the way that we currently utilize this concept in the sciences. I outlined different ontological approaches to the

[7] Broadbent, pg. 11-12.

problem of causation, focusing on causal realism and nominalism. Then, I explained eliminativism and Bertrand Russell's eliminativist arguments. Finally, I argued that causation is indispensable for scientific explanation, regardless of whether it is intrinsic or extrinsic to events.

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Biography

Alina Zhong is a junior at Stanford Online High School. She is the current co-president of her school's Gender and Sexuality Alliance and co-leader of the Literature Club. Outside of school, she is an author and the editor and social media manager for Activism Impacts, a youth-led activist organization. She is also a regional director with Innoverge, a nonprofit organization that promotes the accessibility of STEM education to underrepresented groups. In the future, she aims to study agriculture, environmental science, and philosophy in hopes that her research will help better society.