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The harms of ignoring the social nature of science

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Abstract In this paper I argue that philosophers of science have an obligation to recognize and engage with the social nature of the sciences they assess if those sciences are morally relevant. Morally-relevant science is science that has the potential to risk harm to humans, non-humans, or the environment. My argument and the approach I develop are informed by an analysis of the philosophy of biology literature on the criticism of evolutionary psychology (EP), the study of the evolution of human psychology and behaviour. From this literature, I tease out two different methods of scientific critique. The first I call the "truth-detectional" approach. Those who take this approach are first and foremost concerned about the truth of EP claims as that truth can be determined by evidence. The second I call the "social-dimensional" approach. Those who take this approach talk about the production and truth of EP claims but within a social framework. On this account, the legitimacy and perceived legitimacy of EP claims are not separate from the institutional and social processes and values that lend to their production. I show that the truth-detectional approach risks harms to society and to the philosophy of science, but that the social-dimensional approach avoids these harms. Philosophers of science, therefore, should take a social-dimensional approach to the assessment of morally-relevant science.

Keywords Science and values · Socially relevant philosophy of science · Evolutionary psychology · Feminist philosophy of science

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1 Introduction

Philosophers of science who use their work to aid science in developing and conducting epistemically rigorous research that is sensitive to the ethical and political needs of local and/or global publics are those who are said to do "socially relevant philosophy of science" (Fehr and Plaisance 2010, p. 302). There has been much discussion regarding the benefits of this kind of work (see especially essays in *Synthese 177*(3); Douglas 2009; Katikireddi and Valles 2015; Kourany 2003, 2010; Longino 2002, 2013; Tuana 2013). These discussions have pointed out that philosophers of science are opportunely situated within scientific discourse to offer valuable deconstructions of and guidance in the production of scientific knowledge so as to promote socially responsible science. This has benefits for society as rigorous, ethically and socially-focused science is a valuable social good (Fehr and Plaisance 2010; Kourany 2010; Tuana 2010, 2013). It has benefits for science because philosophical methods and insight are well-suited to tackle the metascientific issues scientists often don't have the means or time to address (Reiss 2010; Shrader-Frechette 2010; Tuana 2010, 2013). It also benefits the philosophy of science; because science is a social process, philosophers gain a broader understanding of science when they know in more detail about its social dimensions (Gannett 2010; Kourany 2003, 2010; Richardson 2010). Moreover, because philosophers of science are also contributing to science as a social good when they do socially relevant philosophy of science, they also promote the philosophy of science as socially valuable (e.g., Shrader-Frechette 2010). Because of these benefits there has been concerted effort on the part of especially social epistemologists and feminist philosophers of science to encourage philosophers of science to pay closer attention to how science is a social process that's historically situated and value-laden. This paper contributes to this effort. However, my call to philosophers of science differs from these other works. Rather than focusing on the epistemological and social *benefits* that come from the practice of socially relevant philosophy of science, I also emphasize the *harms* philosophers of science risk when they neglect recognizing or engaging with the social nature of the sciences they discuss. In this paper I argue that philosophers of science have an obligation to recognize and engage with the social nature of the sciences they assess if those sciences are morally relevant. Morally-relevant science is science that has the potential to risk harm to humans, non-humans, or the environment.[1] Throughout this paper, I develop an approach to science criticism that has recognition of and concern for the social dimensions of science built into it. I offer this approach as a way for philosophers who engage with morally relevant science to avoid the harms I discuss.

My argument and the approach I develop in this paper are informed by an analysis of the philosophy of biology literature on the criticism of evolutionary psychology (EP), the study of the evolution of human psychology and behaviour. From this literature, I tease out two different methods of scientific critique. The first I call the "truth-

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[1] Because the normative thrust of my argument imposes obligations on philosophers of science for how they ought to conduct their research, I limit the scope of my argument to morally-relevant science. When harm is at issue, the minimal obligations I impose are justified. However, when harm is not on the table, the obligations seem inappropriate.

detectional" approach. Those who take this approach are first and foremost concerned about the truth of EP claims as that truth can be determined by the evidence evolutionary psychologists offer, or can potentially offer given the tools of their program. The second I call the "social-dimensional" approach. Those who take this approach recognize the social nature of science and assess scientific research and knowledge claims as part of a framework of social processes and values. On this account, the legitimacy and perceived legitimacy of EP claims are not separate from the institutional and social processes and values that lend to their production. I develop in more detail both of these approaches in the first and second parts of this paper. In the third part, I argue that the truth-detectional approach risks harms to society and to the philosophy of science, but that the social-dimensional approach avoids these harms. Tallying up the points against the truth-detectional approach, I conclude that philosophers ought to abandon approaches like truth-detectionism especially in their assessments of science that risks harm, that is, morally relevant science.

2 The truth-dectectional approach

In this section, I will outline an approach to EP criticism that I call the "truth-detectional approach." In the particular philosophical works I focus on, evolutionary psychologists are criticized for (1) conducting substandard evolutionary research, (2) harbouring problematic epistemic values, and (3) conducting research with pernicious social implications. As I will discuss, what ties these three categories of critique together is a principle concern about the truth of EP claims as that truth can be ascertained by the evidence evolutionary psychologists can and do offer. When philosophers raise truth-detectionist concerns, they are raising doubts about the objectivity of EP and so attempt to invalidate the knowledge claims evolutionary psychologists make. Directly below, I provide a brief outline of these criticisms as they have been put forward by Buller (2005), Richardson (2007), and Gould (1997a, b).[2] Following this I offer a more thorough going characterization of the truth-detectional approach.

2.1 Substandard evolutionary research: problems with theory, methods, and data analyses

Theory. Buller (2005), Richardson (2007), and Gould (1997a, b) have dedicated much discussion to the problematic or wrongful application of evolutionary theory in EP. In particular, these scholars take issue with the tendency among evolutionary psychologists to overemphasize natural selection as an explanation for specific human behaviours—a tendency often referred to as "adaptationism" (Gould and Lewontin 1979). Buller, Richardson, and Gould's criticisms of adaptationism are aimed mainly

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[2] Despite Gould not being a philosopher by profession, I think these particular works of his are ideal for my analysis. Gould's criticisms of EP are nothing short of philosophical and they are familiar works in philosophy of biology. What's more, Gould has taken a more social-dimensional approach in other works (e.g., Gould 1996). This demonstrates nicely that the two approaches I discuss in this paper are *methods* and need not be identified with a particular philosopher's whole corpus of work.

at the various hypotheses in EP that are grounded in the "massive modularity thesis," a theory considered by many evolutionary psychologists to be foundational to EP (e.g., Barkow et al. 1995; Buss 2008; Shackelford and Liddle 2014). According to this thesis, much of human behaviour is under the influence of highly specified organ-like modules in the mind. These modules, we are told, were shaped by natural selection during the Pleistocene when humans were faced with strenuous survival and reproductive challenges. Evolutionary psychologists who adopt the massive modularity thesis advance that, because mind modules are genetically based (and so are inheritable), natural selection could favour some modules and, therefore, some behaviours, over others (Buller 2005; Richardson 2007). As such, they offer an account for how behaviors can be adaptations.

Putting aside the neuroscientific plausibility that the mind can be explained in terms of "modules" (but for criticisms see Buller 2005; Sterelny 1995, 2012), Buller, Richardson, and Gould think the privileging of adaptation explanations for human behaviour (as is entailed by the massive modularity thesis) is too narrow. For one, it neglects the competing, and quite successful, explanations of behaviour that have come out of the social sciences. Many of the behaviours evolutionary psychologists posit to be adaptations have also been explained in terms of developmental and social causes—causes that cannot always be traced back to the adaptive environment in the Pleistocene. Second, undue focus on adaptation explanations blocks research into other mechanisms of evolution. Gould (1997b), for example, stresses the importance of "spandrels." A spandrel is a "byproduct" of natural selection, a trait whose current usefulness is not the direct result of natural selection (1). For instance, reading and writing are useful behaviours, but one cannot say that the neurological machinery necessary to execute them evolved specifically for them. Gould suggests that many of the behaviours evolutionary psychologists conceptualize as adaptations might in fact be spandrels.

Methods. Buller, Richardson, and Gould also take issue with the kinds of methodology many evolutionary psychologists employ to test their evolutionary hypotheses on the human population. In particular, they problematize uses of comparative approaches and evolutionary functional analysis, also known as "reverse engineering."[3] Considering uses of comparative approaches in EP, evolutionary psychologists are most interested in studying the kinds of behaviours that are uniquely human, behaviours that are not expressed by most species that are considered for comparisons. This, of course, limits whatever inferences evolutionary psychologists can draw from behavioral comparisons. Nevertheless, as Buller and Richardson point out, many evolutionary psychologists are incautious with regard to the certainty they claim from their comparative work and can be overly liberal concerning the species they choose (e.g., Thornhill and Palmer 2001 draw on data from scorpion flies to support their conclusions about human rape).

Looking at reverse engineering in EP, Richardson (2007) reminds that "adaptive processes and their results do not correspond one-to-one" (59). For instance, just because the *Archaeopteryx* (a bird-like dinosaur) had feathers and bird-like feet, it does not

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[3] Reverse engineering is when an evolutionary psychologist "attempts to reconstruct the mind's design from an analysis of the problems the mind must have evolved to solve" (Buller 2005, p. 92).

mean that those feathers were needed for flying, or the feet needed to perch in trees. Because of this, Richardson explains it is important that reverse engineering explanations of adaptation be "supplemented and augmented in a variety of ways," including being provisioned with independent evidence and evidence that is directly historical (52).[4] These extra steps, however, are often ignored by evolutionary psychologists.

Data analysis. Buller, Richardson, and Gould also criticize evolutionary psychologists for their problematic interpretations of data. They discuss instances where they have found evolutionary psychologists to fail to report relevant complications or contradictions in their data (e.g., Buller 2005, pp. 228–252, 370–410), and overgeneralize their conclusions (e.g., Buller 2005, pp. 210–228; Richardson 2007, pp. 174–183).

2.2 Problems with epistemic values

Epistemic or cognitive values are those values in a science that are thought to be truth conducive.[5] Ultimately, epistemic values are supposed to provide objective grounds for theory choice (Longino 1996). Buller and Gould point out ways that epistemic values in EP fail to be truth conducive.

Gould criticizes evolutionary psychologists' overly simplistic understanding of evolutionary theory. A simple theory, defined in ontological terms, is one that posits few causal entities or processes (Baker 2013; Longino 1996). Simplicity of theory has been considered to be epistemically valuable for *a priori* reasons (e.g., intrinsic rational value), naturalistic reasons (e.g., complex theories depend too much on ad hoc explanations to deal with anomalies), and reasons pertaining to probability and statistics (e.g., simpler laws have greater prior probability) (Baker 2013). Gould (1997a) criticizes evolutionary psychologists for holding an *overly* simplistic account of evolution: adaptationism. According to Gould, underlying adaptationism is the "dream" that an "enormously complex and various world" can be underpinned by a single mechanism: evolution by natural selection (3). He says this "dogmatism" hurts evolutionary research since it "threatens to compromise the true complexity, subtlety (and beauty) of evolutionary theory and the explanation of life's history" (5).

Buller (2005) discusses problems with a second epistemic value in EP work, an explanatory value he thinks evolutionary psychologists overemphasize: design. Specifically, Buller argues that the value many evolutionary psychologists place on discovering and explaining design in organisms is outdated. On this he cites Peter Godfrey-Smith (1999) who refers to the emphasis on adaptation in EP as a "theoretical vestige" of natural theology's argument from design. The argument from design was originally put forward by William Paley in the early 1800s who proposed nature to have a creator since it has design (as cited in Buller 2005, p. 472). To Godfrey-Smith (1999), both Paley's natural theology and adaptationism wrongly accord the

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[4] Historical evidence in the context of EP would require information about "the sort of environmental 'problem' [human] cognitive mechanisms are responding to, the phenotypic and genotypic variation present, the structure of the relevant social groups, the gene flow between them, and other population parameters" (Richardson 2007, p. 84).

[5] However, see Douglas (2013) who marks a distinction between "cognitive" and "epistemic" values.

problem of design a central status in our investigations of organisms. But, as Buller adds, "There is nothing in the nature of things that mandates that we should explain complex design as being more important than," for example, nonadaptive evolution, extinction, or organismic diversity. Interests in these others have advanced evolutionary theory and are crucial for the study of life (475). An over-valuing of design, then, according to Buller, limits what evolutionary psychologists can learn about the nature of organisms.

2.3 Pernicious social implications

Gould and Richardson dedicate some discussion to the pernicious social implications that are associated with some EP claims. In different ways, both theorists suggest to their readers that the many harmful claims in EP can be dismissed since they are not backed by appropriate evidence. In his discussion, Richardson brings up Philip Kitcher (1985) normative point that "when the negative consequences of accepting some conclusion are great, and the conclusion is itself uncertain, then we should demand higher standards of evidence before we embrace it" (Richardson 2007, p. 34). Taking this seriously, Richardson argues that, given the social costs of so many EP claims,[6] EP should at the very least be held to the same standards as non-human animal evolutionary biology. He goes on to conclude that given these appropriate standards, most EP claims will be found to be unsupportable, and so too their pernicious implications.

Gould (1997b) also notes a potential for social harm if some EP hypotheses are accepted. And like Richardson, he appeals to the scientific inadequacy of EP to reassure that such harms are an unlikely threat:

> If evolutionary psychologists continue to push [their program] as a central dogma, they will eventually suffer the fate of the Freudians, who also had some good insights but failed spectacularly, and with serious harm imposed upon millions of people (women, for example, who were labeled as 'frigid' when they couldn't make an impossible physiological transition from clitoral to vaginal orgasm), because they elevated a limited guide into a rigid creed that became more of an untestable and unchangeable religion than a science. (6)

Thus Richardson and Gould's concerns about harmful claims in EP hinge on a concern about the evidential status of such claims. Although Richardson acknowledges that non-truth-relevant factors (such as a concern about harm) should inform our standards for accepting EP hypotheses, he nonetheless maintains that evidence and its connection to truth should have the final say. Accordingly, this would mean that regardless of how pernicious an EP claim might be, we are required to accept it if the evidence provided passes our (albeit heightened) standards. Gould (1997a), as well, is counting on the empirical inadequacy of EP for the rejection of its pernicious claims. Like the

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6 On this he mentions Thornhill and Palmer (2001) theory of rape and how some see it to justify rape and "give support to rapists" (36).

Freudians, he says, evolutionary psychologists are pushing theories that are harmful but also "untestable" and "rigid" and so will likely fail (6).

In sum, analysis of specific works by Richardson, Buller, and Gould yields a critical approach to EP that I call the truth-detectional approach to science criticism. In these works, EP researchers are criticized for their (1) substandard scientific work with evolutionary theory, methods, and data analyses, (2) problematic epistemic values, and (3) pernicious social implications. What ties these three categories of critique together is a concern about the truth of EP claims as it can be ascertained by the evidence evolutionary psychologists can and do offer. In these specific works, Gould, Richardson, and Buller are concerned about substandard theory, methods, and data interpretations in EP because issues in these domains compromise the evidence evolutionary psychologists offer. They are concerned about problematic epistemic values because they guide EP research in ways that compromise its potential for objectivity. Even their criticisms of the pernicious social implications in EP center on truth. As I showed, both Richardson and Gould dismiss the pernicious claims in EP, anticipating that such claims are largely not adequately supported by evidence.

3 The social-dimensional approach

When philosophers recognize the social nature of science and assess scientific theories, methods, knowledge claims, etc. as part of a framework of social processes and values, they are engaging in what I call the social-dimensional approach to science criticism. In this section, I outline criticisms of EP by John Dupré (2001, 2012), Letitia Meynell (2012), and Cheryl Brown Travis (2003) who, in these specific works, take a social-dimensional approach. I highlight three social dimensions of EP research that these critics take into consideration in their assessments of EP: social values, dissemination, and social implications.

3.1 Social values

In their critiques, Dupré, Meynell, and Travis take seriously the social values that motivate and guide much EP research. Social values as I mean them in this paper are values that reflect what is deemed socially important (e.g., economic welfare, power, equality). They may or may not be truth conducing. Taking from Dupré, Meynell, and Travis's discussions, uncovering social values in science, and learning about the various roles they play throughout the scientific process, is important for at least three reasons. First, uncovering guiding social values can help explicate *why* a scientist or community of scientists might be conducting science in the ways that they are. Second, understanding the values in a science can help explain why a given research program might be attractive to others—if those values are widely shared for instance. Third, talking in-depth about how values in a science can lead to harmful social consequences can help show why that science is not valuable to society and so should be ignored. The two social values I will be discussing from Dupré, Meynell, and Travis's discussions I call "Social Order" and "Authority." In this section, I define these values and discuss the ways in which they have been said to motivate EP research, which is the first

reason, listed above, for why uncovering social values in science is important. I will address the second and third reasons respectively in Sects. 3.2 and 3.3.

Social Order. To value Social Order is to value an organization of people into roles that are conducive to a certain functioning of society. My characterization of Social Order in EP is drawn from Dupré, Meynell, and Travis's discussions about essentialism and biological determinism. Here these critics lay out the ways in which EP research harbours harmful values of Social Order when they define, reify, and ground the differences between social categories in biological causes.

To be essentialist about human categories (e.g., sex, class) is to assume that there are sets of necessary and sufficient conditions that must obtain for individuals to count as members of some category or another (Grosz 1994). Dupré, Meynell, and Travis discuss ways in which EP hypotheses are embedded with essentialist assumption about sex (but also class as I will talk about later). Evolutionary psychologists often cast human sexes as starkly dichotomous categories that have been shaped by natural selection. Men, we are told, have particular physical, mental, and behavioral characteristics that correspond non-arbitrarily to the specific problems they needed to solved in their evolutionary past. Because they needed to compete against one another for access to women, they evolved adaptations that make them fierce competitors: strength, leadership, selfishness, sexual prowess, promiscuity, desire for power. Women, as well, have characteristic behaviors, psychologies, and behavioral tendencies that map onto the adaptive problems they needed to solve, many of which were different from the problems men faced. Because women needed to raise offspring and land a mate to help raise those offspring, they evolved adaptive traits that make them good caretakers, choosy about their mates, and able to retain a male mate for long enough to raise offspring: sociability, empathy, emotionality, sexual coyness. Not coincidentally, this kind of essentialism about sex is conducive to a Social Order that requires men to be the leaders and breadwinners in society and women the caretakers. Essentialism allows for the categories of "men" and "women" to be characteristically different (e.g., men are leaders, women are caretakers) and separate (e.g., it is difficult for men to caretake and difficult for women to lead). Evidence that essentialism about sex in EP is motivated by a valuing of Social Order, and not the result of impartial observations of society, is put nicely by Meynell who explains that essentialism in EP can only be maintained by "willful ignorance" (2012, 21). She says,

> Although it is clear that behavior is variable and that [sex] dimorphism, when found, is typically moderate, [EP] must sideline variance in such a way as to mask the similarities between the sexes and the variety within the sexes.

Issues surrounding essentialism about human categories are often closely linked with discussions about biological determinism. Biological determinism is a mode of explanation of causation that assigns biological factors primacy or, in some cases, totality over the causal space of a given characteristic. For example, a biologically deterministic view of mothering sees mothering first and foremost as a biological or "natural" inclination of women (Birke 1986, p. 13). Two important assumptions that often accompany biological determinism are the views that traits which are biologically determined are immutable (or at least very hard to change) and/or are desirable (Birke 1986). Along these lines, Dupré, Meynell, and Travis point out the ways in which

many evolutionary psychologists root the essential characteristics of sex, and other categories in biological (evolutionary) causes. Such a move inevitably, either implicitly or explicitly, acts to ground the alleged characteristics of the social category as inherent to that category, making them seem permanent and expected. In her discussions about the tendency among many evolutionary psychologists to root gender stereotypes and differences in evolutionary causes, Travis (2003) points out how such a tendency is a symptom of a desire to uphold social orderliness. She says,

> Western, occidental views of sex and sexuality are built around categorical dichotomies, where the creation and celebration of sex differences are understood to be crucial to social order. One gains the impression from this dichotomous view that society would pretty nearly collapse without the oderliness derived from these differences. (10)

Thus, biological determinism picks up where essentialism leaves off in regards to supporting Social Order. Where essentialism establishes the existence of social hierarchies across categories, and norms of membership within categories, biological determinism naturalizes the existence and justifies the persistence of these categories.

One reason understanding the social motivations (i.e., Social Order) underlying essentialist assumptions in EP is important, according to Meynell, Dupré, and Travis, is because it sheds light on *why* evolutionary psychologists hold onto them despite criticism and contradictory evidence. As I will discuss in more detail, this draws an important point against the truth-detectional approach. If values are motivating a certain pattern of mistakes in a program, then it is crucial that these values be addressed because this means they are in part a cause of those mistakes. Attacking particular theories on account of their evidence is only part of the job if the researchers behind the theories have values that will continue to influence future research.

Authority. To value Authority is to value one's own or one's group's position on matters important to society (e.g., moral, scientific, political) as a position of far-reaching authority. I characterize the value of Authority in EP based on Dupré 's (2012) concerns about monism. He explains, one way evolutionary psychologists illegitimately garner epistemic authority for their theories is by exploiting ideas of a reductionistic "scientific unity" (e.g., 2012, 35). Dupré problematizes the pervasive monistic assumption in science that explanations of the different phenomena across scientific disciplines are organized along hierarchical levels such that phenomena at higher levels can be explained by reducing them to phenomena at lower levels. So, for example, this would be to assume that neuroscience and psychology can be unified because the human behaviours psychologists study can be reduced to the neurological processes that are the subject of neuroscience. Part and parcel with assumptions of such scientific unity is that explanations at the lower levels are superior—i.e., they explain more about a given phenomena—to higher-level explanations. According to Dupré (2012), evolutionary psychologists are keen to emphasize the superiority of their discipline given where in the hierarchy of scientific explanations they take their own explanations to occupy. For example, Dupré (2001, 2012) cites Barkow et al. (1995) doing just this. Propounding a version of physical reductionism, these evolutionary psychologists emphasize the importance of scientific explanations that appeal to the internal structural properties of phenomena, as opposed to explanations that highlight

context and environment. This, of course, is meant to epitomize EP (a science of genetics and "mind modules") as a hyper-scientific account of human behaviour, over and above the more traditional human behavioural disciplines that must contend with "chaotic" phenomena like culture (as cited in Dupré 2001, p. 73).

Dupré's discussion of the ideology of reductionistic scientific unity and how evolutionary psychologists can gain from this sheds valuable light on the ways in which values of Authority permeate EP research. By assuming a reductionistic unity of science and claiming to occupy a crucial part of this unity, evolutionary psychologists enhance the epistemic authority of their discipline. This authority is then used to discredit other disciplines' theories of human behaviour (especially those disciplines that do not appeal to the supremacy of endogenous causes) that they claim do not fit as tightly within the science unity that evolutionary psychology allegedly does.

3.2 Dissemination

Contrary to what many philosophers of biology might assume, EP is in fact widely received across public and academic contexts. While there are certainly many scholars across the humanities, social sciences, and biological sciences who reject much EP research, evolutionary psychologists are not without their allies. Evolutionary psychologists publish widely in prestigious journals,[7] receive large grants from some of the biggest granting agencies,[8] and are employed at the top universities in the world.

Dupré, Meynell, and Travis point out that the wide receipt of EP and the connections its scientists have are a nontrivial part of its knowledge production process. The institutional support evolutionary psychologists receive enables their research (e.g., through funding) but also promotes it if those institutional bodies are reputable, which, as I pointed out, often are. This support in turn contributes to the dissemination and legitimization of the knowledge EP produces. According to Meynell (2012), this recognition from reputable institutions, especially prestigious journals, can act as artificially confirming the truth of EP claims. She says, EP's high volume of publications contributes to "an appearance of significant empirical success" (18).

Dupré, Meynell, and Travis connect dissemination with social values. This connection provides a second reason why talking about social values is important for the assessment of morally relevant science. They mention how EP research that is embedded with widely held social values (particularly those of Social Order) can make EP attractive to broad audiences. Research that expresses deeply held values resonates

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[7] Psychology journals include: *Personality Processes and Individual Differences*,*Journal of Personality and Social Psychology*, *Behavioral and Brain Sciences*. Interdisciplinary journals include: *Human Nature*, *Proceedings of the National Academy of Sciences*.

[8] For example, one or more of the four largest EP labs in the United States (i.e., Evolutionary Psychology Lab, co-directed by Todd A. Shackelford & Viviana A. Weeks-Shackelford; The Buss Lab, directed by David Buss; Center for Evolutionary Psychology, co-directed by Leda Cosmides and John Tooby; Evolution and Human Behaviour Laboratory, directed by Michael McCullough) have received funding for their research from, among others, the following major agencies: National Institute of Mental Health, National Institute of Health, National Science Foundation, Hogg Foundation, Gordon P. Getty Trust, John Templeton Foundation, Air Force Office of Scientific Research, The Fetzer Institute.

with what people already believe about categories of people and so makes EP seem
intuitively true.

3.3 Social implications

Meynell, Dupré, and Travis, like Gould and Richardson in their truth-detectional
approach, also voice concern about the social implications of EP. However, their
approach to discussing these implications differs from Gould's and Richardson's in
that they connect their discussions of implications to social values, and talk more
at length about what the implications actually are and why they are harmful. For
instance, in connection with their discussions about social values, Dupré (2001, 2012)
and Meynell point out some dire ethical problems that arise from essentialist views
of sex and class. Meynell points out that typifying members of a category implies
that there is only one general type of person in that category and therefore erases the
real differences between members of that category. This often epitomizes a paradig-
matic "normal" person for that category and casts others as abnormal. Dupré (2001)
shows that, when sets of characteristics assigned to the token members of a category
are pejorative relative to the assumed characteristics of other categories, this acts to
marginalize the entire category. For example, he points out how the view that men
of low socioeconomic status are violent instills an unnecessary fear of them and con-
tributes to their unequal treatment before the law. Travis talks about some harmful
implications associated with biological determinism. She explains how grounding sex
differences in biological causes provides "reassurance about the natural, and there-
fore rightful, divisions of labor," and a reassurance about a "natural basis for unequal
privilege" (2003, 11).

   This richer discussion about the harmful implications of EP research, and their con-
nection to values, does two things for the assessment of EP that Gould and Richardson's
criticisms cannot. For one, it does more to demonstrate the riskiness that is associated
with accepting pernicious EP hypotheses (a goal that, recall, is in fact important to
Gould and Richardson). The mere one sentence that Gould and Richardson each allo-
cate to describing the implications of EP might not be enough to convince their readers
that the implications of EP do indeed make accepting certain EP hypotheses risky. As
I discuss below, losing a reader on this aspect of one's critique is not inconsequential
if the reader has in fact determined that *rejecting* the theory is what is risky. Second,
and referring to the third reason talking about social values is important for the assess-
ment of morally relevant science, discussing in more detail the harms in science does
work to devalue that science as a social good. As a practical enterprise, science is in
the business of producing knowledge that can be used for human ends. Within such
an enterprise, knowledge that thwarts our ends is therefore less valuable (see Kitcher
2001 for more in-depth discussion of this point). Talking at length about the harms in
a science gives philosophers an opportunity to talk about the pragmatic dimensions of
science and to point out to their readers that harmful science is also wasteful from a
societal perspective.

   In brief sum, the social-dimensional approach is an approach to science criticism
that sees science, especially morally relevant science, as embedded in and so intimately

affected by social processes and values. As such, taking this approach requires that the social dimensions of a science such as its social values, dissemination, and social implications be given serious consideration in connection with things like evidence. On this point, it bears emphasizing that the social-dimensional approach is not *just about* values, dissemination, implications or any other salient social dimension of science. By no means would taking the social-dimensional approach prohibit a philosopher from being concerned about evidence, theory, methods, or even truth. It is just that these latter aspects, to a social-dimensionalist, cannot be disconnected from social dimensions and so must be considered alongside them.

4 The truth-detectional approach and harm

In this section, I discuss some of the ways using the truth-detectional approach can cause harm. For the purposes of this discussion, I mark a distinction between *facilitating* a harm and harming. By facilitating a harm I mean contributing in some way to a harm that has been initiated by someone or something else. One can contribute to a harm by adding to it (an active action) or by failing to try to prevent it (a passive action) when given the opportunity. For instance, consider the scenario of a sports team that is currently losing a game. A teammate on the losing side can facilitate their team losing by actively doing something like scoring in their own goal, or by passively not doing something like making no attempt to block scores from the other team. In both cases, the teammate acts in ways that help rather than hinder their team losing. Someone who harms, on the other hand, is an initiator of a harm. Harming, in this sense, can also be active or passive, but the subject must be the initiator of the potential harmful outcome. In this section, I consider the different ways using the truth-detectional approach can cause harm in these two senses. I show that because the truth-detectional approach is not equipped to address harms connected to science, using the approach can passively facilitate certain harms connected to science. I also discuss how the truth-detectional approach harms the philosophy of science in part because it promotes an impoverished understanding of the production of scientific knowledge. In contrast, the social-dimensional approach avoids these harms.

4.1 Social harm

Two characteristics of Gould, Richardson, and Buller's approach to the criticism of EP risk facilitating harms to society. These characteristics are (1) a lack of discussion about EP's harms and (2) an implicit assumption that a harmful hypothesis that is false will be rejected.

First, remaining silent on or talking only minimally about the harms connected to EP, when one is in a position to do so, can passively facilitate those harms because such silence protects evolutionary psychologists from having to account for the harms they cause or risk. Criticizing a sexist programme in EP, for instance, because its theories are weak, its experiments are flawed, or its conclusions are too broad, allows the sexism itself to remain in the program unaccounted for. A seemingly unshakable image of the scientist depicts someone who is impartial, or at least profoundly limited

in their passions by the rigidity of the scientific method. This image remains supported when scientists are continually assumed to not have partiality—especially partiality about social matters. When Gould, Richardson, and Buller dig up flaws in EP theory or methodology but ignore its harmful social dimensions, they lend support to the idea that while evolutionary psychologists can make technical mistakes, their work and actions are irrelevant to or disconnected from issues of social harm. In the eyes of Gould, Richardson, and Buller's readers, this removes accountability on the part of EP for the harm it causes. Thinking about this on a larger scale, a broad application of the truth-detectional approach among science critics contributes more generally to the relaxing of science's accountability for harm. Less accountability can create a climate of incaution in science such that there is little incentive to be mindful of how scientific practice might effect social harms.

Not talking about harmful social dimensions in science passively facilitates social harms in another way. As I mentioned earlier, values can be embedded in scientific practice such that they guide the development of theories, assumptions, and methods, or guide how scientists draw their inferences. This idea that social values can be embedded in the prior developing conditions of theories, sets of assumptions, etc. reveals that they need not be specific to any one research instance but can carry forward to the development of subsequent theories, methods, and so on. For instance, if a prejudice is motivating a certain set of assumptions, critiquing that set of assumptions for reasons precluding the prejudice risks the next set of assumptions also being prejudiced. But if the prejudice is a part of the critique, like it would be in a social-dimensional critique, this gives scientific practitioners or institutions a chance to guard against it specifically in subsequent research. Philosophers of science are well situated to alert scientists to these more systemic kinds of harms.

When philosophers of science take the truth-detectional approach to their discussions about morally relevant science they can also passively facilitate harming their own readers.[9] When philosophers report on socially harmful science, they share that science, its claims, values, assumptions, implications, and so on with their readers. This makes their readers, who might never read EP otherwise, vulnerable to any harmful content that might be embedded in the science being presented. A philosopher can passively facilitate harming their readers if they remain neutral about the harms they are exposing their readers to. Regardless of the philosopher's intentions, being neutral can give implicit support to the harms. To illustrate, consider how a philosopher who takes a truth-detectional approach to an EP "mating strategies" theory could facilitate this type of harm.

Evolutionary psychologists Buss and Schmitt (1993) predict sexual dimorphism regarding human promiscuity. Drawing on Robert Trivers (1972) parental investment theory, which assumes that because men are the lower investing sex and so are more competitive with one another for access to females, Buss and Schmitt make four predictions about men. They say men: (1) should express greater desire for, or interest in, short term mates than will women, (2) should desire larger numbers of sex partners than will women, (3) should be willing to engage in sexual intercourse after less time

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[9] Thank you very much to an anonymous reviewer for their insights on this discussion.

has elapsed than will women, and (4) should relax their mate preference standards in short-term mating contexts more than will women (Buss and Schmitt 2011). Someone reading about this theory in philosophy of science could easily pick up on any one of the theory's many implications: e.g., it is more natural/normal/expected for men to be promiscuous than women; when a man expresses romantic interest in a woman, he most likely just wants to have sex with her. These implications are of course harmful because they reinforce prejudicial norms and assumptions about men's and women's sexualities. They affirm beliefs that women are sexually prudish, only wanting sex when it will get them something (e.g., intimacy, protection, financial support, a child); they also paint men as sex-obsessed and sexually unemotional.

As this train of reasoning (i.e., theory—implications—cultural beliefs) reminds us, more can happen in the mind of a reader of science (or philosophy of science) than mere understanding of linguistic phrases. Readers bring their own assumptions, experiences, and beliefs to their interpretations and understanding of science. This is why, as discussants of science, it is important for philosophers to know their readers and to seriously consider how a piece of knowledge might resonate with them. Certainly we can't know the minds and idiosyncrasies of everyone, but when there exist widespread prejudices, we can expect that many of our readers will either have them or will be susceptible to them given the right "information." Buss and Schmitt's theory counts as just this kind of information. It mimics the kind of knowledge that is necessary to justify the prejudices I mentioned above. Philosophers who disseminate this kind of information to their readers are in a privileged position. They have the option to name and try to mitigate the harms the information can cause, or to remain neutral. If philosophers use their privileged position to remain neutral, they passively facilitate the harm the information can cause.

Building on this, trying to mitigate harms in science by simply showing that the science is "untrue" is unlikely to be effective for a couple of reasons. First, philosophers have to assume that not all of their readers will be on board with their criticisms of science. When this happens in a context where a philosopher is presenting research with prejudicial implications, the philosopher succeeds at nothing other than exposing their reader to a theory that gives them reason (or more reason) to hold a prejudice. Second, even if a philosopher succeeds in persuading their reader that a certain theory is flawed, theories that speak to culturally sensitive subject matter could be hard for readers to reject if rejecting them seems personally risky. For instance, readers of philosophy that presents Buss and Schmitt's theory might wager that it is better to believe the theory and apply it to their own lives, despite the flaws the philosophers talk about, than risk having an "abnormal" sexuality.

4.2 Harm to the philosophy of science

The truth-detectional approach, as it is applied by Gould, Richardson, and Buller in the specific works discussed, can also harm the philosophy of science. For one, these theorists' use of the truth-detectional approach assumes an impoverished understanding of the production of scientific knowledge. This in turn leads to lower quality philosophy of science research than one could otherwise offer with a richer understanding of

science. Much philosophical scholarship over the last decades has moved beyond the idea that science is asocial. Lessons from especially social epistemology and feminism have taught convincingly that few if any aspects of the scientific process are free of social dimensions like social values (Bluhm 2013a, b; Douglas 2009; Dupré 2012; Haraway 1989; Keller 1985; Kitcher 1985; Kourany 2010; Longino 1990, 2002, 2013; Richardson 2013; Solomon 2001). For instance, because of this research, we now know that social values motivate what gets studied and what gets funded (Douglas 2009; Solomon 2001). We know social values motivate theory and method choice (Douglas 2009; Richardson 2013). For instance, a scientist who values career success can be motivated to choose their own method or theory for research. Social values guide what scientists pay attention to, emphasize, or deemphasize in their data (Bluhm 2013a, b; Longino 2013). They are buried in the assumptions that traverse the gap between hypotheses and data, and so play a role in scientists' decisions about how well data support hypotheses (Longino 1990, 2002). Social values, recall from Sect. 3.2, also influence the kind of scientific knowledge that people pay attention to. This can have a significant impact on theory acceptance as popular opinion can give the illusion of empirical success (Dupré 2001, 2012; Longino 2013; Meynell 2012). But all these lessons are lost when philosophers continue to take approaches to science like the truth-detectional approach. The truth-detectional approach assumes a direct line between evidence and truth. Such an assumption prevents inquiry into the ways in which social processes and values disrupt this line or otherwise guide the production of scientific knowledge. The truth-detectional approach, therefore, narrows a philosopher's focus in their assessments and so compromises the quality and accuracy of their assessments.

By simply taking the truth-detectional approach, Buller, Richardson, and Gould risk compromising the quality of their assessments as described above. Buller, however, risks additional harms to the philosophy of science when he makes a pointed effort to delegitimize social-dimensional critiques of science. Consider Buller's treatment of those who have taken issue with the political dimensions of EP.

> ...as my research progressed, I became disheartened over the scarcity of reasoned intellectual exchange regarding evolutionary psychology. [...] it was too easy to find critics attacking evolutionary psychology for its 'directly political dimension' and its 'culturally pernicious' political claims. And, when evolutionary psychology wasn't being attacked on political grounds, it was easy to find critics dismissing evolutionary psychology for being built on a single 'fatal flaw.' [...] Thus dismissing evolutionary psychology for its corrupt politics or being based on 'one big mistake' enabled critics to deflect attention from the *evidence* that evolutionary psychologists present and to avoid altogether any serious engagement with evolutionary psychology. (Italics original 2005, 4)

As is clear from this excerpt, to Buller critiquing a scientist for the politically pernicious implications of their theory is not "reasoned intellectual exchange." This sends a clear message that addressing at least the political dimensions of a scientific theory is unsophisticated.

This message is harmful to the philosophy of science because it delegitimizes discourses that are in fact very valuable to the philosophy of science. Science *is* social and political, and addressing these dimensions can shed important light on

the knowledge productions processes of science. Moreover saying that discourses that address political values in science are unreasoned suggests that only those discourses that refrain from talk of values are reasonable. But never talking about values in science will inevitably result in peddling the very unreasonable notion that science is value free.

The message from Buller's excerpt is also unduly harmful to feminist philosophers who have criticized EP. Indeed the one political analysis of EP that Buller footnotes in the quote above is a work that is co-authored by Hilary Rose (see the Introduction in Rose and Rose 2000), a feminist sociologist, and is very feminist in its content. Sarah Richardson (2010) discusses the myriad of ways in which feminist philosophers are a marginalized group within the philosophy of science. She explains that feminist perspectives of science are often simplified, caricatured, and thought to have little philosophical import beyond their diagnoses of "bias." Feminist critics of science are often villainized, she says, to have "anti-science" aims such as diminishing and limiting the influence of science, flat-out denying scientific findings (that don't uphold feminist values), and rejecting scientific values wholesale, such as objectivity, empirical verification, and logical reasoning (in favor of feminist ideology) (353). Buller's caricature of those who concern themselves with the political issues in EP does no favors to this image of feminist work.

Importantly, however, neither Buller's accusations nor those mentioned by Richardson (2010) are well grounded. Most feminist critiques of science aim to promote *better* science, not to get rid of it. It is true that feminists argue that there should be more feminist values in science, but these arguments are nuanced and take careful consideration of the ways in which science is a social process and a social good. Contrary to how Buller characterizes feminist or political discussions about EP, feminists have provided their fair share of "serious" analysis. Over and above their extensive work on the specifically political dimensions of EP, feminists have also combed through EP studies to see how they measure up to the standards of evolutionary biology, have applied rigorous feminist analyses to the inappropriate assumptions evolutionary psychologists make, and have offered superior methods, theory, and data that evolutionary psychologists can and should make use of (see especially Dupré 2001, 2012; Eagly and Wood 1999; Fausto-Sterling 2000; Fausto-Sterling et al. 1997; Gannon 2002; Lloyd 2001, 2003; Lloyd and Feldman 2002; Meynell 2012; Rosser 1997; Sork 1997; also see discussions in Fehr 2011).

In sum, ignoring the social dimensions of science is harmful to the philosophy of science because doing so promotes an epistemological approach to science that is no longer tenable and compromises the quality of one's philosophical assessment. Effortfully delegitimizing social-dimensional approaches to science criticism in one's truth-detectional approach is also harmful to the philosophy of science because it acts to delegitimize an epistemological approach to science that is in fact quite valuable.

5 Conclusion

I've presented two philosophical approaches to the assessment of EP that stand as a case study for the assessment of morally relevant science more generally. The first approach, the truth-dectectional approach, is hyper-focused on the evidence provided

by a science and how that evidence supports the truth claims of that science. The second approach, the social-dimensional approach, also considers the production and quality of a science's evidence but does so within a framework of social processes and values. I pointed out that the truth-detectional approach is socially harmful since it ignores or cannot adequately address those dimensions of science that cause harm and so is unintentionally complicit with them. I also showed how the truth-detectional approach harms the philosophy of science because it assumes an epistemological approach to science that is no longer tenable and compromises the quality of one's philosophical assessment. The social-dimensional approach, in contrast, does not risk harms to society because it exposes and mitigates social harms embedded in science. Nor does it harm the philosophy of science because it engages a rich epistemological approach to science. I conclude, then, that the truth-detectional approach should be abandoned in favour of a social-dimensional approach for the assessment of morally relevant science. To avoid the pitfalls of the truth-detectional approach, philosophers of science ought to engage with and emulate the philosophical literature that sheds light on and emphasizes the importance of the various ways science is a social process and value-laden (for additional resources see, Brigandt 2015; Brown 2013; Hankinson Nelson and Nelson 1996; Kincaid et al. 2007; Longino 1990; Machamer and Wolters 2004; Solomon 2001)

Before closing, I think it is worth considering whether the obligation implied in my argument is too demanding. Is it fair to expect all philosophers of science who contend with morally relevant science to engage aspects like evidence *and* aspects like values and implications in their analyses? I will unpack this obligation a little because I think it is much less demanding than it may initially seem.[10]

To start, I should emphasize that the obligation in my argument is not one that should result in a policy. If philosophers wish to continue to take approaches to morally relevant science such as the truth-detectional approach, I certainly wouldn't recommend that their work be formally shut out of philosophical discourse in any way. Such steps seem unnecessary and are beyond the scope of this paper.

With that aside, it is certainly true that there would be some extra work involved for those philosophers of science who choose to adopt the methodological changes argued for in this paper. But would this extra work be overly taxing? I think not. The changes would in fact be quite minimal and certainly not more than what philosophers are already expected to do in order to keep their practices up to date. On an individual level, philosophers of science would need to read and engage social and feminist epistemological resources (some of which I provide in this article). I do not foresee this to be overly taxing since reading and learning from other philosophers throughout one's career has always been an expected and welcome part of the profession. On a community level, philosophers of science would need to make more effort to include social and feminist epistemological papers on course syllabi in philosophy of science classes, and to stay away from emphasizing that the papers present "alternative" approaches to philosophy of science. This ensures philosophers are receiving this training early on, and learning that approaches like the social-dimensional approach are legitimate, effective, and sophisticated ways to analyze science. Again, however, I am confident

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[10] I would like to thank an anonymous reviewer for raising this particular worry.

this is not overly demanding. Keeping course syllabi up to date is also an ordinary and necessary part of the discipline.

This, however, is not to say that taking an approach like the social-dimensional approach will come without its challenges. One methodological difficulty in particular that might arise is how to best weigh the two kinds of considerations within the social-dimensional approach (social and epistemic) for a properly thorough evaluation.[11] Not all sciences that philosophers engage are like evolutionary psychology in that they are both epistemically weak and socially harmful. Philosophers might find some sciences to be epistemically very strong but socially harmful, or, conversely, socially beneficial but epistemically flawed. In such cases, the philosopher has a more difficult task prioritizing the strengths and weaknesses of the science's different dimensions. I hope that as myself and others continue to develop approaches like the social-dimensional approach in our practices, and apply these approaches across a variety of sciences, challenges like this one can be worked through, and the methods that prove successful for dealing with them added to the literature.[12]

In close, philosophers now have a surfeit of arguments and evidence available to them that suggest approaches like the truth-detectional approach should be abandoned (and a tacit promise that this should not be too professionally demanding). This paper contributes to a body of arguments in socially relevant philosophy of science that urges philosophers to consider taking seriously the social nature of science. More so today, science permeates our everyday lives. There are ever growing numbers of scientific disciplines and more widespread commodification and dissemination of scientific knowledge. Standards for the production and quality of evidence are therefore not static or uniform. They are determined by fluid communities of knowers who produce science for various ends. Talk of "truth" that is divorced from the social processes that define it is therefore void of meaning or worth in a world of needs, values, power struggles, and changing belief systems. Given their training and opportunity for engagement, philosophers should be at the frontlines of the discourses that deconstruct and guide this social production of science. Philosophers who do socially relevant philosophy of science point out how this could benefit society, science, and the philosophy of science. My paper now adds that not doing so, especially when assessing morally relevant science, can risk harm to society and to the philosophy of science. It is past time philosophers of science take these calls seriously.

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[11] Thank you to the anonymous reviewer who pointed out this particular challenge for the social-dimensional approach. It is in fact quite relevant to very near future work of mine in which I will be engaging sciences that are both epistemically more sophisticated and socially less harmful than evolutionary psychology.

[12] For discussions from philosophers who have dealt (in different ways) with this problem of balancing epistemic and social considerations in science analysis see, Brigandt (2015), Brown (2013), Douglas (2009), Kitcher (1985), Kourany (2010), Solomon (2001).

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