Objectivity & Values in Science –pt.I (cont.): How value-laden are scientific theories and facts? Helen Longino's "Values and Objectivity" & Philip Kitcher's *Science, Truth, and Democrary*

- Recall **Lecture IV:** (Paul Thagard (1978))

"I shall propose a complex criterion … [which] introduces social and historical features as well as logical ones." (27)

- Thagard's socio-historical/logical account (p. 31):

-**Theoretical context** (the *logical* component)
(traditional issues of falsification/ observation/ prediction/ explanation…fit here. "[W] e have seen that this approach is not sufficient in characterizing astrology as a pseudoscience." (31))

- **Communal context** (the *sociological* component)
Agreement among practicioners on principles/ problem-solving methods? Are the practicioners *concerned* about explaining anomalies? *Active involvement* in attempts to [dis/]confirm?

-historical context (the historical component)
Kuhn showed that there must be a *prolonged* and *sustained* barrage of anomalies *and* there must be another challenger.

- Recall **Lecture VII:** (Thomas Kuhn (1973))

"I am suggesting…that the **criteria of choice**[1] with which I began function not as ***rules,*** **which determine a choice, but as *values*, which influence it."**
-(**CC1998**, 111)

"What from one viewpoint may seem the looseness and imperfection of choice criteria conceived as rules may, when the same criteria are seen as values, appear

[1] As employed by the scientist, whether s/he chooses one result over the other, one theory over the other, or (in cases of crisis) one paradigm over the other.

an indispensable means of spreading the risk which the introduction or support of **novelty** always entails**."** - (**CC1998**, 112)

1. **Kuhn's rough-and-ready set of "big five" cognitive values:**

A.) Accuracy: "[A] theory should be accurate: within its domain, that is, consequences deducible from a theory should be in demonstrated agreement with the results of existing experiments and observations." (103) "[F]or present purposes, I take [accuracy] to include not only quantitative agreement but qualitative as well. Ultimately it proves one of the most decisive of all the criteria, partly because it is less equivocal than the others but especially because predictive and explanatory powers…depend on it, [and] are characteristics that scientists are particularly unwilling to give up." (104) Nevertheless, "[h]owever important it may be…accuracy **by itself** is **seldom or never** a sufficient criterion for theory choice." (ibid.)

B.) Consistency: "[A] theory should be consistent: not only internally or with itself, but also with currently other accepted theories applicable to related aspects of nature." (103)

C.) Broad Scope: "[A] theory's consequences should extend far beyond the particular observations, laws, or subtheories it was initially designed to explain." (103)

D.) Simplicity: "[C]losely related [to C.)] it should be simple, bringing order to phenomena that in its absence would be individually isolated and, as a set, confused." (103)

E.) Frutifulness/Fecundity: "[A] theory should be fruitful of new research findings …disclos[ing] new phenomena or previously unnoted relationships among those already known." (103)

Kuhn's Examples of contextual values informing cognitive values:

-Kepler's choice of Copernicanism strongly motivated by his immersion in NeoPlatonic and Hermetic thought.

-"German Romanticism predisposed those it affected toward …acceptance of energy conservation." (106)

Kuhn's (rhetorical) question:

"[H]ow [can] philosophers of science [have]…**so long neglected the subjective elements** [read: contextual values] which, they freely grant, **enter regularly into the actual theory choices made by individual scientists**? Why have these elements seemed to them an **index only of human weakness**, not at all of the **nature of scientific knowledge**?" (106)

- **Helen Longino (1990)**

-Expands on the post-Kuhn legacy by developing accounts for 'objectivity' incorporating and developing themes of the above (Kuhn (1973), Thagard (1978))[2]

Note1: Though later citing Kuhn (1973) (**CC1998,** 1982), she typecasts him earlier in her essay as missing the mark concerning developing a plausible account of scientific objectivity: "[A]lthough Kuhn emphasizes the communitarian nature of the sciences, the theory of meaning he developed…to account for the puzzling aspects of scientific change…reduces that community to a solipsistic monad incapable of communicating with other monads/communities. **Kuhn's account is, thus, just as individualist as the empiricist one."** (173)

How would Kuhn have responded? Is Longino's characterization of "incommensurability" a fair one or a straw-man maneuver? How *did* Kuhn respond to such charges of solipsism in (1973)?

For Longino, both the **empiricists** and the **wholists** (i.e., roughly speaking, pre-Kuhnian logical positivists and logical empiricists, and post-Kuhnians towing the *SSR*[3] line) miss the mark concerning the question of accounting for the nature of scientific objectivity. To invoke Kuhn here (on a meta-level ☺) both accounts suffer from an excessively paradigmatic insularity!

- **The logical empiricist/positivists**, in the affixing to the *context of justification* presumably strict and uniformly algorithmic procedures through which scientific are supposedly reducible to strictly evidence-based observational terms, **beg the question** for their somewhat artificial and overly simplified notion of objectivity, *and* omit the role that contextual values (i.e. background assumptions) can figure among individuals and communities (by shoving off such issues to *context of discovery.*) Denote the latter as the **individualist fallacy.**

  "As long as one takes the positivist analysis as providing a model to which any inquiry must conform in order to be objective and rational, then to the degree in which actual science departs form the model **it fails to be objective and rational."** (172) (I.e., such criteria are question-begging)

[2] Though obviously her question(s) differ in nature from Thagard's (1978) and Kuhn's (1973). Thagard was trying to establish criteria of demarcation and Kuhn was reconstituting criteria of theory of choice (in the narrow and broad senses) in terms of *values*, instead of *rules.* Here, Longino is dealing with the overall issue of *scientific objectivity.* Certainly notions like objectivity, criteria f demarcation, and values informing theory-choice thematically overlap, but the *aims* of such questions are distinct.

[3] *The Structure of Scientific Revolutions*

[Contextual as well as some cognitive values are understood as] "nonempirical elements…[and] features of an individual's psychology….treated as randomizing factors that promote novelty…in the context of justification these generative factors are disregarded …the hypothesis is considered only in relation to its observable consequences, which determine its acceptability." (ibid)

"The absolute and unambiguous nature of evidential relations presented in the positivist view cannot accommodate the facts of scientific change." (185)

- **The "wholists," on the other hand, make essentially the same mistake insofar as their reification of incommensurability renders communities like monadic individuals, perpetually "talking past one another" and incapable of intersubjective consensus, much less cross-paradigmatic critique.**

"Both philosophical accounts assume that method, the process by which knowledge is produced, is the applications of rules to data." (173)

"The incommensurability of theories in the wholist view cannot do justice to the lively and productive debate that can occur among scientists committed to different theories." (185)

Note2: Would *Kuhn* agree with this characterization? Recall his explicit disavowal of such a notion (of rule-based applications vis-à-vis contextual values) in his (1973). One can assume her critiques are directly against an early rendition of Kuhn's *SSR* which may not do justice to some of its more nuanced passages.

Two Senses of "Objectivity"

Objectivity (1): "[B]ound up with questions about the truth and referential character of scientific theories…with issues of scientific realism." (170) (***products* of science**)

Objectivity (2): "[Having] to do with modes of inquiry…to claim that the view provided by science is one achieved by reliance upon nonarbitrary and nonsubjective criteria for developing, accepting, and rejecting hypotheses theories that make up the view." (***process* of science**)

"[My] contextualist view produces a framework within which it is possible to respect the complexity of science, to do justice to the historical facts and to the current practice of science, and to avoid paradox." (186) (A tall order!)

Longino's 'Contextualism'

- **Recall Thagard** "The social character of hypothesis acceptance underscores the publicity of science. This publicity has both **social** and **logical** dimensions." (176)

  "This does not require a commitment to a set of theory-free eternally acceptable observation statements but merely a commitment to the possibility that two or more persons can agree about the descriptions of objects, events, and states of affairs that enter into evidential relationships." (ibid)

- Note that Longino seems to accuse scientists of equivocating "conceptual" with "metaphysical" criticism. Is this a fair charge?

"It is this possibility of **intersubjective criticism**..that permits objectivity in spite of the context dependence of evidential reasoning…Objectivity…is a characteristic of a community's practice of science rather than an individual's, and the practice of science is understood in a much broader sense than most discussions of the logic of scientific method suggest. " (178-179)

- **Four ways a hypothesis can be criticized:** (177-178)

  1. **Evidential**: Attacking the merit of nature of evidence (which can involve both *E* and *C* factors, from Hawthorne's article.) "Such criticism questions the degree to which a given hypothesis is supported by the evidence adduced for it, questions the accuracy, extent, and conditions of performance of the experiments and observations serving as evidence…questions their analysis and reporting." (177) (Mostly pertaining to cognitive values)
  2. **Conceptual (1):** Questioning the nature of a hypothesis' "conceptual soundness" (analogous to Kuhn's "internal consistency" criterion.)
  3. **Conceptual (2):** Questioning the nature of a hypothesis' "consistency with accepted body of theories" (analogous to Kuhn's "external consistency" criterion.)
  4. **Conceptual (3):** How *relevant* is the evidence presented to support a hypothesis?

Note 3: Can any of these four ways be reconciled with Popper's falsificationism? Why or why not? (See n25, p. 188: "Conceptual criticism of this sort is a far cry from the criticism envisaged by Popper. For him [such] issues must be decided empirically, if at all.") Is this a fair charge?

"Criticism [should be] *transformative."* (178)

"[I]ntersubjective criticism is what constitutes [science's] objectivity. Scientific knowledge, is therefore, **social knowledge."** (180)

Note 4: Perhaps a science at different levels of *maturity* (infancy, adolescence, fully mature) is subjected to different degrees of (1.-4.) above (With the youngest sciences getting the most of the Type 3 conceptual criticism.)

Objectivity by Degrees

"Objectivity…turns out to be a matter of degree. **A method of inquiry is objective to the degree that it permits *transformative* criticism.** Its objectivity consists not just in the inclusion of intersubjective criticism but in the degree to which both its procedures and its results are responsive to the kinds of criticism described….**method must be understood as a collection of social, rather than individual, processes, so the issue is the extent to which a scientific community maintains critical dialogue**." (181)

Four criteria (Recall Kuhn):

(A) **Recognized Avenues for Criticism** (Peer review, etc. "[P]edestrian, routine criticism should be valued comparably to pedestrian and routine 'original research'." (181)
(B) **Shared Standards:** (Both cognitive and contextual values…accuracy and empirical adequacy, though none [recall Kuhn (1973)] are necessary or sufficient. "Standards do not provide a deterministic theory of theory choice." (182)
(C) **Community Response: "**Responsiveness is measured by such public phenomena as the contexts of textbooks, the distribution of grants…community members [should] pay attention to the critical discussion taking place and that the assumptions that govern activities remain logically sensitive to it." (183)
(D) **Equality of Intellectual Authority:** "[O]bjectivity is dependent upon the depth and scope of the transformative interrogation that occurs in any given scientific community." (183)

- **Philip Kitcher. Recall McMullin: A historicized Realism (Theories stand the test of time *if* they aim towards the truth. Though McMullin recognizes there may be no such algorithm or transhistorical rules characterizing such an aim)**

Theories as maps: "The best judgment we can make about the reliability of 'success-to-truth' rule is that when predictive success is both systematic and fine-grained, the inference is most like to be **reliable.**"(24)

"Realists should however agree..that …direct access is [always] mediated by concepts and categories…we perceive independent objects by being in states whose features are partly caused by the characteristics of the subject.[4] There is no Archimedean

[4] Recall Anderson's article (standpoint dependence, in particular)

point from which any of us can look down on an unconceptualized world and inspect relations between the independent objects it contains and our representational states." (25)

"I conclude that neither the fact that major scientific controversies are protracted nor our inability to delineate a precise account of scientific evidence should undermine our confidence that that the resolution of the scientific debate on the basis of evidence is impossible. **The ideal of objectivity need not be dismissed as a fond illusion."** (41)