Competing Explanations and Explaining-Away Arguments

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Abstract: An "explaining-away argument" [EAA] aims to discredit some explanatory hypothesis by appealing to the explanatory power of an alternative hypothesis. Nietzsche's genealogical argument against theism and Darwin's case against Paley's "old argument of design in nature" are famous examples. In order for EAAs to have their negative force, they must satisfy several conditions. After clarifying these conditions, I focus in on one in particular: the two hypotheses in question offer potential explanations that *compete* with one another. I develop a formal account of what it takes for potential explanations to compete, and I use this account to argue that EAAs are often misapplied today. This is due to the fact that philosophers often fail to appreciate the subtle line dividing competing from non-competing explanations.

Keywords: Bayesianism, Evolutionary Theory, Explaining Away Arguments, Explanatory Reasoning, Hypothesis Competition, Intelligent Design.

1. Introduction

In several works, Nietzsche attempts to undermine theism by appealing to explanations of the human origins of belief in God. He writes, "How [belief in God] originated can at the present stage of comparative ethnology no longer admit of doubt, and with the insight into that origin the belief falls away."[1] In *Daybreak*, Nietzsche remarks with particular clarity on the structure and power of such arguments:

> *Historical refutation as the definitive refutation.*—In former times, one sought to prove that there is no God—today one indicates how the belief that there is a God could *arise* and how this belief acquired its weight and importance: a counter-proof that there is no God thereby becomes superfluous.—When in former times one had refuted the 'proofs of the existence of God' put forward, there always remained the doubt whether better proofs might not be adduced than those just refuted: in those days atheists did not know how to make a clean sweep.[2]

Here, Nietzsche conveys the idea that justification for theism is completely swept away once one has a potential explanation for such belief that does not appeal to its truth—one which accounts for such belief in purely human terms. An example would be the following rough encapsulation of the explanation on offer in *On the Genealogy of Morals*: Religious belief owes its origins to the development of the "bad conscience", which itself arose out of the internalization of humanity's violent animal instincts.[3] Even if this human explanation is merely a "how-possibly story," Nietzsche asserts that this is enough to discredit theism altogether, to "freeze it to death."

Regardless of what one thinks about Nietzsche's particular argument, the argument form that Nietzsche employs does seem to have the potential to carry a good deal of normative weight. Our justification for believing some explanatory hypothesis can often be entirely undermined by the consideration of an alternative explanation. Let us call arguments that attempt to discredit some hypothesis by appealing to the explanatory power of some alternative hypothesis "explaining-away arguments" (hereon, "EAAs"). Far from being unique to Nietzsche, such arguments are generally prevalent in contexts of philosophical and theoretical reasoning.[4]

One may distinguish no less than three ingredients for any successful EAA:

Explanatory Justification. Our justification for believing or considering some hypothesis H hinges crucially on the explanatory power that H has over some evidence E.

Explanatory Competition. Alternative hypothesis T offers a potential explanation of E that competes with the one H proffers.

Epistemic Inferiority. T is H's acknowledged epistemic superior (T may be known to be true, more probable, a better explanation of E, etc.).

Each of these components is necessary for a successful EAA. (1) If **Explanatory Justification** does not hold, then we may be justified in maintaining belief in H even if T debunks the relevant *explanatory* reasons we otherwise had for believing H. Not all reasons are explanatory reasons, and not all explanatory reasons have to come by way of H's potential explanation of E. (2) If **Explanatory Competition** is not satisfied, then T and H do not compete as explanations of E; in that case, if both T and H are justified on account of their explanations of E, then we would do well just to accept both of these hypotheses. (3) If **Epistemic Inferiority** does not hold, the argument will either not favor either hypothesis, or it will serve to discredit T rather than H depending on whether H is T's acknowledged epistemic superior.

While a full logical account of EAAs would require a detailed analysis of each of these components, this paper focuses exclusively on **Explanatory Competition**. In Section 2, I offer a probabilistic explication of the notion of competition between potential explanations. Section 3 then uses this account to explore the logical implications of EAAs. Section 4 gleans some insight from the philosophy of science, introducing an important caveat for the proposed account. Finally,

Section 5 applies the lessons learned back to the philosophy of religion, with special attention to the intelligent design debate. The result will be a clearer perspective on the use (and misuse) of EAAs.

2. When Explanations Compete

According to **Explanatory Competition**, H and T must offer competing potential explanations of E. But what precisely does it take for explanations to compete in EAAs? Here, we should first highlight the epistemic nature of our task. While there are arguably deep, ontic senses in which hypotheses compete, we are interested in explicating the sense(s) in which hypotheses may compete in an agent's epistemic economy. In EAAs, we consider hypotheses to be epistemic competitors in the sense that reason compels us to infer at most one of these relative to E (i.e., barring other arguments and evidence outside of explanandum E). Such hypotheses may or may not compete in a non-epistemic sense. The relevant question is thus when ought (rationally) we accept at most one of a number of explanations, as opposed to just accepting them all?

Consider the most obvious sense in which hypotheses may compete: they may be mutually exclusive. While mutually exclusive hypotheses surely compete ontically, they may or may not compete epistemically. The inconsistencies by virtue of which these hypotheses preclude one another may be tucked so subtly away into the fabric of the respective hypotheses, or the logical demonstration of such inconsistencies may be so computationally complex, that no rational person need recognize them. In other words, reason may not always oblige us to choose between jointly unsatisfiable hypotheses. Nonetheless, *if an agent does recognize that two hypotheses are inconsistent*, then that recognition will serve as reason compelling the agent to infer at most one of the hypotheses. Working within a broadly Bayesian framework where probabilities measure rational credences, we get the following epistemic variation on the mutual exclusivity sense of competition:[5]

> **Competition (i).** Potential explanations H and T of E compete epistemically for agent $\mathcal{A}$ if $\mathcal{A}$'s rational credences entail $Pr(H|E) > 0$, $Pr(T|E) > 0$, and $Pr(H\&T|E) = 0$.

In this account, we need to specify that the agent has a positive credence in both H and T (conditional on E) to rule out the case where $Pr(H\&T|E) = 0$ merely due to the fact that $\mathcal{A}$ believes one of the hypotheses to be impossible taken individually. It is clear that candidate explanations that satisfy **Competition (i)** do indeed compete epistemically. If $\mathcal{A}$'s rational credences imply that two candidate explanations cannot possibly be true together, then $\mathcal{A}$ ought not accept both.

Note that **Competition (i)** describes a sufficient condition for epistemic competition; is this condition also necessary? In fact, no; it is easy to think of cases in which reason compels us to accept at most one of several potential

explanations, despite the fact that they are recognizably consistent. Our example of Nietzsche's genealogical argument against theism arguably involves just such a case. There is no inconsistency in allowing that religious belief could simultaneously be a result of the internalization of a violent human instinct and owe its existence in some way to the truth of theism. Nonetheless, for most agents, these hypotheses will rightly be viewed as epistemic competitors. An explication of explanatory competition that appeals to inconsistency will not then shed light on the sort of competition at work in EAAs like Nietzsche's.

Consider another case of consistent, epistemically competing potential explanations: I come home from a vacation to find that my basement is flooded with water. I might consider the following two hypotheses: (1) an old pipe in my basement broke; (2) heavy rains leaked in through cracks in my foundation. As noted, these hypotheses are consistent according to my background beliefs and the evidence. Nonetheless, reason compels me to choose between these potential explanations. Once I have accepted one, it would seem like inferential overkill also to accept the other.

In this example, we have some good reason to accept either hypothesis—both provide potential explanations of the evidence (flooding). However, once one of the hypotheses is accepted (say that I discover the broken pipe and so come to believe the first hypothesis), I no longer have good reason to accept the alternative hypothesis. The key point here is that, conditional on one of the hypotheses, the other loses its explanatory power over the evidence, and so we lose our explanatory reason for accepting it. The explanatory work potentially done by these hypotheses can be shown to be done entirely by one of them alone. When this happens, the explanatory hypotheses compete with respect to their common explanandum; rationally, I ought only to choose one of the hypotheses since doing so leaves the other without warrant.

In order to make this thought precise, we can take advantage of recent work on Bayesian measures of explanatory power. Table 1 lists a number of proposed candidate measures of explanatory power. All of these measures take a positive value to the extent that the hypothesis in question H is said to provide a strong or powerful explanation of the relevant explanandum E. Alternatively, these measures equal 0 when H is interpreted as "explanatorily irrelevant" to E, and are negative to the extent that H provides a strong explanation of E's being *false*. E_P and E_M are closely related. Indeed, they are *ordinally equivalent* to one another, meaning that they always impose the same rankings on degrees of explanatory power.[6] However, all of the other measures disagree on how they rank hypotheses with regards to their explanatory power. Fortunately, for the sake of this paper, we need not enter the debate over which of these measures best captures its explicandum. What will matter for the analysis of EAAs is a result on which these measures all agree.

Let $\mathcal{E}$ stand generically for any of these candidate measures. Next, define *conditional degree of explanatory power* $\mathcal{E}(E, H|T)$ as the result of adjusting any of the above measures so that all probabilities involved are conditionalized upon T—e.g., $E_D(E, H|T) = Pr(E|H\&T) - Pr(E|T)$. In terms of these measures, the idea then is:

$$E_D(E, H) = Pr(E|H) - Pr(E) \qquad E_M(E, H) = ln\left[\frac{Pr(E|H)}{Pr(E)}\right]$$

$$E_C(E, H) = Pr(E|H) - Pr(E|\neg H) \qquad E_S(E, H) = \frac{Pr(H|E) - Pr(H|\neg E)}{Pr(H|E) + Pr(H|\neg E)}$$

$$E_P(E, H) = \frac{Pr(E|H) - Pr(E)}{Pr(E|H) + Pr(E)}$$

Table 1. Candidate Measures of Explanatory Power.[7]

Competition (ii). Potential explanations H and T of E compete epistemically for agent $\mathcal{A}$ if $\mathcal{A}$'s rational credences entail $\mathcal{E}(E, H) > 0$ and $\mathcal{E}(E, T) > 0$, but $\mathcal{E}(E, H|T) \leq 0$ or $\mathcal{E}(E, T|H) \leq 0$ (or both).

Less formally, distinct potential explanations compete epistemically with respect to their common explanandum if, upon accepting one of these, the other no longer retains its explanatory power.[8]

3. The Logic of EAAs

While **Competition (i)** and **Competition (ii)** both plausibly go some way to describing the logic of competition between potential explanations, it is the latter account that better captures how explanations compete *in EAAs*. EAAs work by explaining away the justification previously available to us (that justification coming by way of explanatory reasons) in support of some hypothesis H. This is done by putting forward an alternative explanation T of the evidence, which—if accepted—negates H's explanatory power and thus also our explanatory reasons for accepting H. This is exactly the sense of competition spelled out by **Competition (ii)**. It may or may not be the case that H and T also compete in the sense of being recognizably inconsistent in these situations, but their function in EAAs is determined by whether they compete in the **Competition (ii)** sense. Accordingly, we focus on this sense of competition.[9]

It is important to note that all of the measures listed in Table 1 are "relevance measures" as defined by Eells and Fitelson.[10] That is, these measures each satisfy the following condition:

$$\mathcal{E}(E, H) = \begin{cases} > 0 & \text{iff } Pr(H|E) > Pr(H) \\ < 0 & \text{iff } Pr(H|E) < Pr(H) \\ = 0 & \text{iff } Pr(H|E) = Pr(H) \end{cases}$$

Given this fact, it follows robustly (regardless of which of the above measures one prefers) from **Competition (ii)** that hypotheses compete if they both are positively relevant to the evidence but one of them either screens off the other

from the evidence or renders the other negatively relevant to the evidence. That is:

Competition (ii) (corollary). Potential explanations H and T compete epistemically for agent $\mathcal{A}$ if $\mathcal{A}$'s rational credences entail $Pr(H|E) > Pr(H)$ and $Pr(T|E) > Pr(T)$, but $Pr(H|E\&T) \leq Pr(H|T)$ or $Pr(T|E\&H) \leq Pr(T|H)$.

We may now clarify one precise sense in which successful EAAs have their negative force. When H and T compete (à la **Competition (ii)**) as part of a successful EAA, both hypotheses are individually supported by the evidence E, in the sense that they are each more probable in light of E. However, conditional on one of these hypotheses, the other is no longer supported in this way by E. It may even be less probable in light of that same evidence once we have accepted the competing hypothesis. This fact lends formal support to our informal description of EAA's debunking effect: in light of the epistemically superior explanation put forward by T, E no longer gives us positive reason to accept H (and it may even disconfirm H).

4. Some Enlightening Complications

There are at least two sorts of cases—drawn from contemporary philosophy of science—that one can point to in order to challenge the above account, cases in which hypotheses satisfy **Competition (ii)** but nonetheless do not compete. Examining these cases will afford us a more careful articulation of the place of **Competition (ii)** in a full account of explanatory competition.

4.1. Different Types of Explanation

Philosophers of science have long been interested in describing the nature of the "explanatory relation" that links explanans to explanandum. Some of the more popular accounts of explanation characterize this relation logically, causally, teleologically, or in terms of unification by general laws. While few philosophers accept all such accounts of the explanatory relation, many philosophers accept more than one. Such philosophers often recognize the possibility that the same explanandum might be explained in different ways, appealing to different types of explanatory relation.

Consider the following example: Salmon famously asks us to consider what will happen to a helium-filled balloon floating in an airplane upon acceleration down the runway.[11] Contrary to most people's physical intuitions, the balloon will move toward the front of the plane's cabin. Two explanations of this same phenomenon may be given. "First, it can be pointed out that [...] the rear wall of the cabin exerts a force on the air molecules near the back, which produces a pressure gradient from rear to front. Given that the inertia of the balloon is smaller than that of the air it displaces, the balloon tends to move in the direction of less dense air." As Salmon notes, in this explanation, explanans

relates to explanandum as cause to effect. Second, one may appeal to Einstein's principle of equivalence, which entails that "the effect of the acceleration of the airplane is the same as that of a gravitational field. Since the helium balloon tends to rise in air in the earth's gravitational field, it will tend to move forward in the air of the cabin in the presence of the aircraft's acceleration." In this second explanation, the explanans is a general principle which unifies various phenomena, one of which is the explanandum.

The conditions spelled out in **Competition (ii)** are plausibly satisfied by these two hypotheses. That is, both the causal hypothesis C and unification-type hypothesis U have positive explanatory power over E (the balloon's motion upon acceleration). Yet, these hypotheses screen off one another from E. This is entirely due to the fact that either hypothesis alone fully predicts the phenomena (assuming the requisite auxiliary assumptions and initial conditions are loaded into the agent's background beliefs); thus:

$$Pr(E|C) = 1 = Pr(E|C\&U)$$
$$\therefore Pr(U|C) = Pr(U|C\&E)$$
$$\therefore \mathcal{E}(E, U|C) = 0$$

However, in no way would we want to consider these two hypotheses as epistemic competitors. The relation between C and U is itself a topic for debate. But what seems clear is that we are not rationally obliged to choose between them.

4.2. Causal Chains

Seeming counterexamples to **Competition (ii)** also exist in which the competing explanations in question are both of the same type. Consider a simple case of premeditated murder—a case in which, let us say, Marcy had a motive for killing Victor, which led her to shoot and thereby kill him. In this case, when looking for an explanation of Victor's death (E), we might appeal to Marcy's motive M or to her physical action of shooting him S. Both hypotheses seem genuinely explanatory and both seem to be causal—causes of Victor's death include both Marcy's motive and her act of shooting him.

In this case again, the conditions spelled out in **Competition (ii)** may be satisfied by the two hypotheses. Both M and S have positive explanatory power over E; however, given that Marcy shot Victor, Victor has some probability of dying or surviving independent of details about why Marcy shot him:

$$Pr(E|S) = Pr(E|S\&M) = p < 1$$
$$\therefore Pr(M|S) = Pr(M|S\&E)$$
$$\therefore \mathcal{E}(E, M|S) = 0$$

Again in this case, however, the hypotheses clearly do not compete; in fact, they describe two parts of the same causal chain of events: M causes S, which in turn causes E. As such, both M and S can be cited in a causal explanation of E: Victor died because Marcy shot him, and Victor died because Marcy, perhaps, believed he was unfaithful.

Far from being rationally compelled to choose between two hypotheses that sit in a causal chain terminating in E, we may actually have very strong, positive reason to accept both hypotheses—despite the fact that they satisfy **Competition (ii)**. Given the causal relations that hold between M, S, and E in the above case, E may greatly increase the probability of M on account of its connection to M through S. Even if $Pr(M|S\&E) = Pr(M|S)$, it will still be the case that $Pr(M|S\&E) \gg Pr(M)$. In such a case then, strictly speaking, it is indeed the case that in light of S, we lose any direct justification from E to M. However, this is only on account of the fact that all of the confirmation that flows from E to M—and there may be a great deal of it—is indirectly channeled by way of S.

In words, conditional on the shooting, Marcy's motive and Victor's death are no longer positively correlated. However, given the causal relations that hold between these, we nonetheless know that the probability that Marcy had a motive against Victor is greatly increased by Victor's death by way of our accepting the hypothesis that Marcy shot Victor. So, the evidence indirectly confirms M via its confirmation of S.

4.3. Prerequisites for Potential Competition

The first case above suggests that potential explanations of different kinds do not compete with one another. Reason does not incline us to choose between potential explanations that set out to achieve different epistemic ends—even if these satisfy **Competition (ii)**. One explanation may aim to spell out causal-mechanical details that lead to an explanandum's occurrence; another for the generals principles or laws that unify the explanandum to otherwise disparate phenomena. To the extent that these work to wholly distinct explanatory ends, so long as they do not directly conflict with one another, we can just as well accept both.

The second case above additionally teaches us that potential explanations do not compete when they describe different links in the same causal chain—even if these satisfy **Competition (ii)**. Indeed, it will often be the case that we should accept both as part of the same general causal story.

One might view such cases as counterexamples to **Competition (ii)**. However, we can still make this formal account do work for us if we instead use these cases to constrain the range of scenarios in which we can apply it. Think of **Competition (ii)** as an explication of what it takes for potential explanations to compete, *given that they have the potential to compete in the first place*. Next, allow that the above considerations have to do with whether explanations have the potential to compete; wholly distinct types of potential explanations, as well as those that describe different parts of the same causal story, just do not have the potential to be epistemic competitors. Making this interpretive move, we may still use **Competition (ii)** to illuminate the logic of explanatory competition between potential competitors—i.e., explanations that (perhaps *inter alia*) are of the same type and do not form complementary parts of the same causal story.

5. EAAs in Contemporary Philosophy: A Case Study

The above work on explanatory competition puts us in a better position to think about actual EAAs. In this section, I show that this is true through a case study, focusing on the debate in philosophy of religion between proponents of Intelligent Design (ID) and their critics.

EAAs are one (if not *the*) prominent mode of argumentation in this contemporary debate. One side of the debate argues that there is no longer sufficient reason to ground belief in a designer, in the wake of evolutionary theory. This line of thought can be traced back to Darwin, who notes that Paley's famous explanatory argument to design, which he once found so appealing, is undermined given the alternative theory of natural selection:

> The old argument of design in nature, as given by Paley, which formerly seemed to me so conclusive, fails, now that the law of natural selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man. There seems to be no more design in the variability of organic beings and in the action of natural selection, than in the course which the wind blows. Everything in nature is the result of fixed laws.[12]

For Darwin, natural selection and design are epistemic competitors; it is not that the former gives us reasons directly precluding or disconfirming belief in the latter, but rather that the former undermines a powerful explanatory argument in the latter's favor—namely, Paley's argument—by showing that "everything in nature" can be explained without calling upon a design hypothesis.

In the contemporary literature, EAAs are prominent in critical works against ID, and also in more general critiques of theism. Dawkins summarizes his popular case against design with the following comment: "Darwinian evolution, specifically natural selection, [...] shatters the illusion of design within the domain of biology, and teaches us to be suspicious of any kind of design hypothesis in physics and cosmology as well."[13] In his book-length criticism of ID, philosopher of biology Sahotra Sarkar frames the debate in much the same way as Darwin, presenting the relevant theories as epistemic competitors such that laying hold of either one necessitates losing one's rational grasp on the other.[14]

On the other side of the debate, ID proponents commonly offer EAAs against evolutionary theory. ID proponent and biochemist Michael Behe summarizes the thrust of his critical "biochemical challenge to evolution" as follows: "[P]urposeful intelligent design, rather than Darwinian natural selection, better explains some aspects of the complexity that modern science has discovered at the molecular foundation of life."[15] Behe presents ID and natural selection as options that we rationally ought to choose between. And if design is better able to account for certain features of nature than is natural selection, then this is not only a mark in favor of the former hypothesis, but also a mark against the latter.

So both ID theorists and their opponents put forward instances of EAAs. In both cases, roughly speaking, the evidence E in need of explanation invokes "the complex organization and functionality of living beings:" complex organisms are functionally organized for certain ways of life and their parts are adapted to perform certain functions.[16] And the two explanatory hypotheses at play are:

D(**esigner**): An intelligent being is ultimately responsible for the creation of nature.

N(**atural Selection**): The non-intelligent process of natural selection is responsible for the existence and state of nature.

The common assumption made by both sides is that these hypotheses are properly viewed as epistemic competitors. The point of divergence concerns the question of which hypothesis better explains the evidence. ID theorists point to features of complex organisms that they argue go unexplained in evolutionary theory (e.g., Behe's notion of "irreducible complexity"), but which *are* explained if there exists a designer; they thus conclude that D is the superior explanation of E, and so the justification for N from E is explained away. Their critics point to the increasing evidence in favor of evolutionary theory, and its ontological simplicity (explaining without appeal to anything but natural processes); they conclude that N is the superior explanation of E, and so the justification for D from E is explained away.

These EAAs have their critical force only for one who agrees with the above two camps that D and N are epistemic competitors. We may now bring our account of explanatory competition to bear on the debate. Consonant with the distinction we made in Section 4, we may first ask whether D and N have the potential to compete, and then—if so—whether they satisfy **Competition (ii)**.

D and N will not even be seen as potential competitors if (1) these hypotheses are taken to be putting forward different types of explanations, or if (2) D and N are believed to sit in a causal chain terminating in E. Both of these describe longstanding theistic views. An example of the first type of view can be found in concurrentist theologies of nature that require any part of nature to have a natural cause (natural things are endowed with causal powers) and a divine cause. We can explain features of nature either by appeal to natural causes or by appeal to God's activity (or both), but these types of explanation are wholly distinct. For such a concurrentist, explanations by natural selection and by design are distinguishable as different types of explanation; as such, they do not have the potential to compete.

It is easy to find theists (and theistic traditions) that support the second type of view. Those in the "theistic evolution" tradition, for example, often characterize D, N, and E as a causal chain—implying that D and N form a false dichotomy.[17] In this vein, evolutionary biologist Theodosius Dobzhansky famously writes, "It is wrong to hold creation and evolution as mutually exclusive alternatives. I am a creationist *and* an evolutionist. Evolution is God's, or Nature's, method of Creation. Creation is not an event that happened in

4004 B.C.; it is a process that began some 10 billion years ago and is still under way."[18] Philosopher of science Ernan McMullin argues for the same thesis. Moreover, he locates inklings of evolutionary theory in Augustinian theology, arguing that, far from competing with theism, evolution can historically be framed as "a Christian theme".[19]

Unsurprisingly, neither Dobzhansky nor McMullin are moved by the EAA arguments put forward by ID theorists or their opponents. Neither argument holds any force from their perspective; these arguments only have the potential to persuade those who accept that D and N have the potential to compete.

What are the prospects for the EAAs in this debate for those that *do* see D and N as potential competitors? Here, we need to explore what it takes for D and N to count as explanatory competitors in accordance with **Competition (ii)**. Is it the case that accepting either of these hypotheses cancels the explanatory power that the other has over E?[20] Here again, the answer depends on one's background beliefs. If one's theology *entails* that any intelligent being powerful enough to create nature would do so in such a way that the result would be complex and functionally adept living organisms, then D will make E a certainty, and D and N will satisfy **Competition (ii)**:

$$Pr(E|D) = Pr(E|D\&N) = 1$$
$$\therefore Pr(N|D) = Pr(N|D\&E)$$
$$\therefore \mathcal{E}(E, N|D) = 0$$

This situation will be mirrored for anyone who believes that natural selection, given enough time, will *inevitably* result in complex, functional organisms:

$$Pr(E|N) = Pr(E|N\&D) = 1$$
$$\therefore Pr(D|N) = Pr(D|N\&E)$$
$$\therefore \mathcal{E}(E, N|D) = 0$$

In either case, one hypothesis is shown to soak up all of the explanatory power with regards to E. According to our explication then, for anyone with background beliefs as described above (who also has the requisite background beliefs for D and N to have the potential to compete in the first place), D and N do indeed compete epistemically.

Many people will find these beliefs to be too extreme, maintaining that neither natural selection nor an intelligent designer implies the rise of complex, functionally organized life. On the one hand, the theory of natural selection *per se* does *not* require that life evolves from simpler to more complex organisms—or that it evolves at all. Accordingly, much energy is spent in evolutionary biology on the notion of complexity, and the question of why natural selection often guides the evolution of species in this way. On the other hand, the mere existence of an intelligent and creative being is a far cry from the sort of theistic hypothesis that would *imply* that such a being desires and is able to create complex and functionally adept organisms.

But if this is right, then both explanatory hypotheses might retain *direct* confirmation from E, confirmation that is *not* screened off via the acceptance of the alternative. In this case, absent another argument attempting to show that one hypothesis renders the other irrelevant or negatively relevant to E, the hypotheses do not compete with one another. Accordingly, neither side's EAA fully does its job of undermining the alternative's support.[21]

The upshot is that, for a wide variety of reasoners, the EAAs put forward by certain ID theorists and their critics do not get off the ground. To convince a broader spectrum of people, those putting forward such arguments must first argue that D and N truly compete epistemically. They may do this, first, by arguing that D and N have the potential to compete; here, the work may primarily be negative, criticizing theological systems that picture D and N as part of the same causal story, or those that imply that D and N are wholly distinct types of explanation. Second, they must argue that one of the hypotheses in question, taken by itself, renders the other either irrelevant or negatively relevant to E. The most obvious (though not the only) way to pursue this line is to argue that the D or N in question suffices for a full explanation of E (implies E). As things presently stand, the EAAs put forward in this particular debate would seem to have their critical force only for a rather restricted audience.

My main purpose in going through this case study is to show just how the epistemological groundwork that we accomplished in Sections 2 - 4 serves to clarify particular instances of EAAs in contemporary philosophy. Via this work, we have uncovered a common assumption of both sides of the ID debate and focused the disagreement between these camps. In addition, this work has allowed us to take notice of the expansive space of views that just do not have any horse in this race—all of those views that hold, for varying reasons, that the design and natural selection hypotheses do not compete.

Notes

[1]Friedrich Nietzsche, *Human, All Too Human*, trans. R. J. Hollingdale (Cambridge: Cambridge University Press, 1886/1986), I.133.

[2]Friedrich Nietzsche, *Daybreak: Thoughts on the Prejudices of Morality*, trans. R. J. Hollingdale (Cambridge: Cambridge University Press, 1881/1997), s.95.

[3]Friedrich Nietzsche, *On the Genealogy of Morals*, trans. Walter Kaufmann and R. J. Hollingdale (New York: Vintage, 1887/1967), 520-532.

[4]As examples, witness the use of EAAs in normative ethics (Guy Kahane, "Evolutionary Debunking Arguments," *Noûs*, Vol. 45, No. 1 (2011): 103-125), metaphysics (Daniel Z. Korman, "Ordinary Objects," in *The Stanford Encyclopedia of Philosophy*, ed. E. N. Zalta (Winter 2011)), logic (Robert Stalnaker, "Indicative Conditionals," *Philosophia*, Vol. 5, No. 3 (1975): 269-286), and philosophy of religion (David H. Glass, "Can Evidence for Design be Explained Away?" in *Probability in the Philosophy of Religion*, eds. J. Chandler and V. S. Harrison (Oxford: Oxford University Press, 2012), 79-102; David H. Glass, "Darwin, Design and Dawkins' Dilemma, *Sophia*, Vol. 51 (2012): 31-57).

[5]For clarity and ease of exposition, I leave the background beliefs term implicit in all Bayesian formulae.

[6]Formally: for any H, H', E, and E', $E_P(E,H) > (=,<)E_P(E',H')$ iff $E_M(E,H) > (=,<)E_M(E',H')$.

[7] E_P is defended by Popper (*The Logic of Scientific Discovery* (London: Hutchinson, 1959). E_M is defended by Good ("Weight of Evidence, Corroboration, Explanatory Power, Information and the Utility of Experiments," *Journal of the Royal Statistical Society. Series B (Methodological)*, Vol. 22, No. 2 (1960): 319-331) and more recently by McGrew ("Confirmation, Heuristics, and Explanatory Reasoning," *British Journal for the Philosophy of Science*, Vol. 54 (2003): 553-567). E_S is defended by Schupbach and Sprenger ("The Logic of Explanatory Power," *Philosophy of Science*, Vol. 78, No. 1 (2011): 105-127).

[8] Glass and Schupbach ("When Do Hypotheses Compete?" Unpublished manuscript) offer a more complete and in-depth probabilistic explication of the closely related notion of the degree to which hypotheses (and not necessarily potential explanations of some body of evidence) compete epistemically with one another.

[9] This paragraph points to the reason for the difference between my account of explaining-away and that put forward by Glass and McCartney ("Explaining and Explaining Away in Science and Religion," *Theology and Science*, Vol. 12, No. 4 (2014): 338-361; see also David H. Glass and Mark McCartney, "Explaining Away and the Cognitive Science of Religion," this volume). They allow that hypotheses may compete via the evidence (roughly corresponding to my Competition (ii)) *or directly* (roughly corresponding to my Competition (i)) in EAAs. I find it much more useful (and intuitive) instead to distinguish these cases and only associate explaining-away with competition by way of the evidence. When hypotheses directly compete, there need be nothing about the relation (explanatory or otherwise) between either hypothesis and the evidence that weighs against the alternative hypothesis. So, as it seems to me, there is no *explaining*-away, just direct competition. Competition is, by my lights, a logically broader notion than explaining-away, with the latter only pertaining to indirect competition.

[10] Ellery Eells and Branden Fitelson, "Measuring Confirmation and Evidence," *The Journal of Philosophy*, Vol. 97, No. 12 (2000): 663.

[11] Wesley C. Salmon, *Causality and Explanation* (Oxford: Oxford University Press, 1998), 73.

[12] Charles Darwin, *The Autobiography of Charles Darwin 1809-1882* (London: Collins, 1958), 87.

[13] Richard Dawkins, *The God Delusion* (New York: Houghton Mifflin, 2006), 143.

[14] Sahotra Sarkar, *Doubting Darwin? Creationist Designs on Evolution* (Oxford: Blackwell, 2007), 14.

[15] Michael J. Behe, "Reply to My Critics: A Response to Reviews of *Darwins Black Box: The Biochemical Challenge to Evolution*," *Biology and Philosophy*, Vol. 16 (2001): 685.

[16] Francisco J. Ayala, "Darwin's Greatest Discovery: Design Without Designer," *PNAS*, Vol. 104, Supp. 1 (2007): 8567.

[17] Theistic evolution is framed this way, e.g., by Michael Ruse (*Can a Darwinian Be a Christian?* (Cambridge: Cambridge University Press, 2000)) and Elliott Sober (*Evidence and Evolution: The Logic Behind the Science* (Cambridge: Cambridge University Press, 2008)).

[18] Theodosius Dobzhansky, "Nothing in Biology Makes Sense Except in the Light of Evolution," *The American Biology Teacher*, Vol. 35 (1973): 127.

[19] Ernan McMullin, "Evolution as a Christian Theme," Unpublished Herbert Reynolds Lecture presented at Baylor University, online: `http://www.baylor.edu/content/services/document.php/36443.pd` (2004): 2.

[20] D and N do not compete in the **Competition (i)** sense; it is recognizably possible that an intelligent being and a non-intelligent process of natural selection both are responsible for the existence of complex and functionally organized organisms (as shown, for example, by consideration of the concurrentist and theistic evolution alternatives).

[21] Glass ("Can Evidence for Design be Explained Away?") provides a more thorough study of cases in which the explanatory justification for some hypothesis is "partially explained away" by an alternative hypothesis, leaving some "residual confirmation".