Scientific ethics and the illusion of naïve objectivity

ADRIAN TREVES
Nelson Institute for Environmental Studies, University of Wisconsin–Madison, Madison, WI

Scientists value observations and inferences made objectively, "…not influenced by personal feelings or opinions in considering and representing facts" (Oxford English Dictionary https://www.oed.com). Yet scientists have feelings and opinions (worldviews, hereafter) about their own work and that of others. How do we set these aside to generate the best approximations of reality, and how do our worldviews affect the way we communicate our science? The potential consequences of this paradox are particularly acute for the applied sciences, where research can affect the biosphere.

Debates and discussions about applying research to policy often include criticisms of advocacy or mission- or agenda-driven science. I find two insights lacking in many of these debates: (1) people confuse the role of objectivity in how science is conducted and in how it is conveyed, and (2) their claims of objectivity are frequently naïve.

Resolving this paradox of objectivity among scientists requires that we more clearly distinguish what we observe and infer from our vision of how we wish to change or maintain our planet. This makes it easier to separate the conduct of science (internal domain) from how it is conveyed (external domain). However, success in either domain requires us to dismiss naïve objectivity, which is the claim that scientists can divorce themselves entirely from their own worldviews.

To move beyond naïvety, we must acknowledge that science is not conducted in isolation but instead begins with questions posed by society or by curious scientists. Our methods reflect tradition or personal ingenuity, and our interpretations emphasize our priorities, which reflect our values. There is no view from nowhere – all scientists have a viewpoint. Still, rejecting naïve objectivity does not imply the polar opposite, relativism, which proposes no objective reality. Rather, we strive, if imperfectly, toward the best explanation based on observation, inference, and reasoned evidence. Scientific training and process can improve our objectivity and protect us from overwhelming personal biases. Dismissing naïve objectivity would be furthered if we embraced transparent tests of our worldviews. Recall Chamberlin's method of multiple working hypotheses with which "the dangers of parental affection for a favorite theory can be circumvented". (Chamberlin T. 1890. *Science* **15**: 92–96). Such efforts to expose scientists' worldviews to rigorous challenge by an alternative worldview would make the internal domain of science more objective.

Here, I provide an example from predator control. Anthropocentrism (granting priority to humans) is a worldview commonly applied in environmental science yet rarely handled objectively. In anthropocentric predator control, the prevailing assumption is that killing predators protects human interests. However, if we aim for greater objectivity in how we observe and infer human–environment interactions, then we should scientifically evaluate the anthropocentric worldview against its alternative: non-anthropocentrism, which grants equitable consideration to all beings or ecological communities. Under this worldview, not killing predators protects human and non-human interests. By assuming the anthropocentric position, a scientist might not consider using non-lethal interventions and might only measure the response variable of how contemporary human populations are affected while ignoring outcomes for future generations of humans and non-humans alike. Evaluating only one intervention (killing predators) and one type of response variable (effects on current humans) might be simple; however, it is not based on scientific observation that only those interests exist, but rather on a value judgment that only those interests *matter*.

Some scholars extend a naïve objectivity to criticism of their colleagues' behavior in the external domain of science – conflating how we represent (communicate or translate) scientific findings with the methods we use to observe and infer (concluding from known or assumed facts). Naïve objectivity might impose restrictions on how, when, or to whom we represent our scientific evidence, such as by criticizing each other for not being dispassionate or for speaking to media or lawyers. There are gray areas certainly, yet important observations and strong inference are not by necessity biased by how one represents them and to whom.

Our manner of representing important observations and strong inference lies in the external domain of science, and reflects ethics, social norms, laws, policy positions, personal experiences, and the like. Of course, there are gray areas where differing opinions of the acceptability of tone and style might clash, since we live in a world where scientific ideas must face criticism. Indeed, scientists might be tempted to accuse other researchers of bias when their worldviews differ but ultimately the merits of each set of scientific evidence depend on the methods they used for generating observations and inferences, independent of who conducts the research or their preferred modes of communication. Representing one's science ethically cannot tarnish one's objectivity, no matter how much one dislikes the inferences.