

# Cross-Temporal Necessitation? A Reply to Leininger

**Abstract:** According to Leininger, proponents of absolute becoming cannot explain why past and present regularities persist in the future. In order to do so, they would have to appeal to enforcers, such as causation, laws or dispositions. But in a world with no future, these enforcers are powerless and cannot guarantee future regularity. I disagree and offer two answers to Leininger's coordination problem: (1) By endorsing (open-future) Humeanism, the coordination problem can be avoided altogether. (2) By endorsing non-Humeanism, the coordination problem can be met by distinguishing type- from token-level necessitation. Whereas token-level necessitation is cross-temporal in nature and subject to the coordination problem, type-level necessitation is atemporal and immune to the coordination problem. For this solution to work, though, type-level necessitation must be ontologically prior to token-level necessitation. With respect to nomic necessitation, this forces us to adopt a Platonist position according to which universals are transcendent, and not immanent.

## 1. Leininger's argument against future deniers

The notion of **absolute becoming** is key to accommodating time's passage, the unreality of the future, and 'genuine' ontological change. Let us call proponents of absolute becoming **Future Deniers** (or FuDs for short). According to Leininger (2021, 1), FuDs are in trouble as "[t]here is a serious metaphysical problem with absolute becoming".

The problem is the following. According to Leininger, **the world is regular**: there are universal generalizations of the form *all Fs are Gs*. What is more, "there is a fact about the world that what comes into existence is *coordinated* with what comes before in that these universal generalizations are realized. That is, what comes into existence *continues* to maintain this orderly arrangement of the world." (p. 4) Call this the **continuing regularity assumption**.

Given the continuing regularity assumption, FuDs (*i.e.* presentists and growing blockists, but not eternalists or moving spotlights) face a **coordination problem**: how to explain the *continuing* regularity of the world? That is, why do past and present regularities *persist* in the future when the future comes into existence?

A standard way of answering the coordination problem for FuDs is by **appealing to enforcers** (causation, laws of nature, dispositions) to guarantee that what comes into existence must preserve past and present regularities. Enforcers constrain what comes into existence by introducing a **necessary connection N** between present states of affairs F and future states of affairs G, expressed as  $N(F, G)$ , such that if F presently exists, G must necessarily follow when the future comes into existence.

But Leininger argues that in a FuD world (with no future) the **enforcers are powerless** and *cannot* guarantee future regularity. That is,  $N(F, G)$  cannot ensure that G will follow F. After all, if F presently exists, then G is future and does not exist for FuDs. But since the necessity relation N is existence-entailing, both F and G need to exist. Hence, as long as G does not exist, N does not exist, and  $N(F, G)$  cannot be used to necessitate G into existence.

According to Leininger, then, an explanation of regularity requires the future to exist. Hence, **FuD are wrong**: there is no absolute becoming (no ontological shift in which the unreal future becomes real in the present). The future does not come into existence; it already exists. Eternalism is the correct ontology of time.

## 2. Outline of my reply

I do not agree with Leininger's argument against FuDs. My reply is twofold:

- I. I argue that FuDs can avoid the coordination problem altogether by **rejecting the continuing regularity assumption** (§3). This approach will lead to open-future Humeanism which I show to be compatible with FuD worlds (§4).
- II. If we do *not* reject the continuing regularity assumption, then FuDs *do* face the coordination problem. I show the coordination problem to be a variation

of the well-known **problem of cross-temporal relations** (§5) and suggest that the cross-temporality at issue can be avoided by distinguishing between **type- and token-level necessitation** (§6). Whereas token-level necessitation is cross-temporal in nature, type-level necessitation is atemporal, and can therefore be used to explain the continuing regularity of the world. Given space constraints, I develop this type of response for causal necessitation (§7) and nomic necessitation (§8), although I believe it can be generalized to metaphysical necessitation as well.

Having thus answered the coordination problem, I briefly conclude and offer some thoughts for future research (§9).

## 3. Rejecting the regularity assumption

Leininger simply *assumes* the continuing regularity of the world, and then demands an explanation for this fact, which she dubs the coordination problem, and which she claims no FuD can successfully answer (§1). Any Humean worth its feathers though will reject Leininger's continuing regularity assumption. Even if the world has been regular so far (*i.e.* up till the present moment), there is nothing on the Humean picture that *requires* the world to remain regular in the future. (It is not because no object *ever has* travelled at superluminal speeds in the past and present, that no object *ever will* travel at superluminal speeds in the future.)

The reason for this is that, on the Humean view, **there are no necessary connections** between events. Remember Hume: "All events seem entirely loose and separate." As such, the world does not *have to be* the way it is (by necessity); it just *is*. All Fs do not *have to be* Gs (by necessity); it just happens to be the case that, so far, all Fs *are* Gs.

In other words, the regular, constant conjunction of Fs and Gs in the Humean mosaic of events (up till the present moment) is a complete fluke — a **cosmic coincidence**, a mere contingency. And without necessary connections between Fs and Gs, nothing on the Humean picture guarantees that all Fs will remain Gs in the future. Past and present regularities may not persist in the future, contra Leininger's continuing regularity assumption.

## 4. Open-future Humeanism

The question, however, is whether FuDs can appeal to the Humean response, as outlined in §3? That is, can one combine an open-future ontology of time (such as presentism or growing blockism) with a Humean metaphysics?

At first sight, the answer may seem to be 'no'. Following Lewis, most Humeans take the Humean mosaic to consist of *all* the events there are in the history of the world, both past, present *and* future. They consider the Humean mosaic to be a static, four-dimensional spacetime block, comprising the entire spatial and temporal expanse of the Universe. As such, eternalism and Humeanism have long been natural allies (Backmann, 2018, 12).

But there is an alternative position on the market, **open-future Humeanism**, which is supposed to be compatible with an open future, as postulated by FuDs. Open-future Humeanism is commonly linked to growing block theories. Smart (2018), for example, has developed an open-future Humean account of laws of nature that he calls *Hypertemporal Humeanism* and which “is based on a growing-block Humean metaphysic” (p. 99).

But could a presentist, who has access only to present facts, be an open-future Humean? While a growing blockist has a 4D block of past and present events from which to infer the Humean laws of nature, the presentist is limited to a 3D slice of present events, which may not be enough. Miller (2013) thus writes that “we cannot extract Humean laws from the present moment: we need access to the entire mosaic of facts in order to determine the appropriate systematization of those facts.” Smart (2018, 101) concurs that presentism “is prima facie ill-suited to Humean conceptions [since the presentist] thesis provides only a very small supervenience base” for the laws of nature to supervene upon.

However, although past events do not exist for the presentist, and so cannot act as truthmakers for past-tensed statements, the presentist has come up with a variety of answers to the truthmaker problem, and may well argue that she *can* make sense of past-tensed statements, such as “Dinosaurs have existed”. As such, she may include these as facts describing how the Humean mosaic was like in the past, and can thereby enlarge her supervenience base for the laws of nature.

I thus contend that **all FuDs (whether presentist or growing blocker) can endorse open-future Humeanism.**

## 5. The problem of cross-temporal relations

But suppose FuDs do *not* want to subscribe to a Humean metaphysic, and are driven by non-Humean convictions. In that case, the Humean way out of the coordination problem (§2-3) is not available to FuDs, and FuDs need to come up with an answer as to how the world continues to be regular in the future.

Although Leininger nowhere makes it explicit, I maintain that her coordination problem is a new variation of the more general **problem of cross-temporal relations**. Following McDaniel (2009, 235) and Baron (2012, 2), the problem of cross-temporal relations can be stated as follows:

### The Problem of Cross-Temporal Relations for Presentism:

- (P1) Relations require the existence of their relata (assumption)
- (P2) Some relations are cross-temporal and hold between present and non-present events (assumption)
- (P3) Non-present events exist (from P1, P2)
- (P4) If presentism is true, non-present events do not exist (assumption)

Therefore

- (C1) Presentism is false (from P3, P4)

P1 is the assumption that all **relations are existence-entailing**. That is, for a relation to hold, its relata must exist. This assumption is often referred to as the *Principle of Relations*: “Necessarily, if an entity *a* stands in a relation *R* to an entity *b*, then *a* and *b* exist” (Inman, 2012, 56).

P2 is the assumption that many **relations are cross-temporal**. They are exemplified by relata that occur at different times and thus ‘cross time’. Oft-cited examples of such relations are precedence relations, such as *earlier than* and *later than* (“Newton’s birth is earlier than Einstein’s”), comparative relations (“I am bigger (now) than Einstein (was)”) and causal relations (“Yesterday’s storm caused today’s flood”).

P3 is the assumption that **non-present events exist**, and follows from P1 and P2. P4, finally, is the presentist assumption that **non-present events do not exist**. Indeed, according to the presentist credo, necessarily, everything that exists, is present. Past and future events and entities, such as dinosaurs and super-intelligent robots, do not exist. (Notice that the presentist does not

maintain that past and future events do not exist *now*, which is trivially true, but that they do not exist *simpliciter*.)

Given the contradiction between P3 and P4, it is not obvious how the presentist can account for the truth of claims involving cross-temporal relations. What is more, given the pervasiveness and variety of cross-temporal relations, the problem of cross-temporal relations has reared its head in a plethora of ways.

One specific variation on the cross-temporal theme is the **problem of causation**. Assuming that causes *C* are prior to their effects *E*, all causal relations *N(C, E)* are cross-temporally exemplified, and are therefore subject to the problem of cross-temporal relations (Graziani, 2018). Here is Leininger’s formulation of the problem (p. 8):

“N is supposed to be a connection, and a connection cannot exist without its *relata*. This rules out that N comes into existence when [C] comes into existence, because, at that point, one of the *relata* (E) does not [yet] exist. Now, if N comes into existence only when E comes into existence, then [C] can exist without N. And there is nothing about [C] itself that determines that E must exist (because N is what connects [C] and E). This is what N is supposed to ensure: N is what guarantees E’s existence. But if N does not exist without E, N cannot guarantee E’s existence. [C], therefore, can exist without E following.” (In the original, Leininger refers to the uninterfered-with cause *UC*, rather than *C*.)

## 6. The coordination problem

Since Leininger’s coordination problem essentially *generalizes* the problem of causation (§5) to other enforcers, such as laws and dispositions, it forms yet another variation on the same cross-temporal theme. Here, then, is my own formulation of the coordination problem:

### The Coordination Problem for Future Deniers:

- (P1) Relations require the existence of their relata (assumption)
- (P2) Necessitation relations are cross-temporal and hold between present and future states of affairs (assumption)
- (P3) Future states of affairs do exist (from P1, P2)
- (P4) If presentism or growing blockism are true, future states of affairs do not exist (assumption)

Therefore

- (C1) Presentism and growing blockism are false (from P3, P4)

The contradiction that ensues between P3 and P4 suggests that FuDs cannot appeal to enforcers to explain the continuing regularity of the world. As Leininger (p. 2) herself explains: “Ultimately, the regular nature of the world demands postulation of a relationship [N(F, G)] between what exists [F] and what does not [G], a relationship that cannot, in principle, be supplied” given the assumption that relations are existence-entailing.

A variety of strategies have been proposed to meet the problem of cross-temporal relations. But can they also answer Leininger’s coordination problem? FuDs will want to retain P4 (one cannot, by definition, be a FuD and maintain that future states of affairs do exist). FuDs must therefore respond to the coordination problem by rejecting either P1 or P2.

The first strategy consists in **rejecting the Principle of Relations**, and denying that cross-temporal relations are existence-entailing. According to Ingram & Tallant (2022), “presentists who go this route deny “serious presentism” and start down the road towards Meinongianism, a position which many find quite undesirable.” As such, I will not further entertain this strategy here.

The second strategy consists in **denying that necessitation relations are cross-temporal in nature**. *Prima facie*, this strategy may not seem much more promising. After all, in order to ensure that the regularities *persist*, it seems that the necessary connections have to be cross-temporal. Yet, I believe there is a way of avoiding the cross-temporal threat by distinguishing between two kinds of necessitation: type-level and token-level necessitation.

## 7. Type- and token-level causal necessitation

In what follows, I focus first on *causal necessitation* (§7) and then consider *nominal necessitation* (§8). The key to solving Leininger’s causal coordination problem, I maintain, is the distinction between **two kinds of causation** which occur at two different ontological ‘levels’ (see e.g. Hausman, 2005):

- (1) *singular causation* or *token-level causation*, such as  $Cx \rightarrow Ex$  (where the causal relation holds between a token cause  $Cx$  and a token effect  $Ex$ );
- (2) *general causation* or *type-level causation*, such as  $C \rightarrow E$  (where the causal relation holds between a type cause  $C$  and a type effect  $E$ ).

**Token causes and effects are particular events** which can be located in space and time. Assuming that causes are temporally prior to their effects, token-level causal relations are cross-temporal, linking a present cause to a future effect, or a past cause to a present effect.

**Type causes and effects, in contrast, are kinds of events.** Since kinds of events can have multiple instances, they cannot be located in space and time. Type-level causal relations therefore fail to be spatiotemporal and can best be thought of as atemporal in nature (Mumford & Anjum, 2011, 14).

As Baumgartner (2020, 310) explains, **type- and token-level causation are not independent**. Which kind of causation is ontologically prior to the other, though, is open for debate. For our purposes, we will need to argue that type-level causation is more fundamental than token-level causation if we want to avoid the problem of cross-temporality. That is, we will need to argue that the presence of a causal relation between token events  $Cx$  and  $Ex$  obtains *in virtue of* a more general connection between event types  $C$  and  $E$  (of which  $Cx$  and  $Ex$  are tokens):  **$Cx \rightarrow Ex$  in virtue of  $C \rightarrow E$** .

Due to space constraints, I will not develop this argument here, but see Tooley (1987) for a defense of this priority claim. In what follows, I merely intend to show how this move allows us to answer Leininger’s coordination problem.

In all of the above formulations of the coordination problem (see underlined text in §§1, 5 and 6), Leininger systematically fails to distinguish between the type- and token-level. She thus continually writes  $C$  and  $E$ , rather than  $Cx$  and  $Ex$ , for *token* causes and effects, and thereby wrongly assumes that they populate the same ontological level as  $N(C, E)$ . Hence, Leininger wrongly assumes that  $N(C, E)$  cannot exist as long as  $Cx$  and  $Ex$  ( $C$  and  $E$  in her notation) do not exist.

But  $N(C, E)$  is a relation at the *type-level*, linking *type* causes to *type* effects. And on the assumption that *type-level* causation is ontologically prior to *token-level* causation, the causal necessity relation  **$N(C, E)$  atemporally holds**, prior to and independently of any spatiotemporal instantiation of this relation at the token level. As such,  $N(C, E)$  *can* be invoked to explain why  $Ex$  must follow  $Cx$ , even though  $Ex$  does not (yet) exist.

The cross-temporal problem, in other words, can be avoided by invoking an atemporal necessitation relation at the *type-level* to bring its cross-temporal instantiations at the *token-level* into existence.  **$Cx \rightarrow Ex$  in virtue of  $C \rightarrow E$** .

## 8. Type- and token-level nomic necessitation

A similar strategy can be used with respect to nomic necessitation. The standard governing account of laws was independently proposed by Dretske (1977), Tooley (1977) and Armstrong (1983), and is often referred to as the **DTA account**.

According to DTA, **laws of nature are necessary relations between universals** that ensure that certain patterns hold among the particulars that instantiate those universals. That is, a regularity of the sentential form “All  $F$ s are  $G$ s” is a law of nature *iff* (1)  $F$  and  $G$  are universals, and (2) a modal relation of non-logical or contingent necessitation holds between  $F$  and  $G$ . This (higher-order) state of affairs may be symbolized as  $N(F, G)$ , with  $N$  the nomic necessitation relation binding  $F$  to  $G$ .

According to DTA then, if the modal relation  $N(F, G)$  holds,  $G$  has to be instantiated whenever  $F$  is instantiated. In other words, whenever a particular

$x$  instantiates the property  $F$ , the instantiation of  $F$  ( $Fx$ ) guarantees, via  $N$ , that the property  $G$  will also be instantiated ( $Gx$ ).

Importantly, whereas  **$Fx$  and  $Gx$  are tokens** (particular states of affairs, that is, particular instances of universals) which can be located in space and time,  **$F$  and  $G$  are types** (types of states of affairs, that is, universals) which can be multiply instantiated and therefore cannot be obviously located in space and time. What stands in spatiotemporal relations to one another are the states of affairs (this thing’s being  $F$ , that thing’s being  $G$ , that is,  $Fx$  and  $Gx$ ), *not* the universals ( $F$  and  $G$ ) that they instantiate.

Compare Armstrong (1989, 99): “To talk of locating universals in space-time [is] a crude way of speaking. Spacetime is not a box into which universals are put. Universals are constituents of states of affairs. Space-time is a conjunction of states of affairs. In that sense universals are ‘in’ space-time. But they are in it as helping to constitute it.” (If they are to be located at all, universals should be located where their instances are, so they would occupy multiple locations simultaneously.)

As a result, the relation of nomic necessitation  $N$  itself fails to be cross-temporal as it links the universals  $F$  and  $G$ , neither of which is spatiotemporally located in an obvious sense. The different instantiations of  $N(F, G)$ , however, *are* cross-temporal. Armstrong, for example, takes them to be cases of singular causation where  $Fx$  at one time is causally connected to  $Gx$  at a later time.

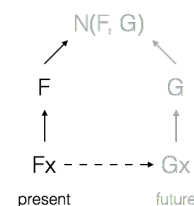
What is more, by postulating a nomic necessitation relation  $N(F, G)$  on the type-level (as opposed to the token-level), DTA suggest that the type-level is more fundamental than (read: ontologically prior to) the token-level. Indeed, according to DTA,  $Fx$  cross-temporally necessitating  $Gx$  on the token-level obtains *in virtue of*  $F$  atemporally necessitating  $G$  on the type-level:  **$Fx \rightarrow Gx$  in virtue of  $F \rightarrow G$** . So just as with causal necessitation (§7), the cross-temporal problem can be avoided by carefully distinguishing between *type-* and *token-level* relations of nomic necessitation.

Yet, a further problem looms, one that becomes salient when we consider Armstrong’s specific developments of DTA. Part of Armstrong’s metaphysics is the (Aristotelian) claim that **universals are immanent**. Following Hildebrand (2019, 2), this can be captured by the thesis that states of affairs are prior to universals, where the relation is one of *ontological priority*. Contrast this with the (Platonic) claim that universals are transcendent, as captured by the thesis that universals are (ontologically) prior to states of affairs.

Armstrong’s immanence thesis entails the Principle of Instantiation which says that **there are no uninstantiated universals**. “A property must be a property of some *real* particular; a relation must hold between *real* particulars”, says Armstrong (1983, 75). So for universal  $F$  to exist, there needs to be at least one instance of  $F$ , that is, one state of affairs  $Fx$ . Similarly, for universal  $G$  to exist, there needs to be at least one instance of  $G$ , one state of affairs  $Gx$ .

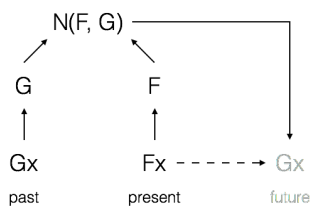
In what follows, I argue that my proposed solution to the nomic coordination problem is incompatible with Armstrong’s immanence thesis, and requires us instead to adopt the transcendence thesis.

Here is why. Imagine  $Fx$  presently exists. By the Principle of Instantiation, the universal  $F$  exists. The question is: why does  $Gx$  invariably follow  $Fx$ ? Invoking  $N(F, G)$  seems problematic, because  $Gx$  does not (yet) exist, and so the universal  $G$  does not (yet) exist. If  $G$  does not exist, then  $N(F, G)$  does not exist by the Principle of Relations, and so  $N(F, G)$  cannot be used to explain why  $Gx$  must follow  $Fx$ .



However, it is sufficient that in the past, a particular instantiated the property  $G$  in order for  $G$  to exist, and thereby  $N(F, G)$ . Hence, since  $N(F, G)$  *does* exist, it can be invoked to explain why the presently existing  $Fx$  will cause  $Gx$  to exist.

Notice, however, that this option is only available to the growing blocker, for whom the past exists. For the presentist, in contrast, the sum total of temporal facts is restricted to the present, and so even if the property G would have been instantiated in the past, its instantiation Gx no longer exists, and by extension G no longer exists.



But even the growing blocker runs into further problems. The above argument fails when one considers the situation at the beginning of the universe, and imagines that Fx presently exists. Since there is no past for Gx to exist, G does not exist, N(F, G) does not exist, and so N(F, G) cannot be invoked to explain why Fx yields Gx.

Recall however that for Armstrong “[a] property must be a property of some *real* particular” and “a relation must hold between *real* particulars.” Concerning the term ‘real’, Armstrong (1983, 75) clarifies: “What is real, however, is not to be confined to the present. Past, present and future I take to be all and equally real. A universal need not be instantiated *now*.” So, even though Gx does not presently exist, and even though there is no past for Gx to exist, perhaps it is sufficient that Gx *will* exist at some future time, in order for G to be realized, and for N(F, G) to exist such that Fx indeed yields Gx?

Although strange, and having an air of backward causation, I believe Armstrong would grant this possibility, but only within an eternalist framework where past, present and future exist and are “equally real” as he himself points out. If the future is as real as the present, then a future Gx is as good an instantiation of the (timeless) universal G as a present or past Gx. But notice, once again, that this option would not be available to a Future Denier, for whom the future does *not* exist, and hence a future Gx cannot be invoked to explain the alleged existence of G.

It thus seems that we are forced to reject Armstrong’s Aristotelian Principle of Instantiation, and adopt a Platonist position instead according to which **universals are transcendent** and do not need any particular instantiating that property for the universal to exist. That is F and G can exist, even if there nowhere is an Fx or Gx. Indeed, according to the Platonist, universals can lack spatiotemporal location altogether; they exist in “Platonic heaven”. Now, if F and G exist, independently of Fx and Gx, then by the Principle of Relations, N(F, G) exists, and N(F, G) can be invoked to explain why Fx will always be followed by Gx, thereby answering Leininger’s coordination problem.

## 9. Conclusions

I have argued that FuDs can meet the coordination problem in two ways:

- (1) By endorsing (open-future) Humeanism, FuDs can reject the continuing regularity assumption and avoid the coordination problem altogether.
- (2) By endorsing non-Humeanism, FuDs can answer the coordination problem by distinguishing between type- and token-level necessitation. For this to work, however, the type-level has to be ontologically prior to the token-level. With respect to the governing account of laws, this forces us to adopt a Platonist position according to which universals are transcendent, and not immanent.

Although I am not the first to conclude that universals must be transcendent (see, e.g. Hildebrand, 2019), I believe I have reached it via a different (cross-temporal) route. It remains to be explored whether my second non-Humean response can be generalized to dispositions and metaphysical necessitation as well.

## References

Armstrong, D. 1983. *What Is a Law of Nature?* Cambridge: Cambridge University Press.

Armstrong, D. 1989. *Universals: An Opinionated Introduction*, Boulder CO: Westview Press.

Backmann, M. 2018. “No Time for Powers.” *Inquiry* 1-29.

Baron, S. 2012. “Presentism and Causation Revisited.” *Philosophical Papers* 41 (1):1-21.

Baumgartner, M. 2020. “Causation.” In *The SAGE Handbook of Political Science*, edited by D. Berg-Schlosser, B. Badie, and L. Morlino, 305-321. London: SAGE.

Dretske, F. 1977. “Laws of Nature.” *Philosophy of Science* 44: 248-68.

Graziani, E. 2018. “Presentism and Causal Processes.” *Argumenta* 4 (1): 159-176.

Hausman, D. M. 2005. “Causal Relata: Tokens, Types, or Variables?” *Erkenntnis* 63 (1):33-54.

Hildebrand, T. 2019. “Platonic Laws of Nature” *Canadian Journal of Philosophy* 1-17.

Ingram, D. & Tallant, J. 2022. “Presentism.” *The Stanford Encyclopedia of Philosophy*. Zalta, E. N. (ed.).

Inman, R. 2012. “Why so Serious? Non-serious Presentism and the Problem of Cross-temporal Relations.” *Metaphysica* 13 (1):55-63.

Leininger, L. 2021. “Coordination and Coming to Be.” *Australasian Journal of Philosophy* 1-15.

McDaniel, B. 2009. “Presentism and Absence Causation: An Exercise in Mimicry.” *Australasian Journal of Philosophy* 88 (2):323-332.

Miller, K. 2013. “Presentism, Eternalism, and the Growing Block.” In *A Companion to the Philosophy of Time*, edited by H. Dyke and A. Bardon, 345-364. West Sussex: John Wiley & Sons, Inc.

Mumford, S. & Anjum, R. L. 2011. *Getting Causes from Powers*. Oxford: Oxford University Press.

Smart, B. 2018. “True-to-Hume laws and the open-future (or Hypertemporal Humeanism).” *South African Journal of Philosophy* 37 (1):99-110.

Tooley, M. 1977. “The Nature of Laws.” *Canadian Journal of Philosophy* 7: 667-698.

Tooley, M. 1987. *Causation: A Realist Approach*. Oxford: Clarendon Press.

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