Methods as Normative Propositions:
Redrafting the Ontology of Scientific Change

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Abstract

Any general theory that attempts to explain changes in a certain domain usually contains two major constituents – a certain *ontology* of the entities and relations that presumably undergo change in that domain and a certain explanation of the *dynamics* of how these entities and relations change over time. Thus, our physical theories tell us *both* what type of entities and relations exist out there in the physical universe (e.g. quarks, lepton, bosons) *and* how they change through time. The same goes for virtually any theory from natural or social science: it normally posits a certain ontology of its domain and attempts to unearth its dynamics. In that sense, the current theory of scientific change accepted in the field of *scientonomy* is no exception: it posits a certain ontology of epistemic agents, elements, and stances, and suggests a set of laws that tells us how the stances taken by different epistemic agents towards different elements change over time. According to the ontology of epistemic elements, currently accepted in scientonomy, the two types of elements that undergo scientific change are *theories* and *methods* of their evaluation (Barseghyan 2015; Sebastien 2016; www.scientowiki.com/Ontology_of_Scientific_Change). Consequently, the current laws of scientific change are all about the dynamics of changes in theories and methods (Barseghyan 2015; www.scientowiki.com/Mechanism_of_Scientific_Change).

Yet, a reflection on the actual practice of the Encyclopedia of Scientonomy (www.scientowiki.com) reveals considerable discrepancies between the *official* ontology of epistemic elements currently accepted in scientonomy and the *actual* ontology that is at the backbone of the encyclopedia. In addition, the recent developments in theoretical scientonomy make it increasingly apparent that the ontology of epistemic elements needs to be redrafted. Thus, it has been recently suggested that *questions* should be accepted into the ontology of scientific change as a separate class of epistemic elements (Rawleigh 2018). It has also been argued that *technological knowledge* should be included in the ontology of epistemic elements as a subcategory of theory (Mirkin 2018).

In this paper, I scrutinize the concepts of *method* and *normative theory* and suggest a new scientonomic ontology which is both theoretically sound and in tune with the actual practice of the encyclopedia. First, I argue that it is misleading to think of theories and methods as completely distinct epistemic elements, since methods are essentially species of *normative theories*. By definition (Barseghyan 2015, p. 5), methods are criteria (requirements, rules) for theory evaluation, i.e. they tell us how theories of a certain kind *ought* to be evaluated. As such, their propositional content is *normative*: when we explicate any given method, what we end up with is a *normative theory*, such as "a hypothesis about a drug's efficacy is *acceptable* if the drug's effect has been confirmed in a double-blind trial", "astronomical data is acceptable if it is obtained by means of a properly functioning telescope", etc. This holds for all methods of theory evaluation, including the most abstract methods, such as the hypothetico-deductive method, or the Aristotelian-medieval method of intuition schooled by experience.

I also show that the distinction between *acceptance* and *employment* is applicable not only to methods of theory evaluation but to *all* normative theories. *Accepting* a normative theory as the best available evaluation/prescription of something is not the same as *employing* that normative theory in practice, since acceptance and employment are *independent* stances: a norm can be accepted without being employed and *vice versa*. For instance, it's one thing to accept that all humans ought to be treated equally regardless of their race, nationality, ethnicity, etc., and it's another thing to act upon this norm (employ it) in practice (Dixon, Durrheim, and Tredoux 2007). Similarly, accepting that "any scientific theory should be testable" is not the same being actually prepared to deem all untestable theories as unscientific (Castelvecchi 2015). The same holds for any normative theory, whether it's a theory from ethics, methodology, or aesthetics.

This redrafted scientonomic ontology raises a number of specific questions concerning the role of normative theories in the *dynamics* of scientific change. First, how does the *acceptance* of a normative theory by an epistemic agent affect the agent's accepted descriptive theories and the agent's methods of theory evaluation? Second, how does the *employment* of a normative theory affect the agent's theories and methods? For instance, what is the effect of the *acceptance* or unacceptance of the principle of racial equality on scientific theories and methods? And what is the effect of its *employment* on the process of scientific change? It is well known that normative ethical theories play role in scientists' decisions which theories to *pursue* and which to neglect, but is there any way that accepted or employed ethical theories affect theory *acceptance*? For instance, it is universally accepted that the Nazi hypothermia experiments were immoral, but we still seem to *accept the data* obtained in those experiments (Sheldon et al. 1989). So do normative ethical theories play any role in the *acceptance* of descriptive scientific theories and, if so, what is that role? The new scientonomic ontology suggested in this paper can promote a focused discussion of these issues and thus help shed new light on the old debate about the role of values in science.

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