Feminist Epistemology: An Interpretation and a Defense

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Feminist epistemology has often been understood as the study of feminine "ways of knowing." But feminist epistemology is better understood as the branch of naturalized, social epistemology that studies the various influences of norms and conceptions of gender and gendered interests and experiences on the production of knowledge. This understanding avoids dubious claims about feminine cognitive differences and enables feminist research in various disciplines to pose deep internal critiques of mainstream research.

Feminist epistemology is about the ways gender influences what we take to be knowledge. Consider impersonal theoretical and scientific knowledge, the kind of knowledge privileged in the academy. Western societies have labeled this kind of knowledge "masculine" and prevented women from acquiring and producing it, often on the pretext that it would divert their vital energies from their "natural" reproductive labor (Hubbard 1990; Schiebinger 1989). Theoretical knowledge is also often tailored to the needs of mostly male managers, bureaucrats, and officials exercising power in their role-given capacities (H. Rose 1987; Smith 1974; Collins 1990). Feminist epistemologists claim that the ways gender categories have been used to understand the character and status of theoretical knowledge, whether men or women have produced and applied this knowledge, and whose interests it has served have often had a detrimental impact on its content. For instance, feminist epistemologists suggest that various kinds of practical know-how and personal knowledge (knowledge that bears the marks of the knower's biography and identity), such as the kinds of untheoretical knowledge that mothers have of children, are undervalued when they are labeled "feminine." Given the androcentric need to represent the "masculine" as independent of the "feminine," this labeling has led to a failure to use untheoretical knowledge effectively in theoretical reasoning (Smith 1974; H. Rose 1987).
Traditional epistemology finds these claims of feminist epistemology to be highly disturbing, if not plainly absurd. Some feminist epistemologists in turn have rejected empiricism (Harding 1986) or even traditional epistemology as a whole (Flax 1983) for its seeming inability to comprehend these claims. I argue, contrary to these views, that a naturalized empiricist epistemology offers excellent prospects for advancing a feminist epistemology of theoretical knowledge.

The project of feminist epistemology with respect to theoretical knowledge has two primary aims (Longino 1993a). First, it endeavors to explain the achievements of feminist criticism of science, which is devoted to revealing sexism and androcentrism in theoretical inquiry. An adequate feminist epistemology must explain what it is for a scientific theory or practice to be sexist and androcentric, how these features are expressed in theoretical inquiry and in the application of theoretical knowledge, and what bearing these features have on evaluating research. Second, the project of feminist epistemology aims to defend feminist scientific practices, which incorporate a commitment to the liberation of women and the social and political equality of all persons. An adequate feminist epistemology must explain how research projects with such moral and political commitments can produce knowledge that meets such epistemic standards as empirical adequacy and fruitfulness. I will argue that these aims can be satisfied by a branch of naturalized, social epistemology that retains commitments to a modest empiricism and to rational inquiry. Feminist naturalized epistemologists therefore demand no radical break from the fundamental internal commitments of empirical science. They may propose changes in our conceptions of what these commitments amount to, or changes in our methods of inquiry. But these can be derived from the core concept of reason, conjoined with perhaps surprising yet empirically supported hypotheses about social or psychological obstacles to achieving them, and the social and material arrangements required for enabling better research to be done. To see how such derivations are possible, modest conceptions of empiricism and reason must be explained before I outline a feminist epistemology that employs these notions.

A MODEST EMPIRICISM

I shall call “empiricism” the view that experience ultimately provides all the evidence we have about the world (Nelson 1990), or more modestly, that observation provides the least defeasible evidence we have about the world (Longino 1993a). No thought process operating independently of empirical evidence can rule out any conceivable hypothesis about the world. I believe that empiricism, so understood, is congenial to the puzzling and seemingly bizarre hypotheses of feminist epistemology because it implies two things. First, for all we know, anything can cause anything, and anything might provide an
illuminating fruitful model for any other phenomenon. There are no sound a priori restrictions on the concepts or vocabulary we use in describing and explaining the world, so long as these concepts "turn wheels" in theories that have empirical implications. Second, empiricism implies that the discovery of the best theories demands the fullest and freest development of our imaginations. There is no reason to think our presently cramped and stunted imaginations set the actual limits of the world, but they do set the limits of what we now take to be possible. We can never know what further stretch of the imagination might uncover and explain what further expanse of the world.

Since feminist epistemology and feminist criticism of science contain many empirical claims about the influence of gender on science that appear at first glance to be unimaginable, it is important to note that nothing in empiricism justifies dismissing such claims out of hand.

Empiricism is commonly taken to mean something else: a doctrine that imposes a priori substantive restrictions on the kinds of entities and concepts that can ultimately figure in science. Various self-described empiricists have tried to eliminate from science reference to unobservables, and use of intentional, modal, and evaluative concepts, or to reduce these to concepts thought to be more "naturalistic." These substantive commitments are simply bets as to how empirical science will actually turn out. Transformed into restrictions on the permissible content of theories, they are attempts to win the bets by rigging the game in advance, preventing the exploration of hypotheses that might show them wrong. This contradicts what I take to be the fundamental commitments of modest empiricism. Since feminist epistemology and feminist criticism of science contain many empirical claims couched in unreduced social, intentional, and evaluative vocabularies, it is important to note that modest empiricism is not committed to eliminating such claims from scientific theories.

I take modest empiricism, then, to be a purely methodological doctrine, which rejects a priori commitments to what the content of our theories and models must be. Empiricism is promiscuous in its permissible ontology and opportunistic in its methods and models. Any hypothesis or method is permitted that advances the goals of discovering and explaining novel phenomena consistent with the constraint that the theories produced seek empirical adequacy.

RATIONALITY AS REFLECTIVE ENDORSABILITY

Reason is the power to change our attitudes, intentions, and practices in response to reflection on the merits of having them or engaging in them. Theoretical reason is the power to acquire, reject, and revise our cognitive attitudes (beliefs and theoretical commitments) and our practices of inquiry through reflection on our reasons for holding them and engaging in them—
that is, through reflection on arguments and evidence for our beliefs and about the consequences of our practices. Reflective endorsement is the only test for whether a consideration counts as a reason for having any attitude or engaging in any practice of inquiry: we ask, on reflecting on the ways the consideration could or does influence our attitudes and practices and the implications of its influencing us, whether we can endorse its influencing us in those ways. If we can reflectively endorse its influence, we count the consideration as a reason for our attitudes or practices (Anderson 1993, 91-98).

This conception of reason as reflective self-government rejects the ideal of individualistic self-sufficiency, which some feminists have argued is androcentric, or expressive of specifically male needs (Bordo 1987; Duran 1991). Rational inquiry is a social enterprise (Longino 1990; Nelson 1993). Anything that counts as evidence for a theory must be publicly accessible, and in experimental contexts, replicable by others. Individuals must use tools, methods, and conceptual frameworks developed by others in order to get their own inquiries under way. They must rely on the testimony of others to get evidence that is too costly or difficult for them to gather on their own, and even to interpret the evidence of their own senses (Coady 1992). Thus it is impossible for individuals to rely only on themselves, for the very reason and interpretations of their experience on which they rely and which seems most to be their own, is a social achievement, not an individual endowment (Nelson 1990; Scheman 1983).

The social character of rational inquiry suggests two things. First, the theories produced by our practices of inquiry may bear the marks of the social relations of the inquirers. To the extent that conceptions of gender inform these social relations, we might expect these conceptions to influence theoretical inquiry. Second, insofar as we reflectively reject certain ways that gender influences the practices and products of inquiry, we need not try to correct these problems by demanding that individual investigators somehow abstract from their gender or gender-related values and commitments. Each individual might be subject to perhaps ineradicable cognitive biases or partiality due to gender or other influences. But if the social relations of inquirers are well arranged, then each person's biases can check and correct the others'. In this way, theoretical rationality and objectivity can be expressed by the whole community of inquirers even when no individual's thought processes are perfectly impartial, objective, or sound (Longino 1990; Nelson 1990; Solomon 1994).

**Feminist Epistemology as a Branch of Naturalized, Social Epistemology**

Many theorists have proposed that we think of feminist epistemology as a social branch of naturalized epistemology (Nelson 1990; Harding 1986; Potter
1993; Tuana 1992; Antony 1993; Duran 1991). Naturalized epistemologists consider knowledge production as an activity in which inquirers are subject to the same causal forces that affect their objects of study (Quine 1969). They ask of science that it provide an account of its own activity. This point of view enables us to investigate empirically how knowledge changes as we change factors concerning the inquirers. Social epistemology is the branch of naturalized epistemology that investigates the influence of specifically social factors on knowledge production: who gets to participate in theoretical inquiry, who listens to whom, the relative prestige of different styles and fields of research, the political and economic conditions in which inquirers conduct their investigations, the social settings in which they interact with the subjects of study, their ideological commitments, the availability of models and narrative forms in the culture that can be used to structure scientific observation and explain phenomena, and so forth. Feminist epistemology can be regarded as the branch of social epistemology that investigates the influence of socially constructed conceptions and norms of gender and gender-specific interests and experiences on the production of knowledge. It asks how the historical exclusion of women from theoretical inquiry has affected the direction and content of research in fields such as anthropology, philosophy, and psychology; how the use of gender metaphors in biology has made some phenomena more salient than others; how history, economics, and medicine would change if we viewed phenomena from the standpoint of women's rather than men's lives; how the feminist movement has changed our data, our ways of describing the data, and our theories about differences between men and women.

These are all empirical questions. By framing the questions of feminist epistemology as empirical ones, feminist theorists can challenge mainstream theorists, who are largely empiricists, in a way that they cannot responsibly ignore or dismiss. This way of framing feminist epistemology also enables feminists to make arguments for reforming theoretical practice in terms internal to the self-critical commitments of science itself. Feminist criticisms and remedies can be seen as particular, if surprising, instances of general types of criticism and remedy already acknowledged and accommodated by scientific practice. For naturalized epistemology, considered as a tool for improving scientific practices, is already incorporated into the self-critical and self-reforming institutions of science.

How can naturalized epistemology, which studies how knowledge claims are actually produced, support normative views about how we ought to produce knowledge claims? This gap between "is" and "ought" is bridged by the reflective self-endorsement test. Naturalized epistemology considers inquirers in their social relations as systems of belief-formation processes, and theoretical inquiry as a social practice that uses these processes to generate new beliefs. These beliefs in turn are related to one another through various explanatory theories, models, or narratives that aim to produce understanding of the
phenomena being studied. This two-level representation of theoretical inquiry suggests two ways naturalized epistemology can get critical leverage on our knowledge practices. First, we can examine our belief-formation processes. Some of these processes are such that, once we reflect on how they work or what they do, we lose confidence in the beliefs to which they give rise, since they do not reliably lead to true beliefs (consider optical illusions). Other processes satisfy the reflective endorsement test: reflecting on how they work or what they do leads us to endorse them and the beliefs to which they give rise (consider deductive inference). A knowledge practice is rational to the extent that it promotes such critical self-reflections and responds to them by checking or canceling out the unreliable belief-formation mechanisms and enabling the reliable ones.

The institution of placebo-controlled, double-blind, multi-center trials as the standard for testing drugs represents an exemplary critical achievement of naturalized epistemology. Each feature of this experimental standard was instituted in response to the discovery of an unreliable belief-formation mechanism that had to be checked. The well-known placebo effect, in which subjects report symptom improvement when they receive any intervention they believe may help them, is checked by requiring that the therapeutic effects of drugs be measured against a control group which is administered a placebo, and by requiring that subjects not know whether they belong to the control or the experimental group. Wishful thinking on the part of experimenters, which leads to exaggerated reports of the therapeutic effectiveness of drugs on trial, is checked by making the tests double-blind, so that even the experimenter does not know which group subjects belong to. Multi-center trials ensure that experimental outcomes are not merely an artifact of the micro-culture of researchers at a single site. These are all reforms scientific institutions have made in the past few decades, in response to scientific studies of its own practice.

The normative implications of much feminist epistemology and feminist criticism of science can be modeled on the case of double-blind testing. If a gendered norm is found to influence the production of knowledge claims in ways that cannot be reflectively endorsed, then we have epistemic reasons to reform our knowledge practices so that this norm is changed or its effects are blocked. Feminist empiricist epistemology thus produces arguments of the same logical type as those already accepted by our knowledge practices.

Feminist empiricist epistemology can generate normative implications for theory in a second way. The model of double-blind testing works only at the level of weeding out false beliefs. But getting an adequate understanding of phenomena is not simply a matter of removing sexist or androcentric bias from factual claims so as to allow scientists to see unvarnished truth. For theoretical inquiry does not aim simply to generate true beliefs. One can add to the stock of true beliefs without the aid of systematic theorizing. Although empirical
adequacy poses a fundamental constraint on theorizing, the point of theory is to organize beliefs and generate understanding through models that explain phenomena that people find significant, important, or fundamental, and that abstract from phenomena thought to be unimportant. But whether a phenomenon is considered important or fundamental depends on practical needs and interests, which may be gendered or staked in other socially constructed positions such as class (Tiles 1987). Theories or models offer us only partial maps of the world. Thus different people may find different models satisfactory, depending on which aspects of the world the models highlight (Longino 1993b, 114-16).

This relativity of the value of a model to the socially conditioned interests and experiences of the people to whom it is offered does not imply that theoretical explanations must be false, or that all are equally good, or that there is no common basis for comparing their merits. Empirical adequacy provides the fundamental and common standard for comparing all theories. But a theory can be empirically adequate without being interesting or useful.

Thus, feminist naturalized epistemology uses reason both to constrain and to expand the range of acceptable theories, given what we know about how theories are formed. By raising the standards for evaluating methods of data collection and interpretation in the light of the reflective endorsement test, feminist epistemologists limit the field of credible theories. By legitimizing the explicit introduction of feminist interests to justify the choice of different models, feminist epistemologists use reason in its permissive mode to open up space for alternative theories oriented toward liberatory ends and to contest theories that close off possibilities for social change by representing the subjects of study as if they had no room to maneuver (Longino 1989, 210-13).

Such moves to multiply available explanatory models, like the moves to reform scientific practices on the lines of the double-blind experiment, are internal to the practices of science. These two types of critical activity correspond to the two goals of the feminist epistemology of theoretical knowledge: to legitimate science oriented toward feminist ends and to underwrite feminist criticism of sexist and androcentric science. The fact that these activities can be situated inside science does not mean that the changes feminist epistemology recommends for science must be modest. The sorts of criticisms that generate internal reform of scientific practices today focus on such matters as improving data-gathering instruments and technical features of experimental method. Feminist epistemology and feminist criticism of science focus on changing the background social conditions in which science is practiced. It is therefore an explicitly political enterprise, but one that is justified by epistemic values, such as reason and empirical adequacy, to which science already declares its allegiance.

The variety of claims made by feminist epistemologists and feminist critics of science is bewildering. Without attempting to account for or endorse all the
conflicting claims made in the name of feminist epistemology, I shall follow the strategy of reading most of them as contributions to a research program in naturalized social epistemology. I propose that we can sort most of them into four categories, each specifying a particular type of gender influence on theoretical inquiry. Feminist epistemology has generally been better at identifying the ways gender is implicated in our knowledge practices than at explaining how these findings should affect our evaluations of the practices or the theories they produce (Longino 1993a). Naturalized epistemology provides a framework for developing such explanations. So I suggest some questions that probe the normative implications of each category of gender influence on theorizing.

First, studies that investigate gender structures focus on the ways gender norms structure the division of labor in society, including the divisions between intellectual and manual and service labor, and within the academy, among different disciplines and subfields, and among primary researchers, teachers, and assistants. These studies consider how the content of theories has been affected by historical discrimination against women entering the sciences, by the difficulties women scientists have getting their work recognized, and by the ways women have changed the orientation of fields of study once they have entered the elite ranks in significant numbers. These studies seek to answer the question, What difference does, or would, an equal representation and status of women researchers make to theoretical inquiry?

Second, some studies consider the uses of gender symbolism, which occurs when we represent nonhuman or inanimate phenomena as "masculine" or "feminine" and model them after gender ideals or stereotypes. Feminist epistemologists have found gender symbolism to be pervasive in theoretical inquiry. It is used to represent the relations of scientists to their subjects of study and the relations of different types of knowledge or of different disciplines and subfields to one another, to describe the character of scientific objectivity, and to model nonhuman and inanimate phenomena. These studies seek to answer the question, What difference does it make to our theories and our scientific practices that we conceive of theoretical inquiry itself and its subjects of study as gendered phenomena? How would our theories and practices of inquiry change if we altered our conceptions of the "masculine" and the "feminine," or ceased to employ gender symbolism in understanding our own theorizing or inanimate objects?

Third, some studies focus on androcentrism in biology, the social sciences, and cultural and literary studies. Androcentrism occurs when theories take males, men's lives, or "masculinity" to set the norm for humans or animals generally, with female differences either ignored or represented as deviant; when phenomena are viewed from the perspective of men's lives, without regard to how women see them differently; and when male activities or predicaments are represented as the primary causes or sites of important
changes, without regard to the roles of females in initiating or facilitating changes or the ways the situation of females has been crucial to determining structural constraints and potentials for change. These studies ask, How would the content of theories be different if we viewed phenomena from the perspective of women’s lives, or refused to accept either “masculinity” or “femininity” as setting the norm for humans or animals generally?

Fourth, some studies focus on sexism in theory, which can appear either in practices that apply the theory or in the content of the theory itself. Sexism is evident when theories are applied in ways that undermine women’s interests or that reinforce their subordination to men. The content of a theory is sexist when it asserts that women are inferior to men, justly or inevitably subordinated to men, or properly confined to gender-stereotyped roles, or when it judges or describes women according to sexist ideals or double standards, or when it uses such claims as background assumptions to secure an evidential link between observations and theoretical claims. Feminist studies of sexism in theories explore the prospects for alternative scientific theories that meet criteria of empirical adequacy while seeking to serve women’s interests and to promote universal equality.

THE GENDERED DIVISION OF THEORETICAL LABOR

Feminist critics of science have carefully documented the history of women’s exclusion from theoretical inquiry (Rossiter 1982; Schiebinger 1989). Although formal barriers to women’s entry into various academic disciplines are now illegal in the United States, informal barriers at all levels remain. Girls are socialized by parents and peers to avoid studying or excelling in subjects considered “masculine,” such as mathematics and the natural sciences. Teachers and school counselors actively discourage girls from pursuing these subjects (Curran 1980, 30-32). The classroom climate in mixed-gender schools favors boys. Teachers pay more attention and offer more encouragement to white boys than to girls, solicit their participation more, and expect them to achieve more, especially in mathematics courses (Becker 1981; AAUW 1992). Boys marginalize girls in class by interruption and sexual harassment (AAUW 1992). These behaviors in mixed-gender schools have a detrimental impact on girls’ academic ambitions and performance. Girls in all-girl schools express a wider diversity of academic interests and perform better academically than girls in mixed-gender schools (Curran 1980, 34). The disadvantage to women’s academic performance and interests from attending mixed-gender schools extends to college. The predominantly male faculty in mixed-gender colleges support women students’ academic ambitions less than male and female faculty at women’s colleges. Women’s colleges produce 50 percent more high-achieving women relative to the number of their female graduates than coeducational institutions (Tidball 1980). Graduate schools present women with informal
barriers or costs to advancement, including sexual harassment and exclusion from networks of male mentors and colleagues often vital to the advancement of aspiring academics (Reskin 1979; S. Rose 1989).

Women who overcome these obstacles and obtain advanced degrees are not treated as equals once they enter academic positions. Women whose qualifications are comparable to their male colleagues get lower pay, less research support, jobs in less prestigious institutions, lower-ranking positions, and positions that assign more and lower-level teaching (Astin and Beyer 1973; Fox 1981). The prestige of the graduate institution, publications, and having one's work cited aid men's career advancement much more than women's (Rosenfeld 1981). Women in scientific and engineering professions with publication rates equal to those of their male peers have higher unemployment rates, lower starting salaries, and lower academic rank than men. These differences cannot be explained by the greater impact on women of marriage and children (Vetter 1981). The National Science Foundation (1984) found that after adjusting for factors such as women interrupting their careers to take care of children, half the salary differential between male and female scientists could be explained only by sex discrimination.

The gendered division of theoretical labor does not simply prevent women from doing research or getting published. It fits into a broader gendered structure of epistemic authority which assigns greater credibility, respect, and importance to men's than women's claims. Laboratory, field, and natural experiments alike show that the perceived gender of the author influences people's judgments of the quality of research, independent of its content. Psychologists M. A. Paludi and W. D. Bauer (1983) found that a group told that a paper's author was "John T. McKay" assigned it a much higher average ranking than a group told that the same paper's author was "Joan T. McKay." A group told that its author was "J. T. McKay" rated the paper between the other groups' evaluations, reflecting the suspicion that the author was a woman trying to conceal her gender identity. Academics are no less disposed than others to judge the quality of work higher simply because they believe a man has done it. L. S. Fidell (1970) sent vitae identical in all but name to heads of psychology departments that advertised open rank positions. The jobs the psychologists said they would offer to the purportedly male applicant were higher-ranking than those they were willing to offer to the purportedly female applicant. When the Modern Language Association reviewed papers submitted for their meetings with authors' names attached, men's submissions were accepted at significantly higher rates than women's. After the MLA instituted blind reviewing of papers, women's acceptance rates rose to equality with men's (Lefkowitz 1979).

The concerns raised by the influence of sexist norms on the division of theoretical labor and epistemic authority are not simply matters of justice. Feminist epistemology asks what impact these injustices toward women stu-
students and researchers have had on the content, shape, and progress of theoretical knowledge. In some cases, sex discrimination in the academy has demonstrably retarded the growth of knowledge. It took more than three decades for biologists to understand and recognize the revolutionary importance of Barbara McClintock's discovery of genetic transposition. Her attempts to communicate this discovery to the larger scientific community met with incomprehension and disdain. This failure can be partly explained by the fact that no biology department was willing to hire her for a permanent position despite her distinguished record of discoveries and publications. Lacking the opportunities such a position would have provided to recruit graduate students to her research program, McClintock had no one else doing research like hers who could replicate her results or help communicate them to a wider scientific community (Keller 1983).

Cases such as McClintock's demonstrate that the gendered structure of theoretical labor and cognitive authority sometimes slows the progress of knowledge. But does it change the content or shape of knowledge or the direction of knowledge growth? If the gender of the knower is irrelevant to the content of what is investigated, discovered, or invented, then the impact of removing sex discrimination would be to add to the pace of knowledge growth by adding more inquirers and by raising the average level of talent and dedication in the research community. Feminist epistemology would then recommend strictly "gender-blind" changes in the processes by which research jobs get assigned and epistemic authority distributed. The MLA's adoption of blind reviewing of papers to reduce cognitive bias due to sexism in the evaluation of research represents an exemplary application of this side of feminist epistemology. It is logically on a par with the institution of double-blind testing in drug research to reduce cognitive bias due to wishful thinking.

But if the gender of the inquirer makes a difference to the content of what is accepted as knowledge, then the exclusion and undervaluation of women's participation in theoretical inquiry does not merely set up randomly distributed roadblocks to the improvement of understanding. It imparts a systematic bias on what is taken to be knowledge. If the gender of the inquirer makes a difference to what is known, then feminist epistemology would not confine its recommendations to purely gender-blind reforms in our knowledge practices. It could recommend that these knowledge practices actively seek gender diversity and balance among inquirers and actively attend to the gender of the researchers in evaluating their products.

The gender of the researcher is known to make a difference to what is known in certain areas of social science. In survey research, subjects give different answers to questions depending on the perceived gender of the interviewer (Sherif 1987, 47-48). The perceived race of the interviewer also influences subjects' responses. It is a highly significant variable accounting for subjects'
responses to questions about race relations (Schuman and Hatchett 1974). In anthropology, informants vary their responses depending on the gender of the anthropologist. In many societies, male anthropologists have less access to women's social worlds than female anthropologists do (Leacock 1982). The race of the researcher affects access to social worlds as well. Native Americans sometimes grant Asian anthropologists access to religious rituals from which they ban whites (Pai 1985).

Where the perceived gender and race of the researcher are variables influencing the phenomena being observed or influencing access to the phenomena, sound research design must pay attention to the gender and racial makeup of the researchers. In survey research, these effects can be analytically excised by ensuring a gender balanced and racially diverse research team and then statistically isolating the variations in responses due to factors other than subjects' responses to the characteristics of the interviewers. In anthropology, the method of reflexive sociology, instead of attempting to analyze away these effects, treats them as a subject of study in their own right. It advises researchers to interpret what informants tell them not as straightforward native observation reports on their own culture, but as reflections of a strategic interaction between informant and researcher and between the informant and other members of the community being studied (Bourdieu 1977). To obtain a complete representation of informants' report strategies with respect to gender, both male and female researchers must interact with both male and female informants and consider why informants varied their responses according to their own and the researcher's gender (see Bell, Caplan, and Karim [1993] for exemplary cases of feminist reflexive anthropology). Similar reasoning applies to factors such as race, class, nationality, and sexual orientation. So reflexive sociology, like survey research, requires a diversity of inquirers to obtain worthwhile results.

The phenomena just discussed concern the causal impact of the gender of the researcher on the object of knowledge. Many feminist epistemologists claim that the gender of the inquirer influences the character of knowledge itself by another route, which travels through the subjectivity of the researcher herself. The gender of the researcher influences what is known not just through her influence on the object of knowledge but by what are claimed to be gender-specific or gender-typical cognitive or affective dispositions, skills, knowledge, interests, or methods that she brings to the study of the object. The variety of claims of this type must be sorted through and investigated with great care. Some are local and modest. No one disputes that personal knowledge of what it is like to be pregnant, undergo childbirth, suffer menstrual cramps, and have other experiences of a female body is specific to women. Gynecology has certainly progressed since women have entered the field and have brought their personal knowledge to bear on misogynist medical practices. The claims get more controversial the more global they are in scope. Some people claim
that women have gender-typical “ways of knowing,” styles of thinking, methodologies, and ontologies that globally govern or characterize their cognitive activities across all subject matters. For instance, various feminist epistemologists have claimed that women think more intuitively and contextually, concern themselves more with particulars than abstractions, emotionally engage themselves more with individual subjects of study, and frame their thoughts in terms of a relational rather than an atomistic ontology (Belenky, Clinchy, Goldberger and Tarule 1986; Gilligan 1982; H. Rose 1987; Smith 1974; Collins 1990).

There is little persuasive evidence for such global claims (Tavris 1992, chap. 2). I believe the temptation to accept them is based partly on a confusion between gender symbolism—the fact that certain styles of thinking are labeled “feminine”—and the actual characteristics of women. It is also partly due to the lack of more complex and nuanced models of how women entering certain fields have changed the course of theorizing for reasons that seem connected to their gender or their feminist commitments. I will propose an alternative model toward the end of this essay, which does not suppose that women theorists bring some shared feminine difference to all subjects of knowledge. Controversies over supposed global differences in the ways men and women think have tended to overshadow other highly interesting work in feminist epistemology that does not depend on claims that men and women think in essentially different ways. The influence of gendered concepts and norms in our knowledge practices extends far beyond the ways male and female individuals are socialized and assigned to different roles in the division of labor. To see this, consider the role of gender symbolism in theoretical knowledge.

**Gender Symbolism (I): The Hierarchy of Knowledge**

It is a characteristic of human thought that our concepts do not stay put behind the neat logical fences philosophers like to erect for them. Like sly coyotes, they slip past these flimsy barriers to range far and wide, picking up consorts of all varieties, and, in astonishingly fecund acts of miscegenation shocking to conceptual purists, leave offspring who bear a disturbing resemblance to the wayward parent and inherit the impulse to roam the old territory. The philosophical guardians of these offspring, trying to shake off the taint of sexual scandal but feeling guilty about the effort, don’t quite know whether to cover up a concept’s pedigree or, by means of the discovery/justification distinction, deny that it matters. The latter strategy can work only if, like keepers of a zoo, the philosophers can keep their animals fenced in. Feminist epistemologists track these creatures sneaking past their fences while their keepers dream of tamed animals happy to remain confined.

The most cunning and promiscuous coyotes are our gender concepts. In a manner befitting their own links to sex, they will copulate with anything.
Feminist epistemologists note that there is hardly any conceptual dichotomy that has not been modeled after and in turn used to model the masculine/feminine dichotomy: mind/body, culture/nature, reason/emotion, objective/subjective, tough-minded/soft-hearted, and so forth. These scandalous metaphorical unions generate conceptions of knowledge, science, and rational inquiry, as well as conceptions of the objects of these inquiries, that are shaped in part by sexist views about the proper relations between men and women. Feminist epistemologists investigate how these conceptions are informed and distorted by sexist imagery. They also consider how alternative conceptions are suppressed by the limits imposed by sexism on the imagination, or by the sexist or androcentric interests served by their present symbolic links to gender (Rooney 1991).

Gender symbolism appears on at least two levels of our knowledge practices: in the construction of a hierarchy of prestige and authority among kinds and fields of knowledge and in the content of theoretical inquiry itself. Consider first the ways different kinds and fields of knowledge are gendered. At the most general level, impersonal theoretical knowledge is coded "masculine." Personal knowledge—the kind of knowledge that is inseparable from the knower's identity, biography, and emotional experiences—is coded "feminine." Theoretical knowledge is thought to be masculine in part because it lays claims to objectivity, which is thought to be achieved through the rigorous exclusion from thought of feminine subjectivity—of emotions, particularity, interests, and values. These uses of gender symbolism have epistemic import because they structure a hierarchy of prestige and cognitive authority among kinds of knowledge, and hence of knowers, that is homologous with the gender hierarchy. As men in sexist society express contempt for women and enjoy higher prestige than women, so do theoretical knowers express contempt for those with "merely" personal knowledge of the same subject matters, and enjoy higher prestige than they. Echoing the sexist norms that women must obey men but men need not listen to women, the gender-coded hierarchy of knowledge embodies the norm that personal knowledge must submit to the judgments of impersonal theoretical knowledge, while theoretical knowledge has nothing to learn from personal knowledge and may ignore its claims.

These epistemic norms cannot withstand reflective scrutiny. Successful theorizing deeply depends on personal knowledge, particularly embodied skills, and often depends on emotional engagement with the subjects of study (Polanyi 1958; Keller 1983, 1985). Cora Diamond's (1991) insightful discussion of Vicki Hearne's personal knowledge as an animal trainer provides a particularly fine illustration of this point. Hearne's writings (1982) expose the failures of knowledge that occur when theorists ignore the experiences, skills, and language of animal trainers. In her animal training classes, Hearne observed that people's success in training their pets was inversely related to their training in the behavioral sciences. The anthropomorphic and value-
laden language of animal trainers enables them to understand what animals are doing in ways not readily accessible to the impersonal, behavioristic language favored by most behavioral scientists. And their skills and personal knowledge of the animals they work with empower trainers to elicit from animals considerably more complex and interesting behaviors than scientists elicit. These powers are not irrelevant to theorizing about animals. Reflecting on Hearne’s story about the philosopher Ray Frey, Diamond writes:

[Frey] attempted to set up a test for his dog’s capacity to rank rational desires. When, in order to see how the dog would rank desires, he threw a stick for his dog . . . and at the same time put food before the dog, the dog stood looking at him. Frey could not see that the dog wanted to know what Frey wanted him to do; Frey’s conception of the dog as part of an experimental set-up (taken to include two possible desired activities but not taken to include queer behavior by the dog’s master), with Frey as the observer, blocked his understanding. Frey’s past experience with his dog did not feed an understanding of how the dog saw him; he could not grasp his own failure, as the dog’s master, to make coherent sense, so could not see the dog as responding to that failure to make sense. (Diamond 1991, 1014 n. 15)

Diamond diagnoses this epistemic failure as the product of Frey’s attachment to a theory of knowledge that distrusts personal experience on the ground that it is distorted by the subject’s emotional engagement with the object of knowledge. The theory supposes that we can’t achieve objective knowledge of our object through such engagement because all it will offer is a reflection of the subject’s own emotions. Subjectivity merely projects qualities onto the object and does not reveal qualities of the object. But the theory is mistaken. Love and respect for another being, animal or person, and trust in the personal experiences of engagement that are informed by such love and respect may be essential both for drawing out and for grasping that being’s full potentialities. One of the reasons why behaviorists tend to elicit such boring behavior from animals and humans is that they don’t give them the opportunities to exhibit a more impressive repertoire of behaviors that respect for them would require them to offer.

The gender-coded hierarchy of knowledge extends to specific subject matters and methods within theoretical knowledge. The natural sciences are “harder,” more like the male body and hence more prestigious, than the social sciences or the “soft” humanities, supposed to be awash in feminine emotionality and subjectivity. Mathematics is coded masculine and is the language of physics, the most prestigious science. Through their closer association with physics, quantitative subfields of biology and the social sciences enjoy higher prestige than subfields of the same discipline or branch of science employing
a qualitative, historical, or interpretive methodology. Experimentation asserts more control over subjects of study than observation does. So experimental subfields in biology and psychology are coded masculine and command more cognitive authority than observational subfields of the same disciplines. Values are designated feminine. So normative subfields in philosophy such as ethics and political philosophy enjoy less prestige than supposedly nonnormative fields such as philosophy of language and mind. Social interpretation is thought to be a feminine skill. So interpretive anthropology is designated less masculine, scientific, and rigorous than physical anthropology, which deals with "hard" facts like fossil bones. In each of these cases, the socially enforced norm for relations between fields of knowledge mirrors that of the relations between husband and wife in the ideal patriarchal family: the masculine science is autonomous from and exercises authority over the feminine science, which is supposedly dependent on the former's pronouncements to know what it should think next.

This gendered hierarchy of theoretical subfields produces serious cognitive distortions. Carolyn Sherif (1987) has investigated how the hierarchy of prestige generates cognitive biases in psychology. Forty years ago, experimental psychology dominated developmental and social psychology. The gendered character of this difference in cognitive authority is not difficult to read. Experimental psychologists, by imitating the methods of the "hard" sciences through manipulating quantified variables, claim some of the prestige of the natural sciences. Developmental and social psychologists engage in labor that looks more like the low-status labor conventionally assigned to women. Developmental psychologists work with children; social psychologists deal with human relationships, and forty years ago usually did so in settings not under the control of the researcher. Following the norm that "masculine" sciences need not pay attention to findings in "feminine" sciences, which it is assumed cannot possibly bear on their more "fundamental" research, experimental psychology has a history of constructing experiments that, like Ray Frey's, ignore the ways the social context of the experiment itself and the social relation between experimenter and subject influence outcomes. The result has been a history of findings that lack robustness because they are mere artifacts of the experimental situation. In experimental research on sex differences, this error has taken the form of ascribing observed differences in male and female behavior under experimental conditions to innate difference in male and female psychology rather than to the ways the experiment has socially structured the situation so as to elicit different responses from men and women.

The notorious claim in experimental psychology that women are more suggestible than men offers an instructive illustration of the perils of ignoring social psychology (Sherif 1987, 49-50). The original experiments that confirmed the hypothesis of greater suggestibility involved male researchers trying
to persuade men and women to change their beliefs with respect to subject matters oriented to stereotypical male interests. Unaware of how their own gender-typical interests had imparted a bias in the selection of topics of persuasion, the predominantly male researchers confidently reported as a sex difference in suggestibility what was in fact a difference in suggestibility owing to the degree of interest the subjects had in the topics. Differences in the gender-typed cognitive authority of the researcher also affect subjects’ responses. Men are more open to the suggestions of a female researcher when the topic is coded feminine, while women are more open to the suggestions of a male researcher when the topic is coded masculine.

Cognitive distortions due to the gender-coding of types and fields of knowledge are strictly separable from any claims about differences in the ways men and women think. Although it is true that the “feminine” sciences and subfields attract more women researchers than the “masculine” sciences do, the differences in cognitive authority between the various sciences and subfields were modeled on differences in social authority between men and women before women constituted a significant portion of the researchers in any field. Men still predominate even in fields of study that are designated feminine. And scientists’ neglect of personal knowledge deprives many men who engage in stereotypically male activities of cognitive authority. For example, animal behaviorists ignore the personal knowledge male policemen have about their police dogs (Diamond 1991). For these reasons, Diamond and Sherif have questioned how gender figures into the cognitive distortions instituted by the hierarchy of knowledge and by scientific conceptions of objectivity.1 By shifting our focus from gender structure and supposed gender differences in ways of knowing to gender symbolism, we can see how ideas about gender can distort the relations between forms of knowledge independently of the gender of the knower. In the light of the cognitive distortions caused by the gender-coding of types and domains of knowledge, feminist naturalized epistemologists should recommend that we no longer model the relations between different kinds of knowledge on a sexist view of the authority relations between men and women.

**Gender Symbolism (II): The Content of Theories**

Gender symbolism figures in the content of theories as well as in their relations of cognitive authority whenever conceptions of human gender relations or gendered characteristics are used to model phenomena that are not gendered. Biology is particularly rich with gender symbolism—in models of gamete fertilization, nucleus-cell interaction, primatology, and evolutionary theory (Biology and Gender Study Group 1988; Haraway 1989; Keller 1985, 1992). Evelyn Fox Keller, a mathematical biologist and feminist philosopher of science, has explored gender symbolism in evolutionary theory most subtly
(Keller 1992). Consider the fact that evolutionary theory tends to delineate the unit of natural selection, the entity accorded the status of an “individual,” at the point where the theorist is willing to use complex and cooperative rather than competitive models of interaction. Among individuals, antagonistic competition predominates and mutualistic interactions are downplayed. The individual is considered “selfish” in relation to other individuals. Thus, theories that take the gene to be the unit of selection characterize the gene as a ruthless egoist ready to sacrifice the interests of its host organism for the sake of reproducing itself (Dawkins 1976). Where the organism is taken to be the unit of selection, it is represented as selfishly competitive with respect to other individual organisms. But within the individual, cooperation among constitutive parts prevails. Cooperation is modeled after the family, often a patriarchal family. The cells of an individual organism cooperate because of the bonds of kinship: they share the same genes. The constitutive parts of an individual cell cooperate because they are ruled by a wise and benevolent patriarch, the “master molecule” DNA, which autonomously tells all the other parts of the cell what to do, solely on the basis of information it contains within itself. Thus, evolutionary theory models the biological world after a sexist and androcentric conception of liberal society, in which the public sphere is governed by competition among presumably masculine selfish individuals and the private sphere of the family is governed by male heads of households enforcing cooperation among its members (Keller 1992, chap. 8). This model is not rigidly or consistently applied in evolutionary theory, but it does mark theoretical tendencies that can be traced back to the fact that Darwin modeled his theory of natural selection after Malthus’s dismal model of capitalist society.

Taken by itself, that evolutionary theory employs a sexist ideology of liberal society to model biological phenomena does not have any straightforward normative implications. Defenders of the theory can appeal to the discovery/justification distinction here: just because a theory had its origins in politically objectionable ideas or social contexts does not mean that it is false or useless. Evolutionary theory is extraordinarily fruitful and empirically well confirmed. The model-theoretic view of theories, widely used by feminist empiricists and feminist postmodernists to analyze the roles of gender in the construction of theoretical knowledge, affirms the epistemic legitimacy of any coherent models, hence of any coherent sexist models, in science (Longino 1993b; Haraway 1986).

In the model-theoretic view, scientific theories propose elaborate metaphors or models of phenomena. Their virtues are empirical adequacy, simplicity, clarity, and fruitfulness. Theories are empirically adequate to the extent that the relations among entities in the model are homologous with the observed relations among entities in the world. Empirically adequate models offer a satisfactory explanation of phenomena to the extent that they model unfamil-
iar phenomena in ways that are simple, perspicuous and analytically tractable. They are fruitful to the extent that they organize inquirers’ conceptions of their subjects in ways that suggest lines of investigation that uncover novel phenomena that can be accommodated by further refinements of the model. Empiricists place no a priori constraints on the things that may constitute useful models for phenomena. Anything might be an illuminating model for anything else. So, empiricists can offer no a priori epistemic objections to modeling nongendered phenomena after gendered ones, even if the models are overtly sexist or patriarchal. Such models may well illuminate and effectively organize important aspects of the objects being studied.

So the trouble with using sexist gender symbolism in theoretical models is not that the models are sexist. The trouble lies rather in the extraordinary political salience and rhetorical power of sexist gender ideology, which generates numerous cognitive distortions. Keller has carefully delineated several such distortions in evolutionary theory, especially with respect to its privileging of models of competitive over cooperative or mutualist interactions among organisms. First, to the extent that political ideology incorporates false conceptual identities and dichotomies, a scientific model borrowing its vocabulary and structure is likely to overlook the alternatives suppressed by that ideology or to elide distinctions between empirically distinct phenomena. The ideology of possessive individualism falsely identifies autonomy with selfishness and falsely contrasts self-interest with cooperation. When used to model phenomena in evolutionary biology, it leads to a false identification of peaceful, passive consumption activity with violent, competitive behavior, and to a neglect of mutualist interactions among organisms. Thus, the mathematical tools of population biology and mathematical ecology are rarely used to model cooperation among organisms although they could do so; in contrast with sociobiology, these mathematical subfields of biology have even neglected the impact of sexual intercourse and parenting behavior on the fitness of organisms (Keller 1992, 119-21). Although the technical definition of competition avoids false identities and dichotomies, biologists constantly turn to its colloquial meanings to explain their findings and frame research questions. In this way, “the use of a term with established colloquial meaning in a technical context permits the simultaneous transfer and denial of its colloquial connotations” (Keller 1992, 121). When the language used in a model has particularly strong ideological connotations, the cognitive biases it invites are particularly resistant to exposure and criticism.

The symbolic identification of the scientific with a masculine outlook generates further cognitive distortions. The ideology of masculinity, in representing emotion as feminine and as cognitively distorting, falsely assimilates emotion-laden thoughts—and even thoughts about emotions—to sentimentality. In identifying the scientific outlook with that of a man who has outgrown his tutelage, cut his dependence on his mother, and is prepared to meet the
competitive demands of the public sphere with a clear eye, the ideology of masculinity tends to confuse seeing the natural world as indifferent in the sense of devoid of teleological laws with seeing the social world as hostile in the sense of full of agents who pursue their interests at others' expense (Keller 1992, 116-18). This confusion tempts biologists into thinking that the selfishness their models ascribe to genes and the ruthless strategic rationality their models ascribe to individual organisms (mere metaphors, however theoretically powerful) are more "real" than the actual care a dog expresses toward her pups. Such thoughts also reflect the rhetoric of unmasking base motivations behind policies that seem to be benevolent, a common if overused tactic in liberal politics and political theory. The power of this rhetoric depends on an appearance/reality distinction that has no place where the stakes are competing social models of biological phenomena, whose merits depend on their metaphorical rather than their referential powers. Thus, to the extent that the theoretical preference for competitive models in biology is underwritten by rhetoric borrowed from androcentric political ideologies, the preference reflects a confusion between models and reality as well as an unjustified intrusion of androcentric political loyalties into the scientific enterprise.

These are not concerns that can be relieved by deploying the discovery/justification distinction. To the extent that motivations tied to acquiring a masculine-coded prestige as a theorist induce mathematical ecologists to overlook the epistemic defects of models of natural selection that fail to consider the actual impact of sexual selection, parenting, and cooperative interactions, they distort the context of justification itself. Some of the criteria of justification, such as simplicity, are also distorted in the light of the androcentric distinction between public and private values. For example, simplicity in mathematical biology has been characterized so as to prefer explanations of apparently favorable patterns of group survival in terms of chance to explanations in terms of interspecific feedback loops, if straightforward individualistic mechanisms are not available to explain them (Keller 1992, 153). Finally, to the extent that gender ideologies inform the context of discovery by influencing the direction of inquiry and development of mathematical tools, they prevent the growth of alternative models and the tools that could make them tractable, and hence they bias our views of what is "simple" (Keller 1992, 160). The discovery/justification distinction, while useful when considering the epistemic relation of a theory to its confirming or disconfirming evidence, breaks down once we consider the relative merits of alternative theories. In the latter context, any influence that biases the development of the field of alternatives will bias the evaluation of theories. A theoretical approach may appear best justified not because it offers an adequate model of the world but because androcentric ideologies have caused more thought and resources to be invested in it than in alternatives.
So feminist naturalized epistemologists should offer a complex verdict on
gender symbolism in the content of theories. They should leave open the
possibility that gendered models of ungendered phenomena may be highly
illuminating and successful, and hence legitimately used in theoretical inquiry.
The impressive explanatory successes of evolutionary theory demonstrate this.
At the same time, the ideological power of gender symbolism sometimes gets
the better of otherwise careful theorists. It can generate conceptual confusion
in ways that are hard to detect, and obscure theoretical possibilities that may
be worth pursuing. The most reliable way to tell when the use of gender
symbolism is generating such cognitive distortions is to critically investigate
the gender ideology it depends on and the role this ideology plays in society.
In other words, theorists who use gendered models would do well to consider
how feminist theory can help them avoid cognitive distortion. Feminist
naturalized epistemologists therefore should recommend that theorists
attracted to gendered models of ungendered phenomena proceed with caution,
in consultation with feminist theorists. It recommends an important change
in the cognitive authority of disciplines, through its demonstration that
biologists have something to learn from feminist theory after all.

**ANDROCENTRISM**

A knowledge practice is androcentric if it reflects an orientation geared to
specifically or typically male interests or male lives. Androcentrism can appear
in a knowledge practice in at least two ways: in the content of theories or
research programs and in the interests that lead inquirers to frame their
research in certain terms or around certain problems. Feminists in the natural
and social sciences have advanced feminist epistemology most fully and
persuasively by exposing androcentrism in the content of social-scientific and
biological theories.

The content of theories can be androcentric in several ways. A theory may
reflect the view that males, male lives, or “masculinity” set the norm for
humans or animals generally. From this point of view, females, their lives, or
“feminine” characteristics are represented as problematic, deviations from the
norm, and hence in need of a type of explanation not required for their male
counterparts. Androcentrism of this sort often appears in the ways theoretical
questions are framed. For decades, psychological and biological research about
sex differences has been framed by the question, “Why are women different
from men?” and the presumed sex difference has cast women in a deviant
position. Researchers have been preoccupied with such questions as why girls
are more suggestible, less ambitious, less analytically minded, and have lower
self-esteem than boys. Let us leave aside the fact that all these questions are
based on unfounded beliefs about sex differences (Maccoby and Jacklin 1974).
Why haven’t researchers asked why boys are less responsive to others, more
pushy, less synthetically minded, and more conceited than girls? The framing of the problem to be investigated reflects not just a commitment to asymmetrical explanation of men’s and women’s characteristics, but to an evaluation of women’s differences as dimensions of inferiority (Tavris 1992, chap. 1). It is thus sexist as well as androcentric.

Another way in which the content of theories can be androcentric is in describing or defining phenomena from the perspective of men or typically male lives, without paying attention to how they would be described differently if examined from the point of view of women’s lives. Economists and political scientists have traditionally defined class and socioeconomic status from the point of view of men’s lives: a man’s class or socioeconomic status is defined in terms of his own occupation or earnings, whereas a woman’s status is defined in terms of her father’s or husband’s occupation or earnings. Such definitions obscure the differences in power, prestige, and opportunities between male managers and their homemaker wives, and between homemaker wives and female managers (Stiehm 1983). They also prevent an analysis of the distinctive economic roles and status of full-time homemakers and of adult independent unmarried women. The distinction between labor and leisure, central to standard economic analyses of the supply of wage labor, also reflects the perspective of male heads of households (Waring 1990). Classically, the distinction demarcates the public from the private spheres by contrasting their characteristic activities as having negative versus positive utility, or instrumental versus intrinsic value, or as controlled by others versus freely self-directed. From the standpoint of the lives of women with husbands or children, these demarcations make no sense. These women are not at leisure whenever they are not engaged in paid labor. Professional women often find much of their unpaid work to constitute a drudgery from which paid labor represents an escape with positive intrinsic value. Middle-class and working-class women who engage in paid labor and who cannot afford to hire others to perform their household tasks and child care are better represented as engaged in (sometimes involuntary) dual-career or double-shift labor than in trading off labor for leisure. Full-time mothers and homemakers often view what some consider to be their leisure activities as highly important work in its own right, even if it is unpaid.

The androcentrism implicit in the standard economic definition of productive labor has profound implications for national income accounting, the fundamental conceptual framework for defining and measuring what counts as economically relevant data for macroeconomic theory. It effectively excludes women’s gender-typical unpaid domestic labor from gross national product (GNP) calculations, making women’s work largely invisible in the economy. In the advanced industrialized nations, economists explain this omission by arguing that GNP figures properly measure only the economic value of production for market exchange. In developing nations, where only
a modest proportion of productive activity shows up in market exchanges, economists have long recognized the uselessness of measures of national production that look only at the market; so they impute a market value to various unmarketed domestic production activities associated with subsistence agriculture, home construction, and the like. But which of these household activities do economists choose to count as productive? In practice, they have defined the “production boundary” in such societies by imposing an obsolete Western androcentric conception of the household. They assume that households consist of a productive primary producer, the husband, who supports a wife engaged in “housework,” which is assumed to be economically unimportant or unproductive. “Housework” has no clear definition in societies where most production takes place within the household. So economists apply the concept of “housework” to whatever productive activities a society conventionally assigns to women. Thus, women’s unmarketed labor in these societies counts as productive only if men usually perform it too, whereas men’s unmarketed labor is usually counted in the national income statistics regardless of its relation to women’s labor (Waring 1990, 74-87). The result is that in Africa, where women do 70 percent of the hoeing and weeding of subsistence crops, 80 percent of crop transportation and storage, and 90 percent of water and fuel collecting and food processing, these vital activities rarely appear in the national income accounts (Waring 1990, 84). Here, androcentrism is built into the very data for economic theorizing, in a such a way that women’s gender-typical activities become invisible.

Even when a theory does not go so far as to define the phenomena in a way that excludes female activities, it may still be androcentric in assuming that male activities or predicaments are the sole or primary sources of important changes or events. Until recently, primatologists focused almost exclusively on the behavior of male primates. They assumed that male sexual and dominance behaviors determined the basic structure of primate social order, and that the crucial social relationships among troop-dwelling primates that determined the reproductive fitness of individuals and maintained troop organization were between the dominant male and other males. The assumption followed from a sociobiological argument that claimed to show that females of any species will typically be the “limiting resource” for reproduction: most females will realize an equal and maximum reproductive potential, while males will vary enormously in their reproductive fitness. Natural selection, the driving force of evolutionary change, would therefore operate primarily on male characteristics and behavior (Hrdy 1986).

These assumptions were not seriously challenged until women, some inspired by the feminist movement, started entering the field of primatology in substantial numbers in the mid-1970s. Many studied female-female and female-infant interactions, female dominance and cooperative behavior, and female sexual activity. By turning their focus from male to female behaviors
and relationships, they found that infant survival varied enormously, depending on the behavior and social status of the mothers, that troop survival itself sometimes depended on the eldest female (who would teach others the location of distant water holes that had survived droughts), and that female-directed social and sexual behaviors play key roles in maintaining and changing primate social organizations (Hrdy 1981; Haraway 1989). Today the importance of female primates is widely recognized and studied by both male and female primatologists.

What normative implications should be drawn about the epistemic status of androcentric theories? Some feminist epistemologists propose that theory can proceed better by viewing the world through the eyes of female agents. Gynocentric theory can be fun. What could be a more amusing retort to a study that purports to explain why women lack self-esteem than a study that explains why men are conceited? It can also be instructive. Richard Wrangham (1979) has proposed a gynocentric model of primate social organization that has achieved widespread recognition in primatology. The model assumes the centrality of female competition for food resources, and predicts how females will space themselves (singly or in kin-related groups) according to the distribution of the foods they eat. Males then space themselves so as to gain optimum access to females. The model is gynocentric both in defining the core of primate social groups around female kin-relations rather than around relations to a dominant male and in taking the situation of females to constitute the primary variable that accounts for variations in male and general primate social organization. According to the feminist primatologist Sarah Hrdy (1981, 126), Wrangham's model offers the best available explanation of primate social organization.

The three androcentric theoretical constructs mentioned correspond to three different ways in which a theory could be "gender-centric": in taking one sex or gender to set the norm for both, in defining central concepts with respect to the sex- or gender-typical characteristics, behaviors, or perspectives of males or females alone, and in taking the behaviors, situation, or characteristics of one sex or gender to be causally central in determining particular outcomes. These logical differences in gender-centric theorizing have different epistemic implications. As Wrangham's theory shows, gynocentric causal models can sometimes be superior to androcentric models. Whether they are superior in any particular domain of interest is an empirical question. It can only be answered by comparing rival gender-centric models to one another and to models that do not privilege either male- or female-typical activities or situations in their causal accounts, but rather focus on activities and situations common to both males and females. An important contribution of feminist scholarship in the social sciences and biology has been to show that the activities and situations of females have been far more causally important in various domains than androcentric theories have recognized.
The other two types of gender-centrism are much more problematic than this causal type. A theory that takes one gender to set the norm for both must bear an explanatory burden not borne by theories that refuse to represent difference as deviance. It must explain why an asymmetrical explanation is required for male- and female-specific characteristics. Given the dominant background assumption of modern science that the cosmos does not have its own telos, it is hard to justify any claim that one gender naturally sets the norm for both. Claims about norms must be located in human value judgments, which is to say that the only justification for normative gender-centrism would have to lie in a substantive sexist moral or political theory. As we shall see below, empiricism does not rule out the use of value judgments as background assumptions in scientific theories. Nevertheless, this analysis of normative gender-centrism suggests why feminists should not be satisfied with a table-turning, "why men are so conceited" type of gynocentric theorizing. Posing such questions may expose the androcentrism of standard ways of framing research problems in sex-differences research to healthy ridicule. But because feminists are interested in upholding the equality of all persons, not the domination of women over men, they have no interest in claiming that women set the norm for humans generally.

Theories that tailor concepts to the activities or positions specific to or typical of one gender only and then apply them to everyone are straightforwardly empirically inadequate. As the case of androcentric definitions of class showed, they obscure actual empirical differences between men and women and between differently situated women. As the case of the labor/leisure distinction showed, they overgeneralize from the typical situation of one gender to that of both. When conceptually androcentric theories guide public policy, the resulting policies are usually sexist, since theories cannot respond to phenomena they make invisible. Thus, when GNP statistics fail to count women's labor as productive, and public policies aim to increase GNP, they may do so in ways that fail to improve the well-being of women and their families and may even reduce it. In Malawi and Lesotho, where women grow most of the food for domestic consumption, foreign aid projects have provided agricultural training to the men who have no use for it, and offered only home economics education to women (Waring 1990, 232, 234). In the Sahel, a USAID drought-relief project forced women into economic dependency on men by replacing only men's cattle herds, on the androcentric assumption that women did not engage in economically significant labor (Waring 1990, 176-77).

Feminist naturalized epistemologists therefore pass different judgments on different kinds of gender-centrism in theoretical inquiry. Conceptual gender-centrism is plainly inadequate in any society with overlapping gender roles, because it leads to overgeneralization and obscures the differences between empirically distinct phenomena. It could work only in societies where men
and women inhabit completely and rigidly segregated spheres, and only for concepts that apply exclusively to one or the other gender in such a society. Normative gender-centrism either depends on a problematic cosmic teleology or on sexist values. This does not automatically make it epistemically inadequate, but it does require the assumption of an explanatory burden (why men's and women's traits do not receive symmetrical explanatory treatment) that non-gender-centric theories need not assume. In addition, its dependence on sexist values give theorists who repudiate sexism sufficient reason to conduct inquiry that is not normatively gender-centric. Finally, causal gender-centrism may or may not be empirically justified. Some events do turn asymmetrically on what men or women do, or on how men or women are situated.

The chief trap in causal gender-centrism is the temptation to reify the domain of events that are said to turn asymmetrically on the actions or characteristics of one or the other gender. The selection of a domain of inquiry is always a function of the interests of the inquirer. Failure to recognize this may lead androcentric theorists to construct their domain of study in ways that confine it to just those phenomena that turn asymmetrically on men's activities. They may therefore declare as an objective fact that, say, women have little causal impact on the "economy," when all that is going on is that they have not taken any interest in women's productive activities, and so have not categorized those activities as "economic." Feminist naturalized epistemologists caution against the view that domains of inquiry demarcate natural kinds. Following Quine, they question supposed conceptual barriers between natural and social science, analytic and synthetic knowledge, personal and impersonal knowledge, fact and value (Nelson 1990, chap. 3). Their empiricist commitments enable them to uncover surprising connections among apparently distant points in the web of belief. If naturalized epistemologists use space-age technology to explore the universe of knowledge, feminist naturalized epistemologists could be said to specialize in the discovery of wormholes in that universe. Gender and science are not light-years apart after all; subspace distortions in our cognitive apparatus permit surprisingly rapid transport from one to the other, but feminist navigators are needed to ensure that we know the route we are travelling and have reason to take it.

SEXISM IN SCIENTIFIC THEORIES

One frequently traveled route between gender and science employs normative assumptions about the proper relations between men and women, or about the respective characteristics and interests of men and women, in the content or application of scientific theories. When a theory asserts that women are inferior to men, properly subordinated to men, or properly confined to gender-stereotyped roles, or when it judges or describes women according to sexist or double standards, the content of the theory is sexist. When people employ such
assumptions in applying theories, the application of the theory is sexist. Naturalized feminist epistemology considers how our evaluations of theories should change once their sexism is brought to light.

The application of theories can be sexist in direct or indirect ways. Theories may be used to provide direct ideological justification for patriarchal structures. Steven Goldberg (1973) uses his theory of sex differences in aggression to justify a gendered division of labor that deliberately confines women to low-prestige occupations. More usually, the application of theories is indirectly sexist in taking certain sexist values for granted rather than trying to justify them. For example, research on oral contraceptives for men and women uses a double standard for evaluating the acceptability of side effects. Oral contraceptives for men are disqualified if they reduce libido, but oral contraceptives for women are not rejected for reducing women's sexual desire.

In a standard positivist analysis, neither form of sexism in the application of theories has any bearing on the epistemic value of the theories in question. That a theory is used to support unpopular political programs does not show that the theory is false. At most, it reflects a failure of the proponents of the program to respect the logical gap between fact and value. But opponents of the program fail to respect this gap in attacking a theory for the uses to which it is put. According to this view, theories supply facts that all persons must accept, regardless of their political commitments. That a theory is indirectly applied in sexist ways provides even less ground for attacking its content. The question of truth must be strictly separated from the uses to which such truths are put.

Naturalized epistemology does not support such a sanguine analysis of theories that are applied in sexist ways. "Successful" technological applications of theories are currently taken to provide evidence of their epistemic merits. If knowledge is power, then power is a criterion of adequate understanding. The prevailing interpretation of this criterion does not consider whose power is enhanced by the theory and whose interests are served by it. Feminists urge that these considerations be taken explicitly into account when one evaluates whether technological applications of theories supply evidence of an adequate understanding of the phenomena they control (Tiles 1987). It may be true that certain drugs would be effective in controlling the phenomena of women's hormonal cycles that are currently designated as pathologies constitutive of premenstrual syndrome. Such control may come at the expense of women's interests, not just because of undesirable side effects but also because the legitimation of drug treatment reinforces the medicalization of women's complaints, as if these complaints were symptoms to be medicated rather than as claims on others to change their behavior (Zita 1989). Doctors may be satisfied that such a "successful" drug treatment of PMS supplies evidence that the theory it applies provides them with an adequate understanding of women's
menstrual cycles. But should women be satisfied with this understanding? Suppose the phenomena associated with PMS could also be eliminated, or revalued, by widespread acceptance of feminist conceptions of women's bodies or by egalitarian changes that would make social arrangements less frustrating to women. (This would be possible if women's symptoms of distress in PMS were partly caused by misogynist social expectations that represent women's menstrual cycles as pathological.) Such a successful "technological" application of feminist theory would provide women with an understanding of their own menstrual cycles that would empower them. Where the sexist medical technology would enable women to adapt their bodies to the demands of a sexist society, the feminist technology would empower women to change society so that their bodies were no longer considered "diseased." Thus, applications of theories may influence the content of theories whenever "success" in application is taken to justify the theory in question. Sexist or feminist values may inform criteria of success in application, which may in turn inform competing criteria of adequate understanding. The epistemic evaluation of theories therefore cannot be sharply separated from the interests their applications serve.

Feminist naturalized epistemology also rejects the positivist view that the epistemic merits of theories can be assessed independently of their direct ideological applications (Longino 1990; Antony 1993; Potter 1993). Although any acceptable ideology must make sure that it does not fly in the face of facts, theories do not merely state facts but organize them into systems that tell us what their significance is. Theories logically go beyond the facts; they are "underdetermined" by all the empirical evidence that is or ever could be adduced in their favor (Quine 1960, 22). The evidential link between an observed fact and a theoretical hypothesis can only be secured by background auxiliary hypotheses. This leaves open the logical possibility that ideological judgments may not be implications of an independently supported theory but figure in the justification of the theory itself, by supplying evidential links between empirical observations and hypotheses.

A particularly transparent example of this phenomenon may be found in theories about sex differences in intelligence. Girls scored significantly higher than boys on the first Stanford-Binet IQ tests developed by Lewis Terman. To correct for this "embarrassment," Terman eliminated portions of the test where girls scored higher than boys and inserted questions on which boys scored higher than girls. The substitution was considered necessary to ensure the validity of the test against school grades, the only available independent measures of children's intelligence, which did not differ by gender. But Terman did not adjust his test to eliminate sex differences on subtests of the IQ, such as those about quantitative reasoning. These differences seemed unproblematic because they conformed to prevailing ideological assumptions about appropriate gender roles (Mensch and Mensh 1991, 68-69). Today, that
IQ scores are good predictors of a child's school grades is still taken to provide key evidence for the claim that differences in IQ scores measure differences in children's innate intelligence. But the evidential link tying school grades to this theoretical claim depends on the background value judgment that schools provide fair educational opportunities to all children with respect to all fields of study. Those schools that discourage girls from pursuing math and science assume that girls have inferior quantitative reasoning ability; they do not recognize that lack of encouragement can cause relatively lower performance on math tests.

From a positivist point of view, this reasoning is defective on two counts. First, it is circular to claim that IQ tests demonstrate innate sex differences in quantitative reasoning ability when the assumption of innate sex differences is built into the background hypotheses needed to validate the tests. Second, no reasoning is scientifically sound that incorporates value judgments into the background assumptions that link observations to theory. The salience of positivist views of science as well as their usefulness to feminists in criticizing research about sex differences has tempted some feminists to use the positivist requirement that science be value-free to discredit all scientific projects that incorporate sexist values in the explicit or implicit content of their theories. But this appropriation of positivism puts at odds the two aims of feminist epistemology—to criticize sexist science and to promote feminist science. If incorporating sexist values into scientific theories is illegitimate on positivist grounds, then so is incorporating feminist values into scientific theories (Longino 1993a, 259).

Feminist naturalized epistemologists offer a more nuanced response to the presence of value judgments in scientific inference. Even "good science" can incorporate such value judgments. The logical gap between theory and observation ensures that one cannot in principle rule out the possibility that value judgments are implicit in the background assumptions used to argue that a given observation constitutes evidence for a given hypothesis (Longino 1990). From the perspective of an individual scientist, it is not unreasonable to use any of one's firm beliefs, including beliefs about values, to reason from an observation to a theory. Nor does the prospect of circularity threaten the scientific validity of one's reasoning, as long as the circle of reasoning is big enough. In a coherent web of belief, every belief offers some support for every other belief, and no belief is perfectly self-supporting. Theories that incorporate value judgments can be scientifically sound as long as they are empirically adequate.

This reasoning underwrites the legitimacy of feminist scientific research, which incorporates feminist values into its theories. Such values may be detected in the commitment of feminist researchers to regard women as intelligent agents, capable of reflecting on and changing the conditions that presently constrain their actions. This commitment tends to support a theo-
retical preference for causal models of female behavior that highlight feedback loops between their intentional states and their social and physical environments, and that resist purely structuralist accounts of female “nature” that leave no room for females to resist their circumstances or maneuver among alternate possibilities (Longino 1989, 210-13; Haraway 1989, chap. 13). In contrast, most behaviorist and some sociobiological theories favor models that highlight linear causal chains from fixed physiological or physical conditions to determine behaviors, and that emphasize the structural constraints on action. The epistemic values of simplicity, prediction, and control might seem to support linear, structural causal models. But we have seen that control at least is a contested value; the kinds of control taken to warrant claims of adequate understanding depend on substantive value judgments about the importance of particular human interests. Is adequate understanding achieved when a theory empowers scientists to control women’s lives, or when it empowers women to control their own lives? Rival interpretations of the other epistemic values also depend on contested nonepistemic values. The kind of simplicity one favors depends on one’s aesthetic values. In any event, other epistemic values, such as fruitfulness, appear to favor complex, nonlinear causal models of human behavior. Such models support experiments that generate novel behaviors disruptive of presumed structural constraints on action.

Naturalized feminist epistemology thus permits scientific projects that incorporate feminist values into the content and application of theories. It does not provide methodological arguments against the pursuit of sexist theories. It does claim, however, that it is irrational for theorists to pursue sexist research programs if they do not endorse sexist values. Moral and political arguments about the rationality of particular values may therefore have a bearing on the rationality of pursuing particular research programs. In addition, the objectivity of science demands that the background assumptions of research programs be exposed to criticism. A scientific community composed of inquirers who share the same background assumptions is unlikely to be aware of the roles these assumptions play in licensing inferences from observations to hypotheses, and even less likely to examine these assumptions critically. Naturalized epistemology therefore recommends that the scientific community include a diversity of inquirers who accept different background assumptions. A community of inquirers who largely accept sexist values and incorporate them into their background assumptions could enhance the objectivity of the community’s practice by expanding its membership to include researchers with feminist commitments (Longino 1993a, 267-269).
THE LOCAL CHARACTER OF NATURALIZED FEMINIST EPISTEMOLOGY

In reading the project of feminist epistemology along naturalized, empiricist lines, I have tried to show how its interest and critical power do not depend on the global, transcendental claims that all knowledge is gendered or that rationality as a regulatory epistemic ideal is masculine. Naturalized feminist epistemologists may travel to distant locations in the universe of belief, but they always remain inside that universe and travel from gender to science by way of discrete, empirically discovered paths. They have an interest in constructing new paths to empirically adequate, fruitful, and useful forms of feminist science and in breaking up other paths that lead to cognitively and socially unsatisfactory destinations. All the paths by which naturalized epistemologists find gender to influence theoretical knowledge are local, contingent, and empirically conditioned. All the paths by which they propose to change these influences accept rationality as a key epistemic ideal and empirical adequacy as a fundamental goal of acceptable theories. This ideal and this goal are in principle equally open to pursuit by male and female inquirers, but may be best realized by mixed-gender research communities. Naturalized epistemologists find no persuasive evidence that indicates that all women inquirers bring some shared global feminine difference in ways of thinking to all subjects of study nor that such a feminine difference gives us privileged access to the way the world is.

In rejecting global, transcendental claims about differences in the ways men and women think, naturalized feminist epistemologists do not imply that the entry and advancement of significant numbers of women into scientific communities makes no systematic difference to the knowledge these communities produce. But, following their view of inquiry as a social, not an individual, enterprise, they credit the improvements in knowledge such entry produces to the greater diversity and equality of membership in the scientific community rather than to any purportedly privileged subject position of women as knowers (Tuana 1992; Longino 1993a). Men and women do have some gender-specific experiences and personal knowledge due to their different socialization and social status. We have seen that such experiences and forms of knowledge can be fruitfully brought to bear upon theoretical inquiry. So it should not be surprising that women researchers have exposed and criticized androcentrism in theories much more than men have. The diversity and equality of inquirers help ensure that social models do not merely reflect or fit the circumstances of a narrow demographic segment of the population when they are meant to apply to everyone. They correct a cognitive bias commonly found among inquirers belonging to all demographic groups, located in the habit of assuming that the way the world appears to oneself is the way it appears to everyone.
This survey of some findings of naturalized feminist epistemology has also identified improvements in knowledge that have or would come about through the entry of feminist theorists into various fields, and through revisions in the systems of cognitive authority among fields that would bring the findings of feminist theorists to bear upon apparently distant subjects. We have seen that the use of gender symbolism to model nonhuman phenomena is fraught with cognitive traps. So it should not be surprising that feminist researchers, who make it their business to study the contradictions and incoherences in our conceptions of gender, can improve theories by exposing and clearing up the confusions they inherit from the gender ideologies they use as models. By pursuing feminist research in the humanities, social sciences, and biology, feminist researchers also pose challenges to prevailing theories. Here again, the kinds of changes we should expect in theoretical knowledge from the entry of feminist researchers into various fields do not typically consist in the production of specifically feminist ontologies, methodologies, standpoints, paradigms, or doctrines. Feminist contributions to theorizing are more usefully conceived as altering the field of theoretical possibilities (Haraway 1986, 81, 96). Research informed by feminist commitments makes new explanatory models available, reframes old questions, exposes facts that undermine the plausibility of previously dominant theories, improves data-gathering techniques, and shifts the relations of cognitive authority among fields and theories. In these and many other ways, it reconfigures our assessments of the prospects and virtues of various research programs. Without claiming that women, or feminists, have a globally different or privileged way of knowing, naturalized feminist epistemology explains how feminist theory can productively transform the field of theoretical knowledge.

NOTES

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1. Diamond (1991, 1009) writes that the exclusion of animal trainers' knowledge from the realm of authoritative knowledge "cannot in any very simple way be connected to gender." Pointing out that the terms "hard" and "soft" as applied to forms of knowledge are used by "men trying to put down other men," Sherif argues that for this reason it is "particularly misleading" to infer that these terms symbolize "masculine" and "feminine" (1987, 46-47). I would have thought that her observation supports the gendered reading, since a standard way for men to put down other men is to insinuate that they are feminine.

2. The interests at stake need not be self-interests or even ideological interests of a broader sort. One might just be curious about how rainbows form, without seeking this...
knowledge for the sake of finding out how to get the proverbial pot of gold at the end. Curiosity is one kind of interest we can express in a phenomenon.

3. The question of the impact of feminist theorists on knowledge is distinct from but related to the question of the impact of women theorists on knowledge. Not all women theorists are feminists, and some feminist theorists are men. At the same time, there could be no genuine feminist theory that was conducted by men alone. Feminist theory is theory committed to the liberation and equality of women. These goals can only be achieved through the exercise of women's own agency, especially in defining and coming to know themselves. Feminist theory is one of the vehicles of women's agency in pursuit of these goals, and therefore cannot realize its aims if it is not conducted by women. So it should not be surprising that most of the transformations of knowledge induced by feminist theory were brought about by women.

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