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Whose social values? Evaluating Canada's 'death of evidence' controversy

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With twentieth- and twenty-first-century philosophy of science's unfolding acceptance of the nature of scientific inquiry being value-laden, the persistent worry has been that there are no means for legitimate negotiation of the social or non-epistemic values that enter into science. The rejection of the value-free ideal in science has thereby been coupled with the spectres of indiscriminate relativism and bias in scientific inquiry. I challenge this view in the context of recently expressed concerns regarding Canada's death of evidence controversy. The worry, raised by Stathis Psillos, is that as constructivist accounts of science demoted the previously secure status of evidence for drawing justified conclusions in science, we were left with no rational delineation between the right and wrong values for science. The implication for the death of evidence controversy is that we may have no rational grounds for claiming that the Canadian Government is wrong to interfere with scientific enterprise. But he does offer another avenue for reaching the conclusion that the wrong social values are directing the current stifling of some sectors of Canadian science. Psillos draws from standpoint epistemologies to devise a salient defence of 'valuing evidence' as a universalizable social value. That is, government bodies *ought* to enable scientific research via adequate funding as well as political non-interference. In this paper, I counter that (i) non-epistemic values *can* be rationally evaluated and that (ii) standpoint epistemology's universalizable standpoint provides an inadequate framework for negotiating social values in science. Regarding (i), I draw from the evidence-based medicine debate in philosophy of medicine and from feminist empiricist investigations into the science–values relationship in order to make the argument for empirically driven value arbitration. If social values can be *rationally* chosen in the context of justification, then we can have grounds for charging the Canadian leadership with being 'at war with science'. (ii) I further argue that my recommended empiricist methodology is preferable to Psillos's search for universalizable perspectives for negotiating social values in science because the latter method permits little more than the trivial conclusion that evidence is valuable to science.

Keywords: evidence; social values; feminist epistemology of science; feminist science studies; evidence-based medicine

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Canada's 'death of evidence' controversy (*CBC News,* July 9, 2012; *Nature*, July 19, 2012) – the Canadian Government's censorship of public science, especially environmental research – illustrates the harms of politicized science. Specifically, scientific integrity is damaged when political and economic imperatives interfere with the epistemic virtues that govern good science, such as freedom of inquiry and open and honest communication of results. One might be tempted to conclude that the solution to the problem of values corrupting science is no values at all – the ideal of *value-free science.* But those of us informed by decades of philosophy of science and science studies research recognize value-free science to be unattainable (whether desirable or not), which leaves us in a difficult predicament. How do we maintain a steady separation between *good* science and *bad* science, where the values underlying the recent actions of the Canadian Government, for instance, represent the *wrong* values for governing Canada's scientific community?

It appears to be with this worry in mind that Psillos (forthcoming) raises Canada's 'death of evidence' controversy for the attention it calls to the epistemic standing of *evidence* in science. The case highlights the damaging epistemic stagnation that occurs when good evidence is suppressed or research is compromised. This interpretation of the death of evidence situation is not controversial. But Psillos takes it that the value judgement tied to the scientists' protests – that it is *wrong* for national science programs to be managed this way – is not so easily justified. He turns his attention to social constructivist tendencies in the past roughly sixty-five years of philosophy of science to suggest that philosophers of science have been complicit in undermining the once-prominent role of evidence in scientific reasoning. Specifically, the attention directed towards the underdetermination thesis and the relationship between science and social values have delimited the justificatory role that evidence plays in theory selection. The concern is that we may be left with no means for rationally justifying our scientific claims. Psillos maintains that we need the *right* social values in order to sustain objectivity in science, but wonders who gets to say which values are right.

Psillos finds a solution to this pressing question in feminist standpoint epistemology, which upholds a concept of objectivity that permits the situatedness of knowledge. In contrast to value-free universalism, standpoint epistemology explores *perspectival* values that can and should be *universalizable,* that is, acceptable to everyone. The Marxist 'standpoint of the proletariat' is one such universalizable perspective. As Psillos explains, 'When Marx famously called the proletariat the "universal class", he did not, obviously, mean that everyone is a proletarian. He meant that the interests of the proletariat (ultimately, human emancipation by the abolition of exploitation) were universal interests; that is interests that could become the interests of the society as a whole (and of other social groups and classes in particular)' (Psillos forthcoming). It is this notion

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of universalizable values that Psillos pursues in order to determine the right social values for science.

I want to challenge the charge that constructivism has enfeebled the epistemic authority of evidence in science by proposing that there are promising lines of contemporary empiricist philosophy of science research that Psillos can draw from in order to acknowledge the relationship between science and non-epistemic values *without* falling into epistemic relativism. The appeal to universalizable standpoints and values, which I will later argue to be an inadequate framework for negotiating social values in science, is thereby unnecessary. The first area of research is the evidence-based medicine debate in philosophy of medicine and the second is feminist empiricism's rigorous focus on the science–values relationship. Both are informative for this discussion because they are similarly invested in maintaining the epistemic status of evidence and the normativity of empirical science while acknowledging the value-ladenness of science. After offering a brief review of the death of evidence controversy in Canada, I will turn to these areas of scholarship in order to make the case for the rational and justified inclusion of the *right* social values for scientific inquiry.

Canada's 'death of evidence' controversy

In July 2012, two thousand Canadian scientists eschewed any presumed science/politics divide by marching on Parliament Hill and staging a mock funeral for the death of evidence (*CBC News*, July 9, 2012).[1] This display of public theatre was a protest against the notorious track record of the ruling Conservative Government of undermining scientific inquiry by selectively underfunding and interfering with scientific research as well as delimiting science communications that conflicted with the government's pro-industry and anti-environment agenda. The list of offences against scientific inquiry has been sobering – it includes the muzzling of Environment Canada scientists by routing all media inquiries through government offices in Ottawa (*Ottawa Citizen*, February 1, 2008), the closing of the office of the non-partisan national science adviser (*CBC News*, January 22, 2008), the closing of the world-renown Polar Environment Atmospheric Research Laboratory (PEARL) and Experimental Lakes Area (ELA) freshwater research station (*Globe and Mail*, March 19, 2013; *Globe and Mail*, March 20, 2013), and severe cuts to basic research agency budgets[2] (*CBC News*, July 9, 2012) and grants programs (*Nature*, July 19, 2012). And while these actions stand against the government's positive record of increased science and technology spending every year since taking power in 2006, successfully attracting top researchers to the country, and bolstering applied research in Canada (*Nature*, July 19, 2012), the critics charged that the direction of scientific research money towards commercialization had been done at the expense of basic research and independent environmental research. The government's publicly stated

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scepticism regarding climate science research, its rescinding of Canada's Kyoto commitments and its investment in a fossil fuel economy (especially the mining and upgrading of bitumen from the Alberta oil sands[3]) have been taken as evidence of the government's economic agenda problematically interfering with free scientific inquiry (*Nature,* February 21, 2008; *New York Times*, September 21, 2013; Turner 2013).[4]

This case illustrates a familiar conflict between science and politics. The Canadian Government's political and economic interests intrude upon the workings of science, which rely on free inquiry and communications in order to operate successfully. Current political interference in the distribution of research effort and resources as well as the dissemination of scientific knowledge, the protesting Canadian scientists charged, signalled the 'death of evidence', and no government reassurances of its commitments to science (Goodyear 2009; Goodyear 2012) could convince them and many observers otherwise. As a 2012 *Nature* editorial on Canada's death of evidence controversy[5] put it:

> Governments come and go, but scientific expertise and experience cannot be chopped and changed as the mood suits and still be expected to function. ('Death of Evidence: Changes to Canadian Science Raise Questions that the Government Must Answer', 272)

The specific political values and interests of the current Canadian Government are widely understood to undermine science. The 'death of evidence' thereby serves as a metaphor for both an unsavoury political interference as well as lack of commitment to scientific enterprise by the government. Those values are understood by critics of the government's actions to be harmful to science.

But not everyone agrees with this evaluation of the situation. Psillos raises the counterclaim, voiced by former Statistics Canada economist Philip Cross, that the actions of Prime Minister Harper's government do not constitute a 'war on science'. In an opinion piece that appeared in the Canadian *Financial Post*, Cross stated that science and economic growth go hand in hand, and therefore the federal government is justified in reducing impediments like 'the science underpinning environmental regulation' (*Financial Post*, October 21, 2013). Research, he maintains, ought to be directed towards commercial ends, and the government, similar to private business, has the right to manage its media communications. He challenges the critics' contention that these priorities infringe on scientists' 'academic freedom', countering that these scientists are not academics but rather government employees (without the credentials to join the academy).

Psillos notes that Cross does not dispute the facts surrounding the 'death of evidence' debate – the limits placed on government scientists from speaking to the press, the efforts to direct scientific research towards economic growth, and so forth – but rejects the claim that these actions constitute a *war* on science. Cross's evaluative claim, Psillos concludes, rests on an implicit conception of the value of science, 'viz. that science should be subordinate to various social,

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political and economic interests, including the government and its economic and political agenda' (Psillos forthcoming). Therefore, 'when there is a conflict between science and the dominant social values, or those that are taken to be the dominant social values, it should be science that has to yield' (ibid).

Psillos desires firm arbitration of these competing valuations of science in relation to social interests. He concludes:

> In the current debate about the death of evidence in Canada, we see in action proof of the claim that though science is not free of social values, it matters a lot *what* these values are and *whose* values they are. (Psillos forthcoming)

He has a sense that Cross is promoting the *wrong* social values and thinks standpoint epistemologies offer the means for justifying this claim. He writes:

> The universalisability of social values is, for all practical purposes at least, their objectivity. This is fully consistent with standpoint epistemologies, in the sense that the standpoint (and hence the values) of a certain socially identified group aims to become the universal standpoint from which society and its structure and values are viewed. (ibid.)

Psillos thinks that it is only within this framework that Cross and the Canadian government's values could be rendered non-universalizable and therefore unacceptable for scientific governance.

I anticipate difficulty with this standpoint intervention for negotiating social values in science and want to suggest a different direction for determining which social values ought to be condoned and which ought to be condemned in scientific research. This alternative framework requires stepping back to Psillos's previous assumption that social values, because they are socially determined, are immune to rational evaluation. Instead, I propose that social values can be subject to empirical evaluation.

I will challenge Psillos's concern that the past over-half century of academic theorizing about the inescapable role of values in science leaves us with little conceptual justification for pointing to *those* political interests as the wrong values for governing science. Psillos sees constructivist accounts of science as having demoted the previously secure status of evidence in drawing justified conclusions in science; therefore we were left with no rational delineation between the right and wrong values for science. I reject this position and do so by turning to recent scholarship in philosophy of medicine and feminist empiricist philosophy of science to argue that designations of good and bad science can still be rationally made within the context of value-laden science.

The evidence-based medicine debate in philosophy of medicine

In medicine, the prolific evidence-based medicine movement put evidence at the forefront of good clinical practice. Its founders, clinical epidemiologists at

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McMaster University in Canada, initially suggested the implausible position that clinical trial evidence could direct patient care. In the 1991 publication that first introduced the medical community to the fledgling approach, the 'way of the future' for clinical reasoning entailed 'quickly tracking down publications of studies that are directly relevant to the clinical problem, critically appraising these studies, and applying the results of the best studies to the clinical problem at hand' (Guyatt 1991; see also Evidence Based Medicine Working Group 1992).

Critics of evidence-based medicine, coming mainly from philosophy of medicine and medical sociology and anthropology, were quick to point out the problematic positivist underpinnings of this new philosophy of medicine (Goldenberg 2006). They insisted that the movement needed to be reflective of both the value-ladenness of science and the underdetermination of theory by the evidence.[6] All the while, those critics did not want to give up on evidence in favour of an approach to clinical reasoning that relied on hunches, intuitions and received wisdom. Philosophers of medicine have worked towards maintaining evidence's rightful place in clinical reasoning – one that respectfully recognizes the limits of evidence without denying the epistemic strength that it legitimately offers (Tonelli 2006).

These critical efforts have been difficult to integrate into clinical self-understanding. While evidence-based medicine offered an appealing vision of medical practice insofar as it aimed to further realize medicine's rational scientific core (evidence-based medicine was originally called 'scientific medicine' by its founders), the critics' counterclaims regarding how social values permeate medicine invited the damning conclusion by some practitioners that evidentiary reasoning in the clinical context was no more than power politics.

Specifically, some commentators have despaired over what they perceive to be inescapable subjectivism in clinical reasoning. One commentator, Edmund Harari, a psychiatrist, published a reflection in a medical journal tellingly titled 'Whose Evidence? Lessons from the Philosophy of Science' (Harari 2001). Similarly, a professor of epidemiology, Eyal Shahar, penned 'A Popperian Perspective on the Term "Evidence-based Medicine"' (Shahar 1997), in which he invoked Popper's theory of falsification in order to argue that clinical reasoning is a political battle over whose value-laden evidence gets to count. Both authors invoked the theory-ladenness of observations, the incompleteness of evidence and the fallibility of our theories – the 'lessons from philosophy of science' – to make the case that even when the latest, best, and most relevant clinical research is consulted, more goes into medical decision-making than experimental evidence. Shahar's challenges to orthodox and evidence-based notions of objectivity concentrate on the many points of subjective preference that enter into clinical research's production and interpretation of clinical data. This leads him to the following pessimistic conclusion:

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> The results of a clinical trial hardly deserve the title evidence, not only because every interested scientist can question various statistical and design aspects, but also because the whole process of data analysis, presentation, and interpretation contains many subjective elements. (Shahar 1997, 113)

Moreover,

> there is no rule of logic that can help us decide whose interpretation of empirical experience is the evidence. [Instead] we can formulate many rules of preference. (ibid., 114)

Shahar fears that since preferences have no logical content, the mantra of evidence-based medicine permits power interests to further their own agendas. He closes with these thoughts:

> Whenever someone waves the flag of *evidence-based medicine* in your face, demand a straightforward answer to the following question: whose evidence is the evidence in *evidence-based medicine*? The answer, or lack thereof, will either expose the identity of someone who claims to have authority over human knowledge or justify your rejection of the term. (Shahar 1997, 116)

Both authors' posing of the question 'whose evidence?' as the conclusionary 'lesson from philosophy of science' highlights their shared assumption that there are no rational grounds for making justified clinical decisions without the previous security of the objectivist account of evidence that evidence-based medicine allegedly offered.[7] This speaks to the common view that there are no means for legitimate negotiation of the social or non-epistemic values that enter in science.

It has been interesting to find discussion of these foundational epistemological issues appearing in the pages of medical journals. The evidence-based medicine movement's confident claim to provide the best evidence for optimal patient care prompted healthy reflection within health care regarding how evidence is derived and applied in the clinical setting (for example, Miettinen 1998). The movement's critics argued that even rigorous clinical research has its methodological limits; additionally, critics found it presumptuous to assume that the rational application of clinical evidence would result in improved patient care.[8] They thereby challenged both the notion of medicine having an 'evidence base' (Upshur 2002) as well as the movement's unsupported revisioning of the nature of clinical reasoning. Specifically, the founders of evidence-based medicine offered the following prescription for clinical decision-making:

> Evidence based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision-making and stresses the examination of evidence from clinical research. EBM

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> requires new skills of the physician, including *efficient literature searching and the application of formal rules of evidence* evaluating the clinical literature. (Evidence-Based Medicine Working Group 1992; my emphasis)

Yet the critics of evidence-based medicine were not satisfied to merely undermine the evidence-based approach. The critical scholarship included corrective accounts of the nature of clinical reasoning with an eye towards improving the practice.

For instance, some critics have undertaken naturalized investigations into 'how doctors think' (Groopman 2008; Montgomery 2006), thereby challenging the evidence-based account just described by offering a contrasting account of clinical reasoning as an *interpretive* activity (Horton 1995). Against the simplistic notion that relevant trial evidence can be adequately applied to individual patient care, the physician faced with producing accurate diagnostics, prognostics and clinically appropriate treatment recommendations instead engages in a complex process of gathering information from a plurality of sources, assigning relevance, and synthesizing those inputs in order to come to a reasonable and well-reasoned conclusion. The final product is an 'interpretive story' (Tanenbaum 1994).

The 'interpretive story' must be coherent insofar as the conclusion must fit with the informational inputs, but it is a 'story' nonetheless inasmuch as gaps in the logic of evidence must be filled by interpretive content. Even a sophisticated decision-making tool, while potentially helpful in ruling out certain options or highlighting missing information, could not guide the cognitive integration of such qualitatively diverse inputs as patient histories, epidemiological data, lab test results and patient preferences. For this, we need the contribution of 'clinical judgment' (or practical wisdom), despite this knowledge being partial, bias-prone, and non-systematic.

Thus proponents of this interpretive account of clinical reasoning accept the limits of clinical evidence for directing clinical decision-making without worrying that the demotion of its status leaves us with insufficient warrants for action. Tonelli (2006), for instance, offers a pluralistic model of clinical reasoning that recognizes multiple warrants for clinical action that operate alongside the relevant research data.[9] Those warrants include clinical trial data, patients' values and beliefs, clinical judgement, expert opinion and systemic considerations like the availability of resources. The reasoning process is not linear or algorithmic, as some of these diverse warrants are more easily quantified, while others figure into decision-making more descriptively. The specifics of the clinical problem determine how to weigh those warrants against each other and how to resolve conflicting recommendations if they arise. But, importantly, no single warrant evades critical evaluation and rational justification for its inclusion or exclusion in the decision-making process. Even the patient's personal preferences and any pertinent social values are part of the reasoning process insofar as they must be determined to be reasonable, actionable, or, failing that,

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unworkable (Tonelli 2006). Notably, Tonelli and proponents of other interpretive approaches like 'narrative medicine' (Greenhalgh 1999) do not see the inclusion of personal and social values as inviting the relativism anticipated by Shahar, Harari, and even Psillos (in the death of evidence context).

As mentioned, the discussion of interpretive accounts of clinical reasoning remains largely academic, having yet to have much influence on the professional self-understanding of practising clinicians. The reason for this is unclear. It might be because interpretive approaches do not offer the secure systematicity or algorithmic certainty that evidence-based medicine allegedly provides. Yet even if clinicians find the evidence-based account of clinical reasoning reassuring, it does not capture what clinicians actually do (or can do) in practice. If interpretive accounts are unsatisfying, it can only be because some clinicians want a different approach, something easier to follow or less error-prone than careful consideration of all relevant inputs. These interpretive accounts can be strengthened, so as to avoid bias, by following certain rules of argumentation (Horton 1998; Miettinen 1998), but critical thinking and good judgement remain central to clinical reasoning. These fallible cognitive processes are not in place of the previous stature of evidence**.** Instead practical wisdom remains part of clinical decision-making and can even strengthen the process by acting as the integrative glue for including more diverse evidentiary warrants (or, if you prefer, permitting a broader conception of evidence).

The science–values relationship in feminist philosophy of science

Feminist epistemologists of science (especially feminist empiricists) frequently deploy the underdetermination thesis to reveal the play of values in scientific reasoning. They interpret the thesis to describe a gap between evidence and theory acceptance that can be filled by social and political values (Intemann 2005). But like the evidence-based medicine critics, they are not satisfied to conclude that no theory can be justified. Feminist science studies works within a post-positivist world view that undermines orthodox positions on the totalizing role of evidence in scientific reasoning. Yet feminist theorists want to protect the normativity of science because they want to be able criticize sexist science (Code 1991; Haraway 1998; Harding 1993, 1995). Feminist scholars have been heavily invested in science studies for decades because of the high sociopolitical stakes of knowledge production. Women have historically suffered numerous exclusions in the name of science, for instance, in biological and psychological explanations of women's supposed cognitive, emotional and moral inferiority to men.[10] Epistemic relativism is therefore unacceptable; feminists need to be able to demarcate good science from bad science to explain the problem of gender bias in many research protocols and practices (see also Brigandt forthcoming). And so feminist theorists have produced various reconfigured accounts of 'objectivity' that are no longer a property of value-free

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science (Harding 1993, 1995; Longino 1990). Instead values, *even* non-epistemic values, can enable good science and justified decisions.

Influenced by Quine's holism as well as his naturalized approach, many feminist empiricists commit to the view that social values are inseparable from scientific reasoning (Longino 1990; Nelson 1990). These values, which include sexist beliefs as well as feminist commitments, are present not only in the context of discovery but also in the context of justification. Yet epistemic relativism is not the necessary consequence. Feminist empiricists offer two general strategies for meaningfully negotiating social values in science. The first is a communal approach, while the latter finds empirically grounded reason, for value choice. Both strategies propose to respond to Psillos and many others' concern that the right social values be selected with justification.

The first strategy, the communal approach, is most substantially developed in Helen Longino's 'critical contextual empiricism' (Longino 1990, 2002). Longino highlights the communal nature of knowledge production in science, which is readily apparent in the often large teams of scientists who work together on research projects as well as the way new research builds on previous findings and more basic assumptions about the objects, methods and instruments utilized in research practices. Research findings and theories are then subject to public scrutiny by one's research community (the 'community of knowers') at academic conferences, and through peer review, published commentaries and letters to the editor. This mundane understanding of science as social knowledge has been taken further by Longino and other feminist empiricists to suggest that social values could similarly be negotiated by research communities.

The worrisome biasing effect that the inclusion of social values can bring to scientific reasoning is mediated through this communal approach; specifically, by facilitating critical arbitration of competing values within democratically organized diverse scientific communities.[11] Scientific objectivity is grounded in this intersubjective process. Objective knowledge is produced through the critical interrogation, by this ideal epistemic community, of the background assumptions supporting competing theories. The composition of the scientific community is crucial for promoting objectivity: *diversity* is meant to ensure that all stakeholders are represented, especially marginalized perspectives that can bring unique insight into, say, unfair background assumptions or the methodological limits of a given research protocol that stands to impact that marginalized community differentially. *Democracy* increases the likelihood that those marginalized perspectives receive uptake even when more powerful interests reside within that same epistemic community.

With this process of 'transformative criticism' (as Longino (2002) calls it), competing non-epistemic values can be evaluated, negotiated and finally accepted or rejected just as we do with epistemic values. Against the fears of value-free science proponents, accepting the place of social values in scientific reasoning does not mean that 'anything goes' or that the most powerful

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interests trump. This intersubjective evaluation holds the promise of getting us closer to the right social values that Psillos and others want for science; those right values are determined by an inclusive epistemic community. By this feminist account, science can be objective via its attention to the rules of evidence as well as the critical negotiation of competing values.

A minority of feminist empiricists have proposed that this communal approach takes an unnecessary step in its arbitration of social values as a practice of political negotiation (Anderson 2004; Clough 2003a, 2003b). Instead they encourage staying true to our empiricist roots by rationally evaluating the content of value judgments that inform science, thereby justifying which values are the right values in circumscribed scientific contexts, by appeal to empirical inquiry. Competing values can be adjudicated by appeal to evidence because value claims are often supported by empirical claims.

To illustrate, consider the position held by many feminist theorists that feminist values are superior to sexist or androcentric values. How can we justify this claim as more than political preference? Sexist values often rest on empirical claims, such as claims about women's inferior cognitive ability in comparison to men, and are therefore testable and even revisable in the light of experience (Clough 2013a). They are further subject to many of the same cognitive requirements that factual claims are held to, such as fruitfulness and defeasibility. Sexist values grounded in claims about women's comparative inferior abilities, for instance, have been amply discredited by social scientific research, thereby suggesting feminist values that endorse gender equality to be epistemically superior to those sexist values. Feminist values therefore stand among the right values that should guide scientific inquiry into gender relations. This is due to their scientific merit rather than any political commitment, which in turn circumscribes the ways in which the position can be challenged by detractors.

Thus non-epistemic values can play more than an instrumental role in scientific reasoning; for instance, by contributing in the interpretation of data and determining when the standard of evidence to support a claim has been met. Instead, the empirical content of social values permits those value judgments to play an *intrinsic* role in scientific reasoning by serving as *evidence* in support of a claim in certain decision-making contexts (Anderson 2004; Clough 2003a, 2003b, 2013a, 2013b; Goldenberg 2014).

In an illustrative case study examining the use of value judgements in feminist divorce research, Elizabeth Anderson maintains that non-epistemic values are not only inextricable from social scientific research, but that research would suffer without them. When investigating a contested issue like the impact of divorce on families, non-epistemic value judgments will invariably enter the researchers' framing of the issue, design of the investigation, interpretation of the data and so forth. Furthermore, they can help to uncover the evidence that bears on the question under consideration (Anderson 2004, 11).

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Divorce researchers are unavoidably influenced by prior beliefs about the value of the nuclear family, gender norms, models of parenting and so forth. This is not detrimental to their research insofar as inquiry would be directionless without some set of background assumptions to frame one's interpretation of events (Anderson 2006, 3). While value-free inquiry is impossible, relativism is not the necessary result. Like feminist epistemologists of all stripes, Anderson maintains that it would be methodologically irresponsible to exclude those assumptions from critical evaluation. Anderson does not, however, call for a social process of critical scrutiny of these values in order to establish their legitimacy. Here, she separates from the instrumental view of non-epistemic values. She argues instead that the acceptability of a value claim stems from its empirical content.

A divorce researcher might approach such evaluative questions as 'are children better off if parents who want divorce stay together?' with the background assumption that divorce is a traumatic breakup of a family. A feminist researcher might begin with the alternative assumption that divorce presents a transformation of the family unit as well as an opportunity for personal growth for divorcees. These background assumptions will guide the inquiry, and that guidance is acceptable or legitimate when those values are left open to empirical testing and revision rather than adopted as a pre-determined conclusion. Indeed, Anderson found that that the background assumption that divorce is experienced as loss encountered empirical problems due to difficulty in evaluating family harm initiated by the divorce against harms that family members were already experiencing prior to divorce as the spousal relationship was deteriorating. The feminist position offered a more epistemically fruitful framing of the experience of divorce because it could account for perceived losses and gains by the stakeholders as a result of divorce.[12]

This case study helpfully reveals two things: (1) background assumptions will guide research, but, against the worries of value-neutralists, there are limits on what counts as acceptable or legitimate guidance; (2) empirical research is suitable for evaluating competing background assumptions. Regarding (1), Anderson grounds the undertheorizing of social values in feminist science studies in the frequent deployment of the underdetermination thesis. But she does not do so by (directly) challenging the plausibility of empirically equivalent competing theories, as previous critics including Psillos (2005, 1999, 164–168) have forcefully done.[13] Instead, she focuses on what is assumed about those non-epistemic values that may fill that gap between evidence and theories. Underdetermination permits the scientist's use of political values to mediate the link between evidence and hypotheses in scientific inquiry, yet provides no criteria for differentiating *legitimate* from *illegitimate* deployment of those values. Anderson (2004) proposes that social values are used *illegitimately* when they are deployed to drive inquiry to predetermined conclusions. This amounts to dogmatism. Many proponents of value-free science see this dangerous direction, but err in thinking that this is the only way that values can operate in

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science. Instead sociology of science research has shown us that value-laden background assumptions are needed to guide scientific inquiry. That guidance is *legitimate*, according to Anderson, when those values are amenable to empirical testing and revision. They thereby foster open-ended inquiry rather than determine the conclusion.

We also saw that (2) empirical research permitted the meaningful evaluation of competing background assumptions in divorce research. Those values were evaluated for their content, whereby the view that divorce could represent new possibilities and life opportunities proved to be more fruitful than the assumption that divorce represented traumatic loss. The proposed benefit of such an empirically driven value inquiry is more chance of reaching agreement by competing ideological factions. We avoid the perils of contestable social values where the evidence, values and community composition are open to debate.[14] The recent philosophical interest in 'socially-responsible science' has once again highlighted the difficulty of negotiating competing social values and goals.[15] While it would be naïve to suggest that claims of empirical adequacy are never contested, this approach to arbitration of competing background assumptions is helpful in allowing us to begin with a cognitive value that is shared by all empiricists, rather than the more difficult negotiation of determining which social values ought to govern scientific inquiry.

The right kind of values in the 'death of evidence' controversy

With these accounts of value-laden empirical inquiry in place, I want to now challenge Psillos's ambivalence regarding the presumed fractured connection between evidence and social values and suggest that he indeed provides sufficient evidentiary grounds for rejecting Cross's argument – social values and all. Most of Cross's arguments are value statements that challenge widely accepted norms regarding the aims of scientific research. Consider how Cross's statements hold up against Merton's (1973) influential norms of science. While these norms have been contested on numerous occasions since their 1942 launch, they have *never* been challenged on the grounds that, as Cross asserts, the primary aim of science is to further economic growth or that funders (even public funding bodies!) have the right to control what findings are publicly communicated.[16] Sure it is Cross's prerogative to choose these values, but much more effort is required to convince others that those values warrant our endorsement. We therefore have little reason to accept his conclusion that there is no war on science.

The weakness in Cross's argument is that the Harper Government is endorsing a set of norms that are not accepted in the scientific community or the philosophical literature. The feminist empiricist focus on communal knowledge captures, at minimum, the prima facie difficulty in upholding his view. Cross would need to make the case for why new and idiosyncratic norms of scientific governance are appropriate. This is a difficult task given the strong

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history of community support for opposing norms like Merton's. But there is arguably some room for debate given the non-ideal composition of our epistemic communities. Further appeal to the empirical grounds of value judgments reveals the unlikeliness that such a position could be successfully argued. We have ample empirical support from the history of science to strongly indicate that science operates most rigorously and productively when it is unfettered by outside political and economic influences. If we accept empirical adequacy as a driving epistemic value in science (an uncontroversial claim, I think, even as we acknowledge the points of disagreement that can arise regarding what constitutes this adequacy), it follows that governmental efforts to restrict research into certain questions and to delimit the sharing of scientific information among stakeholders uphold inappropriate social values for scientific governance. We need not worry over whether the communal or the empirically driven feminist methodologies better serve our purpose of dismantling Cross's position. In the pluralist spirit of integrative approaches to scientific reasoning, both can offer evidentiary warrants for the case that the Canadian Government *is* at war with science and that the social values governing these practices should be rejected.

Cross's value statements stand on shaky normative and empirical ground in contrast to prime minister Harper's critics, who can argue that the government's actions contravene well-grounded scientific norms like disinterestedness and communalism. This assessment of competing values shows the critics to have stronger footing than Cross. Even without pursuing the route of standpoint epistemologies (as Psillos did), we have a justified answer to the pressing question, '*whose* social values are the *right* social values?'

On universalizable standpoints and science

My conclusion that the Canadian Government is upholding the wrong social values might seem unimpressive considering that Psillos already managed to reach the same conclusion. But our different methodologies for reaching this same conclusion matter a great deal. Where I summoned empiricist grounding for justifying social values, Psillos appealed to standpoint epistemology's universalizable perspectives. This exercise allowed him to conclude that 'valuing evidence' is one such universalizable social value. The Canadian Government's actions were wrong because they endorsed values that contravened the universalizable value of 'valuing evidence'.

My worry is that the weighty standard of universalizable values for negotiating social values in science will permit little more than a trivial conclusion: that valuing evidence is good for science, and, if directed towards socially responsible scientific inquiry, it is good for humanity too. The previous discussion regarding evidence-based medicine highlights the paucity of the claim that evidence is good for science. Indeed, evidence-based medicine values evidence. Purveyors of the integrative approach to scientific reasoning also value

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evidence, and doing so resulted in a framework for clinical decision-making that was at odds with evidence-based practice. The conflict between the two sides hinges on what is the right kind of evidence for clinical research and practice. Thus, affirming evidence or 'valuing evidence' offers us very little. It is unlikely to direct social values management adequately. I question whether it can do much more than condemn political interference in science.

Of course, what made 'valuing evidence' a universalizable value was more than the place of evidence in epistemically responsible science. Psillos argued that what makes 'valuing evidence' the 'right social value is that it is conducive to socially responsible science' (Psillos forthcoming). Psillos endorses Kourany's (2010) call for socially responsible science, 'which encourages inclusion of social values that are conducive to human flourishing, promote equality and social justice and, generally, contribute to the making of a good society' (Psillos forthcoming). 'Valuing evidence' is a universalizable social value, on par with the Marxian "standpoint of the proletariat", insofar as it contributes to the social good. It has already been mentioned (see note 15) that critics have challenged the tenability of socially responsible science precisely because it is rarely clear *which values* in science will achieve those laudable social goals. Also, how do we fairly decide which stakeholders get to determine those values? I have already recommended empiricist-driven feminist empiricism over community-based arbitration of social values for the very reason that the latter faces ample opportunity for disagreement regarding which social values have a place in scientific enterprise. Even with the aims of science already established – the promotion of wellbeing, equality, and social justice – it is far from obvious how we get there. The appeal to socially responsible science, it seems, falls back on the 'whose social values?' question that first directed Psillos to standpoint epistemology. And so the question of whose values does not get resolved by demanding science that is responsive to human needs.

Some of the most notorious disputes over values in science show us that the legitimate needs of one group will often contravene the legitimate needs of another – without one side clearly promoting progressive values like human flourishing and social justice while the opposing side condones socially regressive perspectives. It stands to reason that the appeal to universalizable values will not guide us towards resolution of these debates with the ease that it did in the death of evidence case.

The politically and publicly charged debates over mitigating the environmental impact of climate change illustrate this point. Leaving aside unwarranted climate change denial – an unfortunate distraction from the hard and important work of future planning in face of current and future effects of climate change – stakeholders might all agree that we need to change our current course of environmental degradation before catastrophic food and water shortages harm human welfare. However, the right social values for charting that course are not easily settled. The debates over climate change reveal that there

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is no consensus on obligations to future generations as opposed to current ones, or to people living in lesser developed parts of the world (who stand to be more impacted by climate change) against those with more economic resources. There is also no agreement on the right trade-off between economic benefit surrounding the use of non-renewable natural resources against the importance of environmental conservation.[17] It does not seem that any one side or perspective is universalizable. Any answer to these difficult questions regarding how to best manage climate change differently impacts its many stakeholders (current and future). Many interests compete in what appear to be genuine moral conflicts. Unlike the class struggle described by Marx, it is not the case that one side promotes human emancipation while the other protects selfish exploitative practices. The resolution of these difficult questions regarding obligations to others and the environment will not be achieved by demanding universalizable perspectives. Instead resolution will be hard-won, and it will be achieved by empirically driven public debate.

Conclusion

The 'death of evidence' debate in Canada illustrates a clash of science and social values – the lesson from which is not that science should be value-free but that the wrong social values are intruding upon scientific research. Which values are the right social values? The interpretive and feminist empiricist methods discussed here all offered nonarbitrary assignments of which values have a place in scientific inquiry. These methods construe evidence holistically to include not only the factual claims that we typically ascribe to 'evidence' but also the epistemic strength gained via empirically supported value statements. In this sense, evidence does confirm theory. We can agree with Psillos that 'evidence should always be wanted', but the evidence-based medicine debate showed us that 'valuing evidence' is not enough. If the standpoint effort to determine universalizable perspectives can do no more than condone the use of evidence in science, then it does not take us far enough for evaluating competing social values in science and determining which ones are the right ones for scientific governance. Few other disputes over values in science will be resolved by appeal to universalizable social values. Empirically driven social value management, on the other hand, offers a fruitful means for such arbitration.

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Notes

1. For more information, see the Death of Evidence rally organizers' website: http://www.deathofevidence.ca/.
2. Those agencies include Environment Canada, Fisheries and Oceans Canada, Library and Archives Canada, the National Research Council of Canada, Statistics Canada, and the Natural Sciences and Engineering Research Council of Canada.
3. This novel oil-producing technology would make Canada a major oil-producing nation as well as an enormous producer of greenhouse gas by-product (*Nature*, February 21, 2008, 866). The sand oil will be 'dirtier' in terms of negative environmental impact than other oil-producing technologies. The diluted bitumen will then flow through several controversial proposed pipelines spanning Canada and the United States of America.
4. One of the organizers of the 'Death of Evidence' rally told *CBC News,* 'It definitely seems to us these cuts are not just part of fighting the deficit' (*CBC News,* July 9, 2012).
5. This was the second *Nature* editorial dedicated to Canada's problematically politicized scientific research environment. The first editorial, titled 'Canada Must Free Scientists to Talk to Journalists', was published two years earlier (O'Hara 2010).
6. Likwornik (forthcoming) challenges the common framing of evidence and values as distinct, using examples from medical science.
7. The 'whose evidence?' question does not always stagnate the investigation, of course. Code (1981, 1991) and Harding (1991, 1993), for instance, offered fruitful investigations that stemmed from that question as a focus on the social position of the knower. The EBM critics and, to some degree, Psillos use that question differently insofar as they see it as shutting down meaningful investigation by inviting relativism. 'Whose evidence?' troubles these thinkers for allegedly offering no justified answer. I thank an anonymous reviewer of this paper for reminding me of the alternative ways that the 'whose evidence?' question can be read.
8. The hypocrisy of premising an evidence-based movement on a non-evidence-based claim has been widely noted by the critics.
9. Tonelli's (2006) proposed method for clinical reasoning is a *casuistic* process – analogical reasoning from paradigm cases deemed to be most similar to the case at hand. A full description and evaluation of the process is beyond the scope of this discussion. Those interested can find a series of commentaries on Tonelli's casuistic approach in the *Journal of Evaluation in Clinical Practice,* volume 6, issue 3 (June 2006).
10. For a good overview of these issues, see chapter one of Kourany (2010).
11. Our current scientific communities of knowers do not meet these inclusive criteria, motivating some feminist theorists to make the case for diversity in the composition of research communities on epistemic grounds (for example, see Clough 2013b).
12. Fruitfulness is an epistemic virtue to which factual claims are held; here, value judgments are held to that same measure of epistemic strength.

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13. Larry Laudan offers strong criticism of the presumed 'empirical equivalence thesis' underwriting the underdetermination of theory by the evidence (Laudan 1990; Laudan 1996; Laudan and Leplin 1991).
14. However, the community of knowers might agree on this empirical criterion for value assessment. There is, therefore, some room to dispute whether Anderson and others offer a different form of feminist empiricism than critical contextual empiricism, or whether the empirically driven value inquiry is instead compatible with the communal approach. This challenge is beyond the scope of this investigation.
15. Kourany (2010) recently offered a book-length call for action to radically redirect scientific inquiry towards alleviating injustice and suffering, rather than serving commercial interests. While commentators have been sympathetic to the vision of science at the service of the greater social good, they have contested the very question of who determines which social values ought to govern science and direct its use of resources (see Brown 2013; Dupré 2012; Richardson 2012; Rolin 2012).
16. We can further challenge Cross on the inappropriateness of assigning nondemocratic values to public institutions in a democratic society. Kitcher (2001) has made the case that the public institutions in a democratic society are governed by democratic values. Canadian Government scientists therefore work in public interest and citizens should have access to that information and have some say in setting research agendas. I thank an anonymous referee for elaborating on this point about the directives of societal norms in political context.
17. For more on values in the debates over climate science, see O'Brien and Wolf (2010).

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