

AMERICAN UNIVERSITY OF BEIRUT

SEEKING HERMENEUTICAL JUSTICE IN SOCIAL
VALUES

by
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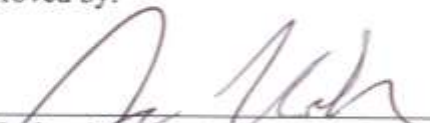
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AN ABSTRACT OF THE THESIS OF

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After feminist scientists and philosophers of science heralded the death of value-free science as a received notion, numerous normative models were developed in order to regulate the influence social values can have on scientific inquiries. As yet, none has proved successful in settling which social values have acceptable influence on science, nor the acceptable manners in which science can be influenced. The aim of this paper is twofold: first I seek to expose limitations faced by normative accounts of values in science. I identify four independent yet interrelated issues that pose a challenge for normative accounts: (1) the ill-defined dichotomy between the so called “epistemic” and “non-epistemic” (or social) values; (2) the unclear nature of the boundaries between the different phases of scientific inquiry; (3) the failure to account for the relation of systematicity between dominant social values and dominant power structures; and (4) the failure to account for the persistence of influence of certain values in the face of changing scientific paradigms. Second, I draw upon Miranda Fricker’s (2006) notion of epistemic injustice to present a superior conceptual framework upon which to build an effective normative account of values in science. Although Fricker discusses epistemic injustice with respect to social experiences, I expand her project by applying it to epistemological issues in the nature of science. I argue that social values are intricately embedded within our collective hermeneutical resources or collective pool of meaning generating practices, they are pre-conditional to our (and the scientist’s) understanding of and engagement with the world. Inasmuch as social values are components of worldviews, they are *constituted* by hermeneutical resources, but they also *constitute* the scientific production of knowledge. The scientific products in turn feed back into those hermeneutical resources such that they sustain and reinforce the same social values which gave rise to them in the first place. This forms a relentless cycle of self-reinforcement which I call a ‘hermeneutical feedback loop’. Finally, I discuss how scientific knowledge production which is persistently and systematically skewed in favor of dominant societal values inevitably gives rise to hermeneutical injustice.

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CHAPTER I

INTRODUCTION

Science and values are intimately related in many ways. Values play a role in selecting the phenomena to be investigated and in suggesting the hypothesis to be tested; they may justify “the imposition of practical or informational constraints on scientific procedures” (Anderson 2004, p.6) in the process of designing an experiment or collecting the data; or they may play a role in determining the level of certainty demanded before a theory can be accepted. Likewise, scientific content may be used as a guide for legislative action, for setting standards, and for making assessments. Indeed, it has been extensively argued that in the process of producing scientific knowledge, scientists make all sorts of decisions and value judgements (Longino 1990, 2002). Longino argues at length that

scientists do not just observe, they design and execute particular experiments on particular occasions for particular purposes, they count a particular set of specimens with particular measurement technologies, and they select particular sites for particular field studies. Scientists don’t just reason; they interpret observations and experiments, they support or critique conjectures or hypotheses, they derive consequences, they extend models to new domains. They have multiple reasons for the particular choices and decisions they make [...] that include feasibility, potential for application, aesthetic values, interest from other colleagues, interest from potential consumers, intelligibility to colleagues, resonance with metaphysical or ideological commitments. These are the kinds of factors included under the umbrella of ‘the social’ (2002, p. 98).

As part of scientific activity, therefore, it is inevitable that scientists make value judgements. Such judgements are not extrinsic to the scientific process, but are an essential part of its very manifestation. Neither are these value judgements necessarily neutral or benign: as has been argued, they have the potential to significantly influence the epistemic nature of the scientific content produced (Longino 1990, 2002; Douglas 2000; Hicks, 2014; Bluhm, 2013; Fox Keller 1991). Once we grasp that the epistemic implications of these judgements are inescapable, any discussion in epistemology of science regarding the possibility of a *faithful* adherence to value-free ideal in science becomes untenable.

In recognition of the influential nature of values and in order to regulate their effects, normative models of values in science have been developed. A plethora of guidelines have been produced (Douglas 2000, Steel & White 2012; Brown 2013; Hicks, 2014), none of which has been wholly successful, neither in settling which values have acceptable influences on science nor when, where and in what ways. The reason is that these models are faced with serious limitations, some of which they attempt to address (but their solutions are largely ineffective), while others go largely unnoticed. The purpose of this paper is to expose some significant challenges faced by normative accounts of values in science, and subsequently to offer an alternative conceptual framework capable of dealing with these limitations; one, which, if developed further, can help us better understand, explain, analyze and ultimately legitimate the role of values within the scientific enterprise.

In the first chapter, I identify four challenges faced by normative accounts of values in science. I argue in this chapter that the problems that afflict these models are due to at least in part the following:

1. they are grounded in an ill-defined, if not false, distinction between epistemic and non-epistemic values
2. they draw on an arbitrary and imprecise distinction between phases of scientific process of inquiry
3. they fail to address the persistent influence of certain insidious social values despite changing scientific paradigms
4. they are insensitive to the differences in value influence and the relation of values to social context

As a result, I argue, current normative accounts are inadequate at dealing with values in science, and we must search for better philosophical frameworks that help us to critically analyze their operation.

In the second chapter I draw upon Miranda Fricker's notion of epistemic injustice which relates knowledge production to structures of social power to propose such an alternative explanatory model. First I introduce Fricker's (2006) conception of hermeneutical injustice, defined as a type of epistemic injustice endured by individuals or groups who are unable to make sense of their social experiences due to their systematic marginalization from contributing to collective hermeneutical or interpretative resources. Although Fricker does not explicitly relate issues of epistemic injustice to scientific knowledge production, I argue that a conceptual framework making use of her notion of hermeneutical injustice provides a superior context through which to understand the embeddedness, and to explain the tenacity and the systematicity of certain social values in scientific inquiry. Specifically, I suggest that social values form an intricate relationship with our hermeneutical resources (or our collective pool of meaning generating practices); i.e. they are intrinsically entwined with the practices by which we are socialized, acculturated,

shaped and conditioned. I argue further that social values with common features lie hidden within the underlying hermeneutical conventions and practices (narratives, metaphors, rhetorical patterns, implicit stereotypes, background assumptions) and are continually re-expressed in different guises amidst the shifting of scientific paradigms.

CHAPTER II

NORMATIVE APPROACHES TO VALUES IN SCIENCE

“Scientific method is rooted in the site of social action, just as other forms of social life are.”

Karin Knorr Cetina (1981, p. 47)

Feminist epistemologists and historians of science have analyzed the relationship between science¹ and values in great detail in the last two decades. Mainly, the discussion has reflected the post-positivist era in epistemology of science where the distinction between fact and values –such that *only* facts belong to science – was interrogated (Kuhn 1962; Rooney 1992, p. 13; Longino 2002). The guiding argument is that “[k]nowledge” is “produced by an amalgam of heterogeneous acts and not by a particular kind of truth-producing activity guided by logic,” and scientific judgment is closer to value judgment than algorithmic or rule governed inference (Longino, 2002, p. 7). Scientists make many types of decisions during the process of scientific inquiry which require guidance beyond logic and evidence alone (Kuhn 1977). As a result, science as a form of knowledge production came to be seen as an activity with social dimensions where values play a significant role².

¹ The areas of science I am interested in are those which have clear implications for decision making, from which knowledge produced is applied to select certain actions, mainly in public policies – in other words, social and biological sciences rather than the formal sciences. I do not mean to claim that the realm of the hard sciences is value-free, but mostly that in the realm of the social and natural sciences, the effects of values have the clearest implications on our lives.

² The argument from underdetermination forms one example: theories can’t be tested in isolation so auxiliary hypotheses are combined with them so as to have testable consequences. Often these auxiliary hypotheses embody values, and sometimes scientists resort to values to decide between differing auxiliary hypotheses. The argument from inductive risk constitutes another example: even with good evidential support, science can only be based on induction; accepting even a very well evidentially supported theory entails some risk, since it might very well turn out to be false. But as

Kuhn (1977) was among the first to introduce to philosophy of science the notion of epistemic³ values (he listed five: accuracy, simplicity, scope, consistency and fruitfulness) which he described as those that directly bear on the truth of a theory and govern the internal core of science. There is no debate as to the legitimate role of epistemic values in all phases of scientific inquiry; in fact, the prevailing claim is that epistemic values should guide scientific judgement (McMullin 1983). The debate however, focuses on the suspicious and possible pernicious role of non-epistemic values (i.e. the social values, such as the political, economic, cultural, ideological and moral values). The generalized suspicion is that non-epistemic values can only play an illegitimate role in scientific inquiry, and prima facie, this inkling seems plausible to many. Elizabeth Potter (2006) rightly frames the suspicion without endorsing it:

Scientists use either facts or values to guide research; but not both. At best, contextual values (moral, social, or political values and interests) displace attention to evidence and valid reasoning; at worst, they lead scientists to bias, wishful thinking, dogmatism, dishonesty, and totalitarianism (p. 76).

Non-epistemic values, we are led to believe, have a questionable function in scientific research and as a result, must be regulated and kept out of the inner workings of science. Consequently, numerous normative approaches were developed in order to guide theory choice and regulate the influence certain values have on scientific inquiry (Douglas 2000; Longino 1990; Hicks, 2014; Steel & al. 2014; among others).

A recent paper by Dan Hicks (2014) examines three normative accounts which offer heuristics for assessing the legitimacy of values. He argues for their

decisions have to be made, values, often socio-political or economic, influence the decision of how much evidence is sufficient to accept a theory.

³ Laudan (1984) refers to epistemic and non-epistemic values as “cognitive” and “non-cognitive” values, while Longino (1990) classifies them as “constitutive” and “contextual” values respectively.

ineffectiveness by demonstrating an ambiguity in their analyses of the influence of values in two scientific case studies, and then he offers a supposedly better account. One of the normative accounts he investigates, Brown (2013), argues that non-epistemic values play a role only *after* evidence has done its work in supporting the hypothesis. Another, Steel (2010), advocates a distinction between epistemic and non-epistemic values, arguing that the gap between evidence and hypothesis should be filled only with epistemic values such as explanatory power, predictive power, and simplicity. The third, Douglas (2000), recognizes a problem with the epistemic/non-epistemic distinction and replaces it with a distinction between direct and indirect roles of values at certain ‘distinctive’ phases of the scientific inquiry. Hicks (2014), subsequently presents and argues for his allegedly superior account which defines legitimacy as synergism between epistemic and non-epistemic values and illegitimacy as antagonism between them. In this section I argue that each of the above normative approaches faces some of the following challenges:

1. They are grounded in an ill-defined, if not faulty dichotomy between epistemic values and non-epistemic/social values. This dichotomy, I argue, is unclear because it is defined as a function of the goals of science; goals which have historically been contingent.
2. They draw on an ambiguous distinction between ‘separate’ phases of scientific
3. They neglect to analyze the tendencies of certain values to persistently and tenaciously appear into the research under different guises. Consider the sexist value of ‘the inferiority of female cognitive skills’ persistently reemerging to influence hypotheses such as: females have smaller brains, fewer neural connections, less cerebral lateralization, etc.

4. They treat ‘non-epistemic’ or societal values in an undifferentiated manner.

Not all social values can be treated equally; some values are systematically and intricately implicated with structures of social power; consider the social values of misogyny and equality.

In what follows, I first elaborate on (A) the two strategies used by the above discussed normative models to legitimate the role of values in science (i.e. the first two limitations): (1) the dichotomizing of values and (2) the dividing of the scientific process. Then I expand on the argument that (B) normative models analyze values in isolation from their context; i.e., the challenges of persistence and systematicity of values in science; I discuss these limitations jointly because they are conceptually and practically interrelated.

A. Strategies Used to Legitimate the Role of Values

1. Dichotomizing values

McMullin (1983) defines an epistemic value in a particular context as one which “if pursued, helps toward the attainment of such [truth-like] knowledge” whereas a non-epistemic value (in the related context) does nothing to enhance a theory’s epistemic condition (p. 18)⁴. Helen Longino (1990) uses different terms to essentially refer to the same dichotomy. She dichotomizes values into the constitutive and the contextual. Constitutive values may be those which characterize a good explanation such as empirical adequacy, predictability, and truth, but they may also include such values as mutuality of interaction, applicability to human needs, and

⁴ His list of epistemic values differs slightly from Kuhn’s and consists of predictive accuracy, internal coherence, external consistency, unifying power, fertility, and simplicity.

diffusion of power, values which, upon McMullin's definition seem to be clearly non-epistemic. Contextual values, she defines, are those belonging to the social and cultural context where the science is taking place. Neither of these philosophers presents a final list of epistemic values, nor do their lists concur. Although a consensus between them may not be needed, the sense of ambiguity and disagreement poses an immediate sign of concern as we attempt to settle exactly how epistemic and non-epistemic values are defined.

a. Questionable definitions

The nature of the dichotomy between epistemic and non-epistemic values is certainly ambiguous (a point I consider in the next section); but primarily it is the definition that this dichotomy hinges on that is questionable. Values, as I have discussed above, are defined *functionally* as those which either promote or suppress the goals of science. On close inspection, it becomes evident that their distinction is necessarily and intricately connected with the issue of science's ultimate goals, an issue that has always been the topic of lively debate. Insofar as these goals are the seeking of 'truth' or the pursuit of 'knowledge', epistemic values are said to have the privileged status of being constitutive of those goals. Yet the question that inevitably arises with any normative discussion of values in science must be considered: what exactly are the goals of science?

If we consider the goals of science historically, we realize that they have not been constant. For example, from a Baconian viewpoint the goal of science was 'truth' defined as correspondence of human knowledge with external reality (Kourany 2010). From within this perspective, for a value to be epistemic, then, is for it to

capture the correspondence between our beliefs/theories and the world. Without digressing into the realist/anti-realist controversy, the following questions, however, need to be considered: can there be human knowledge of phenomena abstracted away from, or untainted by, human engagement with and perceptions of those phenomena? How can we know what corresponds to external reality without the social context within which this reality is perceived? If we cannot, then what would a distinction between that which promotes 'truth' (i.e. the epistemic, defined as correspondence of knowledge with external reality) and that which doesn't, look like? How can we construct a pure, theoretical, and 'epistemic' science distinct from the practical, the cultural, and the social? As most feminist and social epistemologists, I believe we cannot. Following this line of reasoning, epistemic values, as all values, become contingent on cultural and social conditions and the dichotomy of epistemic/non-epistemic collapses.

Further into history, and by the end of the seventeenth century, the goal of science had become 'knowledge of nature' (some might say, its control and subjugation) for the benefit of humankind (Kourany, 2010). The epistemic orientation, according to this goal, was contingent on how we define 'the benefit of humankind'. Further yet, and with the dawn of positivism, formulation of hypotheses and their subsequent verification through experimental results was the best that could be expected from science. From this viewpoint, the goal of science was accurate prediction or explanatory success, and tracing the potential consequences of hypotheses did not only constitute a means for their verification, it was the scientific goal itself.

Therefore, given that the goals of science have differed through time, then the epistemic content is contingent on how we define the goal of science; in other words,

the goal is socially constructed. The implications of this are obvious: epistemic and non-epistemic values lose well-established definitions; in effect, they also become socially constructed and their dichotomy becomes meaningless. However, if we allow this meaningless dichotomy to remain the established grounds for normative approaches to science then we allow the influence of epistemic values to go unanalysed and unchecked, permitting value-laden concepts and theories to be presented as value-free, and essentially propagating an ostensible ‘objectivity’ of science. A discipline deeply embedded in its socio-political and cultural milieu is purported to be capturing the objective truth.

b. Exchangeable roles

The firm boundary of this dichotomy which I challenge is similarly obscured by the fact that the so called non-epistemic values can sometimes serve the function of promoting epistemic values, while epistemic values can occasionally be considered ‘non-truth conducive’. Investigations in the field of archaeology, for example, offer evidence for which non-epistemic values play an instrumental role in improving the epistemic quality of the research. Past accounts of human evolution and archaeological field studies had androcentric⁵ (non-epistemic) assumptions and values underlying theory explanations. Dominant until the sixties, the theory of “man-the-hunter” assumed that hunting – the activity of men –led to the development of tool

⁵ I use the terms in the same sense as Longino discusses them. As she writes, “Androcentrism is generally used to refer to perception of social life from a male point of view with a consequent failure to accurately perceive or describe the activity of women. Sexism is generally used to refer to statements, attitudes, practices, behaviour, or theories presupposing, or implying the inferiority of women, the legitimacy of their subordination, or the legitimacy of sex-based prescriptions of social roles and behaviors....Patriarchal values [are] the assumption of a thoroughgoing dimorphism or sexual essentialism. In part it is the idea that ‘they’ are made for and hence complementary to ‘us’. As such it is a form not only of sexism but of heterosexism. The latter is generally identified as homophobia.” (Longino, 1990, p.129)

use, and by extension furthered the evolution to bipedalism and a larger brain. Its complementary account of “woman-the-gatherer” considered women as passive agents in human evolution. The overall record of data gathering, however, had initially ignored a great deal of information about female activities under the pretence that such data would be inaccessible as they involve perishable artefacts (Wylie & Hankison Nelson, 2007).

Recent theories consider the “man-the-hunter/women-the-gatherer” accounts not only stereotypically gendered (writing current ‘narratives’ of gender roles onto ancient human interactions), but also empirically inadequate. Further interpretation of previous data made possible a new perspective where different analyses provided evidence of secondary processing (after hunting and butchering) and thus sophisticated tool use involving women (Brigandt, 2015). In this manner, applying the non-epistemic feminist value of gender neutrality played a crucial role in the enriching of the evidential basis and in offering different and more ambitious explanatory models⁶. It also gave way for a reassessment of the background knowledge – the auxiliary hypotheses that current gender norms are natural rather than socially constructed – on which the archaeologists depended to interpret the data as evidence⁷.

In other cases, epistemic values such as simplicity are shown to be not purely epistemic, but rather (under “certain interpretations” of the traditional epistemic criteria) laden with socio-political values (Longino 1996, p. 52). A famous case study in neuroendocrinology which presupposes gender dimorphism illustrates just this (Longino 2005). In this research program the goal is to explain gender differences in

⁶ Many feminists are in fact anti-realists about gender.

⁷ The Duhem-Quine thesis

behaviour and cognitive performance in terms of neuro-hormonal functioning. Specifically, the aim is to research the influence of higher than normal levels of pre-natal estrogens or androgens on gender-role behaviour; the influence of higher levels of androgens on homosexuality in women; and the influence of lower levels of pubertal androgens on spatial abilities in males. However, the underlying assumptions of gender dimorphism⁸ and that humans are the products of their physiology⁹, *motivate* the epistemic value of simplicity, *determine* the kind of evidence that is said to be relevant, and *mediate* the way the data is described. For instance, cognitive performance is defined as either conforming to, or failing to conform with, what is considered as natural gender norms and the natural corresponding cognitive abilities¹⁰. Therefore, an explanation using a simple “linear model” establishes “a direct one way causal relationship between ... hormone levels”, inherent cognitive abilities, and manifest dimorphic gender behaviour (p. 214). The replacement of the linear model with a more complex one – i.e. the replacement of the epistemic value of simplicity with the value of ontological heterogeneity which includes “physiological, environmental, historical, and psychological elements” as contributing to human behaviour – provides a superior understanding (p. 214). In the name of restricting the explanatory model to a simple linear model much epistemic value is lost.

We have seen that non-epistemic values have the potential to reveal epistemic import; i.e. when the value of gender neutrality is applied to archaeological research, it provides a more fruitful and ambitious explanatory model. We have also seen that

⁸ The notion that there are only two types of gender appropriate behaviour and the two types are complementary.

⁹ Where human behaviour is influenced by sex hormones rather the combined influence of hormones and social and environmental factors.

¹⁰ i.e the natural designation of gender appropriate behaviour and roles, the naturalness of male mathematical superiority

epistemic values such as simplicity can be used to manipulate inferences to support certain non-epistemic values¹¹; i.e, by insisting on the sexist value of the naturalness of gender norms and trying to force the science around that, much understanding of human behaviour is sacrificed. This evidence for the interchangeability of roles between the epistemic and the non-epistemic allows us to conclude that a clear and effective dichotomy between value-neutral epistemic values and social political non-epistemic values cannot be upheld; neither can it provide a basis for normative accounts of values in science.

2. *Dividing the process*

I have argued in the previous section that the strategy of existing normative accounts which dichotomizes values into the epistemic and the non-epistemic is unsuccessful at legitimating their role because the dichotomy itself is untenable. In this section I discuss another assumption that these extant accounts¹² employ in order to legislate the role of values, namely, that scientific methodology has distinct phases, and I argue that it, also, is ineffective.

Most schemas of normative accounts, including the four reviewed by Hicks (2014) postulate three phases of inquiry: (1) *A pre-epistemic phase* which encompasses the research agenda; the framing of the problem; the methods and data characterization; the formulation of the hypothesis and its explanation; (2) *An*

¹¹ I refer the reader to Kuhn's discussion of Copernicus' adoption of Earth's and planetary motion around the sun. In *The Copernican Revolution*, Kuhn argues that the (socially and ideologically based) Neoplatonic value of mathematical 'beauty' and 'symmetry' motivated Copernicus to propose his theory which resulted in significant epistemic import..

¹² Although Brown (2013), Steel (2010) and Douglas (2000) assume this distinction in their accounts, Hicks (2014) explicitly claims that he finds it is "like a frictionless plane: useful for some analytic purposes, but often not straightforwardly applicable to the concrete complexities of the real world." (p. 3289)

epistemic phase which involves the actual testing / certification of the hypotheses; the evaluation of evidential support and its certification as knowledge; (3) A *post-epistemic phase* which includes the application of the theory/hypothesis, its dissemination in articles to the public and its acceptance into science (Douglas 2000; Brown 2013; Hicks 2014). The pre and post epistemic phases are said to be the external phases of science while the epistemic is the internal or core phase. Two important features of the phases of scientific inquiry are that they are construed linearly or progressively, and that they have clear borders between them.

Although Hicks (2014) briefly identifies the first feature (linearity) and the problematic applicability of the distinction between the phases to real world scientific practices, he does not discuss its implications on normative accounts. He writes, “[t]hese phases are usually construed linearly or progressively, with well-defined boundaries between them. But often this is an oversimplification, and ... in some cases the phases cannot be sharply distinguished: one action, described one way, is epistemic; but described another way, is pre-epistemic.” (p. 3274). In the next few paragraphs I expand on the evidence against linearity and progression and I argue that developing any normative accounts of the influence of values on the scientific process cannot be based on such a misleading distinction.

With respect to the first feature, there is evidence that it is unjustified to assume that the phases of scientific inquiry are linear and progressive. Frederic Holmes (2004), for example, exposes the non-linearity of the scientific process in his analysis of the investigative practices of particular scientists. He describes how experimental knowledge is acquired by providing analyses of practices of such scientists as, for example, Lavoisier and Boyle. His analyses reveal that scientists follow practices along these lines: “exploring new phenomena, designing experiments

to test theories, responding to the outcome of one experiment with another experiment intended to exploit an unexpected result or to obviate an unforeseen obstacle, modifying his [the scientist's] ideas through what he did and observed, modifying his experiments through what he thought.” (p. 122). In other words, the actual process of investigation is characterized by constant re-evaluation, re-designing, and repetition of parts of the experiment. Therefore, the notion of distinct, linearly progressive, and clearly defined stages is not always reflected in the actual practice of science.

The second feature – denoting clear and well-defined borders between the phases where only some phases are value laden – is undermined by the fact that social influences permeate the phases of scientific inquiry. The appraisal of a hypothesis in the epistemic phase is deeply influenced by the way that the theory is formulated in the pre-epistemic phase as well as by its expected application in the post-epistemic phase. As Kathleen Okruhlik (1994) writes: even if we grant “that scientific method is itself free of contamination by [non-epistemic] factors..., nothing in this procedure will insulate the content of science from sociological influences *once we grant that these influences do affect theory generation.*” (p. 34; her italics). The central problem is the difficulty of eliminating socio-political influences from the *content* of science once they are granted access in the pre-epistemic phase. Even if the standards of theory appraisal are free from the contamination of non-epistemic values, they nevertheless may permeate the very content of the science that is produced. Okruhlik adds, “Once you grant that social factors may influence the context of theory generation we just have to admit that they may also influence the context of science. You can’t just give theory generation to the social scientists and expect to exclude them [social factors] at some later date through the rigorous application of epistemic virtue. That is akin to closing the barn door after the horses have escaped.” (Ibid).

Put another way, non-epistemic values associated with activities in the pre-epistemic phase (such as the choice of research question, the research design, and the theory development) influence theory appraisal in the epistemic phase by altering the decision making factors. An interesting analogy of the ‘whodunnit’ murder mysteries (Elliott & McKaughan, 2009) is useful at illustrating just this point. The analogy illuminates how the “degree of evidential support for a theory clearly depends both on the array of available theories and on the set of data at hand.” (p. 600) Consider the difference that varying sets of hypotheses about the identity of the murderer can have on the assessment of the evidence: the police knows the butler had a motive and no alibi and so takes this evidence to mean the butler did it; while the detective who adopts the alternative ‘the cook did it’ hypothesis searches for evidence to implicate her. Similarly, pre-existing conceptions and assumptions about sex, gender, race, etc. influence decisions about which questions are asked and how; about what type of data must be accounted for and what can be ignored; and which interpretation among those empirically adequate is to be adopted.

An interesting example of this comes from research on the feminization of poverty¹³ (Anderson 2004). In this study, assumptions and attitudes about the institution of marriage - values in the pre-epistemic phase - influence the types of questions asked, the type of data gathered and the interpretation of that data; in other words, they permeate the epistemic phase. Research, beginning with the social value of conservatism and the significance of the institution of marriage, results in findings that show divorce and out-of-wedlock births to be the main causes of women’s poverty. Alternatively, research grounded in feminist values, which view marriage and its gendered division of domestic and market labor as disadvantageous

¹³ The notion that women experience poverty at rates disproportionately higher than men

to women in the sense that it sets them up for worse outcomes in the case of divorce, results in finding different causes for women's poverty. These causes include women's exclusion from better paid jobs, their 'weak' bargaining power in marriage, and the norms of masculinity which encourage and permit the lack of participation of fathers in child-rearing, thereby forcing mothers to forgo their careers in order to take on the responsibilities of an absent father.

This permeability of influence has grave ramifications: by advocating distinctive phases of scientific inquiry, normative accounts of values allow an unrestricted and unanalyzed influence of social values in the pre-epistemic and post-epistemic phases believing that these phases have little or no epistemic consequence elsewhere in the process. But the fact is that the social (non-epistemic or external) stages of inquiry have significant epistemic import on the scientific content. Therefore, a strict distinction of where values have import and where they don't cannot in practice be upheld. Social values, which are allowed to exert their influence in the processes of theory generation and/or theory dissemination, may permeate through to the 'epistemic' phase by altering the decisions made around the evidence and the type of supporting data. There is no type of filter that somehow screens and prevents the social values from contaminating scientific content and results as the process passes from one 'phase' to another. Accounts of values which ground their normativity in the notion of progression through distinct impermeable phases of inquiry are therefore unsuccessful.

B. Analyzing values in isolation

I have argued that extant normative accounts are based on fundamentally erroneous and false distinctions between the types of values on the one hand and between the stages of the scientific process on the other. In this section, I discuss the third and fourth challenges to normative models. Here, I argue that such models consider all social values on an equal par, disregarding the fact that some appear to have persistently insidious effects. Additionally, these models overlook the systematic connection between the epistemically influential dominance - or marginalization - of certain values and the socio-political and economic dominance - or marginalization - of certain groups which hold those values. This failure to account for the complexity of the operation of social values as well as their analysis within their social contexts; i.e. their intimate connection with structures of social power, makes it unlikely that they will be successful in legislating between legitimate and illegitimate values.

In what follows, I draw on feminist work in science which has shed light on the social contextualization of values¹⁴ and their complex interrelatedness with structures of social power. I illustrate, through a case study in neuroscience, the defectiveness of the long-held prognosis that with time – and effective regulation – values will eventually be sifted out of science. I present an example of gender and racial bias (androcentric and white supremacist values) which has persisted despite some philosophers' and scientists' long-held proclamation that science can be free from social values, in order to reveal the diagnosis that values are in reality grafted into the very scientific process, inherent to its formation and development.

¹⁴ From here onwards, since I denounce the distinction between the epistemic and the non-epistemic, I refer to all value judgements in science as simply 'values'.

1. *Persistence of values*

Sexist-racist-heteronormative-classist¹⁵ values have systematically and tenaciously continued to enforce their pernicious effects on the process as well as the content of science. In a dogged insistence on demonstrating the ‘natural’ and ‘innate’ brain differences between women and men, scientists continue, despite evidence to the contrary, to investigate differences between the sexes. The likely candidate for the tenacity of such biological determinist hypotheses¹⁶ (the theory that we are inevitable byproducts of our biology) seems to be a tacit desire¹⁷ for the maintenance of an archaic and sexist social order based on a sharp distinction of social identities and between the roles of women and the roles of men; while men are appropriately concerned with science, politics and commerce, women’s place is centered around the home. Thus, ‘natural’ (i.e. biological) differences become essential ‘evidence’ for the sanctioning of such differences in social roles. In the nineteenth century, brain size was used to justify intellectual hierarchies between sexes, races, and social classes.

Elizabeth Fee (1979) traces the attempts of craniologists¹⁸ to demonstrate that intellectual inferiority of women (and people of color) is the ‘natural’ result of differences between their brains and those of white men. In her research, she documents the failure of various techniques to find the clear sex (race) difference that scientists sought; approaches into absolute size differences, into differences relative to body size, and differences of various parts of the skull all failed to show any clear and

¹⁵ As opposed to egalitarian, just, humanist, and diversity values.

¹⁶ For example, that women are ‘by nature’ (i.e. biologically determined) to be less intelligent than men.

¹⁷ What matters is not that the desire is wilful or unconscious, but that it is motivated by sexist values.

¹⁸ As the name suggests, craniologists measured the skull with the supposition that the skull “formed a faithful case of the underlying brain ... and measurement of crania could therefore be substituted for direct measurement of the brain”. This theory was popular in mid and late nineteenth century (Fee 1979, p. 420).

significant results. Yet, despite the lack of verification, scientists never questioned the hypotheses that they were trying to prove.

The ‘science’ of craniology was eventually abandoned, yet the same sexist/misogynist motivation behind the biological deterministic theories of sex differences in the brain has reemerged repeatedly in different guises; often within neuroscience. The prevalent theory in the 1980s concerned the corpus callosum¹⁹, specifically the hypothesis that male brains are more lateralized (and therefore more cognitively specialized) than female brains; in other words, that the two hemispheres of the male brain operate rather ‘independently’ while in the female brain the hemispherical interdependence is greater and therefore the corpus callosum is bigger. According to surveyors of the research, in particular Fausto-Sterling (2000), there are differing ways to measure this brain structure and scientists have tried all of them but “no matter how they carve up the shape, only a few researchers find absolute sex differences in the corpus callosum area. A small number report that males and females have differently shaped corpus callosums,... even though the shape does not translate into a size difference.” (130-131).

Nowadays, with meta-analyses refuting the difference, and with new brain imaging technology demonstrating cerebral plasticity²⁰ (Bluhm, 2013), our understanding of brain structures and brain functions has progressed dramatically. Yet the bias persists. While more and more data (on cognitive differences for example) is gathered, they continue to be interpreted by scientists motivated by biological determinism and the assumptions that accompany it, all the while evidence of the bidirectional effects of environment and biology is completely disregarded.

¹⁹ The corpus callosum is a bundle of neural fibers connecting the two brain hemispheres.

²⁰ Cerebral plasticity is the brain’s ability to change itself in response to life experiences.

Alternative hypotheses explaining anatomical differences in the brains of women and men as due to social, developmental, and environmental factors influencing the brain's developmental trajectory are often dismissed (Vidal 2012). Given that in this case there is an underdetermination of evidence²¹ scientists need to consider issues beyond the data when choosing one explanatory theory over another. In the research on brain differences, scientists repeatedly and persistently have been driven by sexist values to explain the data. Fausto-Sterling (2000) reasons that the persistence of the debate “speaks to how entrenched their [the scientists’] expectations about biological differences remain.” (p. 145). These expectations are not simply altered or disregarded when new data disconfirm them; on the contrary, new ways of research are developed to support an essentially similar hypothesis of sex differences in the brain. Put another way, as the theory survives one falsification after the other, the failure is attributed to auxiliary hypotheses, not to the theory itself; and so adjustments on auxiliary hypotheses continue to be made.

2. *Systematicity of values*

In a recent interview for *The New York Times*, race and feminist scholar bell hooks discusses power structures underlying the social order. She claims: “We can’t begin to understand the nature of domination if we don’t understand how the systems connect with one another.” (Yancy, 2015). She stresses the importance of analysing the systematicity of oppression by considering the intersectional nature of its various forms (imperialism, capitalism, classism, racism, and patriarchy). Along the same lines, I argue that we can’t understand the role of values in science if we don’t

²¹ Refer to footnote #2

understand the *systematic* relationship between these values affecting research and their interconnectedness and intersectionality with the social, economic, political, cultural, and epistemic systems via common underlying constitutive structures.

It is therefore important to examine the connections between certain social, economic, political and cultural circumstances which seem to have led to the proliferation of value-laden research (such as that on brain differences and the choice of theories to explain the data). In the case of research in craniology, its ‘dawn’ coincided with first wave feminism in the West (Bluhm 2013, 2015) while the growth of research of sex difference in neuroscience can be linked to social changes which threatened the social order and the status quo: mainly the “vigorous resurgence of the women’s movement and feminist scholarship.” (Ruth Bleier 1984 as discussed in Bluhm 2015). In the case of sex differences in the brain, the inclination to interpret the data largely as the result of distinct innate developmental programs for each sex is based on the background assumption that sex differences are biologically determined; that women and men think and behave differently because nature has made them differently. Clearly, in the studies thus far reviewed, socio-political and ideological factors, in the form of dominant sexist-misogynistic social values, were the driving force²² behind the research and they persistently and repeatedly influenced the scientific content produced (recall the incessant attempts to ‘prove’ the natural intellectual inferiority of women or the innate cognitive differences between the sexes). Additionally, the profusion or dominance of certain social values within the scientific research is directly related to the dominance of certain structural systems of power that foster and perpetuate these same values.

²² The research is in some sense *driven* (at least tacitly or implicitly) by an interest in demonstrating the biological differences between males and females

The point of the argument so far is not to say that scientists are deliberately and willfully malicious²³, nor that science in its entirety is a failed enterprise. Rather it is to highlight the problems that inevitably arise when discussing the role of values in science: i.e. the embeddedness of values in the very structure of scientific inquiry, the persistent influence of certain social values, and the systematic relation between these persistent values and the dominant social or economic power structures. Specifically, it is to demonstrate that a framework based on relations of power, knowledge, and hermeneutical practices is better able to capture the way in which social values shape and direct scientific research in such a way as to expose hidden biases and provide a basis for further normative accounts of scientific methodology. In the following sections, I propose such an alternative framework for understanding social values and their role in science; one which overcomes the four discussed limitations and is based on Miranda Fricker's (2007) notion of epistemic injustice.

²³ The motivation may lie hidden within implicit prejudices, unbeknownst to the scientist herself.

CHAPTER III

AN ALTERNATIVE CONCEPTUAL FRAMEWORK

"There's really no such thing as the 'voiceless'. There are only the deliberately silenced or the preferably unheard."

Arundhati Roy

Consider the following case from the teaching of cellular biology: “The Egg and Sperm: How science has constructed a romance based on stereotypical male female-roles”. In this famous article, Emily Martin (1991) recounts the picture of the egg and sperm drawn in scientific textbook accounts of biology, a picture which relies on stereotypes of social identities and social roles *embedded* in cultural understandings of what it means to be female or male. The textbook imagery she cites portrays the reproductive processes of the female and the male with stereotypically connotative metaphors. Oogenesis (the production of ova) is depicted as “wasteful”, “destructive” and “degenerative of [the] ova” which is stockpiled since birth and waiting to be “shed” monthly; this is in stark contrast to the male reproductive cycle represented as “constructive”, “a remarkable feat” that “produces hundreds of millions of sperm each day” (p. 497-489). The egg and the sperm are similarly personified with intentions and motivations: the egg is depicted as the “damsel in distress, shielded only by her sacred garment” (p. 491); she is “passive”, “dormant”, having a “corona” and accompanied by “attendant cells”, while the sperm is described as on a “mission”, moving “through the female genital tract in quest of the ovum”, a “heroic warrior to the rescue” (p. 490-491).

This picture dominated the understanding of the reproductive cycles of males and females throughout the last century until new data demonstrated that the egg, in

fact, played a more active role, such that its zona was shown to actively pull in the sperm. Nevertheless, scientists seemed intent on casting the female reproductive processes in a passive light. Even with this new data, scientists did not eliminate gender stereotypes from their descriptions; on the contrary, they employed different but no less damaging terms to describe the phenomena – the stereotype was embedded in the very language that they used. The egg became the femme fatale stereotype; the “female aggressor who ‘captures and tethers’ the sperm with her sticky zona, rather like a spider lying in wait in her web” (p. 498). One can’t help but question why both systems could not be portrayed homologously as active producers, since this seems a model that best fits the reality of their roles. Such a portrayal would entail the involvement of the social value of equality, a value similar to justice, diversity, conservation of natural environment, and other feminist-endorsed values, which traditionally are proscribed from the scientific venture for fear of contaminating its content.

By calling such cases of value-laden science bad science, I do not mean to endorse a feminist empiricist perspective; as I will shortly argue, it is certainly not a simple matter of eliminating the influence of ‘bad’ social values by replacing them with ‘good’ social values. So what would be the next step in understanding the role of values in science? I am suggesting we adopt an explanatory framework which can account for the internal, persistent and systematic operations of values in science. This conceptual framework can serve to explain such insidious operations by relating values to the conventions and the practices we engage in –the hidden metaphors in our rhetoric, the ingrained assumptions in our collective consciousness, and the embedded narratives in the hermeneutical practices that shape our interpretation, explanation, understanding, and engagement with the natural and the social world. In what

follows, I argue that Fricker's notion of epistemic injustice constitutes a conceptual framework from which we can derive an understanding of the function of values in scientific research. First, I present (A) the concept of epistemic injustice with its related notions of hermeneutical resources and hermeneutical marginalization, I then argue that if applied to the role of values in philosophy of science, such concepts can present a conceptual basis for explaining (B) the systematicity, (C) the persistence, and (D) the embeddedness of values in scientific research.

A. Epistemic injustice

In her most influential work, *Epistemic Injustice: Power and the Ethics of Knowing* (2007), Miranda Fricker argues that social identity and power should be at the center of epistemological (and ethical) discourse. Her discussion of epistemic injustice has epistemic as well as moral relevance because it deals with how knowledge is generated as much as with how it is validated. Alison Wylie describes epistemic injustice as the injustice which arises "when norms of credibility 'imitate structures of social power' so that our socially inflected 'working indicators' of rational authority pick out the powerful and not necessarily the knowledgeable or the truthful." (Grasswick 2011, p.100).

Fricker (2007) describes two types of epistemic injustice. The first, "testimonial injustice", arises when the "subject is wronged in her capacity as a knower"; in her "capacity as a giver of knowledge; ... a capacity for reason" which "lends humanity its distinctive value." (p. 44). It is an injustice that "can cut deep" for it "undermines the knower in their very humanity." (ibid). This type of injustice occurs when members identified within certain social categories or communities –

defined by gender, race, ethnicity, sexual orientation, religious affiliation, age, class, etc. – find that their credibility is undermined, devalued, or deflated on the basis of identity prejudice – qua their social identity – no matter what their epistemic credentials may be (pp. 9-29). The second case of epistemic injustice, “hermeneutical injustice”, takes root when one has “some significant area of one’s social experience obscured from collective understanding owing to hermeneutical marginalization.” (p. 158). That is to say, hermeneutical injustice constitutes an unfair differential access to interpretive resources, where the disempowered or the marginalized group faces a conceptual impoverishment preventing them from being able to understand and articulate their experiences (these concepts will become clear shortly). Although the two types of epistemic injustice are deeply intertwined, it is hermeneutical injustice that I will focus on in my analysis.

A striking example of hermeneutical injustice for Fricker is the concept of ‘sexual harassment’²⁴ (1999, p. 206). The existence of this concept as such was hardly comprehended prior to its being coined and used as a concept. Fricker (2007) describes how the concept developed: Carmita Wood, a department assistant at Cornell University, worked for a senior faculty member who as Wood recounts “would jiggle his crotch when he stood near her desk and looked at his mail, or he’d deliberately brush against her breasts while reaching for some papers. One night as the lab workers were leaving their annual Christmas party, he cornered her in the elevator and planted some unwanted kisses on her mouth.” (Fricker, 2006, p. 96, citing Brownmiller). As a consequence, Wood experienced medical symptoms which made her work difficult; she tried to avoid the professor, requested to transfer to another department but when her request was denied, she quit her job. She applied

²⁴ so is “marital rape”, “date rape” “stalking”, “workplace bullying” and “gay parenting” among others

for unemployment insurance but was refused because she was unable to frame her hateful experiences and to articulate them; all she could say was that her reasons for quitting were personal. Only after she began speaking with women who had similar experiences, and together they coined the term ‘sexual harassment’, was she able to make proper sense of her social experience.

Individuals –like Carmita Wood – suffer hermeneutical injustice as they cannot make sense of their social experience because it is obscured from the collective understanding, and this obscurity is due to what Fricker calls “hermeneutical marginalization” defined as a structural prejudice in the formation of hermeneutical resources (or the collective pool of meaning generating practices) (2007, p.158). What happens when a group is hermeneutically marginalized is that its members are marginalized from participation in meaning-generating practices within epistemically relevant areas such as the legal, political or scientific spheres; a marginalization which causes a shortage in the epistemic resources that could help these individuals describe and establish facts about the world that they experience. As a result of this lacuna in the collective interpretive resources, many women such as Carmita Wood suffered physically, morally, as well as epistemically; their lived experiences found no manifestation in concepts or meanings; nor did they find actualization in language and practice.

So how do hermeneutical resources relate to values? Values, I want to suggest, are the reflection of our hermeneutical resources or our meaning generating practices. Akin to stereotypes, unchecked assumptions, prejudices, narratives, etc., their influence on scientific inquiry is not immediately evident, and often is mistakenly or willfully normalized; i.e., naturalized. That is to say, similar to the effects of stereotypes and other hermeneutical conventions and practices, the effects of values

can be covert, as they are embedded in the collective hermeneutical resources, and deceptive, as they are often mistakenly considered as the norm. In the following sections, I attempt to untangle some of the complexities in the operation of values on scientific research by querying further into the nature of collective hermeneutical resources and practices, and their relation to values in science.

B. Social values as an optical lens: Understanding the embeddedness

In order to begin to investigate how values function and interact in science, we must therefore rid ourselves of the mistaken idea that values are external entities/concepts whose influence on scientific research can be isolated and eradicated. A metaphor from optics can be helpful to explain their role. Consider values as analogous to a lens through which we come to engage with, interpret, and represent our social and natural world. It is an intrinsic type of lens – similar to the lens inside our eyes. Scientists, as ample research shows (Longino 2002), simply cannot decide to eliminate values in any of the phases of their work; a value is not some external entity exerting its influence on a neutral scientific process, and therefore potentially eliminable and removable as eyeglasses are removed off of one's eyes. Values are in effect an internal lens through which scientists - and all human beings - experience the world. They are *intrinsically embedded* in the very reality of the social beings that we are. The influence of these values can make itself felt regardless of the scientist's claims about her beliefs and assessments of the procedure she's undertaking. Oftentimes, scientists, as the rest of us, are completely unaware of the effects of their values since values – as the lenses of the eyes – constitute the

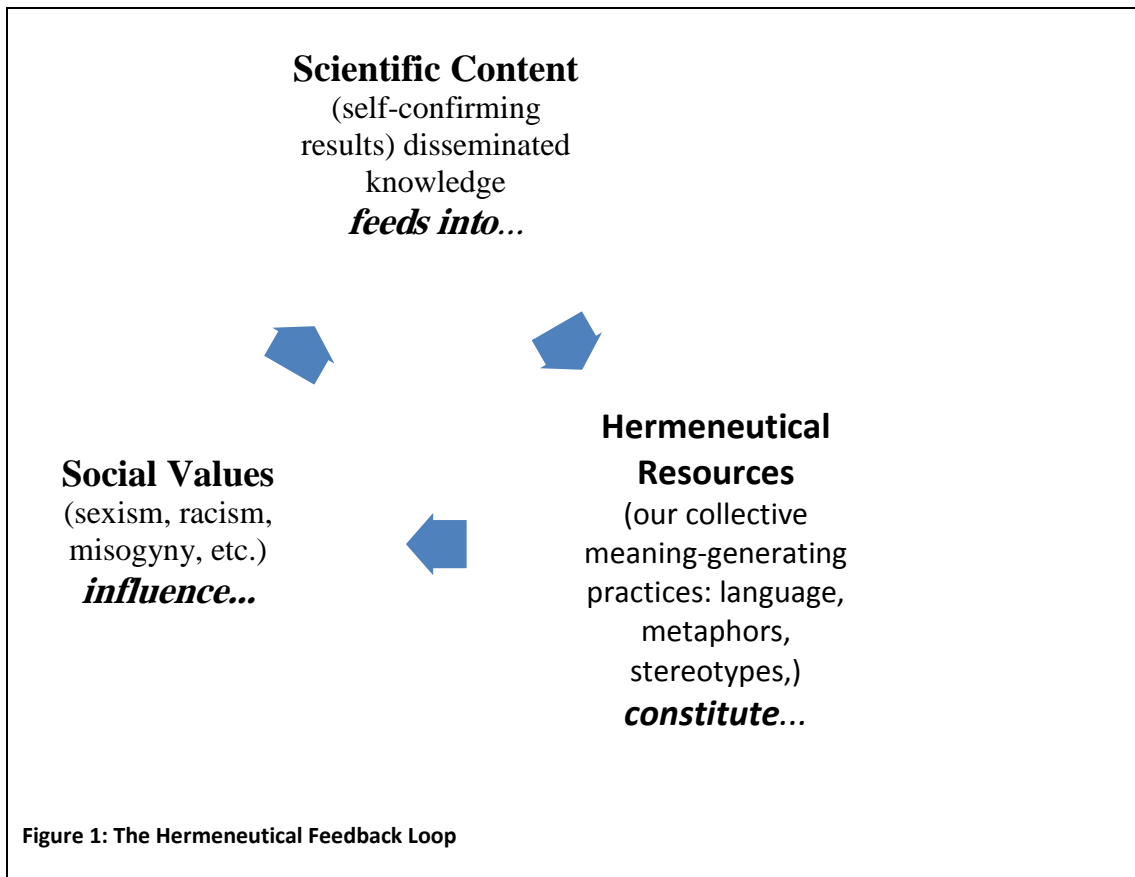
language they use and the interpretive tropes they employ as they understand their world.

That is to say that our collective hermeneutical resources - in which values are implicated - constitute the “shared pool of concepts and interpretive tropes that we use to make generally share-able sense of our shared experiences.” (Fricker, forthcoming, p. 4). In effect, these resources *constitute* our “shared form of life”²⁵: our agreement in language, standards of truth and falsity, our shared meanings, concepts, narratives, methods, metaphors, and implicit stereotypes. These resources and practices, in turn, give rise to the lens of values which is “preconditional” to the scientist’s understanding of, and more importantly to her engaging with, the natural and the social world. As such, they are *constitutive* of the way she ‘understands’ things – many of which she comes “to actualize in practice” (p. 207). Decisions she makes at different steps in her scientific inquiry, such as how to design the scientific experiment, what data to attend to, how to evaluate and interpret the data, for example, are enlightened and informed by (at least) the lens of values she holds, and are therefore constituted by her hermeneutical resources and practices. She represents the natural and social world through her hermeneutically based lenses of values. In the same way, the scientific content she produces serves to reinforce and reproduce the same shared pool of concepts and hermeneutical resources. (This will become clearer in the upcoming section.)

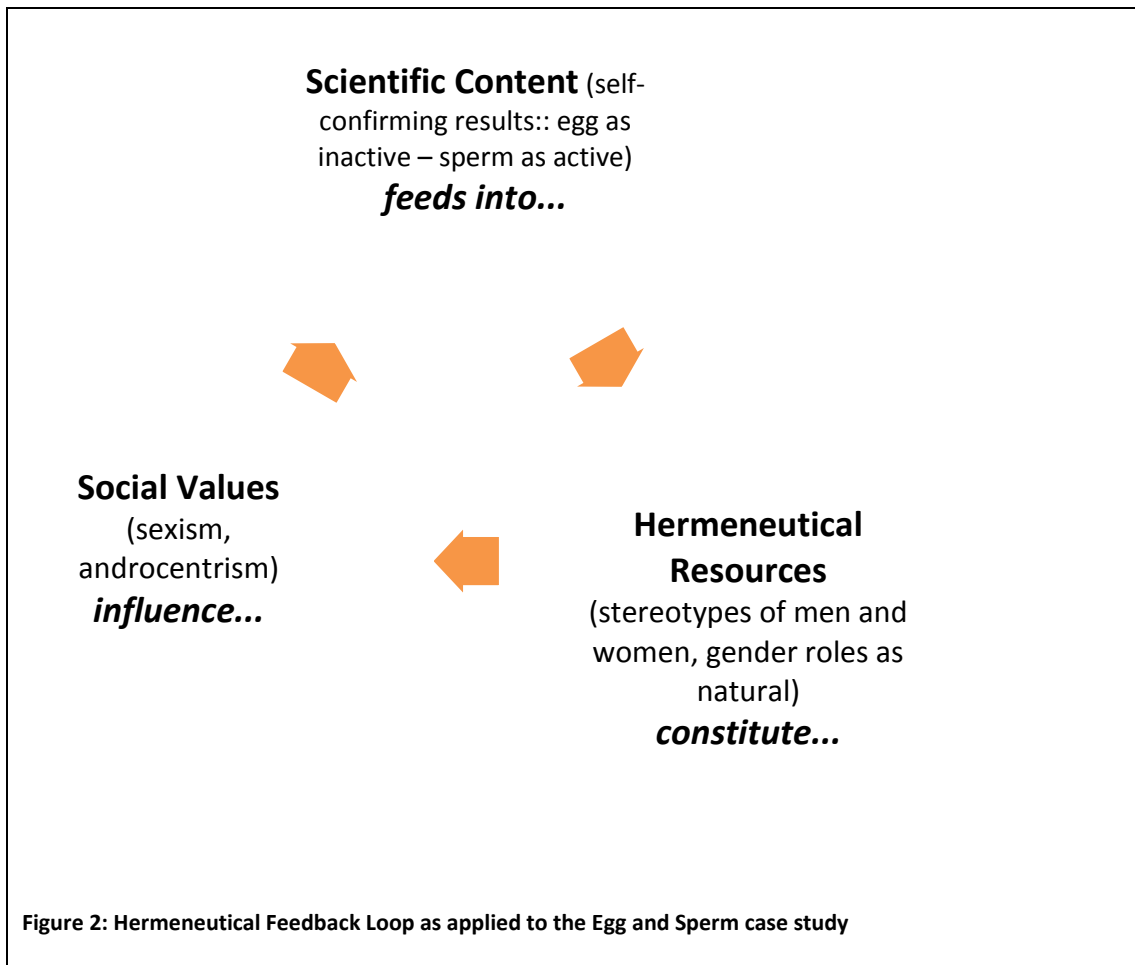
²⁵ Fricker references the infamous quote from the *Philosophical Investigations* when Wittgenstein’s interlocutor asks “So you are saying that human agreement decides what is true and what is false?” and the reply is “It is what human beings say that is true and false, and they agree in the language they use. That is not agreement in opinions but in forms of life.” (Wittgenstein, section 241)

C. The hermeneutical feedback loop: Understanding the persistence

To briefly summarize, then, it seems that there is a tacit process by which certain conventions, intrinsic to hermeneutical practices, constitute the way scientists engage with, interpret, and represent the social world, i.e., the way they *do* science. By way of metaphors, narratives, implicit stereotypes, prejudices, and undeclared assumptions, these conventions or practices allow for a surreptitious incorporation of prevailing social, political or ideological values into the scientific processes while simultaneously protecting their influence from being easily recognized. Lenses can deceive one into thinking that they ‘see’ the external reality as it ‘truly’ is. In an important sense, values, inasmuch as they are components of worldviews, are constituted by the hermeneutical or interpretive resources but they also constitute scientific knowledge which in turn feeds back into the hermeneutical resources; this is what I call a ‘hermeneutical feedback loop’ (see Figure 1).



A hermeneutical feedback loop is a reciprocal relation of reinforcement between hermeneutical resources and scientific content via the lens of values, and it accounts for both the persistence and the endurance of certain dominant values. The hegemony of certain hermeneutical practices and resources at once produces and reproduces its corresponding lens of values through which corresponding scientific results are discovered; in turn these products of science reinforce the original hermeneutical resources in a relentless cycle. The net effect is two-fold: on the one hand the theoretical structure of science is insulated from critical revision and on the other hand, epistemically dominant groups are provided with conceptual support as validation of their world-view. See Figure 2.



Interpretive practices through which a scientist understands the social or scientific facts are conditioned by her “social experiences”, her “social identity” (Fricker 1999, p. 207), her worldview and certainly by the collective social facts²⁶. In other words, a knower’s standpoint – inasmuch as a standpoint requires lenses – is “preconditional” to her knowing the social and the scientific facts. The interpretive practices and the ‘facts’ stand to each other in a relation of pre-condition such that “our understanding of the social world ... is at the mercy of our interpretive practices.” (p. 205). For example, a scientist whose social experiences and social identity are predominantly those of a rich white Christian heterosexual European is

²⁶ By ‘social experiences’ I mean events experienced while growing up, living, and engaging within a particular society (including its norms, rituals, traditions, social roles, values, language, etc). I take ‘social identity’ to mean a category essential to one’s identity (example, one’s sexual, racial, political or religious identity). A ‘worldview’ is a particular model of ideas, attitudes and conceptions of the world. And by ‘collective social facts’ I mean the knowledge (whether scientific or pseudoscientific) shared and expressed as scientific facts.

most likely to select certain features of situations as salient and significant and is most likely to adopt certain prejudices - perhaps unwittingly - which influence her values; i.e., the lens through which she understands and engages with the world. The lens of values is at work here. Interpretive practices and decisions made in the process of scientific inquiry can, therefore, fail to capture the full or the more accurate picture of the world; i.e. they can yield “cognitive failings”. Such “cognitive failings” will most likely skew the collective epistemic resources in such a *systematic* manner that they will give rise to what Fricker calls “epistemic oppression” (p. 207-208).

Although Fricker claims that these “cognitive failings” should be understood as formations of hermeneutical gaps - or maintaining the optical metaphor blind spots - in the collective interpretive resources available to epistemic agents (in this case, scientists) I believe such an argument gives us an erroneous impression. The argument implies that filling the gaps with fully representative types of hermeneutical resources provides us with a better epistemology. This, of course, will not do! Not only is our epistemology not representative of our social world but the social world as we know it is itself represented, constituted, and structured by the current and powerfully dominating interpretive tropes (more on this in section D of this chapter). In other words, the picture seen through the dominant lens is in effect, an epistemically unjust representation. It is also erroneous: we simply can’t overlook the fact that certain societal values have contributed widely to the production of ignorance and false beliefs (recall the many examples from case studies above.) In this paper, I do not attempt to provide a solution (for science or epistemology) out of this vicious cycle or feedback loop, but I consider that identifying the dominating social factors and the underlying mechanisms that sustain this cycle forms an essential step towards epistemic justice and a superior normative account of values.

D. **The relation between knowledge and power: Understanding the systematicity**

So far I have discussed how the notion of hermeneutical injustice can provide a useful conceptual framework through which to understand the embeddedness and the persistence of social values in science. In the next few paragraphs I discuss how the production of scientific knowledge is systematically related to social structures of power. If we aim at formulating an effective normative model, we must understand the relation between social systems, such as the scientific, religious, epistemic, economic, and political, etc., and structural power (as I have already argued in the second chapter, section C2). The key point to have in mind is that when we consider such a relation, we discover it to be systematic in that those who hold the power in one social system also hold the power in the others; that is to say, injustices are connected via a common bias and those who are socially and economically marginalized are in effect also epistemically marginalized. The injustice is reflected across all systems. As Fricker (2007) explains,

[R]elations of unequal power can skew shared hermeneutical resources so that the powerful tend to have appropriate understandings of their experience ready to be drawn on as they make sense of their social experiences, whereas the powerless are more likely to find themselves [...] with at best ill-fitting meanings to draw in the effort to render their experience intelligible (p. 148).

Recall that cognitive failings are epistemically disadvantageous to all epistemic agents, but it is important to stress that they cause an injustice only for those who are in the margin²⁷, and this injustice is *systematic* such that the marginalization tracks the

²⁷ A non-marginalized agent may suffer an epistemic disadvantage but he does not suffer from an injustice in the sense of a persistent and systematic inequality in expressing or contributing or participating in knowledge production. Nor does he experience marginalization across different

agent through different systems of social activity other than the hermeneutical²⁸.

Hermeneutically marginalized groups are often also economically, socially and politically marginalized. Similarly, inasmuch as science is an epistemic and a social activity, this phenomenon is reflected in the production, and in the products, of science.

More crucially, however, is that as those with socio-economic and political power dominate the hermeneutical pool with their resources and practices, the risk of hermeneutical injustice becomes built into the very structures of social order. The asymmetry in the influence of values due to the gaps in the collective epistemic resources forms a systematic hermeneutical injustice such that, as Fricker (2006) notes, it is “part of the broad pattern of a social group’s general susceptibility to different sorts of injustice.” (p. 100). Thus, the discussion of systematicity becomes central from the point of view of an interest in the broad pattern of injustices and marginalization. In this manner, hermeneutical injustice is “socially patterned”; it is not confined to the epistemic dimension, but inflects other social dimensions as well, including the scientific. Borrowing from Fricker (ibid), “[w]e should think of systematic hermeneutical injustice as the central case – it is central from the point of view of an interest in how epistemic injustice is woven into the fabric of social injustice more generally.”

While I agree with Fricker that injustices are interconnected across different social dimensions, I argue further that through the hermeneutical feedback loop, the

dimensions of social activity – i.e. the hermeneutical marginalization he experiences is not part of a general susceptibility to other sorts of social marginalization. Similarly, harm in the epistemic world brings about harm in the non-epistemic world. Recall that Carmita Wood, due to her social experiences, suffered physical pain, over and above the psychological pain, and was unable to claim insurance nor compensation after she lost her job; all because a word was missing from our vocabulary. In effect, she was harmed by her epistemic marginalization

²⁸ By social systems I mean the ‘economic, the political, the institutional, the cultural, the epistemic, the scientific, the religious, etc.

injustices in effect feed on each other through a pernicious relationship of reinforcement and perpetuation of further injustices. Epistemologically, the credibility of the disempowered gets diminished because they lack the social position and the material power to uphold it, while those who do hold the power champion the trustworthiness of the already socially powerful knowers and knowledge as much as they promote an epistemic reality tailored upon their own experiences. Essentially, it is power relations which fuel this hermeneutical cycle and perpetuate the injustices since being in the dominantly situated group means nothing less than having the material, social and epistemic power to affect the hermeneutical resources while lacking the power diminishes the epistemic agency of those in the margin. It is, then, in the interest of the dominant to maintain the set of existing hermeneutical practices, and it is precisely through the examination and the deconstruction of those practices that the epistemic and the scientific status quo can be changed. As Catherine MacKinnon so famously notes “[p]ower means, among other things, that when someone says, ‘this is how it is’, it is taken as that way ... Powerlessness means that when you say ‘this is how it is,’ it is not taken as being that way.”²⁹

Feminist philosophers (mainly Wylie (2011), Pohlhaus (2012), and Fricker) have also argued for a systematicity underlined in the close interconnectivity of injustices across different social dimensions via common prejudices. Alison Wylie (2011), for example, argues that testimonial and hermeneutical injustices reinforce one another in obvious ways³⁰. She argues that the ability of the disempowered to advocate their knowledge and credibility – especially in areas where what they know challenges dominant cultural norms – is greatly reduced when “there is pressure on

²⁹ http://www.azquotes.com/author/9216-Catharine_MacKinnon

³⁰ A point Fricker comes to agree upon and discuss further in her forthcoming paper. She describes a persistent and socially patterned testimonial injustice as creative of or increasing of hermeneutical marginalization.

the norms of credibility to track power” (p. 161). In a similar way, she reasons that when those in the powerful group are in a social position to project their experiences and perspectives as representative of everyone in society, they also project the “working indicators that sanction not just familiar kinds of knowers, but also the forms of knowledge and norms of plausibility associated with them.” (ibid).

It is important to keep in mind that Fricker’s account developed from feminist standpoint theory and remains true to its thesis that the social situatedness of knowers and knowledge are construed structurally (Fricker 2006; Wylie 2011). As such, she maintains that individuals who belong to structurally marginal or disempowered groups will often have a different perspective than those belonging to the empowered group³¹; additionally, the perspectives of those in the disempowered groups are invisible to those in the empowered ones. There is certainly a focus on how social conditions structure the composition of the social reality as much as on the epistemic communities from which (scientific) knowledge production and validation can be and has been skewed. Yet we can expound on this to argue that although the dominantly situated knowers have a partial, inadequate, and inaccurate perspective of the social world, because their position does not allow them to see the existence of other perspectives, namely those of the disempowered, they – by virtue of their social power – can determine which perspectives and what knowledge are said to be

³¹ I am more inclined to argue along with Sandra Harding (1991) that being marginally situated leads not to ‘different’ perspectives or knowledge, but to ‘more objective’ knowledge for the following reasons. (1) Marginally situated individuals are in a position to notice the inadequacy (or find the gaps) in the epistemic resources for making sense of their experienced world. (2) Marginally situated individuals are socially vulnerable to the dominantly epistemic knowers – to those with material and social power – and this vulnerability means that they will need to be attentive to more of the experienced world in general – including the salient experiences of those to whom she is vulnerable. This is not so in the other direction (Wylie in Grasswick, 2012; Pohlhaus, 2012).

important, significant, and worth being heard. In other words, they can *structure* the epistemic (and scientific) world according to their interests³².

The implications of this, for epistemology in general and for philosophy of science in particular, are not to be dismissed. If dominantly situated knowers structure the epistemic world according to their interests, then our knowledge of the social world is at the mercy of these skewed interpretive practices. The fact that much of the content of science (recall the examples above) is produced through the lens of the dominant values at once validates the existing power structures and corroborates those same values. Biologists, for example, understand, see, and explain the world through the lens of their values; if their hermeneutical practices are skewed towards the dominant androcentric values, this entails the usage of sexist language and metaphors, as is the case with the story of the egg and sperm. The biologists in fact not only come to see the world in a certain skewed way through that lens, but they also constitute and structure it to fit their hermeneutical resources.

E. Willful ignorance, unconscious bias or both?

The previous section showed us that social power offers unfair differential access to interpretive resources, but the story does not end here. The practical fact is that often, even with the development of ‘adequately representative’ hermeneutical resources, there seem to be ‘willful’ attempts at dismissing, refuting, and outright resisting such input. Gaile Pohlhaus, Jr. (2012) calls this cold reception “willful hermeneutical ignorance” since, she argues, it occurs when epistemic agents on the powerful end of the social spectrum “refuse to acknowledge the epistemic tools

³² For an interesting example of this, see Lysenko affair in Soviet Russia.

developed from the experienced world of those situated marginally” in such a way as to systematically “misunderstand, misinterpret, and/ignore whole parts of the world.” (p. 715). She sees this happening

when those situated dominantly dismiss the viability of such arduously honed concepts like ‘white privilege’, ‘date rape’, or ‘heteronormativity’. These epistemic resources, which could (and sometimes do) help dominantly situated knowers to know the world in light of marginalized situatedness, can be preemptively dismissed, because, attuned to what is not immediately present within the experienced world of the dominantly situated knower, such resources can appear to the dominantly situated knower to attend to nothing at all, or to make something out of nothing. (p.722)

In effect, it is easy for those who are in social positions of power – the dominantly situated knowers – to dismiss the cogency of arguments which draw attention to epistemically unjust practices; specifically since those arguments either do not register through their lens, or, if they do, they do not seem to pose any epistemic harm. They simply can ignore such arguments since they fail to speak to their immediate perspective, but more critically, since they are not in their interests to uphold.

Pohlhaus reasons that although there may be a psychological difficulty to appreciate or assess aspects of the world to which one is not used to attending, this difficulty is not “a necessary act” or “an inherent inability” (p. 729); analogously, it isn’t as though the lenses can’t be focused³³. On the contrary, it is only a difficulty intensified and solidified by the willful refusal to see anything that challenges one’s

³³ Although the focusing requires revisiting of stereotypes, biases, and practices within our collective hermeneutical resources and practices, it is not an entirely impossible, nor an intensely difficult endeavor.

established understanding of the world³⁴. “When a group with material power is vested in ignoring certain parts of the world, they can, therefore, maintain their ignorance by refusing to recognize and by actively undermining any newly generated epistemic resource that attends to those parts of the world that they are vested in ignoring” (p. 729). Recall the case studies from craniology, neuroimaging, and cellular biology. It is in the interests of the individuals in power to maintain ignorance of epistemic resources which challenge the status quo. Yet maintaining this ignorance comes at a high expense – that of ‘truth’ and justice³⁵.

My contention with this argument is that underlying is an assumption that scientists can consciously decide to (so to speak) ‘remove’ the lens of social value deliberately and at will – as I have argued, the process is not so simple. Even if scientists are consciously aware of problematic values and of their influences, they often are not aware of the unconscious and implicit biases and prejudices (in the form of hermeneutical resources) which constitute and give rise to those values. It is these underlying practices that must be altered for any change to happen. The lens of values can be altered to obtain clearer vision only as a result of the changing of the more fundamental layer of this process.

³⁴ I refer the reader to Elizabeth Lloyd in Nelson and Nelson (ed) (1996) “Feminism, Science, and the Philosophy of Science”, 217-259 where she discusses the “standard attacks” on feminist analyses of science and the distortions that are necessary to uphold such criticisms. Her discussion of critics’ persistent misinterpretation of feminist epistemologists as being anti-science, as reducing epistemic values to social or political commitments, and as showing them to be endorsing of relativism and irrationality highlights the critics’ insistence on discrediting and excluding feminist research of scientific activities, as well as exempts science from being the subject of anthropological or sociological study.

³⁵ See Elizabeth Lloyd (1996) “Science and anti-science: Objectivity and its real enemies”.

CHAPTER IV

CONCLUSION

Extant analyses of the role of values in science do account for the insight that our scientific practices are socially conditioned. However, they fail to consider the way social values are intrinsically and implicitly influential; likewise, they overlook the complex interactions of knowledge production with structures of social power. Therefore, they are insufficient. What I mean to say is that although current normative models give a partial description of the way values interact within science, they will always be powerless to form a basis for actual change in practice so long as they neglect to consider the confluence of knowledge, power and social situatedness. As I have argued, these relations run very deep and are implicated in our understanding of the world through complex hermeneutical feedback loops. But these normative accounts are more than just so; they are also complicit to epistemic oppression. What I mean to say is that if scientific knowledge production is persistently skewed in favor of dominant societal values, then an epistemic injustice ensues; and when this injustice is not only persistent but also systematic, then the injustice presents a face of oppression.

Bringing Fricker's work on systematic and structural injustice to bear on the discussion of social values in science expands the approach from the social and epistemological to encompass the ethical level. It focuses the analysis on the interaction of unjust social formations and ways in which certain forms of knowledge are excluded from public exchange, and how the epistemic authority of certain would-be knowers is either denied or diminished, not simply as the result of contingent epistemic failures, but in ways structurally connected with the unjust conditions

themselves. As the epistemic hegemony of certain societal values *persists* and *dominates*, it becomes the role of epistemologists of science to probe the underlying factors and mechanisms that lead to such an arrangement and to identify, or as Emily Martin puts it, to “wake up [the] sleeping metaphors [social values and other hermeneutical practices] in science.” (1991, p. 501).

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