

**Title:** A Historical Perspective on Value Judgments, Value-Neutrality, and Values in Science

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**Abstract:** A number of philosophers working in values and science have recently called for more attention to the nature of value judgments. Following Douglas (2009) on the history of the value-free ideal, I think contemporary work in values and science can benefit from its history. So, I consider the recent calls from a historical perspective. I highlight underemphasized aspects of the relationship between views about the nature of value judgments and their role in scientific reasoning in the mid-20th century. In light of this history, I raise three questions about value judgments and outline answers drawing upon feminist philosophy of science.

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## **I. Introduction**

Closely connected to questions about the role of values in scientific reasoning are questions about the nature and cognitive status of value judgments. Yet, a number of philosophers of science claim recent work in values and science tends to focus on questions about the role of values in scientific reasoning without attending much to value judgments. Zina Ward says “we philosophers of science have gotten by with an intuitive but extremely vague understanding of what values are and what they do” (2019, 772). Matt Brown suggests, “views about the nature of values are taken for granted and left implicit in most discussions of values in science” (2020, 88). Finally, Sarah Wieten claims the “tendency was to skip right over the sticky first question: ‘What are values?’, in order to move on to ‘Are there values in science?’ ‘Where are they?’ ‘Which ones?’ ...” (2021, 299).<sup>1</sup>

Taking a cue from Heather Douglas (2009) on the history of the value-free ideal, I think contemporary work in values and science can benefit from looking to its history. So, I adopt a historical perspective to consider the relationship between views about the nature and cognitive status of value judgments and views about the proper role of values in scientific reasoning. I highlight aspects of the history of values and science, including feminist philosophy of science, that speak more directly to questions about the nature of value judgments than what others see in the recent science and values literature. In §2, I examine work from the mid-20th century when questions about the nature of value judgments figured prominently in discussions about values and science. I identify two views about the cognitive status of value judgments and show how they relate to different accounts of values in scientific reasoning. In §3, I raise three questions in light of the history I sketch, and draw upon work in feminist philosophy of science to outline some answers. §4 concludes.

## **2. Value-neutrality and scientific reasoning in the mid-20th century**

### **2.1 For value-neutrality, against values in scientific reasoning**

In mid-20th century philosophy of science, a number of philosophers of science took up questions about the relationship between science and ethics. One prominent view endorses the value-neutrality of the sciences. Value-neutrality holds that the statements of science are not

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<sup>1</sup> Compare with Anderson: “Feminist philosophers of science have focused on analyzing science, while mostly taking value judgments for granted” (2004, 2).

deductive or inductive grounds from which value judgments follow. For some advocates, the value-neutrality of the sciences turns on an alleged linguistic difference between scientific statements and value judgments (Feigl 1950; Reichenbach 1951; Nagel 1961; Hempel 1960/1965). On one hand, scientific claims are descriptive statements, and so can be true or false. On the other hand, value judgments are expressions of attitudes, interests, or preferences, and ought-statements are imperatives. Neither expressions of attitudes nor imperatives can be true or false. So, the descriptive statements of science have cognitive status by being true or false, and value judgments are noncognitive because they cannot be. Correspondingly, scientific statements are subject to empirical confirmation or disconfirmation and value judgments are not. This difference in cognitive status—grounded in the linguistic point it is supposed to follow from—guarantees the descriptive statements of science do not entail value judgments.

For Herbert Feigl, the difference between the descriptions of science and the value judgments and imperatives of ethics is grounded in a more fundamental distinction between the aims of science and the aims of ethics. Roughly speaking, science aims to offer true descriptions of the world. Feigl says, “The body of scientific knowledge consists of *information*” (1950, 41). However, value judgments concern endorsement, encouragement, approval, and exhortation in relation to satisfying and directing the “needs and interests” of “goal-seeking, intelligent agents” (41). For Feigl, our needs and interests “give rise to the imperative character of valuations,” but scientific results do not endorse particular needs and interests (41). He continues, “Scientific statements can by their very nature not contain such words as ‘advisable,’ ‘desirable,’ ‘should,’ ‘ought,’ or ‘must’” (41–2). So, science cannot tell us which ultimate goals are advisable to pursue or which interests we ought to have. The endorsement of particular ends and exhortations to adopt them are incapable of empirical testing.<sup>2</sup>

To see how this view about value-neutrality relates to the role of values in scientific reasoning, consider Isaac Levi’s (1960) response to Richard Rudner’s (1953) argument that the scientist makes value judgments when accepting or rejecting hypotheses. Levi (1960) insists on a

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<sup>2</sup> For Feigl, instrumental value judgments relative to adopted ends are empirical; see also Nagel (1961, Ch. 13) and Hempel (1960/1965). Additionally, by stipulating empirical definitions of value terms, value judgments can become factual (Feigl 1952, 677). Feigl likens this procedure to how thick terms like ‘healthy’ function in medicine (678). Such definitions are not testable, and alternative definitions remain possible.

distinction between accepting a hypothesis as true and acting on the basis of the hypothesis with a particular practical objective in mind. Levi builds upon Richard Jeffrey's argument that descriptive claims like "This vaccine is free from active polio virus" cannot "tell us what the vaccine is *for*, or what would happen if the statement were accepted when false" (Jeffrey 1956, 242). Jeffrey took this argument to establish that when we cannot specify a practical objective in relation to accepting or rejecting a hypothesis, the scientist merely assigns probabilities to that hypothesis. According to Levi, this is because Jeffrey equates accepting a hypothesis with deciding to act on the basis of that hypothesis. Levi rejects this. He argues "a person can meaningfully and consistently be said to accept a hypothesis as true without having a practical objective" (1960, 350). Actions taken relative to particular practical objectives are tied to our needs, interests, and corresponding value judgments. Belief in, or acceptance of a hypothesis, however, concerns a hypothesis's truth, which we affirm or deny independent from knowing what actions we might pursue on its basis.

With this separation in mind, Levi claims, "The necessity of assigning minimum probabilities for accepting or rejecting hypotheses does not imply that the values, preferences, temperament, etc. of the investigator, or of the group whose interests he serves, determine the assignment of these minima" (356). Instead, the minima are "determined by...the canons of inference" (356). I highlight two points. First, like Feigl, Levi groups values with preferences and temperament in a way that suggests he holds value judgments are akin to non-truth-evaluable expressions of attitudes. Second, Levi's separation of belief from action assumes scientific information cannot serve as grounds for value judgments that spur us to action. After all, there is nothing in any factual hypothesis that specifies a practical objective to take on its basis. So, the value-neutrality of the sciences for Levi is secured in much the same way as for Feigl. In light of the noncognitive status of value judgments and the corresponding separation of belief and action, there is no role for values in scientific reasoning. Science is value-neutral.

## 2.2 For values in scientific reasoning, against value-neutrality

Another position in mid-20th century philosophy of science maintains science could—and should—inform our value judgments. Prominent proponents of this position begin from the argument that the scientist, in accepting or rejecting hypotheses, must make value judgments (Churchman and Ackoff 1947; Ackoff 1948; Rudner 1953). Then, they argue from the role of

values in scientific reasoning to the need for an empirical conception of value judgments; more specifically, they argue we need a “science of ethics” (Rudner 1953, 6). In this way, the direction of the relationship between the role of values in scientific reasoning, the value-neutrality of the sciences, and the nature of value judgments is reversed from the position in §2.1. These philosophers of science begin from an account of scientific reasoning—the acceptance or rejection of hypotheses—and argue on that basis that science is not neutral towards value judgments.

Rudner’s (1953) argument that the scientist *qua* scientist makes value judgments is by now well-known thanks especially to Douglas’s (2009) historical work. Here, I focus on slightly earlier and less detailed arguments appealing to developments in statistical inference. In Russell Ackoff’s discussion of a symposium on what the social sciences might contribute to the physical sciences, he says, “Recent developments in mathematical statistics...indicate that the selection of the best statistical testing procedure involves at least a knowledge of the social consequences for the various mistakes one might make in using any specific testing procedure” (1948, 116).<sup>3</sup> An earlier paper Ackoff co-authored with C. West Churchman develops this claim. They make the familiar point that a scientist runs the risk of false positives and false negatives when accepting or rejecting a hypothesis (Churchman and Ackoff 1947, 269). The scientist then faces a decision about how to weigh the risks of either error. The decision specifically concerns how to value the consequences that might follow from making one of the two types of error and how to adjust the level of evidence required to accept or reject a hypothesis accordingly. For Churchman and Ackoff, the decision is not mathematical or statistical, but involves practical goals related to our needs and interests. They maintain, “Since the answer to the question depends on aims or motives the solution is either a psychological, social, or ethical one. For a science which goes beyond the caprice of the individual or society, the selection of the weight function must be ethical” (269). Note here the assumption that the ethical goes beyond an individual’s psychology and social mores; it seems Churchman and Ackoff reject the view that value judgments are mere expressions of attitudes.

On the basis of developments in statistical inference showing value judgments enter scientific reasoning, a number of philosophers call for the development of a science of ethics

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<sup>3</sup> The symposium appears in the same issue as Hempel and Oppenheim (1948).

(Churchman and Ackoff 1947; Ackoff 1948; Rudner 1953). Implicit in these calls is the view that ethics and science cannot be separated solely because of an alleged linguistic difference between the descriptive statements of science and value judgments. For Churchman and Ackoff, “a basic scientific technique, mathematical statistics, is calling for an experimental measure of value” (1947, 270). However, they think ethicists have so far come up short in providing a measure that might help, e.g., devising a way to “measure the degree of moral responsibility of an individual for an act he commits” (270). Churchman and Ackoff claim a science of ethics requires both “an operational (i.e., experimental) definition of value” and a way to “determine experimentally the value of any act or set of actions” (271).

For Ackoff, the social sciences have an important role to play in this endeavor, especially regarding questions about responsibility. To answer such questions, we must know what nonepistemic consequences are foreseeable when a scientist accepts or rejects a hypothesis. Ackoff maintains, “It is true that scientific results can be used simultaneously for both good and evil, but within any specific social setting, the social scientist should be able to tell us which type of consequence is the more probable” (1948, 117). If the scientist *qua* scientist makes value judgments related to the foreseeable consequences of error, then those judgments should be made in light of empirical information about what is and is not likely. In this way, scientific claims, especially social scientific claims, are directly relevant to value judgments the scientist makes.

According to James Leach (1968a; 1968b), the arguments advanced by Rudner, Churchman, and Ackoff challenge Levi’s separation of belief in a hypothesis as it relates to its truth and acting on the basis of that hypothesis according to practical objectives. For his part, Leach says he cannot imagine an analysis of belief disconnected from action (1968a, 102). Like Rudner (1953, 6), Leach invokes W.V. Quine’s (1951) holism to make the case that belief in a hypothesis is connected to practical consequences, even if sometimes only indirectly. Leach maintains “no hypotheses are quite free of practical considerations” (1968a, 108). The argument that the scientist must make value judgments in accepting or rejecting hypotheses, then, complicates longstanding views about “the relationships between the theoretical, technological, and policy-making aspects of rational inquiry” (1968b, 366). Moreover, echoing the earlier calls to develop a science of ethics, Leach thinks “of primary concern for scientists as well as humanists must be the question, ‘Can value judgements be appraised on rational grounds (perhaps even on scientific grounds)?’” (366). He hints that his answer is ‘Yes.’

The two views in this section suggest a number of questions about the relationship between value-neutrality of the sciences and the value-free ideal, whether the descriptive and the empirical overlap, and the scope of holism. I turn to these questions and outline answers from more recent feminist philosophy of science.

### **3. Three questions, and some answers**

#### **3.1 What is the relationship between value-neutrality and the value-free ideal?**

Questions about the value-neutrality of the sciences are distinct, but related to questions about the value-free ideal. What is that relationship? Two views fall out of the history I sketch. First, if one thinks value judgments are mere expressions of preferences or attitudes incapable of empirical confirmation, then one seems likely to endorse value-freedom to ensure science's objectivity. Indeed, Feigl (1950) argues one difference between ethics and science is that science has shared methods for answering questions and adjudicating disagreements whereas ethics does not. These methods guarantee the objectivity of the sciences. Since ethics has no such methods for guaranteeing agreement about value judgements endorsing ultimate ends—as opposed to instrumental value judgments made once ends are adopted—it is not objective. Second, if one thinks value judgments play a key role in the acceptance or rejection of hypotheses, then one might think science's objectivity is guaranteed only if value judgments are subject to methods used in scientific reasoning. Calls to develop a science of ethics are attempts to allay worries that value-laden science is not objective.

So, one might endorse the value-free ideal because of views about the noncognitive status of value judgments. And one's worries about value-laden science might be addressed if value judgments have similar cognitive status to the descriptive claims of science. Work in early 21st-century feminist philosophy of science emphasizes similar points. Kristen Intemann says, "Some of the resistance to the possibility that values influence the justification of empirical hypotheses may stem from worries about the status of value judgments," particularly when one understands those judgments as "subjective or even nonpropositional" (2001, S513). She also claims, "If value judgments are objectively justified, then the objectivity of science is not undermined by their role in theory justification" (S513). Support for the value-free ideal and against value-laden science, and support for value-laden science and against the value-free ideal, then, are sometimes related to differing views about value judgments' cognitive status.

Elizabeth Anderson makes a similar point in calling for feminist philosophy of science “to integrate moral philosophy and the philosophy of science” (2004, 3). She argues that views about the proper role for values in scientific reasoning turn “more on the character of ethical thought than is usually supposed” and claims “science is value-free if and only if values are science-free” (7). On Anderson’s account, values are not science-free because value judgments answer to and are revisable in light of experience (9). I will not go into the details of Anderson’s argument except to note she develops a cognitive account of value judgments in which “there is a body of evidence”—emotional experience, in particular—“to which value judgments can and ought to be held accountable” (11). For her, value judgments are empirically sensitive and revisable in much the same way descriptive statements are.

Anderson’s empirical account of value judgments is not without its critics in feminist philosophy. In particular, Audrey Yap argues an empirical account of value judgments “leaves open the possibility of calling prejudiced value judgments objectively true if an empirical case can be made for them” (2016, 62). Moreover, while we might welcome the result that certain value judgments are revisable in light of new experiences and empirical information, Yap points out others have argued “values such as respecting women’s autonomy and self-determination should be seen as basic commitments” (63). Though Yap does not put the point this way, value judgments might just be expressions of commitments to act in particular ways.<sup>4</sup> Recalling the views in §2.1, such expressions of commitments might not be empirically confirmed or disconfirmed like descriptive, scientific statements.

My reading of Yap’s criticisms of empirical construals of value judgments point us to the next question. In particular, we can ask if a value judgment’s being empirically sensitive means it is confirmed as true or disconfirmed as false in the way descriptive statements are.

### 3.2 Do the empirical and descriptive overlap?

The argument for the value-neutrality of the sciences in §2.1 turns on a distinction between the descriptive claims of science and value judgments expressing attitudes, endorsing ends, or influencing others via imperatives. Whereas descriptive claims are empirically confirmed or disconfirmed as true or false, value judgments are not truth-evaluable and not subject to

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<sup>4</sup> Given Yap’s (2010) earlier work on Carnap, this point might be congenial to her.



empirical testing. In this way, scientific claims cannot serve as grounds from which value judgments follow. Given this lack of connection, as well as the related distinction between belief in a hypothesis and acting on its basis, value judgments have no role in scientific reasoning. But are value judgments excluded from being empirical in virtue of being nondescriptive? One way to tackle this question not considered by the views in §2 is to ask if value judgments can serve as justifying reasons for the descriptive claims of science. Mid-20th century approaches to the value-neutrality of science focus on whether value judgments follow from scientific statements, but pay little attention to whether value judgments can justify empirical claims.

Intemann takes up this question and challenges the division between the descriptive claims of science and value judgments in her defense of arguments “that moral and political considerations *can* legitimately influence theory choice” (2001, S506). First, she points out thick terms like ‘well-being’ that contain normative and descriptive content have a justificatory role to play in some sciences. For example, classifying depression as a phenomenon distinct from feelings of sadness is justified on the grounds that depression “involve[s] feelings of sadness that impair the functions most essential to human well-being...” (S509). In this way, value judgments—e.g., “that sleeping, eating, and engaging in relationships are central to a good human life” (S509)—justify empirical judgments about depression. Further, those judgments are the basis for diagnoses of clinical depression. In this way, some descriptive statements of science are justified by value judgments, especially in sciences using thick terms.<sup>5</sup>

On the basis of this example, Intemann challenges the assumption “that something’s being an *empirical* claim implies that it is *descriptive*” (S512). Intemann maintains her example makes it unclear that this claim holds (S512); ‘empirical’ might have a wider scope than ‘descriptive.’ A value judgment might be empirical even if not straightforwardly descriptive because it is used to justify empirical claims and because it is sensitive to experience, emotional or otherwise. Our value judgments about, say, the negative impact of some conditions on well-being, might be revised as experiences and social circumstances change. This empirical sensitivity, however, does not mean value judgments are directly confirmed or disconfirmed as true or false in the same way descriptive statements are. It is possible such a view might sidestep the worries Yap raises about empirical accounts of value judgments.

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<sup>5</sup> See Alexandrova on thick terms in science (2018). See Diggin (2022) on ways empirical claims follow from value judgments.

To make sense of how a value judgment might be empirical without being descriptive, I turn to the last question about the scope of holism.

### 3.3 Does our web of beliefs include value judgments?

Consider Lynn Hankinson Nelson's development of Quine's naturalized epistemology in a feminist direction. She endorses a type of holism that includes social, political, and ethical values in our web of beliefs.<sup>6</sup> On Hankinson Nelson's extension of Quine's holism, there are no *a priori* boundaries between different disciplines or types of judgments. For her, careful examination of our knowledge-generating practices from a naturalistic perspective within science shows value judgments are connected to empirical claims. She says, "Scrutinizing and evaluating the values, political and otherwise, incorporated in our approaches to human and nonhuman nature, and taking responsibility for their consequences, must, without the assumption of false boundaries, become part and parcel of good scientific practice. And because not anything goes in science, insofar as values, politics, and science are interfused, the same holds of values and politics" (1990, 316). Thus, on the basis of her naturalistic holism, Hankinson Nelson maintains, "We are uncomfortable with the view...that values, including political values, are not subject to empirical controls" (305). Note that the claim here is not that value judgments are true or false descriptive claims; instead, it is that they are subject to empirical controls.

Given her naturalistic commitments and holism, Hankinson Nelson thinks empirical evidence can count for and against our value judgments. New experiences, recalcitrant or otherwise, can lead us to adopt or reject particular value judgments, just as they can lead us to revise the truth-values of descriptive claims. Advocates of positions similar to those in §2.1 might respond by suggesting that value judgments are less likely to be, and in fact are less-often revised in the face of experience than descriptive claims. But for someone committed to holism, while we can hold fast to value judgments in the face of experience, that possibility, on its own, does not settle their empirical or nonempirical status. This is because holism shows the very same possibility holds also for descriptive claims.

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<sup>6</sup> Solomon (2012), who does not think holism is particularly informative about the role of values in science, calls this the web of valief. Quine denies values are part of the web of beliefs given "the methodological infirmity of ethics as compared to science" (1979, 477).

There are two things to note about my very rough sketch of Hankinson Nelson's holism. First, it provides a way to make sense of how a value judgment might be sensitive to empirical experience without being a descriptive statement confirmed or disconfirmed by experience. According to Quine, one implication of holism is that "it is misleading to speak of the empirical content of an individual statement" (1951, 40). Instead, encounters with experience lead us to revise any part of our web of belief in a way that cannot be modeled by the straightforward confirmation or disconfirmation of a single descriptive statement. Moreover, if revisions to the nondescriptive laws of mathematics and logic count as empirical on Quine's holist view (40), then it seems we should also count revisions of value judgments as similarly empirical on Hankinson Nelson's holist view, even if value judgments are nondescriptive.

The second thing to note is that invoking holism to motivate an empirical conception of value judgments is distinct from Leach's invocation of holism mentioned in §2.2. Leach took Quine's holism to imply that "it makes as much sense to speak of degrees of practical consequences and associated pragmatic utilities, with a system or network of hypotheses linked at its edges to immediate practical consequences, as it does...to speak of degrees of testability or empirical significance, with a network of hypotheses linked at its edges to immediate observations" (1968a, 108). Leach's appeal to holism is less about the empirical status of value judgments and more about connecting belief in a hypothesis with acting on the basis of that hypothesis. If the two are connected, attempts to secure the value-neutrality of the sciences by distinguishing belief and action fail. For example, Leach claims, "if 'X believes Y', in conjunction with other appropriate statements, implies 'X performs act A' then it seems reasonable that the appraisal of act A should bear on the appraisal of belief Y" (1968b, 360). In short and without going into the details, making the value judgment that an action based on a hypothesis is or is not warranted can affect whether we are justified in believing that hypothesis by influencing the level of evidence we demand for accepting or rejecting that hypothesis. So, any empirical hypothesis may be connected to action, even if remotely.

Questions about how to analyze the relationship between belief and action cannot be settled by establishing the empirical status of value judgments, or even by claims that value judgments can justify empirical claims. I follow Leach in thinking that the more general connection between the theoretical domains of belief and the practical domains of action is important to explore in science and values particularly in light of holistic considerations.

#### 4. Conclusion

My brief historical sketch of mid-20th century philosophy of science on the value-neutrality of the sciences identifies a number of metaethics-adjacent questions relevant to science and values that are distinct from questions about the role of values in scientific reasoning. Note that the answers from late-20th and early-21st century feminist philosophy of science were made in the context of arguments mostly aimed at establishing that values have a positive role in scientific reasoning. Now that there is more or less widespread consensus that value judgments do have such a role, we might renew attention to metaethical questions about the nature of value judgments raised and pursued in past work.

While I do not think these questions are necessarily the most pressing we can ask about value-laden science, I share Anderson's view that work in science and values can benefit from better integrating moral philosophy. Consider my historical sketch and the questions raised in light of it an endorsement of recent calls for philosophers of science to pay more attention to the nature of value judgments; a suggestion that we might already possess rich resources for doing so in existing literature; and a preliminary attempt to take up those calls alongside others who have done so recently and not so recently.<sup>7</sup>

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<sup>7</sup> Aside from work already mentioned, especially Brown (2020, Chs. 3–5), see Ward (2021) and ChoGlueck and Lloyd (2023). The latter defend an empirical conception of values, and provide an overview of the robust debate in feminist philosophy about the status of value judgments going beyond the small parts of the literature I consider.

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