A Brief Exposition of Miriam Solomon's Social Empiricism

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Abstract: Nearly for the last forty years, two claims have been at the core of disputes about scientific change - that scientists reason rationally and that science is progressive. Mostly discussions got polarized between philosophers, who defended traditional Enlightenment ideas about rationality and progress; and sociologists, who talked about relativism and constructivism. However, recently new ideas have come from the history of science, feminist criticism of science etc., which goes beyond the polarized positions. Addressing the traditional arguments as well as building on these new ideas, Miriam Solomon constructs a new epistemology of science named Social Empiricism. She holds that to develop an adequate theory regarding the sociality of knowledge, the insights and claims coming from the sociology of scientific knowledge, feminist studies as well as various historical, ethnographical or psychological accounts of science have to be taken seriously. Solomon argues that in spite of many differences, philosophers and sociologists of science share not only standards for the evaluation of scientific practices, but also many underlying assumptions about science due to a shared background in Enlightenment epistemology. These shared premises include individualism, i.e. the focus on the individual thinker, the demand that science should be free of motivational or ideological bias, the appreciation of consensus and the all-or-nothing-quality of rationality, that is, rationality does not come in degrees. Solomon argues that these shared assumptions about the nature of rationality and progress lead to mirror image views of the nature of scientific change and that they need to be overcome for a new social epistemology.

Keywords: *social epistemology, decision vectors, consensus, dissent, cognitive labour*

Introduction

For the last forty years, two claims have been at the core of disputes about scientific change - that scientists reason rationally and that science is progressive. Mostly discussions got polarized between philosophers, who defended traditional Enlightenment ideas about rationality and progress; and sociologists, who talked about relativism and constructivism. However, recently new ideas have come from the history of science, feminist criticism of science etc., which goes beyond the polarized positions. Addressing the traditional arguments as well as building on these new ideas, Miriam Solomon constructs a new epistemology of science. One of her goals is to have a positive influence on scientific decision making through practical social recommendations.

I

Miriam Solomon's new epistemology of science is named Social Empiricism.[1] She holds that to develop an adequate theory regarding the sociality of knowledge, the insights and claims coming from the sociology of scientific knowledge, feminist studies as well as various historical, ethnographical or psychological accounts of science have to be taken seriously. Solomon argues that in spite of many differences, philosophers and sociologists of science share not only standards for the evaluation of scientific practices, but also many underlying assumptions about science due to a shared background in Enlightenment epistemology.[2] These shared premises include individualism, i.e. the focus on the individual thinker, the demand that science should be free of motivational or ideological bias, the appreciation of consensus and the all-or-nothing-quality of rationality, that is, rationality does not come in degrees. Solomon argues that these shared assumptions about the nature of rationality and progress lead to mirror image views of the nature of scientific change[3] and that they need to be overcome for a new social epistemology.[4]

II

Three Central Socio-Epistemic Topics:

There are three central socio-epistemic topics that are at the centre of Solomon's approach. The first one concerns the distribution of cognitive labour at the level of scientific communities. The second concerns the role of consensus and dissent within scientific communities. And the third topic which Solomon considers in her book *Social Empiricism*[5] is the role of biases on the development of science in different field. She focuses on the role of biases for the achievement and dissolution of consensus on different theories within scientific communities, their effects on the distribution of cognitive labour and the overall impact on the advancement of science in different scientific fields measured by empirical success. In doing so, Solomon makes the scientific community, and not the individual scientist, the centre of her inquiry. This shift, she claims, will help to overcome the epistemic individualism that has long hampered philosophy of science and epistemology. Instead of using the common term 'bias', Solomon introduces the notion of 'decision vectors'. She argues that biases are not detrimental to science, but it depends on the distribution of different types of biases whether science is advanced or hindered.

Division of cognitive labour : concerns the question of how epistemic work should be most rationally and epistemically beneficial, distributed over a multitude of people. This can be tackled on the micro-level as well as on the macro-level. On the micro-level, it will concern about deciding upon how many people and who works on which tasks within a research group. On the macro-level, it will be concerned about the funding for different fields of research. Solomon's focus lies

on the level of a research community and the guiding question is how many, which and for how long different research strategies should be pursued.

The focus on the distribution of cognitive labour within scientific communities, not within research teams, is the framework for Solomon's Social Empiricism. According to Solomon, cognitive effort should ideally be distributed equitably, that is, proportional to the empirical success of different theories or methods. Since empirical success can only be assessed after research has been conducted, her recommendation concerning the funding of research alternatives remain quite simple - as long as not all empirical evidence can be accounted for by one theory, all other theories that have empirical success which this theory cannot account for should continue to be pursued and thus have to be funded. This means that premature consensus has to be avoided as long as there is at least some empirical success by theories other than the mainstream theory.

The second major topic of Solomon's Social Empiricism is about consensus and dissent, that is, the questions of consensus formation, retention and dissolution in science; the role various social factors play for it; and the effects it has on the development of science in different fields. She also holds that dissent plays a much bigger and more positive role in science than normally assumed. She considers consensus to be a special case of dissent, namely zero degree of dissent and argues that dissent usually is much more profound and enduring than what is traditionally conceived. In those traditional accounts, it is more or less assumed that if all scientists have the same information and act rationally, cognitive uniformity is to be expected - at least in the long run. Reasons for dissent can be numerous and diverse - imperfect communication of information, different access to evidence or different subjective prior probabilities for different theories, different weights for each of their theoretical values (e.g. fruitfulness, predictive accuracy, etc.) or simply different methodologies. But once enough evidence is gathered and information has been properly communicated, it is expected that there will be consensus.

Unlike Keith Lehrer's theory on rational consensus formation, which says that consensus is something inherently valuable, (Lehrer and Wagner[6]) Solomon argues that instead of taking consensus to be intrinsically valuable and the ultimate goal of science, it can be shown that there have been numerous cases of premature consensus in the history of science, cases in which an early agreement on research agendas, on methods and theories, has actually hampered science by precluding the pursuance of alternative approaches. She argues that while there certainly are some cases in which consensus is and remains normatively appropriate over time, in the majority of cases there either should have been still considerable dissent at the time consensus on one theory or method was reached or consensus should have been dissolved quicker in the light of

contradicting evidence. Thus Social Empiricism accordingly should provide some guidance as to whether and when to refrain from consenting, when to dissolve consensus and how to decide on the distribution of cognitive labour over different approaches. The crux of her argument is that as long as more than one theory or method is empirically successful, consensus on the mainstream approach should be suspended, because such premature consensus formation would be detrimental to the advancement of science.

Empirical Success: Solomon is strongly committed to empiricism and as such, her approach lays importance on empirical success over theoretical success. By empirical success, she means predictive and technological success. Theoretical success denotes concepts such as simplicity or elegance of a theory, breadth of scope, but also Helen Longino's list of feminist theoretical virtues, for example, novelty and ontological heterogeneity.[7] Solomon argues for the primacy of empirical success because empirical success is due to dependable behaviour of the world and as such not entirely fabricated or man-made. Moreover, it is indispensable, if empirical success is not a value, it is not science. Theoretical success by contrast, is not only contingent to the inquirer herself and accordingly less valuable, it is also negotiable. She maintains that this is why - empirical success is a primary goal of scientific inquiry, and theoretical success is valuable only when it brings extra empirical success, convenience or moral benefits with the available empirical success.[8]

Whig Realism: Though Solomon stresses the importance of empirical success, she nonetheless agrees with Alvin I Goldman[9] and Philip Kitcher[10] that truth, also serves as one of the primary goals of science. However, taking into account historical analyses, she rightly concludes that truth might be a difficult concept for assessing scientific theories, because the majority of claims and assumptions in science turn out to be false over time. Nonetheless, instead of rejecting the relevance of truth for science or developing an alternative epistemic success term, she sticks with the notion of truth and labels her approach Whig realism, as a blend of Whig history[11] and realism. Whig realism is meant to denote that although scientific theories might neither be literally, nor partially or approximately true nor even good representations, there is typically something true about empirically successful theories.[12] Giving a positive definition of her concept of truth however, seems to be more difficult, so that the following is as close as we get to a definition about what she means by truth in the theory - What is true about our empirically successful theories is, typically, an implication of the theory at the theoretical level, that is, not just a prediction or observation, that may or may not be explicitly derived during the historical period in which the theory is accepted.[13] Crucially, this truth in the theory can only be recognized in hindsight. Thus, this truth can be analyzed and ascribed only by historical reconstruction, but is impossible to assess in the course of the actual research process. Solomon states that her Whig realism is

superior to realist and anti-realist accounts of truth, because of this possibility to make concrete recommendations for science policy based on historical analyses. More precisely and with reference to the question of consensus, she argues that while traditional realists simply aim at consensus in science, and anti-realists are indifferent to consensus or dissent, Whig realism can be more specific in arguing for or against consensus in different situations. Quite generally, consensus is only very rarely normatively appropriate, namely only when one theory can account for all empirical evidence. Otherwise, Solomon's approach would demand an encouragement of pluralism up until the point at which all last doubts about a theory are dispelled and all empirical evidence yields into one direction.

Decision Vectors: The Role of Bias - The so-called decision vectors - is the key concept that Solomon introduces to account for the effect of various social factors on science and knowledge. In trying to show that social factors are not inherently detrimental to science and epistemic practices more generally, she proposes this term as an alternative to the notion of bias. Decision vectors denote all factors that influence scientific decision making and as such have an effect on scientific outcomes. They include such diverse things as ideology, pride, peer pressure, deference to authority, the birth rank of scientists etc. She holds that there is only one difference between empirical and non-empirical decision vectors. While empirical decision vectors are causes of preference for theories with empirical success[14], non-empirical decision vectors lack this connection to empirical success.

Examples of such empirical decision vectors are salience and availability of data as cognitive factors, an egocentric bias towards one's own data as a motivational factor as well as more generally a preference for a theory which generates novel predictions. Non-empirical decision vectors by contrast are not related to empirical success and include social and political factors like ideology, deference to authority, agreement with scripture, motivational factors like pride, conservativeness, radicalism, competition, peer pressure; and cognitive factors as well as theoretical values, such as elegance, simplicity.

III

Now the question taken up by Solomon is how are these decision vectors related to the formation of consensus and the distribution of cognitive labour? The connection between consensus and the distribution of scientific effort is straightforward, given that premature consensus can lead to an untimely cutting of research grants for alternative approaches and an accordingly unbalanced distribution of cognitive effort. The decision vectors have played a role in the formation of consensus.[15] More specifically, different distributions of decision vectors have been either beneficial

or detrimental to the advancement of science in different fields by affecting consensus formation or dissolution. Solomon states that the ideal distribution consists in an equitable distribution of empirical decision vectors combined with an equal distribution of non-empirical decision vectors. She concludes that the closer the distribution of decision vectors was to this ideal distribution, the better science developed. If the decision vectors were far from ideal, problems such as premature consensus and unbalanced distributions of cognitive labour were the result. The goal of science policy would then be to affect the distribution of decision vectors to approximate this ideal state.

Like Steve Fuller,[16] Solomon asserts that science does not self-organize in the best possible way without corrective intervention. Rather, science policy makers should intervene by making use of insights from a normative social epistemology that can prescribe how to ensure such favourable distributions of decision vectors i.e. equitable distribution of empirical decision vectors, equal equitable distribution of non-empirical decision vectors. Solomon's Social Empiricism is normative social epistemology. More specifically, she specifies under which conditions consensus, dissent and the dissolution of consensus are normatively appropriate and makes these recommendations the normative-prescriptive core of her Social Empiricism. These are her three recommendations concerning consensus, dissent and the dissolution of consensus. There are distinct conditions under which dissent is appropriate and others under which consensus would be adequate and these conditions are related to the distribution of empirical success and the distribution of the different types of decision vectors.

According to Solomon, when the following three conditions are fulfilled, dissent should prevail:

1. Theories on which there is dissent should each have associated empirical success.

2. Empirical decision vectors should be equitably distributed (in proportion to empirical successes).

3. Non-empirical decision vectors should be equally distributed (the same number for each theory).[17]

Since she considers consensus to be a special case of dissent, namely zero dissent, her normative account of dissent can be applied to consensus as well. Consensus is normatively appropriate only if one theory can account for all empirical evidence, which hardly ever is attainable.

1. One theory comes to have all the empirical success available in a domain of inquiry.

2. This same theory comes to have all of the empirical decision vectors, since all scientists working productively (with empirical success) are working within the one theory.

3. Any distribution of non-empirical decision vectors is ok, but typically more will develop, over time, on the consensus theory, as the old theories fade away. During dissent, and thus in the early

stages of consensus formation, the above requirement of equal distribution of non-empirical decision vectors holds.[18]

However, since Solomon argues that consensus should not be regarded the final stage of scientific development, she also needs to account for the dissolution of consensus. This process basically is set off by new empirical evidence being produced by a theory other than the consensual one. If as a result the empirical decision vectors then become equitably distributed and the non-empirical ones equally distributed, consensus should be dissolved. She holds, in order to dissolve consensus the following prerequisites should be met:

1. A new theory has empirical success that is not produced by the consensus theory. (So, the new theory deserves attention.)

2. Empirical decision vectors come to be equitably distributed.

3. Non-empirical decision vectors come to be equally distributed. [19]

IV

These three normative recommendations concerning consensus, dissent and the dissolution of consensus are at the heart of Solomon's Social Empiricism. She argues that her approach is social in making normative recommendations on the level on the community as opposed to normative recommendations for individual scientists. And it is empiricist, because empirical success along with truth is of prime importance. In comparison to other social epistemologies she argues that Social Empiricism demands more and less. While it does not demand that individual scientists improve their scientific reasoning, it requires changes at the macro-level, i.e. systematic changes of science produced by a science policy based on Social Empiricism. In this sense, Social Empiricism is a form of social engineering for science.[20]

Summarily put, the normative implications of Solomon's Social Empiricism are quite clear: Suspend consensus on one theory for as long as any other theory also has empirical success that the mainstream theory cannot account for. For science policy, this means that alternative approaches should be funded up to that point of consensus as well, which is quite unlikely. With respect to the ideal distribution of decision vectors, Miriam Solomon is also quite explicit: ideally empirical decision vectors should be equitably distributed and non-empirical decision vectors should be equally distributed. However, when it comes to the crux of the matter this explicitness is profoundly lacking: How could such a favourable distribution of decision vectors get achieved? Which means of science policy are appropriate? How could science policy makers ensure that empirical decision vectors are equitably distributed and non-empirical decision vectors equally distributed?

Conclusion

Solomon concludes by saying that social empiricism is conceptually simple. There is nothing mathematically or philosophically challenging in the idea that empirical decision vectors should be equitably distributed and non-empirical decision vectors equally distributed. Difficulties come in identifying decision vectors, and in making realistic recommendations for changing their distribution.[21] Unfortunately, both these difficult tasks have not been tackled by her. One may question the relevance of decision vectors for Miriam Solomon's account altogether. Funding alternative approaches as long as they are empirically successful is one of the suggestions of Solomon, and this funding should ideally be equitable, but we should remember that the empirical success can only be known after research is conducted. The concept of decision vectors does not help in finding out how to achieve such an equitable distribution.

Miriam Solomon in her *Social Empiricism* claims that her decision vectors are not conceptual but empirical. But there remains some methodological issues concerning the origin of Solomon's decision vectors, and her classification into empirical and non-empirical decision vectors.

Solomon lists a number of decision vectors in her theory including: ideology, pride, conservativeness, radicalism, elegance, simplicity, competitiveness, peer pressure, defense to authority, birth order of scientists, etc. These are all examples of non-empirical decision vectors. Empirical decision vectors are, for instance, salience and the availability of data, or an egocentric bias towards one's own data or a preference for a theory which generates novel predictions.[22] Though the number of these decision vectors look quite diversified. But as Solomon reminds us, a decision vector is anything that influences the outcome of a decision,[23] one would assume that given this broad definition many things would qualify as decision vectors in science. To her mind, the number of types of decision vectors is probably between 50 and 100.[24]

But how does Solomon arrive at this number? And how does she arrive at the distinct decision vectors she labels - ideology or pride or birth order? The decision vectors that Solomon lists appear to be a quite random synopsis of various social, political, motivational and cognitive biases extracted from a variety of theoretical and empirical literature.[25] How exactly she ends up with the proclaimed 50-100 decision vectors is not obvious. Throughout her work, there is no method discernible despite a seemingly random choice of labels for different factors that might or might have not have had an impact on the development of science.

Moreover, as Solomon's differentiation between empirical and non-empirical decision vectors is the primary classification of decision vectors and forms the conceptual basis of her Social Empiricism, the plausibility and discriminatory power of this differentiation is crucial. Surely,

while some factors which influence decision making in science are related to empirical success, Solomon's examples are not enough convincing. As compared to the extensive list of non-empirical decision vectors, Solomon lists only four empirical decision vectors: salience of data, availability of data, egocentric bias towards one's own data, and preference for a theory which generates novel predictions.[26]

But are these really empirical decision vectors, i.e., are they necessarily linked to empirical success? Questions may be raised - are salience and availability of data necessarily empirical decision vectors Or could they also be non-empirical?

We can imagine that some extremely important literature on a certain topic exists, but only at a library to which we have no access or knowledge of. In this case data would not be available or salient, even though it exists, yet could be highly relevant for future empirical success. Similarly, think about the decisions that are made within an epistemic community, or maybe even within a research group, about what literature and which methods should be used. In this case, information may simply not be salient to someone because it is not considered to be important for reasons other than empirical adequacy.

In other words saliency often depends on other non-empirical decision vectors. Thus, neither are decision vectors independent, nor is the differentiation between empirical and non-empirical decision vectors indisputable.

Notes and References

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3. Ibid., p.6.
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8. Solomon: *Social Empiricism*. MIT Press, Cambridge, 2001, p.20.

9. Goldman, A. I.: *Knowledge in a Social World*, Claredon Press, Oxford, 2003.

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11. The term Whig goes back to the Whig party which has been one of the main parties in the British Parliament. Whig history usually denotes interpreting history from the present point of view and as a story of progress toward the present. This often also means implying a line of causation and stressing the necessity and unavoidability of historical development (Solomon 2001: 33).

12. Solomon: *Social Empiricism*, MIT Press, Cambridge, 2001, p.11

13. Ibid., p.39

14. Ibid., p.56

15. Solomon: Miriam, *Social Empiricism,* MIT Press, Cambridge, 2001.

16. S. Fuller: *Social Epistemology*, Indiana University Press, Bloomington,1988.

17. M. Solomon: *Social Empiricism*, MIT Press, 2001, Cambridge, p.117f.

18. Ibid., p.119.

19. Ibid., p.119f.

20. Ibid.

21. Ibid., p. 151.

22. Ibid., p. 57f.

23. Ibid., p. 62.

24. Ibid.

25. Ibid., p. 51ff.

26. Ibid., p. 57.