

Collaboration, toward an integrative philosophy of scientific practice

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Abstract

Philosophical understanding of experimental scientific practice is impeded by disciplinary differences, notably that between philosophy and sociology of science. Severing the two limits the stock of philosophical case studies to narrowly circumscribed experimental episodes, centered on individual scientists or technologies. The complex relations between scientists and society that permeate experimental research are left unexamined. In consequence, experimental fields rich in social interactions (notably biomedicine) have received only patchy attention from philosophers of science. This paper sketches a remedy for both the symptom and its root cause. An empirical study of social interactions in an established field of biomedicine grounds a robust account of success in experimental practice. The core idea is the concept of collaboration, of participants working together on a common project toward a shared goal. The interactive social integument of experimental research is both examined and enacted in a study integrating socio-historical research and philosophical investigation. The two approaches are used in concert to explicate the concept of scientific objectivity. Their joint explication of this contested epistemic ideal demonstrates that philosophical and sociological approaches can work together toward a social epistemology of scientific practice.

The explication is in three stages. First, a minimal framework for investigating collaborative activities is established. Social action is understood and evaluated in terms of the connection between shared goals that participants hope to accomplish together, and the coordinated means by which they try to do so. This connection is explicated as participation, a relation mediating between a group and its members, which includes minimal constraints of instrumental rationality.

Second, this framework is fleshed out via empirical study of scientific practices. The focal case examines the intersection of immunology and stem cell research in mid-20th century biomedicine, tracing the key social interactions within and among laboratory groups, as the field of blood stem cell research emerged in the 1960s and advanced throughout the next four decades. The study yields a robust empirical result. Participants consistently recognize two aspects of scientific success: construction of improved models of blood cell development, and formation of new boundaries among scientific groups.

In the third and final stage, this result is generalized to other experimental episodes and shown to fit with recent accounts of models in scientific practice. The generalized result approximates a familiar normative view of scientific knowledge. An epistemic ideal of scientific objectivity in practice is then derived from this robust general result, using the minimal constraints on rational participation. The derivation is analogous to specification of ends in moral philosophy; given the means taken and assuming some hope of success, what must the goal of scientific inquiry be like? The aim of science so conceived corresponds to a classic conception of scientific objectivity: knowledge independent of epistemic criteria specific to particular persons or groups. This result weaves together sociological and philosophical accounts of science, explicating the epistemic ideal of objectivity in relation to social aspects of scientific practice. This undercuts the entrenched dualism between normative (evaluative), vs. descriptive (comparative) approaches to scientific knowledge. Socio-historical study of science does not deflate, but vindicates, scientific objectivity. Philosophy and sociology are recast as collaborating participants in articulating social epistemology of science.

Keywords: collaboration, stem cell biology, experiment, social epistemology, objectivity

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