EXPLANATORY VIRTUES ARE INDICATIVE OF TRUTH

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ABSTRACT: In a recent issue of this journal, Miloud Belkoniene challenges explanationist accounts of evidential support in two ways. First, he alleges that there are cases that show explanatory virtues are not linked to the truth of hypotheses. Second, he maintains that attempts to show that explanatoriness is relevant to evidential support because it adds to the resiliency (stability) of probability functions fail. I contest both of Belkoniene's claims.

KEYWORDS: evidentialism, explanationism, explanatory virtues, evidential probability

Providing an accurate account of evidential support is a central concern in epistemology. After all, evidentialist and non-evidentialist epistemologists agree that at least sometimes the evidence at hand supports believing a particular proposition. Hence, all epistemologists have a stake in answering the question, "What does it take for a body of evidence to support believing a proposition?" Explanationists answer this question by appealing to explanatory relations. Roughly, explanationism is the claim that evidential support comes down to a proposition being part of the best explanation of the relevant evidence.

Recently, Miloud Belkoniene has argued that the explanationist account of evidential support faces serious difficulties.[1] He claims that in order for explanationism to be correct the sort of explanatory virtues that make an explanation the best must be indicative of the truth of that explanation. However, Belkoniene insists there are cases that demonstrate that explanatory virtues are not linked to the truth in this way. He takes things a step further by arguing that not only does explanationism fail as a full account of evidential support, but also attempts to show that explanatoriness is an essential feature of the evidential support relation are mistaken as well.

[1] Miloud Belkoniene, "What Are Explanatory Virtues Indicative Of?" *Logos & Episteme* 8, 2 (2017): 179-193.

Fortunately for explanationists, Belkoniene's arguments are unsound. That being said, the points that Belkoniene raises are still worth carefully thinking about and deserve a clear response. Furthermore, they are helpful as they move the debate concerning explanationism forward and aid in clarifying the explanationist's position.

1. An Explanationist Account of Evidential Support

In order to evaluate Belkoniene's case against explanationism's prospects as an account of evidential support, it will be helpful to have a concrete example of an explanationist theory on hand. Since Belkoniene uses my *Explanationism* as his target explanationist view, it is worth briefly describing it here.

> *Explanationism*: A person, S, with evidence *e* at time *t* is justified in believing *p* at *t* if and only if at *t* S has considered *p*, and:
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> (i) *p* is part of the best (sufficiently good) explanation available to S at *t* for why S has *e*
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> or
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> (ii) *p* is available to S as an explanatory consequence of the best (sufficiently good) explanation available to S at *t* for why S has *e*.[2]

[2] This is essentially the account of evidential support that I spell out in Kevin McCain, "Explanationism: Defended on All Sides," *Logos & Episteme* 6, 3 (2015): 333-349, 339. There are two notable differences between the formulation I have here and what I present in that article. First, here I make explicit in the formulation of *Explanationism* that it is not just that *p* is part of the best explanation, or an explanatory consequence of that explanation, but also that the best explanation must be "sufficiently good." This is a point that I clarified in a footnote of "Explanationism: Defended" as well as in Kevin McCain, "Undaunted Explanationism," *Logos & Episteme,* (2017) 8, 1: 117-127. Unfortunately, this qualification seems to have been overlooked by some. Second, in "Explanationism: Defended" I refer to this as "Ex-EJ 2.0" rather than *Explanationism*. That being said, this is the account of evidential support I have defended as a key component of my complete theory of epistemic justification, *Explanationist Evidentialism*. *Explanationist Evidentialism* is explained more fully in Kevin McCain, *Evidentialism and Epistemic Justification* (New York: Routledge, 2014). For further discussion and defense of this account of evidential support also see Kevin McCain, "Explanationist Evidentialism," *Episteme*, (2013) 10: 299-315, Kevin McCain, "Evidentialism, Explanationism, and Beliefs about the Future," *Erkenntnis*, (2014) 79: 99-109, Kevin McCain, *The Nature of Scientific Knowledge: An Explanatory Approach* (Switzerland: Springer, 2016), and Kevin McCain, "Explanationist Aid for Phenomenal Conservatism," *Synthese* (forthcoming).

Although there are various points about *Explanationism* that warrant further discussion and elaboration, for the present purpose we can limit ourselves to two. First, S's evidence, *e*, refers to the total evidence that S has at the time. Second, the qualification that the best explanation must be *sufficiently good* in order for *p* to be justified is especially important. After all, sometimes the best just isn't good enough. Admittedly, it is difficult to say exactly when an explanation surpasses the threshold for being sufficiently good, but there are some clear cases. For example, if there are one thousand equally important pieces of evidence and the best explanation, of which *p* is a part, only explains one of those pieces of evidence, that's not good enough to be justified in believing that *p.* Conversely, if the best explanation that *p* is part of explains all of the relevant evidence in a simple way without conflicting with background evidence, then that is sufficiently good to justify believing that *p*.[3] It will be helpful to keep both of these points in mind as we examine Belkoniene's attack on *Explanationism*.

2. Explanationism and Evidential Probability

Belkoniene's first challenge picks up on a recent debate between Ryan Byerly, Kraig Martin, and me with the two of them on one side and me on the other.[4] In the course of this debate Byerly & Martin allege that there are cases where a particular hypothesis is clearly the best explanation of the evidence, and yet intuitively one would be unjustified in believing the hypothesis. As a result, they claim that *Explanationism* is false—*Explanationism* says that believing a particular proposition is justified because it is the best explanation of the evidence, but believing that proposition is clearly not justified.

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[3] For further discussion of the need for this restriction see "Explanationism: Defended." Also, see the literature on inference to the best explanation for a similar sort of restriction—in particular, see Peter Lipton, *Inference to the Best Explanation 2nd Edition* (New York: Routledge, 2004).

[4] There have been several exchanges in this debate. Things began with my "Explanationist Evidentialism" and T. Ryan Byerly, "Explanationism and Justified Beliefs About the Future," *Erkenntnis* 78 (2013): 229-243. I responded to Byerly in "Beliefs about the Future" and *Evidentialism and Epistemic Justification*. These responses were followed by additional objections in T. Ryan Byerly and Kraig Martin, "Problems for Explanationism on Both Sides," *Erkenntnis* 80 (2014): 773-791. I replied to these objections in "Explanationism: Defended", which led to further objections in T. Ryan Byerly and Kraig Martin, "Explanationism, Super-Explanationism, Eclectic Explanationism: Persistent Problems on Both Sides," *Logos & Episteme*, 7 (2016): 201-2013. I have addressed Byerly & Martin's most recent concerns in "Undaunted."

Belkoniene sides with Byerly & Martin arguing that a recent response of mine fails to adequately address the concern they raise with their *SALLY* case.[5] Consequently, he claims that Byerly & Martin's case demonstrates that "explanatory virtues and… evidential probability can come apart and that therefore, explanatory virtues cannot be taken to be indicative of the truth."[6] Hence, Belkoniene concludes that *Explanationism* fails as an account of evidential support.

Since Belkoniene's attack on *Explanationism* rests on the strength of Byerly & Martin's case, it is worth quoting their description of the case in its entirety.

> *SALLY:* Imagine that Sally is the lead detective on an investigation of a burglary. She typically uses an eight-step investigative procedure for crimes of this sort and this procedure involves gathering and analyzing multiple kinds of evidence – physical evidences, forensic evidences, testimonial evidences, psychological evidences, circumstantial evidences, and so on. Sally is now mid-way through her investigative procedure, having completed four of the eight steps. She has gathered and analyzed the appropriate evidence for these four steps, but has not yet gathered or analyzed evidence that may or may not arise during the final four steps. The list of suspects with which Sally began has been narrowed, and there is one very promising suspect in particular named Jeremy. In fact, the claim (call this the Jeremy hypothesis) is the best explanation available to Sally for all of the evidence she currently has obtained through the first four steps. There are multiple witnesses locating someone who fits Jeremy's description at the scene of the crime at the time at which it was committed. Some drug paraphernalia like that which Jeremy commonly uses to feed his drug habit was found at the scene of the crime. Jeremy seems to display a sense of satisfaction or gladness about the robbery. His bank account reflects a deposit shortly after the incident. Other current suspects, while not ruled out, do not fit the evidence Sally currently has anywhere nearly as well as Jeremy does. The Jeremy hypothesis is the best available explanation for the evidence Sally currently has and it is a very good explanation of that evidence.
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> But Sally isn't justified in believing the Jeremy hypothesis. For, she has good reason to think that there may very well be relevant evidence concerning the burglary that she does not currently have. After all, there have been many times in the past where, after completing step four of her investigation, things took a dramatic swing. It has not at all been uncommon that at these later stages in the process, an alternative suspect emerges who fits the data even better than previous suspects. Thus, while the Jeremy hypothesis is the best available

[5] This is my label for their case.

[6] Belkoniene, "Explanatory Virtues," 187.

> explanation of the evidence Sally currently has, and while it is even a very good explanation of that evidence, Sally is not justified in believing this hypothesis. Believing the Jeremy hypothesis would be premature. The correct explanation for Sally's data may very well not be available at present, and she has good reason to think this.[7]

The problem for *Explanationism* here is supposed to be that it is clear that the Jeremy hypothesis is the best explanation of Sally's evidence, but believing that Jeremy committed the crime is unjustified. As a result, *Explanationism* claims that the evidence supports believing a proposition when it doesn't.

In response to Byerly & Martin's case I originally argued that the Jeremy hypothesis is not in fact the best explanation of Sally's *total* evidence.[8] Rather, I explained that the best explanation of her total evidence is that some other, as yet unknown, suspect committed the crime. Belkoniene doesn't find this response convincing, and he raises concerns similar to those that Byerly & Martin raise in their response to me on this point.[9] As I've argued elsewhere, these concerns are misplaced.[10]

Since I have addressed the sorts of concerns that Belkoniene and Byerly & Martin raise about my response to *SALLY* in another article, I won't rehash that discussion here. Instead, I'll focus on a response that is open to the explanationist that requires a weaker claim than what I make in my most recent reply to Byerly & Martin. In my response to Byerly & Martin I argued that the Jeremy hypothesis isn't the best explanation of Sally's evidence because <Some, as yet unknown, suspect committed the burglary> better explains the total evidence. The explanationist doesn't have to argue for this claim, however. All the explanationist needs to show is that the Jeremy hypothesis isn't *sufficiently good* to warrant Sally's believing it. So, the explanationist can grant, as Belkoniene and Byerly & Martin insist, that the Jeremy hypothesis is the best explanation of Sally's evidence without generating a problem for *Explanationism*. As noted above, *Explanationism* includes the important qualification that the best explanation must be *sufficiently good* before its truth can be inferred. The Jeremy hypothesis, even if it's the best explanation, isn't sufficiently good.

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[7] Byerly and Martin, "Problems for Explanationism," 783.
[8] McCain, "Explanationism: Defended."
[9] See Byerly and Martin, "Explanationism, Super-explanationism."
[10] McCain, "Undaunted."

It's worth spelling out this response more fully. Recall, in Byerly & Martin's case Sally has two bodies of evidence. She has E (the evidence from the first four steps of her investigation) and E* (the evidence concerning how her investigative process has worked out in the past). It is stipulated that the Jeremy hypothesis is the best explanation of E. However, even if we add to this that it is a very good explanation of E, it doesn't follow that the Jeremy hypothesis is a sufficiently good explanation of Sally's *total evidence* to warrant believing it. After all, the Jeremy hypothesis doesn't explain E*. In fact, the Jeremy hypothesis along with other parts of the best explanation of E seems to be directly in conflict with the best explanation of E*. Part of the best explanation of E* is that the most likely suspect at step 4 of Sally's process didn't commit the crime. This is inconsistent with the conjunction of the Jeremy hypothesis and <Jeremy is the most likely suspect at step 4 of Sally's process>, which is also part of the best explanation of E. So, the Jeremy hypothesis not only fails to explain all of Sally's evidence, but it is also inconsistent with the best explanation of a large portion of that evidence.

To make this point clearer, consider a similar situation.[11] You see an object. This object looks like a dog, barks like a dog, walks like a dog, and so on. Presumably, in this situation the best explanation of your evidence is that what you see is a dog. Nonetheless, this explanation may not be sufficiently good to warrant your believing that what you see is a dog when additional information is added. For instance, if you know that you are near a factory that produces large quantities of robotic dogs that are nearly indistinguishable from real dogs, you are currently in the middle of an area that is vigilantly patrolled to ensure that there are no dogs in it, and so on; the "dog hypothesis" is no longer all that good of an explanation. Although the dog hypothesis best explains a significant portion of your evidence, its failure to fit with the totality of your evidence makes it a poor explanation overall. In such a case, *Explanationism* doesn't license your believing that you see a dog because that explanation isn't sufficiently good, even if it's the best explanation. Similarly, in *SALLY* the Jeremy hypothesis is the best explanation of E, but its failure to fit with Sally's *total evidence* renders it insufficiently good to justify believing it. Thus, *Explanationism* doesn't commit one to claiming that Sally should believe that Jeremy committed the crime in this case. Consequently, *SALLY* fails to provide reason to think that explanatory virtues and evidential probability come apart in the way that Belkoniene suggests.

[11] The example that follows is similar to the "duck" example I present in "Undaunted."

3. Explanationism and Stability

After pressing his first line of attack on *Explanationism*, Belkoniene considers whether explanatory virtues might play an essential role in evidential support even if *Explanationism* is false. A major thread of this second challenge involves objecting to a claim of Ted Poston and mine that "explanatory considerations can render a probability function more resilient."[12] Drawing on the work of James Joyce, we distinguish between the *balance* of evidence and the *weight* of evidence.[13] In terms of evidential probabilities, the balance of evidence is the probability of *p* given the evidence; the weight of evidence is how resilient/stable the probability function Pr ($p|E$) is in the light of new evidence. For example, (Case 1) if you have flipped a coin 10 times and your evidence suggests it is fair, the Pr (*heads on the next toss*$|E$) is .5. Similarly, (Case 2) if you have flipped a coin 10,000 times and your evidence suggests it is fair, the Pr (*heads on the next toss*$|E$) is .5. In both cases the *balance* of evidence is the same—Pr (*heads on the next toss*$|E$) is .5. However, the *weight* of evidence is significantly different in these two cases. If you were to flip the coin 10 additional times and it came up tails every time, what probability should you assign to heads on the next toss? In Case 2, you should still assign a probability very close to .5, but in Case 1 you should assign a probability that is significantly lower. This is because although the balance of evidence is the same in both cases, the weight of evidence is much stronger in Case 2 than Case 1. As a result, the probability function in Case 1 is significantly less resilient/stable than it is in Case 2. Hence, there is an important dimension of evidential support that is left out if we only focus on how probable a body of evidence makes a proposition.

Poston and I argue that one way that explanatory virtues can contribute to evidential support is in terms of increasing resiliency/stability.[14] We make use of an example to support this claim.

> *URN*: Sally and Tom have been informed that there are 1,000 x-spheres in an opaque urn. Sally and Tom have the same background evidence except for this

[12] Kevin McCain and Ted Poston, "Why Explanatoriness is Evidentially Relevant," *Thought*, (2014) 3: 145-153, 149.

[13] James Joyce, "How Probabilities Reflect Evidence," *Philosophical Perspectives* (2005) 19: 153-178.

[14] This is part of our response to William Roche and Elliott Sober, "Explanatoriness is Evidentially Irrelevant, or Inference to the Best Explanation Meets Bayesian Confirmation Theory," *Analysis* 73 (2013): 659-668.

> difference: Sally knows that blue and red x-spheres must be stored in exactly equal numbers because the atomic structure of x-spheres is such that if there are more (or less) blue x-spheres than red, the atoms of all of the x-spheres will spontaneously decay resulting in an enormous explosion. Sally and Tom observe a random drawing of ten x-spheres without replacement, five blue and five red. The x-spheres are replaced in the urn.[15]

In this case Sally and Tom should both assign a probability of 0.5 to the next x-sphere randomly drawn being blue. However, Sally's probability assignment is more resilient/stable in the face of future misleading information. For instance, Sally's assignment of a probability of 0.5 that the next x-sphere randomly drawn will be blue should remain the same even given an unlikely run of drawing 10 blue x-spheres in a row. Whereas Tom's probability assignment for the next x-sphere randomly drawn being blue should significantly change after the new (misleading) information provided by the run of drawing 10 blue x-spheres in a row. Thus, the explanatory difference between Sally and Tom makes an evidential difference. Explanatory virtues make Sally's probability function more resilient/stable than Tom's.

Belkoniene disagrees with us on this point. Rather, he claims that Roche & Sober are correct in responding that *URN* fails to demonstrate that explanatoriness increases resiliency/stability.[16] I won't discuss the flaws with the Roche & Sober response that Belkoniene endorses here for two reasons. First, Ted Poston and I have already explained where that response goes wrong elsewhere.[17] Second, and more importantly, Belkoniene doesn't base his attack solely on the Roche & Sober response. He instead offers an example of his own designed to cause problems for our position. For these reasons I will limit my focus here to addressing the concerns raised by Belkoniene's example.

Here is Belkoniene's *Sally Case**:

> Sally investigates a burglary based on the same procedure as in the original [SALLY] case. During the burglary, a safe has been opened by someone who knew the safe's code. A very promising suspect is Sam who is an employee of the company where the burglary took place and who potentially had access to the

[15] McCain and Poston, "Evidentially Relevant," 149.

[16] See William Roche and Elliott Sober, "Explanatoriness and Evidence: A Reply to McCain and Poston," *Thought* (2014) 3: 193-199.

[17] Kevin McCain and Ted Poston, "The Evidential Impact of Explanatory Considerations," in *Best Explanations: New Essays on Inference to the Best Explanation*, eds. Kevin McCain and Ted Poston (Oxford: Oxford University Press, 2017): 121-129.

> safe's code. As in the original case, the Sam hypothesis can explain other pieces of evidence that Sally gathered during her investigation and hence is the best explanation available to Sally as to why she has the evidence she does mid-way through her investigation procedure. However, unlike the original case, it is Sally's first ever investigation and therefore, given her total evidence, the probability of the Sam hypothesis is quite high as Sally has no reason to suspect that a better explanation for her evidence is yet unavailable to her.[18]

Given the situation, Belkoniene assumes that Sally is justified in giving the "Sam hypothesis" a high probability of .8. Then he questions whether her probability for the Sam hypothesis should remain this high after she learns that because of a hacking incident 100 people in addition to Sam had access to the safe's code. Belkoniene points out that since Sally doesn't know anything about these 100 other people, it is plausible that the Sam hypothesis is still the best explanation of the evidence. Nevertheless, "the probability that Sally is justified to assign to the proposition 'Sam committed the burglary' once she has learnt the new hacking information is considerably lower than it was before."[19] He claims that this is problematic for the view that Poston and I defend because although the Sam hypothesis is the best explanation, "its evidential probability is not stable under conditionalization on the propositions compatible with its truth."[20] As a result, Belkoniene concludes that explanatory virtues do not play an essential role in evidential support because they fail to render evidential probabilities stable.

What Belkoniene says about *Sally Case** is very plausible. In fact, I agree with just about everything he says. Initially, Sally should assign a high probability to the Sam hypothesis. But, once she learns of the 100 other suspects, she should definitely assign a much lower probability to this hypothesis. There are, however, two points where I disagree with Belkoniene.

The first point of disagreement is that it is not clear to me that the Sam hypothesis can plausibly remain the best explanation of the evidence in this case. I think that more details are needed before the plausibility of this can be determined.[21] But, this isn't central to Belkoniene's argument, so I won't press the point.

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[18] Belkoniene, "Explanatory Virtues," 192.

[19] Belkoniene, "Explanatory Virtues," 193.

[20] Belkoniene, "Explanatory Virtues," 193.

[21] I also think that even if the Sam hypothesis remains the best explanation it is exceedingly likely that it fails to satisfy the "sufficiently good" requirement necessary to make believing it justified.

The second point of disagreement is that I don't think there is a problem for explanationists here. As noted above, Poston and I claim, "explanatory considerations can render a probability function *more* resilient."[22] We don't claim that in all cases explanatory considerations will render a probability function completely stable. The issue is whether they affect the resiliency/stability of probability functions.

Explanatory considerations do affect resiliency/stability. To see this, consider a variation of Belkoniene's case.

> *Simon*: Everything is like the *Sally Case** except for two features. First, rather than the Sam hypothesis, Sally only has Simon as a suspect (she knows nothing of Sam). Second, the Simon hypothesis is the only explanation that Sally has available, but is inferior to the Sam hypothesis in the *Sally Case**.

Now, when Sally learns of the 100 other suspects in *Simon* she should significantly lower her probability that the Simon hypothesis is true. So, *Simon* and *Sally Case** are pretty similar. But, it seems that they are not identical. It is plausible that Sally's probability for the Simon hypothesis should be more strongly affected than her probability for the Sam hypothesis when she learns about the other suspects. This is not to say that she shouldn't significantly lower her probability in both hypotheses, she should. Instead, this is to say that the quality of the explanation that Sally has makes a difference to how much she should change her probability assignment. The explanatory virtues of the Sam hypothesis make a difference to the resiliency of the probability that Sally assigns to that hypothesis. That is all that is required for explanatory virtues to play this key role in evidential support.

Of course, Belkoniene might insist that Sally's probability functions for the Sam hypothesis and the Simon hypothesis are equally stable/unstable. However, it seems plausible that they are not equal in this way. Hence, to avoid simply begging the question against the explanationist, an argument would be needed for thinking that these probability functions are equally volatile. Until such an argument is generated, not a likely prospect, the explanationist can rest easy on this front as well.

In sum, Belkoniene's arguments help to move important explanationist debates forward, and examining them helps to clarify explanationism and what can

[22] McCain and Poston, "Evidentially Relevant," 149.

be said in favor of it. Yet, they ultimately fail to undermine explanationism or its commitment to the idea that explanatory virtues are indicative of truth.[23]

[23] Thanks to Kevin Lee and Ted Poston for helpful comments on earlier drafts.