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Academic Freedom, Feminism and the Probabilistic Conception of Evidence

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There is a current debate about the extent to which Academic Freedom should be permitted in our universities. On the one hand, we have traditionalists who maintain that Academic Freedom should be unrestricted: people who have the appropriate qualifications and accomplishments should be allowed to develop theories about how the world is, or ought to be, as they see fit. On the other hand, we have post-traditional philosophers who argue against this degree of Academic Freedom. I consider a conservative version of post-traditional philosophy that permits restrictions on Academic Freedom only if the following conditions are met,

Condition 1: The dissemination of the results of a given research project R must cause significant harm to some people, especially to people from oppressed groups.

Condition 2: Condition 1 must possess strong empirical support,

and which accepts the following assumptions: (1) there is a world of objective facts that is, in principle, discoverable, (2) rational means are the means of discovering it and, (3) rational means requires *strong empirical support*. I define strong empirical support for an hypothesis h on evidence e in probabilistic terms, as a ratio of posterior to prior probabilities substantially exceeding 1.

I now argue in favour of a research policy that accepts unrestricted Academic Freedom. My argument is that there is a formal and general quandary that arises within the standard theory of probability when we apply this account of empirical support to a set of possible causal hypotheses framed in such a way that the "reverse probabilities", pr(e/h) are 1. I consider various possible ways to escape this quandary, none of which are without difficulties, concluding that a research policy allowing for unrestricted Academic Freedom is probably the best that we can hope for.

Keywords: academic freedom, Feminisim, empirical evidence, probability theory, Bayesian probability, scientific method, causality, causal reasoning

The Debate Over Academic Freedom

There is a current debate about the extent to which Academic Freedom should be permitted in our universities. On the one hand we have traditionalists who maintain that Academic Freedom should be unrestricted: people who have the qualifications and accomplishments to be appointed as professors in universities should be allowed to develop theories about how the world is, or ought to be, as they see fit. This extends to the content of their theories: anything goes as long as it is part of what Bernard Williams has called the project of pure inquiry. The project of pure enquiry is defined by a goal—discovery of important objective

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truths about the world—and rational method to be carried out dispassionately. On the other hand, we have post-traditional philosophers who reject the project of pure inquiry and the doctrine of unrestricted academic freedom that goes with it.

There are various ways that one can reject the project of pure inquiry. For example, one can reject the hard distinction between fact and value, thus rejecting the existence of a world of objective facts. One can also reject the demand for rationality. But let's consider a version of post-traditional philosophy which accepts both (1) the assumption that there is an objective world of facts and (2) the requirement of rationality as the means of discovering it. Let us, moreover, (3) identify rationality with evidence-based scientific method. This does not mean, however, that post-traditionalists also have to accept Academic Freedom in an unrestricted version. This is because (4) the post-traditionalists can reject the normative doctrines implied in the claim that Academic Freedom should be unrestricted.

Let's say that what we should do is to be evaluated against one of two background theories of normativity: a deontological theory and an axiological theory. The former is a theory framed in terms of rules and duties, the latter is framed in terms of what is good. I take the latter framework to be the more comprehensive and objective, since it is easier to give an objective assessment of rules and duties in terms of goodness achieved (Rule Utilitarianism) than it is to give an objective assessment of what the right rules and duties might be, including those which prescribe acting for good consequences. So, let's also accept (5) the utilitarian framework for assessing rules and duties. Since Academic Freedom is a right, and since that right imposes duties on others to permit unrestricted Academic Freedom, we can ask on utilitarian grounds whether imposing that duty on academics and others achieves the greater good. This is where the rubber meets the road in the current debate over Academic Freedom.

Let me, further, assume that we can distinguish epistemic goods—for example, the discovery of important truths about the world being one example—from practical goods—for example, avoiding causing harm to people, especially oppressed people. One important kind of harm that oppressed people can suffer is an intellectual climate in which their autonomy is diminished. For example, some feminist theorists have argued for a relational conception of autonomy[1] in which autonomy depends on our ability to self-authorize our judgments about ourselves and the world, which self-authorization itself depends on what others have to say about us. Since Academic Freedom applies to disseminating research, and since the dissemination of research can reach the eyes and ears of oppressed people, this is where restrictions on Academic Freedom might be justified in such topics as gender, race, physical and psychological (dis)abilities. Let's call this justification for restrictions on Academic Freedom "The Post-Traditional Feminist Approach to Academic Freedom".

Within the Post-Traditional Feminist Approach, there are, of course, many variants. The variant that I will consider accepts assumptions (1) through (5). Of special interest is assumption (3): that rationality is to be identified with evidence-based scientific method. What is "evidence-based scientific method"? I want to proceed carefully here, in two stages. The first stage presents a triad of definitions:

Definition$_1$: Evidence-based scientific method is a form of reasoning in which an hypothesis h is shown to have strong empirical probity.

[1] See Soljar, 2020: 347. For a seminal work in feminist accounts of relational autonomy see Sherwin, 1998.

Definition$_2$: An hypothesis h is shown to have strong empirical probity iff h is shown, in the best available scientific method, to be strongly supported by a substantial body of empirical evidence e.

Definition$_3$: An hypothesis h is strongly supported by a substantial body of empirical evidence e iff the ratio of the probability of h on e, pr(h/e), (the posterior probability) to the probability of h, pr(h), (the prior probability) thus

$$\frac{pr(\frac{h}{e})}{pr(h)}$$

is substantially greater than 1 (I call this ratio, "The Evidential-Boost Ratio").

The central contention of The Post-Traditional Feminist Approach to Academic Freedom, as I shall understand it, is that there are two conditions that must be met for restrictions to be placed on Academic Freedom.

Condition 1: The dissemination of the results of a given research project R must cause significant harm to some people, especially to people from oppressed groups.

Condition 2: Condition 1 must possess strong scientific probity.

These conditions are necessary, not jointly sufficient, for it must also be argued on the basis of the Greater Good Principle, that the overall benefit of preventing the amount of harm that is demonstrated by Condition (1) outweighs the benefits offered by the Project of Pure Inquiry. Only when conditions (1) and (2) are met, according to this approach, are we justified in preventing the conduct of research program R, that is, to restricting Academic Freedom. This is assumption (6), which I shall call "The Central Thesis of the Post-Traditional Feminist Approach to Academic freedom", "The Central Thesis" for short.

I will not address condition (1) here. Rather, I will focus on Condition (2). My argument will be that Condition (2) probably cannot be met unless there is unrestricted academic freedom, thus undermining The Central Thesis. The second stage of my consideration of the notion of evidence-based science is a development of a version of probabilistic reasoning for causal hypotheses employing Bayes Theorem.

Empirical Probity: Bayesian Causal-Theoretical Induction

Central to the argument of this paper is the concept of strong empirical support of an hypothesis on empirical evidence. Since the concept of empirical support is defined here in terms of the Evidential-Boost Ratio (the ratio of posterior to prior probabilities), reasoning involving Bayes' Theorem will be required to determine when strong empirical support in my sense is present. Critical to this reasoning is the concept of "reverse probability". A reverse probability is pr(e/h), the reverse of a posterior probability, pr(h/e), where e is a body of empirical evidence and h is a proposition (an "hypothesis") in a conditional probability relation to e. I shall call a Bayesian Inference to a posterior probability with at least one hypothesis having a reverse probability of 1, *Bayesian Theoretical Induction*. Not all scientific reasoning has a goal of establishing theoretical hypotheses, and not all reasoning that establishes theoretical hypotheses is inductive, or, if inductive, employs Bayesian Theoretical Induction, but a good deal of important science is theoretical and much of it can use the resources of Bayesian Theoretical Induction.

Before proceeding with the critique of The Central Thesis, we need to spend some time on the notion of cause. Any cause of an effect requires the occurrence of the effect as a matter of logic, so any statement that hypothesizes a cause for an effect entails the effect. This means that the reverse probability of all causal hypotheses h for an effect e, pr(e/h), = 1. Because this is established as a matter of logic, reasoning to the

probability of causal hypotheses counts as a version of Bayesian Theoretical Inference. I shall call this version of the latter, *Bayesian Causal-Theoretical Induction*.

Not all reasoning of scientific interest is causal reasoning but there is a special reason for us to be interested in a set of hypotheses that contain not only causal hypotheses but only causal hypotheses.[2] The special reason is the following principle: when a cluster of events or properties are not statistically independent (are not "random"), then these events are linked by underlying causal processes[3].

I don't maintain that all natural processes are causal-processes: there are also those depending on the laws of chance (stochastic explanations). But I do maintain that there are no intermediate cases—phenomena that are both non-causal and non-stochastic. I demonstrate this in the following thought experiment. Suppose that we have three rooms that are causally isolated from one another: no transmission of information can occur between them. In each room a coin is to be flipped. What is the probability that the result will be three heads? Intuitively, we think: 1/8. This is because, intuitively, we think that the conjunction of the events, *head-turns up in room 1* and *head turns up in room 2* and *head turns up in room 3* is calculated by the laws of chance. So, we have the following conditional statement: C1 "If there is no causal connection between the events in rooms 1-3, then the conjunction of events is governed by the laws of chance". Now take the contrapositive of this: C2: "If the conjunction of events is not governed by the laws of chance then there is a causal connection between the events". I call this form of the conditional, The Causal Principle.

Regarding the nature of causality itself, I will be working with a conception of causes as spatio-temporal processes due to Salmon (Salmon, 1984; 1994) rather than a general-condition account of causes, the best known of which is Mackie's INUS-condition account (Mackie, 1974). We now use the notion of a causal process in our formulation of hypotheses in applications of Bayesian Causal-Theoretical Induction: when E is the evidence-statement asserting that a certain event, e, occurs, h will be formulated as the hypothesis that a certain causal process terminates in e.

For example, I hear a sharp crack outside my house. Was it a gun shot? In this case the cause would be someone pulling the trigger on a gun, with an ensuing process that leads to the sound. Was it the ice cracking on the nearby lake? In that case the cause would be whatever triggered the cracking. Was it a car backfiring? In that case the cause would have been what triggered an explosion in the muffler, which led to the sound. Whether we call the initiating event "the cause" or not is not critical for me, what is critical in these cases is that the process is a causal process and is defined as starting with an initiating event and ending with the result. The result is the evidence for a conditional posterior probability: "pr(ice-cracking-leading-to-cracking-sound: h) given the cracking sound: e)=x". This gives is a reverse probability value of 1 for pr (e/h). In what follows, I am assuming that there is an evidence statement e asserting that an event e occurs and that the set of all possible hypotheses h_1-h_n assert the existence of causal processes terminating in e, differentiated from one another in their assertion of different initiating events I and consequent processes P.

This choice of hypothesis-formulation protocol, together with The Causal Principle, allows us to use a three-step method for reasoning in accord with Bayesian Causal-Theoretic Induction. Our first move as a scientist should be to reject the possibility that a cluster of events we are studying is a collection of randomly occurring events. This can be done by a standard procedure in non-Bayesian statistics whereby we reject the

[2] This is an oversimplification which I explain, and correct, elsewhere. See (Vinci, 2020).
[3] I have argued for this principle previously (Vinci, 2020) and give here only a sketch of the argument.

null hypothesis or in some other way. However we do it, let us suppose that we have rejected the possibility that the evidence is a set of randomly occurring events. By The Causal Principle, we now conclude, in a second step, that a causal process of some kind is operating to cause the effect. Our interest now is restricted to a set of possible causal hypotheses S, each with a reverse probability of 1. Our third step is to determine the probabilities of the causal hypotheses on some body of evidence by Bayesian Causal-Theoretic Induction.

Suppose that there are a set of causal hypotheses for a given set of empirical evidence and that we want to determine the posterior probability of the causal hypotheses using Bayesian Causal-Theoretic Induction relative to that evidence. It is natural to assume of any hypothesis h that "conclusively accounts" for some true evidence e, that is, where pr(e/h)=1 and e is true, that h gains at least some empirical support simply in virtue of those facts. I now show that this is not the case when empirical support is understood as a ratio of posterior to prior probability.

To make things simple for a start, let's suppose that there is only one alternative hypothesis h_2, to our preferred hypothesis h_1 available in the set of possible causal hypotheses. To simplify our calculations, let's also use the basic form of Bayes' Theorem (Equation (1)):

$$pr(h/e) = \frac{pr(h).pr(e/h)}{pr(e)} \tag{1}$$

We now posit that pr(e) = 0.5 and $pr(e_1/h_1) = 1$. Substituting these values into the equation we have (Equation (2)):

$$pr(h_1/e_1) = 2pr(h_1) \tag{2}$$

which yields Equation (3):

$$\frac{pr(h_1/e_1)}{pr(h_1)} = 2 \tag{3}$$

This means that there is an Evidential-Boost of 1.0, and an Evidential-Boost Ratio of 2/1. That is "substantially" greater than 1. Suppose that the alternative hypothesis, h_2, also has a reverse probability of 1 (see $Definition_3$). By parity of reasoning, it then looks as if it too would get a Boost of 1.0 and Boost Ratio of 2 to 1. But looks are deceiving here, as we can see when we consider the full form of Bayes' Theorem. What we find is that the presence of a set of alternatives, all of which have the same reverse probabilities, in this case, 1, nullifies any positive effect on posterior probability on either the preferred or the alternative hypothesis. Here's the proof[4].

Start with Equation (4):

$$pr(h1/e) = \frac{pr(h_1).pr(e/h_1)}{pr(h_1).pr(e/h_1) + pr(h_2).pr(e/h_2) + \ldots + pr(h_n).pr(e/h_n)} \tag{4}$$

We assume that all of the hypotheses, h_1 to h_n, are hypotheses with reverse probabilities of 1. This yields Equation (5):

$$pr(h1/e) = \frac{pr(h_1).1}{pr(h_1).1 + pr(h_2).1 + \ldots + pr(h_n).1} \tag{5}$$

which yields Equation (6).

$$pr(h1/e) = \frac{pr(h)}{pr(h_1) + pr(h_2) + \ldots + pr(h_n)} \tag{6}$$

[4]A version of this proof has already been published in Campbell and Vinci (1983).

Since h_1 to h_n are exclusive and exhaustive, their probabilities sum to 1, yielding Equation (7):

$$\Pr(h\_1/e) = \frac{\mathrm{pr}(h_1)}{1} \tag{7}$$

which reduces to Equation (8):

$$\mathrm{pr}(h_1/e)=\mathrm{pr}(h_1) \tag{8}$$

Equation (8) tells us that the posterior probability of h_1 on e is exactly the same as the prior probability of h_1 by itself. This means that the fact that h_1 accounts, with a probability of 1, for a true body of empirical evidence e by itself gives no empirical support at all to h_1. This is the chief technical result I aim to establish in this paper. In the final section I draw some conclusions from this for a policy of unrestricted Academic Freedom and against The Central Thesis.

Unrestricted Academic Freedom

In the second of the definitions given in the first section, we had occasion to refer to the best available scientific method. In the next section, I had occasion to introduce and defend The Causal Principle. The Causal Principle tells us that in all cases where a group or sequence of events occurs non-randomly, there are underlying causal processes. Understanding when groups or sequences of events are occurring randomly and when they are not, and, if they are not occurring randomly, understanding what the underlying causal processes are, should be a fundamental purpose of theoretical scientific method. The best of these methods is Bayesian Causal-Theoretic Induction. But we have seen a quandary that arises for this method.

Fortunately, there are some possible ways around the quandary. One involves the notion of Bayesian Updating. Considerations of scope prevent me from considering this way here. Another is to move away from probability altogether as the central concept in scientific reasoning, as Popper has recommended (Popper, 1959, pp. 251-284). Popper denies that scientific hypotheses can be shown to be probable by any method, the most that we can do is to try to falsify them; and when we can't, we log the outcome as a "corroboration" of said hypothesis. Those hypotheses with the most corroboration are the ones that we should stick with. But there are problems in determining what falsification is, whether the falsification of a hypothesis in the required sense has occurred, and whether it can be made to stick in the face of attempts by proponents to save the hypothesis[5]. Probably the best that we can hope for is to see which ideas retain proponents, whatever available methods are used, and which do not, in a free and open intellectual marketplace—and that requires unrestricted Academic Freedom in our research communities!

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[5]A classic source is (Lakatos, 1976)

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