

# OCCASIONALISM IN A CONTEMPORARY CONTEXT

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ABSTRACT. This essay was completed in January 2016 and accepted for publication in a collection on occasionalism by Nazif Muhtaroglu. It attempts to update the doctrine of occasionalism to make it independent of theism and fit better with contemporary physics and a modern understanding of causation. We find that modern physics provides an avenue to support the essential core of occasionalism.

## 1. INTRODUCTION

The aim of this essay is to draw on the resources present in contemporary theories of causation to cast light on the venerable occasionalist tradition. The benefit of bringing centuries of thought to bear on a historically prominent doctrine should be clear enough but so too the danger of depicting occasionalism in a misleading manner by imposing foreign concepts. To mitigate this danger, we are deliberately setting aside the goal of presenting occasionalism as it would have been understood centuries ago. Instead, we will explore how occasionalist theses and arguments can be criticized or supported from a contemporary perspective.

The defining tenet of occasionalism is that the only efficient cause of anything is God, so that any causal role played by finite beings must not amount to *bringing about* effects. (Another tenet is that God is the efficient cause of every natural occurrence, but this doctrine is not specific to occasionalism.) Paradigmatic examples of efficient causation among worldly events are labeled ‘occasional causes’ by the

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occasionalist, and occasionalism holds that occasional causes are not genuine causes.

There are two main questions we will investigate. First, it is unclear when it is appropriate to identify some occurrence as an occasional cause. So we can ask, what specifically distinguishes an occasional cause from other worldly happenings? Because modern science and philosophy often draws distinctions among different sorts of causes, we should investigate how ‘occasionalist cause’ maps onto modern terminology. In doing so, we will discover a kinship between occasionalism and Humeanism.

Second, can we use contemporary distinctions to clarify and perhaps bolster the case for occasionalism? The historical context of occasionalism is theistic, and arguments about the nature of causation are unlikely to attract attention nowadays if based on theological assumptions, which are too controversial. If a reasonable case could be made for occasionalism that is neutral concerning theology, it might be seen as a live metaphysical doctrine deserving more thorough examination. For that reason, we will sketch how the essential character of occasionalism could be elucidated from a contemporary secular perspective.

## 2. PRELIMINARY CLARIFICATIONS

Contemporary terminology concerning causation is varied and insufficiently precise for our purposes, so a few clarifications need to be made.

First, occasionalism is a metaphysical thesis and as such it primarily concerns *fundamental reality*, not reality. Occasionalism, we think, is best understood as the claim (1) that there are some fundamental causal relations of a necessitating sort and (2) that in all cases an act of God (such as God stating that some particular effect shall occur) serves as the ‘causing’ relatum in this two-place relation. Events in nature, i.e., spatio-temporally located events, serve only as the ‘being effected’ relatum in this relation and never as the ‘causing’ relatum.

We say ‘of a necessitating sort’ because paradigmatic causal claims do not presuppose that causes be necessitating in any sense. For one thing, people commonly accept that causes might (for all we know) have a chancy relation to their effects. For another, in contemporary

lingo, to say an event  $e$  has a cause  $c$  is to say that  $c$  is a *partial cause* of  $e$ . According to occasionalism however, events in nature can never even be *parts* of the ‘causing’ relatum in a fundamental causal-necessitating relation.

We say ‘fundamental’ because occasionalism leaves open the possibility that events in nature can serve in some sort of causal or causation-like relation. Occasionalists will contend that any such relations are not genuine causes. A reasonable way to interpret this position, we think, is to say that occasionalists deny that events in nature engage in any sort of fundamental causing, but that they can serve as a derivative sort of cause. In particular, natural events can appear (to the uneducated) to bring about effects and the events involved in such appearances do exist. The apparent cause, however, does not bring about the effect nor does it generate the effect, nor is it a genuine efficient cause of the effect. That is, it is not fundamentally a cause of the effect. When an occasionalist’s opponents point to seemingly paradigmatic examples of causation among events in nature, the occasionalist need not deny that there is a relation between such events worth distinguishing. Indeed, the term ‘occasional causation’ refers to this relation, and ‘occasional cause’ refers to the natural event on the ‘causing’ end of this relation. The occasionalist will instead characterize this occasional cause as not genuine.

By imposing our contemporary terminology, we can reformulate the occasionalist doctrine as follows. Because it is useful to refer to the seemingly causal relations in nature, we can and should say that causation exists and that asserting the existence of causation leaves open whether any causation-like relations are fundamental. At this stage, nothing contentious about causation has been claimed, and the conceptual framework is not biased for or against the occasionalist. The occasionalist, though, goes further to make a controversial two-part metaphysical claim: (1) There are some fundamental causation-like relations, especially a causal-necessitating relation going from acts of God to natural events. (2) Natural events do not bear any fundamental causation-like relations to anything. As a result, occasional causation is by definition a derivative metaphysical relation. (A derivative relation is, by definition, a relation that exists and is not fundamental.)

Second, occasionalism denies the existence of efficient causation except where God is serving as the cause. In contemporary terminology, ‘causation’ does generally refer to efficient causation and not to the material, formal, or final causation discussed famously by Aristotle. However, the word ‘causation’, to modern ears, does not necessarily indicate a fundamental metaphysical relation. Most contemporary theories of causation do not posit a fundamental metaphysical relation that corresponds closely enough to causation for the theory to count as an opponent of occasionalism. One exception we will discuss shortly is the determination account of causation.

Third, contemporary discussions of causation routinely assume that both cause and effect are situated in space and time and thus have a spatio-temporal connection between them. For this reason, philosophers have been keen to use events as the causal relata. For our purposes here, it will prove convenient to restrict our discussion to causation between events because we can understand events broadly enough to encompass other kinds of relata that have been put forth as alternatives to events, such as processes, aspects, and tropes. Also, the contemporary presupposition that causation involves events with spatio-temporally connections is incompatible with God being the cause of natural events because there is no path in space-time from God to any ordinary material happenings. In order for contemporary theories of causation to be applicable to divine causation, one needs to generalize them so as to allow for direct God to nature causation. Without trying to defend a full account of how best to accomplish that, let us assume that God’s acts of speaking or willing can serve as a cause and that part of any such causation involves a direct specification of the spatio-temporal region where the effect occurs. (This technicality will play a role in a defense of occasionism below.)

### 3. WHAT IS AN OCCASIONALIST CAUSE?

Occasionalism was first developed by the Ash‘arites, a philosophical and theological movement in the tenth and eleventh centuries initiated by Abû al-Ḥasan al-Ash‘arî of Basrah. The main goal of the Ash‘arite doctrine of causality is to explain the consistency of natural processes without entailing any necessitarian conclusions, either in the

world or in God. The idea of necessity in the natural order, for the Ash‘arites, implies a limitation of the Divine Sovereignty and Freedom. The accentuation of God’s absolute control over the created order is the grounding theological and pietistic motivation, as expressed by Abû al-Ḥasan al-Ash‘arî (d. 936): “It suffices for God to say ‘be’ to create anything. Good or evil, everything is God’s creation.... None but God creates. The deeds of the creatures are decreed and created by God. The Qur’ân says: “God created you and your deeds.” (17:96) “The creatures cannot create and are created themselves.” (1967, 9–10) In a very similar fashion Yusuf al-Juwaynî (d. 1085), another important Ash‘arite theologian, writes: “The one who creates everything *ex nihilo* and continuously is the Lord of the Worlds. He is the creator, there is no other creator. Everything which has a beginning is in the domain of the Divine Power (*qudra*). The servant is able to do anything because of God’s power. God is the creator and the source of His servant’s deeds.” (al-Juwaynî, 1966, 1996)

The most succinct and clear expression of the theory comes from famous al-Ghazâlî (d. 1111). In the seventeenth discussion of the *Inconsistencies of the Philosophers (Tehâful al-Falasifa)* he writes that “the connection between what is habitually believed to be a cause and what is habitually believed to be an effect is not necessary according to us.” The connection between cause and effect, he argues, “is due to God’s decree, Who creates them side by side, not to its being necessary in itself, incapable of separation.” (1997, 166) Along the same lines in his other important work, the *Balance (Iqtisâd)*, he writes “no created thing comes about through another (created thing). Rather, all come about through (divine) power.” (1994, 314-315)

It is clear that al-Ghazâlî, alongside with other Ash‘arites, rejects necessary connection between cause and effect. Observation shows only concomitance, not any necessary connection between cause and effect. Constant conjunction is one thing, necessary connection is something else altogether. God creates both cause and effect and attaches them to each other.

Two questions arise here. First, if there are no necessary connections in seemingly paradigmatic causal relationships, where do the consistency and regularity of natural processes come from? Aristotle’s answer

was that things have natures due to the material form that dictates their development and behavior. Entities consistently act in certain manners because of their forms or of innate natures (*tabʿ*). Al-Ashʿarī rejects this Aristotelian solution due to its necessitarian implications. Instead, he introduces the notion of habit (*ʿādah*). God creates, not randomly, but on freely chosen, self-imposed habitual paths (*ajra al-ʿādah*). The natural processes are consistent, not because of the entities' innate natures, but because of God's habitual creation in the world. The idea of habituality precludes the depiction of God as an arbitrary king, although the detachment of cause and effect seems to lead to the conclusion that God creates the next moment of the universe without incorporating causal contributions of entities.

But, is not this limiting God's freedom? No. First these are self-imposed habits, thus freely chosen. Second, God is not bound even by these self-imposed habits. In rare cases, the habits of God could change. As al-Ashʿarī puts it, "God follows a habit in the temporal order in which He brings these events about, and doing it the other way would be a violation of His habit." (Ibn Fûrak 1987, 134.5–8; Griffel, 2009, 127) The prophetic miracles are these exceptional violations of God's otherwise habitual creation to a king's unusual gestures. To use an analogy, "a king's habit is to ride a horse through the marketplace; but it is not impossible that he walks through." (ibn Maymûn 1975, 211) Habituality does not limit God. In rare cases, exceptions and miracles occur.

The second question can be formulated as the following: How does it make sense to talk about causal relationships in the Ashʿarite occasionalist context given that the theory detaches cause from effect? In other words, what is the exact role of "what is habitually believed to be a cause" in seemingly causal relationships? After all, despite the rejection of any necessary connection between cause and effect, the Ashʿarites posit some sort of causal relationship. There is some regularity in natural processes, and what is habitually believed to be a cause is consistently followed by what is habitually believed to be an effect. Occasionalism retains the tenet that (what are habitually believed to be) causes and effects occur in a state of spatio-temporally proximity. What, then is the nature of this relationship between a natural event

that is followed by another natural event in causation-like manner? This second question can be answered by differentiating non-causation and occasional causation.

There are at least two thinkers in the Asha'rite occasionalist context who take up this task: al-Ghazâlî and Said Nursi. Al-Ghazâlî writes that one can say an effect exists *with* cause, but one cannot say an effect exists *by* cause. (1997, 168) The distinction between “with” and “by” is, we believe, crucially important. Despite the rejection of necessary relationship, al-Ghazâlî seems to suggest that there is still a kind of relationship between cause and effect, for cause and effect occur near each other. There is a spatio-temporal proximity or contiguity. Al-Ghazâlî's formulation of occasional causation does not require that this relationship is necessary, but it nevertheless exists.

Said Nursi calls this spatio-temporal proximity without necessity ‘iqtiran’. Iqtiran connotes nearness, togetherness, and constant conjunction. Nursi holds on to the basic tenets of the Ash'arite occasionalism. For him, “constant conjunction (*iqtiran*) is one thing, necessary connection (*illiyâ*) is another” and “the All-Glorious Maker, Who is powerful over all things, has created causes, and so too does He create the effects. Through His wisdom, He ties the effect to the cause.” (2000, 180) Causal relations in the world are orderly and consistent. The regularity of cause and effect relationships might be deceiving in that when “the two things come together or be together” we suppose that “the two things cause one another.” Day is continually followed by night, but day does not cause the existence of night. Since in causal relationships we frequently observe that the non-existence of one thing is the cause of the non-existence of the other, we often wrongly suppose that the existence of one thing is also the cause of the existence of the other. (2000, 182)

For illustration, consider that certain sorts of electrical discharges in the sky cause both a bright flash of light in the sky as well as a characteristic sound, thunder. It is currently uncontroversial that the flash of light does not cause thunder but that they have a common cause, the electrical discharge known as lightning. However, because the flash and the thunder continually occur near each other in the same temporal order, an untutored observer could reasonably postulate a

necessary causal relation from characteristic light flashes to thunder. Occasionalists like al-Ghazâlî or Nursi can offer the same diagnosis of how people are generally incorrect in attributing causation among natural events. The real cause (God) creates a pair of effects side by side (*iqtiran*). Fundamentally, there is only God-to-nature causality, but this occurs in way that permits recurring patterns among natural events. What's more, it is reasonable for the untutored to postulate causation from natural event to natural event.

With cursory answers to these two questions now in hand, al-Ghazâlî's distinction between "creation of effect *with* cause" and "creation of effect *by* cause," and Nursi's concept of *iqtiran* have proven to be helpful for understanding Ash'arite occasionalism. Both philosophers have asserted that *some* relationship exists between cause and effect while at the same time rejecting the necessity of this relationship. They are attributing to the world neither a complete lack of causation nor a fundamental necessitating causation, but of occasional causation, which is some sort of derivative causation.

We have two concerns with the occasionalist's proposed solution. First, occasionalists have not yet developed any notion of occasional causation with enough detail to be able to answer definitively which events are related by the occasional-causation relation. Second, occasionalists have not yet clarified what purpose the notion of occasional causation is intended to serve.

#### 4. DETERMINATION ACCOUNTS

Occasionalism holds that (the fundamental sort of) causation should be understood as some sort of necessitation. This idea has reappeared in a weaker form relatively recently in the determination account of causation given by John Mackie (1973).

Perhaps the simplest way to set up the traditional determination account is to define 'determination' as

$c$  determines  $e$  iff  $c$  together with any laws of nature suffices for  $e$  to occur.

and to add that

$c$  is a determinant of  $e$  iff  $c$  determines  $e$ .



Determination relations can be thought of as fundamental full-cause relations. Because determination isn't necessarily temporally asymmetric and because contemporary science makes it extremely plausible that typical determinants of human-scale events extend over a vast spatial region, people may balk at calling determinants 'causes', but this is an irrelevant terminological quibble. The important observation is that a determinant serves as a fundamental structure that directly vindicates talk of *bringing about effects* and indirectly vindicates all other veridical causal talk. One can account for the utility of our more restrictive application of the word 'cause' by way of a metaphysics of derivative causation and our psychology of it, as detailed for example in (Kutach 2013).

On the one hand, the determination theory of causation appears to be incompatible with occasionalism because determination theories posit fundamental causation-like relations among events in space-time,<sup>1</sup> which occasionalism denies.

On the other hand, the determination theory of causation is friendly to occasionalism in the sense that if we shift determination relations out of nature and into the mind of God, the determination theory can be understood as a logical consequence of occasionalism. Here's what we have in mind: Take a prototypical theory with determination relations between natural events, a theory where for any event  $c$  and any appropriate spatio-temporal region  $R$  relative to  $c$ , what occurs in  $R$  is fixed by a mathematical function of  $R$  and  $c$ . The mathematical function  $L(cR)$  is implied by a fundamental deterministic law, for example, Maxwell's equations. For such a theory, the occasionalist can strip such determination relations out of fundamental reality, and instead postulate that God wills that if God wills that  $c$ , then God also wills that  $L(cR)$  will occur in  $R$ . Furthermore, assume everything that occurs in nature is willed by God. In this case, whenever  $c$  occurs, it is guaranteed that God willed that  $c$ , which (given the further will of God) implies that  $e = L(cR)$  occurs in  $R$ . Note that all we have done

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<sup>1</sup>Strictly speaking, the relation needs to be defined in some sort of arena—that is, a fundamental container space—but it does not need to be specifically *spatio-temporal*; it is contentious whether space-time is fundamental.

here is to put the fundamental deterministic law  $L$  in the mind of God while still leaving it up to God whether to will that  $L$  holds.

One reason why this possibility might be interesting outside the context of theism is that physicists sometimes postulate theories (or at least sketch proto-theories) of fundamental physics where space-time and events inhabiting space-time are non-fundamental and where their derivative existence is implied by fundamental stuff that obeys a deterministic law. Such a model, if accurate, would vindicate the basic conception of fundamental causation entertained by the occasionalist; fundamental reality would be playing the role occasionalists attribute to God.

## 5. HUMEAN ACCOUNTS OF CAUSATION

The term ‘Humeanism’, as used in contemporary philosophy, is best thought of as the doctrine that there is no fundamental causality, meaning no fundamental dynamical laws or fundamental causation or fundamental powers or anything like that. Whatever causes (and laws and powers) exist are derivative, obtaining by virtue of a fundamental reality that consists merely of a mosaic of inert attributes like distances and angles and brute physical magnitudes.

In the most straightforward sense, Humeanism is opposed to occasionalism because Humeanism rejects the kind of fundamental causation that occasionalists believe exists between God and nature. But Occasionalists and Humeans agree that there are no fundamental causes in nature and hence that all natural causes—what occasionalists call ‘occasional causes’ and what Humeans call ‘causes’—are non-fundamental. As a result, they both need to give some account of what makes a cause different from a non-cause, and they both tend to appeal to patterns in nature. Occasionalists did not establish any clear distinction between occasional causes and non-causes, but this could be addressed by appealing to the same sorts of features that Humean theories of causation employ.

We will sketch a few of the most popular approaches only briefly. See Chapter [XXX] for more detail.

**5.1. Regularity Accounts.** The paradigmatic Humean account of causation is the regularity account. The regularity account of causation is notable for having virtually no public advocates while continually being criticized as if it were wildly popular. It is discussed mainly because its relative simplicity makes for good teaching material and serves as a foil for philosophers to use to motivate their own theories.

According to regularity accounts, a cause-effect relation going from token event  $c$  to token event  $e$  exists exactly when the designated event types  $C$  and  $E$  (of  $c$  and  $e$  respectively) satisfy the designated conditions. Regularity accounts can vary on these designations, but the primary constraint, which gives the account its name, is that *all* instances of  $C$  are followed by instances of  $E$ . This condition could (and should) be relaxed to allow a less-than-universal regularity between  $C$ 's occurring and  $E$ 's occurring, but we do not have the space here to address this technicality.

Another technicality concerns what it means for  $C$  to be “followed by”  $E$ . Implicit in formalizations of the regularity theory, there is a presupposition that the types  $C$  and  $E$  are intended to be considered as a pair bound with some (possibly coarse-grained) spatio-temporal relation between them. For example, throwing a rock up in the air (in typical circumstances) is one cause of the same rock landing on the ground sometime between one and ten seconds and somewhere within a couple hundred meters. It is not necessarily a cause of other similar rocks landing in similar conditions in other parts of the universe or at other times. It is easiest to construe the types involved in causation in terms of a single coarse-graining of  $c$  plus  $e$  plus the spatio-temporal relation between them, all together as one unified type.

With this presupposition made explicit, we can examine a second condition usually imposed by regularity accounts: that the cause and effect must be contiguous. In Hume's day, contiguity was understood in the context of mechanism, where objects were alleged to be influenced only through contact forces imposed by adjacent objects. (That Newtonian gravity had no known mechanism in terms of contact forces was usually understood as a puzzle to be resolved, not as a refutation of mechanism.) In a contemporary context, it is unclear and surprisingly under-explored how contiguity should be understood. Causal process

theories, discussed in the next section, provide one answer but not the only answer and probably not the best. One liberal way to construe contiguity would simply be to impose no further constraint beyond that  $C$  and  $E$  must be somehow spatio-temporally related. It is unclear why a stronger condition is needed. Indeed, it is unclear what the goal of the regularity theory is.

Exactly how the typing of the  $c+e$  combination is supposed to be conducted is a critical deficiency of the regularity account that often goes unmentioned. On the one hand, if  $c+e$  is too finely-grained, there will likely be<sup>2</sup> only one instance of that type and most everything will trivially count as a cause of most everything else. On the other hand, if  $c+e$  is too coarsely grained, we get the same result; most everything will count as a cause of most everything else. So to be useful, the regularity theory needs some account of how in general to ascertain types for events.

Here is where an Occasionalist could attempt to seize the opportunity to address this deficiency and be rewarded with an account of occasional causation.

**5.2. Causal Process Theories.** Another Humean (and thus occasionalist-friendly) approach to causation is the ‘causal process’ approach, advocated most prominently by Max Kistler (1999) and Phil Dowe (2000), with a precursor in Wesley Salmon’s (1977, 1993) work. The essential idea is to identify cause-effect relations by looking at whether two events exhibit an appropriate physical (and Humean) connection. In Dowe’s version, the Conserved Quantity (CQ) account, a causal process is defined the path of a conserved quantity through space and time, and a causal interaction as a transfer of a conserved quantity among causal processes. The result is a necessary condition: For two events to be in a cause-effect relation, there needs to be some path from cause to effect through causal processes and their interactions.

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<sup>2</sup>This reasoning assumes that the microscopic structure of the actual world is rich enough for absolutely exact repetitions of events to be extremely rare. This is a reasonable assumption given what we now know about physics.

In one respect, this necessary condition is overly weak. Assuming (as the causal process approach intends) that at least some actual subatomic particles are causal processes and their collisions are causal interactions, the vast majority of events that are within each other's light cone satisfy the condition. This consequence makes the causal process theory's concept of causation unsuitable for distinguishing causes that generally bring about the same kind of effect. For example, for any mundane incidence of influenza, each virus particle counts as a partial cause but so does every pebble on the Moon.

In another respect, this necessary condition is overly strong. If interactions occur only by way of fields rather than corpuscles, there are likely no paths of conserved quantities, so that virtually no causal interactions will be deemed to exist. It is unclear whether and how the CQ account applies to the actual world given what we currently know about physics.

Exactly what causal process theories are attempting to accomplish is unclear. It might be hoped that they would provide the resources to reduce all causal relations to facts about the motions of elementary particles, but its main advocates do not advance this idea. In Kistler's version, in particular, laws are invoked in addition to the motions of particles.

The relevance of causal process theories to occasionalism is that causal process theories, setting aside Kistler's version perhaps, are intended to treat efficient causation as non-fundamental. The claim would be that fundamentally there is space-time inhabited by particle world lines and conserved quantities shifting around, a Humean mosaic; but those resources, without any fundamental efficient causation, are adequate for establishing all cause-effect relations. Can a contemporary occasionalist build on this idea? Maybe, but it would first require being clearer about what the theory of occasional causation is intended to achieve.

**5.3. Counterfactual Theories of Causation.** Counterfactual theories of causation have mostly been understood as attempting to reduce causation to some non-causally loaded assertions that essentially involve counterfactual conditionals. They constitute one approach to

modeling efficient causation as non-fundamental. However, broadly speaking, counterfactual theories of causation may be understood as trying to reduce some (but not necessarily all) non-trivial aspects of causation to facts about how effects counterfactually depend on their causes. This broader construal of counterfactual theories is compatible with the existence of fundamental relations of efficient causation.

The best motivation for counterfactual theories of causation is that causes affect, and counterfactual theories are best positioned to account for this aspect of causation. That causes affect is not a truism. Paradigmatically, causes affect the future. What it means for an action or event  $C$  to affect the future is for  $C$  to make the future different from the way the future would have been had  $C$  been otherwise. This definition of ‘affecting’ is framed in terms of counterfactual dependence. To make it more precise, we could set up a contrast between two “what-ifs”:

- On the one hand, we consider what would have happened if  $C$  had occurred.
- On the other hand, we consider what would have happened if  $C$  had not happened or had happened somehow different from the way it actually occurred.

If there is a mismatch between what these two ‘what-if’s dictate for what happens,  $E$ , at any given time and place, we say that  $E$ ’s occurrence *counterfactually depends* on  $C$ ’s occurrence. Counterfactual theories basically claim that causation exists when the right kind of counterfactual dependence occurs.

This rough idea has been spelled out in various ways. The most popular versions (Lewis 1973) rather preposterously assume that measures of counterfactual dependence should obey the semantics of natural language counterfactual conditionals. Most discussion of the topic also assumes the goal is to propose principled rules that match intuitive judgments about what caused what in particular (though perhaps imaginary) circumstances.

The relevance of counterfactual theories of causation for occasionalism is that mainstream advocacy for the counterfactual approach tends to be motivated by rejection of the idea that events in spacetime are related by any “necessitation” or any sort of efficient causation that goes beyond what is implied by the layout of matter in spacetime. Yet the

biggest problem using the resources of counterfactual theories of causation in support of occasionalism is that the only theories of counterfactual dependence that are even remotely plausible employ underlying causation-like relations—laws of nature—which occasionalists eschew. So the task for the occasionalist is to formulate a theory of counterfactual dependence that makes sense of how apparent causes seem to affect later events without incorporating any fundamental metaphysics that involves laws of nature governing how the universe evolves. The two choices for an occasionalist are then as follows: (1) to provide some theory of how counterfactuals work (for example, how they depend on God's will) that give rise to something like a non-fundamental law that plays a role dictating how nature develops through time. (2) to provide some theory of how counterfactuals work that bypasses seemingly fundamental laws yet vindicates counterfactual dependencies like those evident in our knowledge of the natural world.

**5.4. Probabilistic Theories.** Much the same can be said about probabilistic theories of causation. One way in which probability can be introduced into a theory of causation is to understand it as built into the fundamental dynamical law that propagates the present state of the universe into the future. This way would simply be a more permissive version of the determination account of causation.

Yet, the more widely discussed way of incorporating probability into a theory of causation is friendly to the Humean and occasionalist perspective. The family of theories that are standardly grouped together under the label 'probabilistic theories of causation' are distinguished by relying on a special understanding of 'probabilistic relation'. Probabilistic relations in effect come from a suitably large collection of scenarios all of which instantiate the right kind of initial conditions, from which are derived statistical relations among suitable event types. In special cases, the statistics might be cleaned up to respect symmetries, for example, setting the probability of coin flip outcomes to  $1/2$  even when the frequency of heads deviates from  $1/2$ .

Then, causation among event types is defined as the right kind of probabilistic relation. A simplistic version would have  $C$  causing  $E$  iff  $p(E|C) > p(E| \neg C)$ . This simplistic version is widely perceived to need

adjustment so as not to imply that  $C$  is a cause of  $E$  when the equation holds merely because  $C$  is an effect of  $E$  or merely because  $C$  and  $E$  are both effects of some common cause. There are further conditions that need to be accounted for as well. Specifying an adequate theory of causation along these lines has met with great difficulty and has not yet succeeded. What's more, no one has yet sufficiently characterized the purpose of probabilistic theories of causation.

These probabilistic theories of causation are straightforwardly compatible with occasionalism in the sense that the causal relations among singular (token) events are not fundamental. A single event of type  $C$  is a cause of an event of type  $E$  only insofar as there exist the right kind of statistical patterns in the Humean mosaic. Though there are many similarities between probabilistic theories of causation and regularity theories, perhaps the probabilistic theories are perceived more positively because they at least possess a richer set of resources that correspond with the scientific practice of identifying causal factors.

## 6. CONCLUSIONS

The first of the two questions that inspired our discussion was, "What is an occasionalist cause?" This question has not yet been given a detailed answer by occasionalists. Al-Ash'arī held that God causes everything natural by way of a freely chosen, self-imposed habit (*ajra al-'adah*). But what occurrences are linked via occasional causation? We might say those events that follow in accordance with God's habit, yet without more detail, it is difficult to draw precise conclusions. Al-Ghazālī and Nursi suggested that spatio-temporal contiguity and regularity marked the presence of occasional causation, but like Hume after them, did not clarify what is accomplished by defining occasional causation in that way. Why is it better to speak, like al-Ghazālī, of effects *with* cause rather than some other way that is also consistent with the tenet that no genuine causes occur in nature? No sufficiently detailed answer has yet been presented.

The second question was essentially, "Does anything in the contemporary study of causation bolster the case for occasionalism?" Here, we discovered an intriguing possibility. Modern physicists often tinker with models of the universe where space-time and the matter inhabiting



space-time are non-fundamental. If some such model were empirically adequate—by determining how matter is arranged in space and time—it would vindicate the occasionalist doctrine in the sense that all causation in the natural world (of matter in space-time) would be entirely derivative, holding merely by virtue of necessitating relations coming from outside of space-time to jointly fix how matter and space-time are arranged.

For this reason and because occasionalism has been largely perceived as a historical curiosity rather than a live philosophical doctrine, there is a promising opportunity to develop occasionalism further than was ever imagined by its first proponents.

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