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Comments on Paula Olmos' "The Value of Judgmental Subjectivity"

Mark Weinstein
Montclair State University

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MARK WEINSTEIN
Educational Foundations
Montclair State University
Montclair, NJ 07028
USA
weinsteinm@mail.montclair.edu

Olmos discussion of argumentation in science is a welcome addition to both argumentation theory and philosophy of science. Working from Kuhn's seminal contributions, she adds insights from argumentation theory that support a reasoned approach to scientific argument that escapes the aprioristic demands of early positivism and the problem of incommensurability that some saw as supporting a post-modern account of science that obliterates the difference between science and such aesthetic paradigms familiar in post modernism as literary analysis and architecture. The heart of her contention is drawn from Kuhn who she exemplifies as follows:

> Empirical proof –i.e. experimental confirmation (in any case gradual) of the observational consequences implied by theories– is never decisive (it *underdetermines* theory choice), but neither are mandatorily decisive, in an absolute way, the value-based … There is always room … for reasonable (even scientifically-based) disagreement. Although there are concrete cases where recalcitrant and stubborn positions in scientific matters might be identified and criticized as such (by the majority of a community), this cannot be done in an algorithmic or unanswerable way. The *argumentative* situation (as it happens in legal matters) remains, as science keeps going on, and theories are assessed and accepted as *currently* valid. (p.3, italics in original).

Without further ado, I concur with her analysis and see my remarks as a friendly amplification of her position. Olmos follows Kuhn is addressing two often-cited episodes in the history of science, the dispute between oxygen and phlogiston as the basis for combustion, and the competition between the heliocentric and geocentric models of the solar system. Using two of Kuhn's criteria, accuracy and simplicity and she shows that both approaches satisfied them in some respect. Oxygen was more accurate in predicting observed values; in terms of explanatory capacity in relation to the properties of other metals, phlogiston did better, offering more accurate chemical analogies. The classic dispute about geocentrism is seen in terms of simplicity. Here again the theories differ in terms of a key criterion. Geocentrism offered simpler calculations. Heliocentrism offered a simpler geometric account, using the favored geometric figure of the circle, which corresponded to the metaphysical principles governing astronomy to that point (pp. 6ff.).

It should be noted that accuracy and complicity are only two of the five criteria that Kuhn puts forward, although these two are those that predominate in the discussion of the two disputes. The others, as Olmos indicates, are consistency, scope and fruitfulness (p. 5). Consistency is not an issue here since both competing theories seemed internally consistent at the time. Most importantly for our later discussion, scope and fruitfulness could not be ascertained at, what in hindsight, are the early stages of modern speculation about chemistry and astronomy, although geocentrism had enormous scope in the understanding of the universe in theological terms and phlogiston had all of the support of empirical chemistry based on categorization of elements by means other than weighing. Thus, given scope and fruitfulness, phlogiston and geocentrism should have been the most reasonable approaches at the time. Clearly, not when seen from our perspective. This indication of perspective leads to one of the more valuable insights that Olmos draws from argumentation theory, following Kuhn in seeing disputes as open-ended and decisions of epistemic adequacy to be come to over time rather than at a time. This will be a key consideration when we move to my preferred example of scientific process, Prout's hypothesis and the subsequent development of the periodic table (Weinstein, 2018). But first a central contention in Olmos' paper.

Olmos wants to move the analysis of scientific argumentation from a rules conception, prevalent in much of recent argumentation theory, to the role of values in assessing argument. She articulates this in terms of five considerations. Assessment of argument even in science should be seen as making a "value judgment":

> an evaluative not a factual expression, conveying an *agent-related* positive attitude towards the object to which it is attributed" They are "a *matter of degree* …gradual and comparative" serving as "substantive grounds for comparative attribution. They are "associated to contexts and practices." Similar to legal arguments they strive to maximize the 'joint satisfaction of different values," call for "complicated (sophisticated) argumentation. They typically imply demands for backing (because warrants and warrant choices are not obvious), weighing procedures and are finally open to further demands for better grounding. (pp. 11-12, italics in the original).

Olmos rightly, sees this to require a discussion of objectivity, typically seen as defining, especially, the physical sciences, and desirable in knowledge claims of all sorts. Drawing from recent work in argumentation theory she concludes that judgments about arguments in science, although subjective, must meet standards of public argumentation. By subjective she intends that judgments are:

> agent-related (only human agents *recognize* non-algorithmic reasons and *draw* conclusions thereof) and should be conceptually construed not as a set of *a priori* conditions (of success) a certain content may prove to have for being *judgmental*, but as the condition a certain content *acquires* by being presented for its examination, questioning and judging (by others than its proponent) in the public arena of *argumentative practice*" (p. 15, italics in the original).

She identifies the following plausible standard for public discourse as applied to science:

a) *Publicity*: any reason adduced within a scientific community must be *publicly* expressed.
b) *Reliability*: all good reasons are linked to processes evaluated according to their *reliability*.
c) *Reflexivity*: scientific community is involved in a collective process, on which its *epistemic authority* relies, carried out through *reflexive strategies* leading to the continuous assessment of the epistemic position from which it exercises its activity" (p. 15, italics in original).

As indicated, I have no problem with Olmos' discussion as far as it goes, but as a friendly amendment I would make the following observation. Although her account captures what it means to make a reasonable decision by an agent at a point in time, she fails to acknowledge the possibility of objectivity by looking at science in the long run, and thus misses the opportunity to develop a correlative basis for objective judgment at a point. To see this, we must look briefly at my favorite example, physical chemistry, and the salient juncture in its history identified with the hypothesis of William Prout. For with Prout, the stakes are very high. It is not merely the availability of alternative explanations, but the fact of inconsistency with available evidence over an extended period of time, despite the ultimate vindication of a point of view.

Prout's hypothesis, a corner stone of the periodic table and, in 1817, a bold and ultimately fruitful conjecture can be stated as: All elements are composed of hydrogen atoms. The vicissitudes of just what we might mean by 'element' and by 'hydrogen atom' was reflected in the complex status of the available evidence and underlying theories through which the conjecture was to be verified. The evidence that prompted the conjecture was an outgrowth of a deep explanatory principle in early atomic theory, that is, that atoms of elements could be described in terms of whole number multiples of some primordial atom. This was itself based on both the underlying intuition of atomic theory in its original form (that atoms, being indivisible, would only enter into combination as discrete individuals) and a growing body of evidence showing whole number ratios among the experimentally ascertained weights of naturally occurring substances after chemical decomposition. This led to the correlative theoretic notion of atomic weight as an overlay of the empirical results of measuring weights on increasingly sensitive balances. Unfortunately, in 1825, the noted chemist Jacob Berzelius "compiled a set of improved atomic weights the disproved Prout's hypothesis" (Scerri, 2007, p. 40). Prout's hypothesis remained inconsistent with the evidence for at least a century. Nevertheless, Prout was correct in seeing hydrogen as the basis of the elements, since hydrogen with one proton serves as the basis as we move across the periodic table, each element adding protons in whole number ratios based on hydrogen with one proton. The core insight remained at the center of later work that strove to develop coherent chemical models based on multiples of fundamental elements. Problems with anomalies persisted despite the fact that the number of protons yielded the final organizing principle of the table. These were finally resolved, once atomic number, distinguished from atomic weight, which includes the contribution from neutrons unknown until the mid-20th century, finally vindicated Prout's bold conjecture (Weinstein, 2011).

How then are we to understand argument in science on this model. Clearly, all of the criteria for public argument were met during the early years of the periodic table when the issues were being fought out, but is the judgment about the adequacy of Prout's hypothesis captured by the argumentative discourse, or even by Kuhn's criteria, in particular, is the judgment of Prout and the periodic table that it exemplifies merely currently valid? It is certainly logically possible that a Copernican revolution will overturn all of physical chemistry, although 'revolutions' such as quantum theory reinterpret, but ultimately support, the structure be offering deeper ontologically significant explanations (reductions) of chemical knowledge. But why would it be fanciful at best to question the periodic table based on the logical possibility of its replacement? After all, argumentation requires plausibility and reasonable not certainty. In my work, I have identified three criteria based on the history of physical chemistry, with the periodic table at the center, that offer an objective basis for assessing claims. Without going into detail, they are criteria for evaluating the durability of warrants and my idea is that arguments need to be assessed in terms of the robustness of the warrants, rather than, for example, in terms of evidence pro and con. The criteria for identifying the strength of warrants, drawn from the history of chemistry are: first, ***consilience,*** requires that theories are increasingly supported by a body of evidence that is improving in scope and detail. Second, ***breadth*** requires that a theory explains an increasing number of diverse phenomena, and third, ***depth*** requires that a theory is reinterpreted in terms of by higher-order explanatory frameworks that connect it to other theories of increasing breadth and increasing evidentiary adequacy. My contention is given concrete expression in my model of emerging truth (MET), where warrants are afforded weights in relation to the growth of consilience, breadth and depth over time (Weinstein, 2009). When combined with an intuitive analysis of how these weights function dialectical and within available modifications of adaptive logic (Weinstein, 2012), the MET offers a coherent account of dialectical advance in the face of changing evidence with clear consequences for understanding the logic of inquiry in science, for the theory of argument and for critical thinking (Weinstein, 2013).

References

Scerri, E. (2007). *The Periodic Table: Its Story and Its Significance*. New York: Oxford University Press, 2007.

Weinstein, M. (2009). A metamathematical model of emerging truth. In: J-Y. Béziau & A. Costa-Leite (eds.), *Dimensions of Logical Concepts.* Coleção CLE, **vol.55,** Campinas, Brazil, 2009, 49-64.

Weinstein, M. (2011). Arguing towards truth: The case of the periodic table. *Argumentation*, **25(2),** 185-197.

Weinstein, M. (2012). A metamathematical model for A/O opposition in scientific inquiry. In: *Around and Beyond the Square of Opposition.* J-Y. Béziau & D. Jacquette (eds.), New York: Springer Basel.

Weinstein, M. (2013). *Logic, Truth and Inquiry*. London: College Publications.

Weinstein, M. (2018). The philosophical importance of the periodic table. In: Scerri, E. and Restrepo, G. (eds.) *Mendeleev to Oganesson: A Multidisciplinary Perspective on the Periodic Table.* NY, NY: Oxford University Press.