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# Critical Realism: A Critical Evaluation

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## ABSTRACT

Critical realism, championed by its proponents as the most promising post-positivist social science paradigm, has gained significant influence in the last few decades. This paper provides a critical evaluation of the critical realism movement in the hope of facilitating more fruitful dialogues between its proponents and rivalling schools of sociologists. Two concerns are raised about contemporary critical realism. First, critical realism is not the only philosophical school against positivism and not necessarily the best. Second, critical realists exaggerate the importance of critical realism to social science and conflate philosophy of science with sociological theories.

## KEYWORDS

Critical realism; Duhem-Quine thesis; transcendental critique; interpretivism

## 1. Introduction

Critical Realism (CR) is a recent philosophical trend among sociologists. It was initially developed by the English philosopher of science, Roy Bhaskar, and has since been expanded by Margaret Archer, Andrew Sayer, Tony Lawson, and others. CR consists of two parts (Bhaskar [1975] 2008, Bhaskar [1979] 1998): a general philosophy of science, transcendental realism, and a philosophy of social science, critical naturalism. The distinguishing feature of CR is ontological realism: it asserts the existence of a transcendental reality that 'operates independently of our awareness or knowledge of it' and that 'does not wholly answer to empirical surveying or hermeneutical examination' (Archer et al. 2016). Observable events are the actualization of the unobservable real, manipulable, and internal mechanisms. Thus, the social world can be truly understood only if people understand the structures that generate events, and the empirical study of the observable world should be accompanied by sufficient 'ontological' studies of the hidden real generative structures.

CR addresses some issues in the philosophy of social science and provides some valid critiques of contemporary social studies. In this sense, it certainly adds valuable input to the progress of social science. However, proponents of critical realism frequently make strong claims about the philosophical and scientific merits of CR and seek to establish it as 'a hegemonic project which seeks conceptually to re-tool the natural and social sciences' (Cruickshank 2004, 567). For example, in his book *What Is a Person*, Christian Smith claims:

Critical realism seeks to offer a constructive alternative to both the positivist empiricist paradigm, on the one hand, and constructivism, postmodernism, and certain versions of the hermeneutical perspective, on the other. The struggle between these two broad alternatives has left the social sciences deadlocked in a debate that cannot be resolved within its own terms. Critical realism seeks to transcend that sterile impasse by articulating a coherent, third-way alternative. I believe critical realism succeeds in this and so I wish to advance it further in American sociology. For present purposes, I believe critical realism opens a window for understanding the human in more illuminating and satisfying ways than do rival approaches (Smith 2011, 92).

Similarly, a group of prominent sociologists declares in the 2016 spring issue of *Perspectives*:

Critical realism represents a broad alliance of social theorists and researchers trying to develop a properly post-positivist social science. Critical realism situates itself as an alternative paradigm both to scientific forms of positivism concerned with regularities, regression-based variables models, and the quest for law-like forms; and also to the strong interpretivist or postmodern turn which denied explanation in favor of interpretation, with a focus on hermeneutics and description at the cost of causation (Archer et al. 2016).

This article raises the concern that, in its current state, the philosophical and scientific merits of CR cannot shoulder the ambition of its proponents. The aim is to offer a critical evaluation of CR to facilitate more fruitful dialogues between its proponents and rivaling schools of sociologists. The article consists of two critiques of CR. First, as a philosophy of science, CR is not the only philosophical school against positivism, and its philosophical status is no sounder than Quinean holism. Second, critical realists overestimate the importance of CR in evaluating and guiding practical science, and conflate philosophy of science with scientific theory to unjustly dismiss rivaling schools of sociology. In the rest of the article, [Section 2](#) and [Section 3](#) articulate the above two critiques separately, and [Section 4](#) concludes.

## 2. Critical Realism is Not the Only Philosophical School Against Positivism

As a philosophy of science, CR is not the only tradition against positivism and arguably not the most powerful one. In this section, we examine the problem of positivism as a philosophy of science, the critical realist critique of positivism, and the holist critique of positivism, and at last compare critical realism with holism.

### 2.1. The Trouble of Positivism

As a philosophy of science, positivism holds that “all knowledge regarding matters of fact is based on the ‘positive’ data of experience and that beyond the realm of fact is that of pure logic and pure mathematics” (Feigl 2020). Thus, information derived from sensory experience, as interpreted through reason and logic, forms the exclusive source of scientific knowledge. The two core doctrines of positivism,<sup>1</sup> as summarized by Quine (1951, 20) in his famous *Two dogmas of Empiricism*,<sup>2</sup> are:

One is a belief in some fundamental cleavage between truths which are analytic, or grounded in meanings independently of matters of fact, and truths which are synthetic, or grounded in fact. The other dogma is reductionism: the belief that each meaningful statement is equivalent to some logical construct upon terms which refer to immediate experience.

Among the two doctrines, analytic-synthetic cleavage and reductionism, it is the latter that is the focus of criticism by anti-positivist social scientists.

To illustrate the problem of reductionism, let us consider the following hypothetical research question that is representative of contemporary social science: ‘What is the impact of unemployment insurance on labor supply?’ To answer this question, the standard practice is to find a discontinuity (quasi-natural experiment) in unemployment insurance policy, (e.g. an unemployment insurance reform in Austria in 2005), and study the change in labor supply using statistical techniques. The following type of statements is typically accepted as a legitimate answer: ‘a 10% increase in unemployment benefit leads to a 2% reduction in labor supply’, or ‘an 8% increase in the length of unemployment benefit leads to a 3% reduction in labor supply’.

In practice, positivist social scientists are not always straightforward about their commitment to reductionism. They also engage with metaphysical research questions that are irreducible to immediate experience *prima facie*, such as the origin of the wealth inequality of nations. However, these questions are always distorted into immediately falsifiable statements to permit studies by positivist methodologies. For example, Acemoglu, Johnson, and Robinson (2001, 1369) claim to

study the ‘colonial origins of comparative development’, but what they actually do is run statistical regressions of per capita income data on immigrant mortality rates during the colonial era; Pfeffer and Waitkus (2021, 567) claim to study the ‘wealth inequality of nations’, but what they actually do is perform some composition analysis on a survey dataset called Luxembourg Wealth Study.

This type of positivist research, however, draws its legitimacy from numerous implicit beliefs, assumptions, and theories that cannot be empirically tested. As Archer et al. (2016) point out,

Sociology (and the practice of sociology) relies on certain broad beliefs about the nature of the social world which inform our investigations. Sociologists operate with certain beliefs about the nature of order, structures, processes, persons, and causes. These beliefs are not reducible to our empirical data, and are often taken for granted when we construct our theories. Many of the determinate and important features of the world are not empirically verifiable or quantifiable, and may in fact resist ... empirical scrutiny (Archer et al. 2016).

Getting back to the unemployment insurance example, we may challenge its validity in several ways that cannot be addressed by the positivist research design. First, why should unemployment insurance have an impact on labor supply? One must first believe that humans react to material incentives in a fundamentally important way.<sup>3</sup> Second, why can a general question about human behavior be answered by studying a dataset within a certain geographic unit and time span? There must be certain underlying assumptions on the homogeneity of human behavior.<sup>4</sup> Third, there are numerous empirical observations to be made about humans and societies. Why even bother studying unemployment insurance or labor supply?<sup>5</sup> These metaphysical questions will be dismissed by positivists as empty and meaningless and fail to qualify as legitimate topics for scientific inquiries.

The refusal of positivists to talk about metaphysics, however, cannot rid science of metaphysics; neither can positivist research modify metaphysics due to underdetermination (Duhem [1906] 1954, Quine 1951). Positivists are concerned with the confirmation and refutation of the statements that are reducible to immediate experience, which are peripheral statements of science because ‘total science is like a field whose boundary conditions are experience’ (Quine 1951, 39). However, ‘the total field (of science) is so undetermined by its boundary conditions, experience, that there is much latitude of choice as to what statements to re-evaluate in the light of any single contrary experience’ (Quine 1951, 39): the scientists cannot know whether the peripheral statements or metaphysics are wrong in the face of recalcitrant evidence. Under positivism that considers metaphysical discussions meaningless, the scientists are occupied by the test and modification of peripheral statements indefinitely (Feyerabend 1963, 20).<sup>6</sup> Therefore, positivist reductionism is liable to the establishment and preservation of ‘a dogmatic metaphysics’ (Feyerabend 1963, 3–5).

## **2.2. The Critical Realist Critique of Positivism**

CR critiques positivist reductionism with its transitive-intransitive dichotomy of human knowledge. According to CR, the objects of human knowledge have both intransitive and transitive dimensions (Bhaskar [1975] 2008, 21). The intransitive dimension concerns the real, which includes structures and mechanisms that are unobservable; the transitive dimension concerns the observable, which includes events generated by the unobservable structures and mechanisms (Bhaskar [1975] 2008, 56). The transitive dimension is historically, socially, and culturally situated, while the intransitive dimension is unchanging and does not depend on the transitive dimension for its being (Smith 2011, 94–95). A large part of human knowledge about the real is ontology or metaphysics which is irreducible to immediate experience.

The CR critique of positivism is that, by narrowly focusing on immediately empirically verifiable/falsifiable studies, it leads social scientists to neglect the pursuit of metaphysics and produce only transitive and fallible empirical knowledge. Instead of only formulating and answering immediately empirical questions, social scientists should also work on ontological questions such as ‘Whether

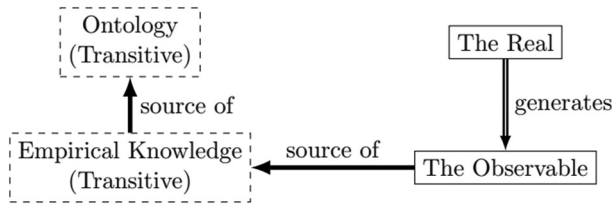


Figure 1. The critical realist view of scientific knowledge (I).

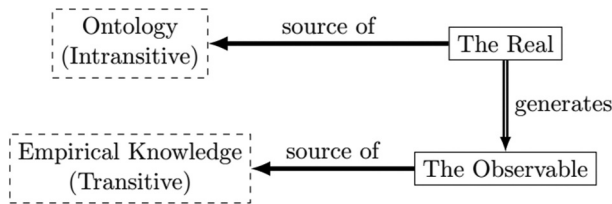


Figure 2. The critical realist view of scientific knowledge (II).

there are social kinds? Do capitalism, or classes, or the state, or empires exist as social entities? What constitutes a social entity? Are there consistent traits of fascism? Are there consistent traits of any social entity?' (Archer et al. 2016)

There are two mutually exclusive interpretations of what critical realists mean by 'ontology', as pointed out by Cruickshank (2004, 567): (I) "on the one hand, ontology pertains to what critical realists refer to as the 'transitive domain' of fallible, theoretical interpretations of reality"; (II) "on the other hand, ontology is taken to be a direct representation of the 'intransitive domain', meaning the reality beyond our knowledge". According to interpretation (I), ontology is derived from empirical knowledge and consequently transitive; according to interpretation (II), ontology directly mirrors the reality beyond our experience, so it is 'categorically independent' of empirical knowledge and intransitive. The two interpretations of the CR view of human knowledge are illustrated in Figures 1 and 2, respectively.

### 2.3. The Holist Critique of Positivism

One need not be a realist to disagree with positivist reductionism. In philosophy of science, there has been a long-standing anti-positivist tradition, the Duhem-Quine holism (Duhem [1906] 1954, Quine 1951), which was established several decades before Bhaskar's 1975 book *A Realist Theory of Science*. Holism views scientific knowledge as an interconnected web that can only be empirically tested as a whole but not in isolation. The center of the web consists of the core beliefs and assumptions, which, when combined with certain auxiliary theories, generate implications and predictions; these implications and predictions generate further layers of implications and predictions when combined with other auxiliary theories. The web only touches upon immediate experience at the furthest layer from the center. Holism is undoubtedly anti-realist or empiricist because it considers human knowledge as consisting purely of 'cultural posits' that are merely 'a device for working a manageable structure into the flux of experience' (Quine 1951, 41). The holist view of scientific knowledge is illustrated in Figure 3.<sup>7</sup>

An empirical study, no matter how well designed, can never test an isolated testable statement, but always tests a group of interconnected theories, including core and auxiliary theories. Cover, Curd, and Pincock (2012, 335) illustrate the holism thesis using Newtonian mechanics. Think about

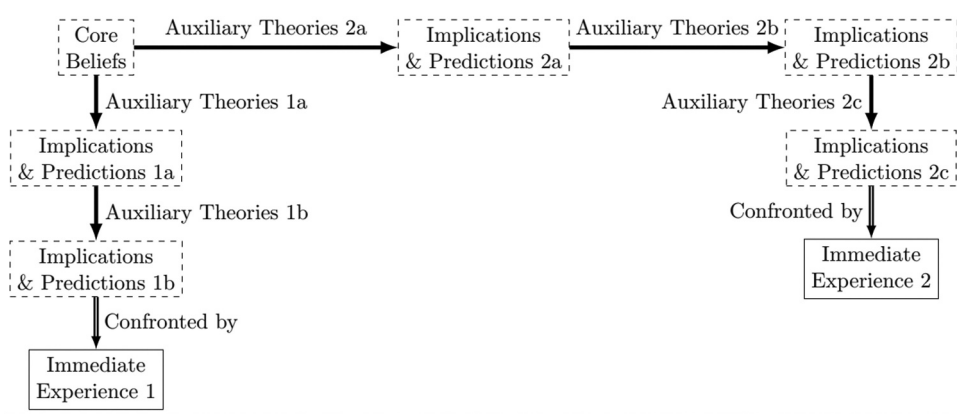


Figure 3. The holist view of scientific knowledge.

a physicist who wants to study whether the movement of the planets in the solar system conforms to Newton's laws, which are Newton's three laws of motion together with the law of universal gravitation:

$$F = G \frac{m_1 m_2}{d^2}.$$

Newton's laws per se are clearly devoid of empirical content. To derive testable implications, we need a myriad of additional theories and auxiliary hypotheses, such as the initial conditions of the planets and the assumption that the planets are not significantly affected by other forces. Moreover, to measure the position or velocity of the planets, we need instruments, such as telescopes, cameras, and clocks, which require us to use theories to move away from what we directly observe.

Holism offers powerful critiques of positivism. Since empirical tests can only test scientific theories as a whole, when empirical evidence is recalcitrant to the existing theory, one cannot know if the core theories or auxiliary theories are wrong. Since the auxiliary theories are closer to immediately testable statements, positivism provides the scientists with the excuse to focus on formulating and revising auxiliary theories and omit the discussion of core theories, thereby leading to the establishment of dogmatic metaphysics. The implication of holism is that 'a good empiricist will not rest content with the theory that is in the center of attention and with those tests of the theory which can be carried out in a direct manner'; he must first be a 'critical metaphysician' (Feyerabend 1963, 39).

#### 2.4. Critique of Critical Realism from the Perspective of Holism

Both CR and holism critique positivist reductionism and call for a revival of metaphysical inquiries in science, but offer drastically different accounts of the origin and structure of scientific knowledge. Is there any imperative reason for anti-positivist social scientists to strictly prefer CR over holism? Let us compare holism with both versions of CR with different interpretations of ontology as discussed in Section 2.2.

If ontology is understood as transitive, the same as scientific knowledge, according to interpretation (I), ontology collapses into epistemology. Critical realists then need to resolve at least two challenges to justify their ambition of establishing CR as the hegemonic philosophy of social science.

First, ontologically, how can the postulate of the real be justified, as no one can possess direct knowledge of the real? This is the central problem of the classical realism versus anti-realism debate in philosophy of science, which has been a decades-long standoff.<sup>8</sup> CR's intransitive-transitive dichotomy of the objects of scientific study cannot alleviate any of the classical arguments against

scientific realism, such as the underdetermination thesis (Duhem [1906] 1954, Quine 1951) and the pessimistic induction (Laudan 1981); neither does it offer any new insight in favor of realism. Bhaskar's argument that 'we can imagine a world with intransitive objects of scientific knowledge and without science, but cannot imagine a world with a science but not intransitive objects' (Bhaskar [1975] 2008, 22–23) suffers from the same flaw as the arguments for realism in the previous literature: it is valid only if one has already committed to realism.

Second, practically, why is the postulate of the real essential for a post-positivist social science paradigm, if ontology also has to come from the observable? Since all human knowledge comes from the observable, the real cannot serve as the source or touchstone of metaphysics; since holism has already provided a powerful empiricist motivation for metaphysical discussions in science, neither is the real essential in the justification of metaphysical studies, aka, the refutation of positivism. This is not to say that the real is a redundant concept for post-positivist social science – rather, the point is that it is inessential in the presence of holism.

Now consider interpretation (II). If ontology is understood as a direct representation of the real beyond our knowledge, CR needs to make the troublesome assumption that humankind, or at least a subset of it, possesses 'an Archimedean point or God's eye view, from which one could know the essential features of reality beyond our knowledge' (Cruickshank 2004, 568). In other words, some humans possess a cognitive ability that allows them to directly comprehend the transcendental reality without the intermediary of experience or the observable world. Although they generally avoid such absolutist stances, some critical realists seem to slide to this interpretation occasionally.<sup>9</sup>

In contrast to interpretation (II) of CR, holism need not postulate a God's eye view. It clearly states how the core beliefs and auxiliary theories of human knowledge can be inspired and confronted by experience. It provides a complete hierarchical structure of human knowledge, as shown in Figure 3, in which metaphysics and empirical statements are beliefs of different epistemological degrees that can be deduced from the core to the peripheral, which then touches upon experience:

A conflict with experience at the periphery occasions readjustments in the interior of the field. Truth values have to be redistributed over some of our statements. Re-evaluation of some statements entails re-evaluation of others, because of their logical interconnections – the logical laws being in turn simply certain further statements of the system, certain further elements of the field. Having re-evaluated one statement we must re-evaluate some others, whether they be statements logically connected with the first or whether they be the statements of logical connections themselves (Quine 1951, 39).

While the existence of a transcendental cognitive ability to directly comprehend the real cannot be falsified, the reasonable doubt of its legitimacy should nonetheless be sufficient to render interpretation (II) of CR less favorable than holism.

Interpretation (I) and interpretation (II) can be combined to form a mixed interpretation. Bhaskar (2009, 36–37) distinguishes between philosophical ontology, which is independent of the observable, and scientific ontology, which can only be established by scientific investigation of the observable. This mixed interpretation is illustrated in Figure 4. The previous critiques of interpretations (I) and (II) can be applied to this mixed interpretation directly: the postulate of scientific ontology is indistinguishable from the Duhem-Quine understanding of metaphysics and the postulate of philosophical ontology requires an untenable Archimedean view. Therefore, the mixed interpretation cannot justify a strict preference for CR over holism either.

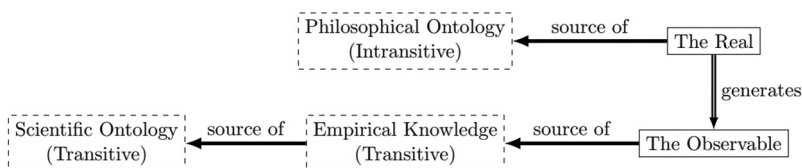


Figure 4. The critical realist view of scientific knowledge (I) & (II) mixed.



## 2.5. Resolving Bhaskar's Critique of Holism

Bhaskar offers an ontological critique of holism in *The Possibility of Naturalism* concerning the possibility of philosophy. He claims that holism must be abandoned since philosophy is impossible if we take the holist stance of human knowledge.

Taken consistently, the Quine/Lakatos conception is ultimately subversive of any claims for philosophy. For once crude empiricist criteria of scientificity are abandoned there is no reason why philosophy, as so conceived, should not just be assimilated into science. For its results must be as potentially transient as, and cannot differ significantly in epistemological status from, substantive scientific theories. At most they can only be characterized by a relative immunity to revision – an immunity which, it would seem, must ultimately be justified, if it can be justified at all, on a posteriori grounds (Bhaskar [1979] 1998, 5).

Bhaskar believes that 'philosophy' means more than the study of the fundamental nature of knowledge, reality, and existence, but also an intellectual territory aloft to science and need not answer to experience but only philosophers' speculation: 'a philosophical ontology is developed by reflection upon what must be the case for science to be possible; and this is independent of any actual scientific knowledge' (Bhaskar [1975] 2008, 39). Indeed, Quine (1951, 41) argues that philosophy in this sense is impossible, and philosophy differs from other fields of human knowledge, including science, ethics, and mathematics, 'only in degree but not in kind'.

However, for Bhaskar's claim to triumph over Quine's, he needs to justify, a priori, the belief that the 'aloft' philosophy envisioned by him is possible (as an empirical justification constitutes a self-contradiction). Therefore, we may safely conclude that Bhaskar's critique of holism is purely circular, and if there were any argument for a strict preference for CR over holism, critical realists have yet to provide it.

## 3. The Philosophy of Science Overreach

The second concern with the CR movement is its objective to build a post-positivist social science around a philosophy of science,<sup>10</sup> which is the knowledge about the nature and structure of scientific knowledge rather than the actual objects of scientific study, or 'second-order knowledge' (Bhaskar [1979] 1998, 8). To justify their commitment, critical realists claim that philosophy of science, or more specifically CR, is the underlabourer of science (Bhaskar 2013, 30), by which they mean (Bhaskar [1979] 1998, 16–17): (1) CR is essential to or helps with the judgment of the value of scientific theories (judge of science); (2) CR helps the scientists come up with new ideas (midwife of science). In this section, we dispute the legitimacy of both claims.

### 3.1. Critical Realism Cannot Judge the Value of Scientific Theories

Since the very beginning, critical realists have been actively disputing the legitimacy of alternative social science theories using CR,<sup>11</sup> because they believe that CR, as a philosophy of science, can serve as a good judge of the value of scientific theories. As Bhaskar ([1975] 2008, 16) claims: CR 'can set the terms for a more rational appraisal of the real problems the scientists face by enabling a fairer contrast to be drawn between their conditions and possibilities'. However, such belief goes against one of the most important doctrines of contemporary philosophy of science, the underdetermination thesis (Duhem [1906] 1954, Quine 1951), which can be phrased as follows:

(The Underdetermination Thesis) For any scientifically based theory there will always be at least one rival theory that is also supported by the evidence given, and that that theory can also be logically maintained in the face of any new evidence.

The underdetermination thesis essentially states that there exists no set of epistemological criteria, which include philosophy of science, to determine the value of scientific theories. As Duhem ([1906] 1954, 216) says, 'good sense is the (only) judge of hypotheses which ought to be abandoned'.<sup>12</sup> To



illustrate the underdetermination thesis, we follow Stanford (2017) and differentiate between holist underdetermination and contrastive underdetermination for ease of exposition. However, it is worth noting that both types of underdetermination are direct implications of the holism thesis interpreted in a strict Quinean sense (holism of the entirety of human knowledge).

Holist underdetermination concerns the refutation of individual scientific theories. It arises because theories can only be tested in groups but not in isolation, as was discussed in Section 2.3. Here we focus on contrastive underdetermination, which concerns the choice between rivaling theories. There are many reasons for contrastive underdetermination, e.g. (1) the theory-ladenness of observation, (2) the ambiguity of shared standards, (3) the collective inconsistency of rules, (4) shifting standards, (5) meaning variance, and (6) observational equivalence (Cover, Curd, and Pincock 2012, 191).

Contrastive underdetermination can be illustrated using the debate in Weber's *The Protestant Ethic and the Spirit of Capitalism* between mainstream economists and interpretivists. The Weberian thesis is widely considered to have been falsified by mainstream economists. The most representative work is Becker and Woessmann (2009), *Was Weber Wrong? A Human Capital Theory of Protestant Economic History*, which uses county-level data from late-nineteenth-century Prussia to show that Protestants' higher literacy, not their ethic, is responsible for most of the gap in economic prosperity. This article is published in one of the most prestigious journals in mainstream economics, the *Quarterly Journal of Economics*, and is cited more than 1,500 times. However, Zhang (2021) shows that it is valueless under interpretivism: (1) the 'theodicy' problem (Weber [1920] 1993, 138) implies that the correlation between material prosperity and Protestant ethic only applies to large-scale societies, not counties (theory-ladenness of observation); (2) interpretivists believe that the correlation between education and economic prosperity does not indicate causality, but rather that both are driven by religious ethics (observational equivalence); (3) quantitative accuracy, cherished by mainstream economics, is irrelevant or even harmful when conducting the interpretive analysis of meaning (ambiguity of shared standards, shifting standards); (4) mainstream economists understand Protestantism as a religious denomination, but interpretivists consider Protestantism as a special case of an ideal-type worldview called inner-worldly asceticism (Weber [1905] 2013, ch. 4), which is the true driving force of the capitalistic spirit (meaning variance). Collective inconsistency of rules concerns the consistency of within-paradigm standards, so it is not obvious in this example.

The underdetermination thesis implies that all scientific theories differ epistemologically 'only in degree but not in kind' (Quine 1951, 41); the only touchstone for the value of a scientific theory is experience, but even how good a theory explains experience is underdetermined. Without knowledge about the subjects of a scientific theory, philosophers of science can claim nothing about its scientific value. As Kemp (2005, 1) says: 'ontological claims can be given some justification, but only when they are derived from research that is widely held to be empirically successful'. For example, how can philosophers of science judge the astrological claim that human affairs are affected by the movements of celestial objects without any knowledge of human affairs and the movements of celestial objects?<sup>13</sup> Similarly, CR, as a philosophy of social science, cannot judge the value of social science theories without referring to knowledge of the objects of social studies.

Scientific underdetermination poses a grave challenge to critical realists' practice of disputing alternative sociological theories with CR. To resolve it, critical realists must either deny the holism thesis, which is the origin of underdetermination, or assume an Archimedean view, which will provide the ontological certainty needed to resolve the epistemological indeterminacy caused by underdetermination. As mentioned in Section 2, critical realists do not have legitimate arguments against holism, and an Archimedean view assumption would be considered unreasonable by most philosophers and scientists. Therefore, there is no imperative reason to believe that CR is useful in judging the value of scientific theories.

### 3.2. *Conflation of Philosophy of Science and Scientific Theory: the Unjust Dismissal of Interpretivism*

If it is impossible to judge the value of a scientific theory with philosophy of science, why can critical realists achieve ‘transcendental critiques’ (Bhaskar [1979] 1998, 120) of rivalling sociological theories with CR? The reason is that the transcendental critiques offered by critical realists are not transcendental at all: they are sociological theories disguised as philosophy of science, despite critical realists’ repeated claim that ‘CR is not a sociological theory’ (Porpora 2015, 208). In this section, we use Weber’s interpretivism as an example to show how critical realists conflate philosophy of science with sociological theory to unjustly dismiss rivalling sociological theories.

Although occasionally concerned with philosophy of science, Weber’s interpretivism is primarily a sociological theory which insists on the fundamental importance of subjective meaning in determining and explaining social action and evolution<sup>14</sup>:

[Sociology is] ... the science whose object is to interpret the meaning of social action and thereby give a causal explanation of the way in which the action proceeds and the effects which it produces. By ‘action’ in this definition is meant the human behavior when and to the extent the agent or agents see it as subjectively meaningful ... the meaning to which we refer may be either (a) the meaning actually intended either by an individual agent on a particular historical occasion or by a number of agents on an approximate average in a given set of cases, or (b) the meaning attributed to the agent or agents, as types, in a pure type constructed in the abstract. In neither case is the ‘meaning’ thought of as somehow objectively ‘correct’ or ‘true’ by some metaphysical criterion. (Weber [1922] 1978, 7)

Weber’s interpretivism ‘rejects the central axiom of Marxism, neo-Marxism, organicism, functionalism, and structuralism’ (Kalberg 2014, 210): human societies are functionally autonomous, i.e. social actions, social structures, and other material conditions causally explain the evolution of all social factors. It holds as a core hypothesis that, in the social world, it is not means that determine ends, but motives (meaning, worldview)<sup>15</sup> that determine both the means and ends. Moreover, the mapping from motives to ends is one-to-one, but the mapping from motives to means is not: different motives may be pursued by the same means, and the same motive may be pursued by different means. The implication is that the same action and structure may lead to different social outcomes, and different actions and structures may lead to the same social outcome. For example, between the sixteenth century and the nineteenth century, Protestant civilization and Confucian civilization both had a social norm of hardworking and intellectualism, but their evolution diverged. All the above statements belong to sociological theory: they are beliefs and hypotheses about the nature and causal relationships of human society, not the nature and structure of social science itself.

With the above clarifications of interpretivism, we demonstrate how the ‘transcendental critiques’ of interpretivism by critical realists are actually sociological critiques in disguise. Three typical critiques are discussed: the importance of the hermeneutic dimension, the distinction between natural science and social science, and methodological individualism.

#### *Importance of the Hermeneutic Dimension*

Critical realists criticize interpretivism for putting too much emphasis on the study of ‘meaning’ and rejecting causal analysis (in the natural science sense) in favor of interpretation: ‘it contends that social science is (or should be) concerned with the elucidation of meaning and the tracing of conceptual connections – activities clearly lacking counterparts in the study of the inanimate world of nature’ (Bhaskar [1979] 1998, 17). They maintain that the analysis of meaning shall not ‘take precedence in the human realm over non-hermeneutic explanation’ (Porpora 2015, 179).

However, interpretivists place the interpretation of meaning above the study of other social factors because they believe causal explanation of the social world can only be found in the interpretive sphere of reality. This belief is a purely sociological hypothesis, and to dismiss this belief is to take the opposing sociological, not philosophy of science, stance that the realm of meaning is either inconsequential or subordinate to the functional realm of the social world.

### ***Distinction Between Natural Science and Social Science***

Critical realists blame interpretivism for drawing ‘an absolute contrast between the science of the physical non-human world of nature and the science of the world of mind, of culture and of history’ (Bhaskar [1979] 1998, 18). Again, interpretivists draw such contrast for sociological reasons: the natural world is functionally autonomous, but the social world is not. In contrast to natural science, which only needs to study ‘how’ and ‘what’, social science needs to study ‘why’ and how it explains ‘how’ and ‘what’. Therefore, natural science and social science study fundamentally different objects which may require incompatible methodologies.

### ***Methodological Individualism***

Critical realists accuse interpretivists of methodological individualism: ‘Weber combined a neo-Kantian methodology with a still essentially individualist concept of sociology’ (Bhaskar [1979] 1998, 31). Indeed, Weber’s works (Weber [1905] 2013, Weber [1915] 1951, Weber [1916] 1992, Weber [1917] 2010) all appear to study the collective social outcome with individualist analysis of meaning. However, the reason why interpretivist analysis is carried out this way is because of the sociological ‘theodicy’ problem (Weber [1920] 1993, 138): ‘evil consequences often will ensue from the actions of those who exactly follow the precepts of the moral law’ (Weber [1963] 1993, lvii). For example, honesty and diligence are invaluable for a large-scale economy if every participant follows them; however, a small group of honest and diligent business people will certainly lose their businesses if all their competitors and customers are dishonest and ready to exploit them. Therefore, although the interpretive analysis of meaning and action should be carried out in an individualistic ‘put oneself into the shoes of the agent’ way (Weber [1922] 1978, 29–30), the collective analysis of the social outcome of worldviews, such as economic prosperity, scientific development, and political stability, is better conducted through studies of large-scale societies holding relatively homogeneous worldviews. The interpretivist position on methodological individualism and collectivism is due to the empirical observation of the ‘theodicy’ problem rather than any philosophy of science commitment.

The point of this discussion is not about whether interpretivism is correct or not, but that critical realists’ transcendental critiques of interpretivism are not transcendental but replete with implicit sociological claims. Interpretivism is a scientific theory consisting of core beliefs and auxiliary hypotheses about the social world, with the ultimate objective to explain and predict social evolution. If critical realists were to claim that ‘Weber’s (interpretivism) ... holds back, and ultimately annuls, a real scientific advance’ (Bhaskar [1979] 1998, 31),<sup>16</sup> they need to engage in proper sociological discourses corroborated by empirical evidence. They should provide alternative sociological theories to explain, or dismiss as irrelevant, those empirical facts that are traditionally considered more favorable to interpretivism. For example: (1) why economic development is highly correlated with religious ethics (Landes 1999); (2) why cultural integration constantly fails in the globalized and secularized modern world (Huntington [1996] 2007); (3) why scientific achievement is closely associated with religious ethics (Berry 1981). However, critical realists make no such efforts. For example, Bhaskar and Porpora’s lengthy critiques of interpretivism (Bhaskar [1979] 1998; Porpora 2015) make no attempts to discuss *The Protestant Ethic and The Spirit of Capitalism*, arguably the greatest interpretivist sociological work, let alone Weber’s other works. To initiate fruitful dialogues with rivalling sociological schools, critical realists need to stop claiming to be standing on a non-existent ontological high ground and defend their sociological commitments with proper theoretical analysis and empirical evidence.

### ***3.3. Can Critical Realism Inspire Scientific Discoveries?***

Critical realists believe that CR, as a philosophy of science, can help the scientists come up with new ideas: ‘by exploring an affinity which philosophy shares with social science, ... , (CR) can illuminate a kindred mode of discovery’ (Bhaskar [1979] 1998, 17). This belief, however, is not shared by many

prominent philosophers of science, who believe that scientific discovery is a process that defies any logical reconstruction and guidance, which naturally include philosophy of science. For example, Popper ([1959] 2005, 8) says

However, my view of the matter, for what it is worth, is that there is no such thing as a logical method of having new ideas, or a logical reconstruction of this process. My view may be expressed by saying that every discovery contains 'an irrational element', or 'a creative intuition', in Bergson's sense.

Feyerabend (1975, 10) claims

Creation of a thing, and creation plus full understanding of a correct idea of the thing, are very often one and the same process. The process itself is not guided by a well-defined programme, and cannot be guided by such a programme, for it contains the conditions for the realization of all possible programmes. It is guided rather by a vague urge, by a 'passion' (Kierkegaard).

Such claims from philosophers of science are corroborated by the testimony of practicing scientists. For example, Einstein (1918) says

The supreme task of the physicist is to arrive at those universal elementary laws from which the cosmos can be built up by pure deduction. There is no logical path to these laws; only intuition, resting on sympathetic understanding of experience, can reach them.

Admittedly, it would be presumptuous to attempt a definitive account of the relationship between philosophy of science and scientific creativity with such a small amount of text. After all, the origin of scientific discovery is still an open question among philosophers and historians of science. For example, Longino (2020) emphasizes the role of institutions, Zhang (2022) argues for the fundamental importance of worldviews, and Romer (1990) identifies economic needs as the driving force. We are content with pointing out that the 'midwife of science' role of philosophy of science assigned by CR is rather radical and challenged by several rivalling accounts of the origin of scientific discoveries. Given the current situation in sociology and history of science, there is no imperative reason to believe that CR can serve as a midwife to social science.

To summarize, the arguments in this section imply that philosophy of science, the inquiry of the nature and structure of science, is a parallel intellectual field to science. The role of philosophy of science to science, to make an analogy, is akin to that of linguistics to literature. While a certain amount of grammatical knowledge is necessary for literary works, it is wrong to claim that a good novelist must be a linguist, or that a shift in linguistic theory could inaugurate an age of great poetry. Moreover, a linguist is not necessarily a better judge of literary works. One should not claim to be a better writer or a better judge of literary works simply because he possesses more linguistic knowledge. Viewed in this light, the struggle for a 'post-positivist' social science paradigm might be a misguided objective itself: acknowledging the importance of metaphysics for social science is neither necessary nor sufficient for the evaluation of existing metaphysics or the discovery of new metaphysics. The debates and crises in social science need to be resolved by sociological, rather than philosophy of science, discourse.

#### 4. Conclusion

This paper makes no attempt to claim that critical realists' philosophical and sociological commitments are wrong. The objective is to show that they are not superior to the existing alternatives to warrant a hegemonic status in post-positivist social science. Two concerns are raised over the contemporary form of CR. First, the Duhem-Quine holism thesis, a long-standing anti-realist tradition in philosophy of science, provides a powerful critique of positivism and a thorough structure of human knowledge, both of which CR struggles to rival. Second, CR, and philosophy of science in general, cannot determine the value of scientific theories, and its value in guiding scientific discoveries is questionable. Critical realists' overestimation of the importance of philosophy of science to practical science has led them to conflate philosophy of science with scientific theories to unjustly

dismiss rivalling schools of sociology. Although CR has contributed positively to contemporary sociological debates, its philosophical and sociological merits cannot shoulder critical realists' ambition of leading post-positivist social science.

From the perspective of a skeptic, critical realists need to make three improvements to render future dialogues with rivalling sociological schools more fruitful. First, they need to establish CR's philosophical soundness by debating with more recent rivalling schools in philosophy of science, rather than positivism and other outdated philosophies of science that have long been discarded by serious philosophers. Second, they need to draw a clear line between philosophy of science and scientific theories and separate their philosophy of science commitments from their sociological commitments. Third, when confronting rivalling schools of sociology, they need to substantiate their sociological claims with theoretical construction and empirical observation instead of dubious 'ontological' arguments. My worry about the overreaching ambition of the critical realist movement is that it unfairly discounts the value of rivalling sociological theories and may even lead astray the entire anti-positivist endeavor. However, I hope that the concerns with CR raised in this paper are more due to oversight and can be alleviated by genuine discourse, so that my worry will prove to be unwarranted.

## Notes

1. In sociology, the term positivism often includes other claims, such as that human society operates according to general laws (Macionis 2013, 11) or that social science should be quantitative (Giddings 1922). However, it is debatable whether these claims belong to philosophy of science or sociological theory, so they are not included in the discussion here.
  2. When Quine criticizes empiricism, he means his contemporary dogmatic empiricism, or positivism, that holds the two dogmas of analytic-synthetic cleavage and reductionism, rather than the entire empiricist tradition, which is the antithesis of realism. Quine considers himself an empiricist (though not the dogmatic type): 'as an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience' (Quine 1951, 41).
  3. A challenge to this metaphysical belief is that labor supply is fundamentally determined by worldview rather than material incentives. For example, in the *Protestant Ethic*, Weber argues that the long working hour of ascetic Protestants, for whom 'labor must be performed as if it were an absolute end, a calling', 'cannot be evoked by low wages or high ones, but can only be the product of a long and arduous process of (religious) education' (Weber [1905] 2013, 22).
  4. Note that the research question is a-positional, while any dataset is positional. A metaphysical challenge is that the result is invalid outside the sample for unaccounted reasons, which can be religious, cultural, institutional, psychological, or biological. This type of challenge can be constructed regardless of whether the dataset is from a country, a continent, or the entirety of humankind from the beginning of history until today, and can only be ruled out by certain metaphysical assumptions on the homogeneity of human behavior rather than a positivist research design.
  5. At first sight, labor is crucial for the economy as it is one of the most significant input factors, so economists should commit major efforts to study labor supply. A metaphysical challenge to the importance of labor supply is that what fundamentally affects the economy is not the hours worked, but why the workers work. Therefore, the functionalist study of labor supply should be subordinate to the study of meaning, aka, worldviews. Weber ([1905] 2013) is conducted under this alternative assumption. Toynbee expressed similar views: 'in general, I minimize the effect of material factors of all kinds, economic and technical as well as military, and I magnify the effects of spiritual factors' (Toynbee 1961, 609).
  6. If it were not for underdetermination, positivist scientists could achieve the refutation of the peripheral statements individually, which would lead to the re-evaluation of the metaphysical statements that are irreducible to immediate experience.
  7. Holists disagree about the extent to which human knowledge should be treated holistically. For example, Duhem believes that holism applies only to physics, while Quine believes it applies to the totality of human knowledge.
  8. 'We suggest that the great hope for realism and anti-realism lies in retail arguments that attend to the details of particular cases. It is unlikely that either side will win every argument; it seems more likely that realism and anti-realism are options to be exercised sometimes here and sometimes there. This equivocal victory for each might be uncomfortable for realists and anti-realists alike, but so be it' (Magnus and Callender 2004, 336–37).
- Van Fraassen (1989,1994) argues that neither realism nor anti-realism is ruled out by plausible canons of

rationality; each is sustained by a different conception of how much epistemic risk one should take in forming beliefs on the basis of one's evidence.

For more details about the realism vs. anti-realism debate, see Cover, Curd, and Pincock (2012, ch 9) and Chakravartty (2017).

9. 'Only if the working scientist possesses the concept of an ontological realm, distinct from his current claims to knowledge of it, that he can philosophically think out the possibility of a rational criticism of these claims. . . . by restoring the idea of an ontological realm distinct from science . . .' (Bhaskar [1975] 2008, 43).  
'Human knowledge has both intransitive and transitive dimensions that should not be conflated. The transitive aspects of knowledge are (fallible) social products that change over time. The intransitive aspects of knowledge may be social products (e.g. real social structures) but often they are not social products (e.g. atoms, stars, etc.)' (Smith 2011, 94).
10. 'Critical realism is the core of a research program' (Bhaskar 2013, 141); it is 'a philosophy which has a greater relevance than is the case at present for scientific practice', without which 'it is impossible to steer clear of the Scylla of holding the structure dispensable in the long run (back to empiricism) without being pulled into the Charybdis of justifying it exclusively in terms of the fixed or changing needs of the scientific community (a form of neo-Kantian pragmatism exemplified by e.g. Toulmin and Kuhn)' (Bhaskar [1975] 2008, 9–10).
11. For example, see [1979] 1998, 132–58) for a critique of interpretivism, Sayer (2000, 67–80) for a critique of postmodernism, and several chapters from Lawson (2015) for a critique of mainstream economics.
12. 'The sound experimental criticism of a hypothesis is subordinated to certain moral conditions: in order to estimate correctly the agreement of a physical theory with the facts, it is not good enough to be a good mathematician and skillful experimenter; one must also be an impartial and faithful judge' (Duhem [1906] 1954, 218).
13. An in-depth discussion regarding the epistemological status of astrology can be found in Thagard (1978).
14. 'Human actions are goal-oriented, in means-ends terms. This in turn implies that human actions should be subject to a fundamental 'hierarchy of control', and that the higher levels of this hierarchy should lie on the cultural plane. Therefore, all human societies embody references to a normative cultural order which places teleological 'demands' upon men" (Parsons [1963] 1993, xlii).
15. In interpretivism, a worldview is defined as a systematic answer to ultimate questions: 'What is the meaning of life? What purpose does our existence serve? How do we best live our lives?' (Kalberg 2004, 140).
16. Critical realists' hostility towards interpretivism might originate from their Marxist/materialistic commitments: 'Marx's work at its best illustrates critical realism; and critical realism is the absent methodological fulcrum of Marx's work. . . . there is an elective affinity between critical realism and historical materialism, in that inter alia critical realism is a heterocosmic instance of the emancipatory transformation socialism aspires to achieve' (Bhaskar 2013, 143). CR's materialistic commitments are discussed in Hodgson (1999).

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## References

- Acemoglu, Daron, Simon Johnson, and James a Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *The American Economic Review* 91 (5): 1369–1401. doi:10.1257/aer.91.5.1369.
- Archer, Margaret, Claire Decoteau, Philip Gorski, Daniel Little, Doug Porpora, Timothy Rutzou, Christian Smith, George Steinmetz, and Frederic Vandenberghe. 2016. "What is Critical Realism?" *Perspectives: A Newsletter from ASA Theory Section* 39: 4. <http://www.asatheory.org/current-newsletter-online/what-is-critical-realism>.
- Becker, Sascha O, and Ludger Woessmann. 2009. "Was Weber Wrong? A Human Capital Theory of Protestant Economic History." *The Quarterly Journal of Economics* 124 (2): 531–596. doi:10.1162/qjec.2009.124.2.531.
- Berry, Colin. 1981. "The Nobel Scientists and the Origins of Scientific Achievement." *The British Journal of Sociology* 32 (3): 381–391. doi:10.2307/589284.
- Bhaskar, Roy. [1975] 2008. *A Realist Theory of Science*. London: Routledge.
- Bhaskar, Roy. [1979] 1998. *The Possibility of Naturalism: A Philosophical Critique of the Contemporary Human Sciences*. London: Routledge.
- Bhaskar, Roy. 2009. *Scientific Realism and Human Emancipation*. Milton Park: Taylor & Francis.
- Bhaskar, Roy. 2013. *Philosophy and the Idea of Freedom*. Milton Park: Taylor & Francis.
- Chakravartty, Anjan. 2017. "Scientific Realism." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N Zalta. Summer 2. Stanford: Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/entries/scientific-realism/>
- Cover, J. A., Martin Curd, and Christopher Pincock. 2012. *Philosophy of Science: The Central Issues*. New York: Norton.
- Cruikshank, Justin. 2004. "A Tale of Two Ontologies: An Immanent Critique of Critical Realism." *The Sociological Review* 52 (4): 567–585. doi:10.1111/j.1467-954X.2004.00496.x.
- Duhem, Pierre M M. [1906] 1954. *The Aim and Structure of Physical Theory*. Princeton: Princeton University Press.
- Einstein, Albert. 1918. "Principles of Research." [https://www.site.uottawa.ca/yymao/misc/Einstein\\_PlanckBirthday.html](https://www.site.uottawa.ca/yymao/misc/Einstein_PlanckBirthday.html).
- Feigl, Herbert 2020. "Positivism." <https://www.britannica.com/topic/positivism>.
- Feyerabend, Paul. 1963. "How to Be a Good Empiricist – a Plea for Tolerance in Matters Epistemological." In *Philosophy of Science, the Delaware Seminar* Vol. 2, edited by Bernard Baumrin, 3–39. New York: Interscience Publishers.
- Feyerabend, Paul. 1975. *Against Method*. New York: Verso.
- Giddings, Franklin. 1922. *Studies in the Theory of Human Society*. New York: Macmillan.
- Hodgson, Geoffrey. 1999. "Marching to the Promised Land? Some Doubts on the Policy Affinities of Critical Realism." *Alethia* 2 (2): 2–10. doi:10.1558/aleth.v2i2.2.
- Huntington, Samuel P. [1996] 2007. *The Clash of Civilizations and the Remaking of World Order*. New York: Simon & Schuster.
- Kalberg, Stephen. 2004. "The Past and Present Influence of World Views: Max Weber on a Neglected Sociological Concept." *Journal of Classical Sociology* 4 (2): 139–163. doi:10.1177/1468795X04043931.
- Kalberg, Stephen. 2014. "Max Weber's Sociology of Civilizations: The Five Major Themes." *Max Weber Studies* 14 (2): 205–232. doi:10.15543/MWS/2014/2/5.
- Kemp, Stephen. 2005. "Critical Realism and the Limits of Philosophy." *European Journal of Social Theory* 8 (2): 171–191. doi:10.1177/1368431005051762.
- Landes, David S. 1999. *The Wealth and Poverty of Nations: Why Some are so Rich and Some so Poor*. New York: W.W. Norton.
- Laudan, Larry. 1981. "A Confutation of Convergent Realism." *Philosophy of Science* 48 (1): 19–49. doi:10.1086/288975.
- Lawson, Tony. 2015. *Essays on the Nature and State of Modern Economics*. London: Routledge.
- Longo, Helen E. 2020. *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry*. Princeton: Princeton University Press.
- Macionis, John. 2013. *Sociology*. New York: Pearson.
- Magnus, P D., and Craig Callender. 2004. "Realist Ennui and the Base Rate Fallacy." *Philosophy of Science* 71 (3): 320–338. doi:10.1086/421536.
- Pfeffer, Fabian T, and Nora Waitkus. 2021. "The Wealth Inequality of Nations." *American Sociological Review* 86 (3): 1–36. doi:10.1177/00031224211027800.
- Popper, Karl. [1959] 2005. *The Logic of Scientific Discovery*. Milton Park: Taylor & Francis.
- Porpora, Douglas. 2015. *Reconstructing Sociology: The Critical Realist Approach*. Cambridge: Cambridge University Press.
- Quine, Willard V O. 1951. "Two Dogmas of Empiricism." *The Philosophical Review* 1 (60): 20–42. doi:10.1086/211003.
- Romer, Paul M. 1990. "Endogenous Technological Change." *The Journal of Political Economy* 98 (5): 71–102. doi:10.1086/261725.
- Sayer, Andrew. 2000. *Realism and Social Science*. New York: SAGE Publications.
- Smith, Christian. 2011. *What is a Person?: Rethinking Humanity, Social Life, and the Moral Good from the Person Up*. Chicago: University of Chicago Press.
- Stanford, Kyle. 2017. "Underdetermination of Scientific Theory." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N Zalta. Winter 201. Metaphysics Research Lab, Stanford University.



- Thagard, Paul R. 1978. "Why Astrology is a Pseudoscience." *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1: 223–234. doi:[10.1086/psaprocbienmeetp.1978.1.192639](https://doi.org/10.1086/psaprocbienmeetp.1978.1.192639).
- Toynbee, Arnold J. 1961. *A Study of History: Volume 12: Reconsiderations*. Oxford: Oxford University Press.
- Van Fraassen, Bas C. 1989. *Laws and Symmetry*. Oxford: Oxford University Press.
- Van Fraassen, Bas C. 1994. "Gideon Rosen on Constructive Empiricism." *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 74 (2): 179–192. doi:[10.1007/BF00989802](https://doi.org/10.1007/BF00989802).
- Weber, Max. [1963] 1993. "Introduction." In *The Sociology of Religion*. Boston: Beacon Press. xxix–lxxvii.
- Weber, Max. [1905] 2013. *The Protestant Ethic and the Spirit of Capitalism*. Amazon: CreateSpace Independent Publishing Platform.
- Weber, Max. [1915] 1951. *The Religion of China: Confucianism and Taoism*. Glencoe: The Free Press.
- Weber, Max. [1916] 1992. *The Religion of India: The Sociology of Hinduism and Buddhism*. New Delhi: Munshiram Manoharlal.
- Weber, Max. [1917] 2010. *Ancient Judaism*. New York: Simon and Schuster.
- Weber, Max. [1920] 1993. *The Sociology of Religion*. Boston: Beacon Press.
- Weber, Max. [1922] 1978. *Basic Concepts in Sociology*. London: Peter Owen.
- Weber, Max. [1922] 1978. "The Nature of Social Action." In *Max Weber: Selections in Translation*, edited by W. G. Runciman, 7–32. Cambridge: Cambridge University Press. doi:[10.1017/cbo9780511810831.005](https://doi.org/10.1017/cbo9780511810831.005).
- Zhang, Tong. 2021. "Was Weber Really Wrong? a Comment on Some Recent Empirical Studies on Economic Growth." *Max Weber Studies* 21 (2): 203–212. doi:[10.15543/maxweberstudies.21.2.203](https://doi.org/10.15543/maxweberstudies.21.2.203).
- Zhang, Tong. 2022. "Reinterpreting Science as a Vocation." *Max Weber Studies* 22 (1): 55–73.