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Many philosophers of science in the "science and values" community claim that the ethical and the epistemic are intertwined. This paper explores how Kourany's "thorough integration" of science and values relates to other normative accounts, and presents some reservations about how thoroughly integrated science and values should be.

Philosophy of Science after Feminism (Kourany 2010) starts with the observation that "the ethical and the epistemic are intertwined." Many[1] philosophers of science in the "science and values" community—from Otto Neurath (1939) to Helen Longino (1990, 2002), Lynn Hankinson Nelson (1996), Richmond Campbell (1998), Elizabeth Anderson (2004) and Sharyn Clough (2004)—make claims about the intertwining of the ethical and the epistemic. While agreeing on this, and agreeing that the intertwining has normative implications, they disagree about what the normative implications are. Kourany wants the ethical and the epistemic to be "thoroughly integrated," proposing a "Socially Responsible Science" (SRS) as the result. My discussion will show how Kourany's "thorough integration" relates to other normative accounts in the science and values literature, and presents some reservations about how thoroughly integrated science and values should be. It turns out, I will argue, that a traditional view of "values" and their operation lies behind some claims of intertwining. This traditional view is reminiscent of the classical Greek doctrine of the unity of virtues. When the view is challenged, more nuanced positions become possible.

Kourany begins by reflecting that if the ethical and the epistemic are

1. Many, but not all: Heather Douglas (2009) and Hugh Lacey (Lacey 1999) are exceptions. Both claim that in some parts of inquiry, non-epistemic values should not play a role (in Douglas's case, a direct role).

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intertwined, then value-free science is not possible. So, given that values are a part of science, how do (or should) they operate to bring about successful science? Kourany correctly describes Helen Longino as prescribing a particular strategy of *management of values:* values are acceptable in science so long as the scientific community is sufficiently democratic, diverse, and critical that the values are revealed in the course of normal inquiry and criticism. Kourany then devises a counterexample (she calls it the PETERS objection) suggesting that management of values is not sufficient for good science. The gist of the example is that an elitist scientific community can satisfy Longino's four criteria of objectivity, yet not deserve the status of "good science," on the grounds that it has bad political values. Apparently, Kourany has more stringent requirements of "good science" than does Longino.[2]

Another option in the recent literature that Kourany discusses, although rejects, is to *test the values empirically:* the values we want in science are those that are found to help produce successful scientific theories. This is a position I call feminist radical empiricism (what is radical is the empiricism, not the feminism) or, after Quine, the "Web of Valief"[3] (Solomon 2012). Feminist radical empiricism embraces those values and beliefs that have a track record of success (are reliable), so that values are assessed instrumentally. Elizabeth Anderson (2004), Richmond Campbell (1998), and Sharyn Clough (2004) are feminist radical empiricists. Kourany finds this strategy also insufficient, indeed risky: she claims that it could end up endorsing Nazi science (which had bad political values but arguably strong empirical success) as good science (2010).

Kourany's proposal is to renounce trying to manage values or select values based on their instrumental success in bringing about good science. She wants to *let the values steer the science* instead of the reverse. She proposes a takeover by the values. It's a simple proposal, a bold proposal, and a frankly moralistic one. (Kourany calls it "homespun" but I think she is too modest.) Let's explore how the proposal is supposed to be implemented.

The word "value" is used very broadly in the values and science literature. Perhaps the broad usage started with Helen Longino's 1990 book, *Science as Social Knowledge.* "Value" has been used to include political values, aesthetic preferences, psychological biases, cognitive goals, personal and societal goals, ideologies, and pre-theoretic intuitions. So "value" is, in practice, not restricted to ethical values or even aesthetic values.

2. Longino might argue that PETERS does not satisfy her four criteria of objectivity—in particular it does not satisfy the requirement for public forums for criticism and/or the requirement of equality of intellectual authority.

3. "Valief" means beliefs and values, combined.

"Values" include pre-theoretic assumptions, ethical conduct of inquiry, and causes of preference for one theory over another. Given this broad usage there are probably no scientific considerations that are not imbued with values. (If the usage of "value" was narrower, that might not be the case.) Now let's ask the question, which values will a Socially Responsible Science endorse? Of course it will endorse "good" values such as democracy, respect, and altruism. But what will it say about the goal of unified explanation? (Is it morally neutral, or bad because of the metaphorical resonances with hegemony?) And what will it say about the role of individual ambition? (Is it bad, or morally neutral, or good?) Will it evaluate an interactive theory as more plausible than a hierarchical theory a priori? I find these questions unanswerable, in part because SRS seems to depend on classifying values, independent of their scientific context, into the overgeneral and binary categories of "good" and "bad." The idea of letting the values steer the science is attention-grabbing, but the reality is that values (in the broad sense of "value" typical in this literature) resist such bivalent and general classification.

Although it is not clear whether values such as the desire for unified explanation or the desire for personal reward fall under SRS, it is definitely clear that some values do NOT belong in SRS. The values of Nazi science do not belong, because Nazi science was not SRS. Nazi values are consummate bad values. So it looks like SRS is clear about its application to, and condemnation of, Nazi science. Although this is perhaps an obvious claim (we can all agree that Nazi science is not SRS), it leads to further claims that are not so obvious. Kourany insists that if Nazi science is successful (by epistemic criteria) then we must look to factors other than its values to explain that success. Such factors might include "which scientists were involved in the project, the level of their talents and training, and the conceptual, material, and social resources at their disposal" (2010). Kourany also draws the complimentary conclusion: if science done with good values is unsuccessful (as was the case with Lysenko era Soviet genetics), then that lack of success should not be attributed to the values. In fact, Kourany blames the lack of success of Lysenko's research program on its poor epistemic resources (Kourany 2010). To be sure, the complexity of values—epistemic and other values—makes it difficult to come up with instrumental individual assessments of the values. But in that case, Kourany is not justified in concluding that political values are not even partially responsible for the success of the science that they help produce. She rules out the possibilities that morally bad values are causally responsible for producing epistemically good science (the Nazi case) and morally good values causally responsible for producing epistemically bad science (the Lysenko case). But surely it is an empirical matter, however difficult it

is to disentangle the effects of multiple causes. And I think it is plausible to suggest that Nazi Science was *more* successful in part because of its bad political values, which permitted unrestricted experimentation with human beings.

Kourany is willing to accept the possibilities that morally bad values are causally responsible for producing epistemically bad science (e.g. sexist psychology), and morally good values causally responsible for producing epistemically good science (e.g. recent feminist work in the biological and social sciences). However, she is not willing, in practice, to accept the alternative possibilities that morally bad values can produce good science, or morally good values can produce bad science. So her position about values as the cause of scientific success is not evenhanded.

On the matters of Nazi science and Lysenko science, Kourany is in the same awkward position as feminist radical empiricists (Nelson 1996, Campbell 1998, Clough 2004) who assess values instrumentally (in terms of the empirical success of the science that they produce). The Nazi and Lysenko cases are at least prima facie inconvenient, since the most straightforward interpretation of them is that bad political values can help produce epistemically good science, and good political values can help produce epistemically bad science.

My view is that both Kourany and feminist radical empiricists are entangling the ethical and the epistemic more than is appropriate. Nazi science and Lysenko science are not the only sticking points. Bad social values can, on occasion, produce successful science (e.g. Jim Watson's assumption that important biological objects come in pairs was a helpful heuristic in discovering the structure of DNA (Watson, Stent 1980) and good social values can, on occasion, produce unsuccessful science (e.g. Margie Profet's maverick theory of the evolutionary purpose of menstruation (1993) has not (yet?) produced evidence in its favor)). Of course, a few cases do not establish a general trend, one way or another. In Popperian fashion, they show that we have some evidence against the theories that morally good values always help produce successful science and morally bad values always help produce unsuccessful science. There is not enough of a known trend one way or the other that we need to make a choice, on epistemic grounds, between using good or bad values in science. Furthermore, there is generally more than one way of getting scientific success. More than one set of values can guide successful research, even research leading to similar conclusions: there is more than one way to get to the truth about the world.

"Good for science" does not mean "good for society" or vice versa. But why would Kourany—and several other accomplished philosophers of science in the analytic tradition—seem to deny this? I think that the idea of

the intertwining of the ethical and the epistemic has become a mantra that makes it difficult to state a more nuanced position. Here's a start, but only a start: the ethical and the epistemic are intertwined, but they are not merged. There are many possible accounts of how the ethical and the epistemic do, can and should, interact.

The mantra of merging of the ethical and the epistemic may be unconsciously supported by the ancient doctrine of the unity of virtues, where contemporary "values" take the place of ancient "virtues." With such an assumption of unity, "good" values including the values of social responsibility and the epistemic values of science are thought to coincide, or at least to be strongly connected. Note that the doctrine of the unity of values also assumes that values are understood generally (rather than contextually) and that values are bivalent and classifiable into good and bad. In these ways, it is also a doctrine of the simplicity of values.

Here's a way to state things without sliding into assumptions about the unity of values: Nazi science is not *ipso facto* "bad science" but instead, more accurately, "unethical science." Nazi science might, therefore, produce knowledge about human physiology. Of course it is a separate question whether or not we ought to use this knowledge, even for the important goal of the advancement of science. A distinction between scientific goals and other goals or ideals can be maintained while allowing that in some respects the ethical and the epistemic are intertwined. The distinction is not a mere analytic construct but a result of the multiple goals that guide our activities. It is a pragmatic distinction. If we can differentiate the activities, we can differentiate the values that guide them, even though the values may on occasion overlap. And perhaps I should say, no-one is being called upon to make a choice between being virtuous and being a successful scientist.

Perhaps such worries arise because it appears that values can conflict: the value of being virtuous and the value of doing good science look like they cannot both be satisfied when considering using Nazi science (let alone *doing* Nazi science). But I think we have too simple a view of "value conflict." When values conflict, there are in practice several options, not just the option of dropping one value or another. We do not have to choose between being virtuous and being a successful scientist, even in the Nazi case. Torturing people is not the only way to find out about human physiology. We may have to forswear the most obvious method for ethical reasons, but that does not mean that we are giving up on our scientific goals.

Let's take a closer look at the assumption that values are general. It is assumed by the "unity of values" that the values we hold are to be applied generally, irrespective of domain of application. Yet values, even when stated generally, usually have a specific intended domain of application.

And usually that domain is the one of persons. For example, Helen Longino's cognitive virtue "prefer novelty," which contrasts with the traditional cognitive virtue of "conservativeness" gets its ethical valence from the association with freedom of persons. Should it guide choice in theories of high temperature superconductivity? I.e. should we try to pursue a theory which postulates new entities or processes? The *sensible* answer to this question is, *openness* to novel theories is a cognitive virtue in science, but *preference* for novel theories may be going too far.

Feminist radical empiricists would challenge this, arguing that "prefer novelty" should be assessed by the science that results from applying it, not from any judgments about "being sensible". They argue that values are confirmed and disconfirmed by the results of their application. As a Quinean empiricist myself, I was tempted to join them. But, on reflection, the epistemology of the "Web of Valief" is problematic.

Values can be used where they are relevant or where they are irrelevant. Many examples of gender bias in science involve using values in domains where they are irrelevant (e.g. projecting gendered assumptions onto the activities of nucleus and cytoplasm). We probably can't help doing that, and I'm not recommending that we stop and do "value-appropriate" science (let alone "value-free" science). But it is not appropriate to take the irrelevant, metaphorical usage literally and regard the results *of irrelevant* application of values to be relevant to the assessment of the values themselves. For example, if the novel new theory of high temperature superconductivity turns out not to work, feminist philosophers of science should not interpret that as a strike against the value of embracing novelty for the freedom of persons. And the plausibility of the feminist value of mutuality of interaction (non hierarchical social systems) should not rest, even partially, on how interactive the nucleus is with the cytoplasm. Humans are neither superconductors nor cells. We may *use* human values, at least metaphorically, when reasoning in scientific domains, and some of these uses may turn out to be better than others at answering some of our questions, but we do not typically test them for their moral correctness in the scientific domains.

The role of "irrelevant values" in science is vital to the production and assessment of successful science. Values are a source of creativity, and diversity of values helps increase the theoretical options. But science is less particular than political movements about which values to make use of. "Values" are very blunt epistemic tools in science, however clear-cut they may be in the realm of human behavior.

I am not recommending "disappearing" values from discussions in the epistemology of science—even if it were possible. Values are indispensible. However, recommending "best values" in some general way, as does

Socially Responsible Science, is too simple and general a recommendation. There are no "best values" in general, and being socially responsible is not the only thing we are trying to do. Both Helen Longino and I, in different ways, embrace values (good, bad, and indifferent) yet "neutralize" the effect of particular values on science (she with her account of objectivity and general values critique (1990, 2002), me with balancing of non-empirical decision vectors (Solomon 2001)).

In conclusion, the mantra of "intertwining of the ethical and the epistemic" should be used with caution. It does not mean that the intertwining is so pervasive and so general that we have a "web of valief" and a single combined struggle to do science and make the world a better place. We can, of course, care about both and pursue both, without making it a joint project.

There is no reason to be confident a priori that feminist values will produce better science, especially when the domain of application is not social. Alison Wylie (2004) has argued that feminist values should be regarded as useful only contingently and contextually. So far, at least, that has provided us with plenty to work with.

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