

## DEFENDING ETHICAL NATURALISM: THE ROLES OF COGNITIVE SCIENCE AND PRAGMATISM

*by Andrew Ward*

*Abstract.* In various essays, Paul Churchland explores the relevance of studies in cognitive science to issues in ethics. What emerges is a kind of ethical naturalism that has two components. The first component is a descriptive-genealogical one whose purpose is to explain how people come to have their ethical beliefs. The second component is a normative one whose purpose is to explain why some values are better than other values. Given this distinction, the problem of integrating ethics with beliefs about the world is a consequence of the traditional view that it is possible to naturalize descriptive-genealogical ethics but not normative ethics. With this distinction as background, I critically examine Churchland's exploration of cognitive science's contribution to our understanding of the values and purposes that should direct our lives. The conclusion is twofold. First, using concepts from the American pragmatists, I argue that, *pace* Churchland, it is possible to bridge the descriptive-normative gap in order to articulate an ethical naturalism that addresses the so-called naturalistic fallacy but is not committed to an unpalatable relativism. Second, I argue that the sort of ethical naturalism that emerges has affinities to the postmodern ethics of Jean-François Lyotard.

*Keywords:* Paul Churchland; cognitive science; John Dewey; ethics; Jean-François Lyotard; pragmatism.

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In April and May of 1929, John Dewey delivered a series of Gifford Lectures at the University of Edinburgh that became the basis of his book *The Quest for Certainty*. In chapter 10 of that book, "The Construction of Good," Dewey writes, "The problem of restoring integration and cooperation between man's beliefs about the world in which he lives and his

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[*Zygon*, vol. 40, no. 1 (March 2005).]

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beliefs about the values and purposes that should direct his conduct is the deepest problem of modern life. It is the problem of any philosophy that is not isolated from that of life" (Dewey [1929] 1984, 204).

Dewey revisited these concerns on 9 June 1931 when he delivered the commencement address at Lehigh University in Bethlehem, Pennsylvania. The address, published the next month in the *Lehigh Alumni Bulletin*, addressed questions concerning the social impact of scientific and technological progress:

The greatest problem facing civilization today, one might almost say the only ultimate problem, is the use which humanity is to make of the instrumentality of science and its related techniques—by far the most powerful instrument for good or for evil that mankind has ever known. In comparison with the hundreds of thousands of years that mankind has lived on earth, the instrument is an infant, even though the infant be a giant in stature. (Dewey [1931] 1985, 50)

The problem with which Dewey was concerned, the problem with whether and how values fit into our scientific conception of the world, is as acute at the beginning of the twenty-first century as it was in 1929 and 1931.

In this spirit, Paul Churchland, in essays such as "Moral Facts and Moral Knowledge" (1993, 297–303), explores the relevance of studies in cognitive science to issues in ethics (see also Churchland 1996a, chaps. 6, 10, 11). What emerges is a kind of ethical naturalism that, as Owen Flanagan notes, has two components. The first component is a descriptive-genealogical one whose purpose is to "specify certain basic capacities and propensities of *Homo sapiens*, e.g., sympathy, empathy, and egoism, that are relevant to moral life" (Flanagan 1996b, 194). This component will "explain how people come to feel, think, and act about moral matters in the way they do" (p. 194).<sup>1</sup> The second component is a normative one whose purpose is to "explain why some norms (including norms governing choosing norms), values and virtues are good or better than others" (p. 194).<sup>2</sup> Given this bifurcation of the components of ethical naturalism, the problem of restoring an integration of ethics with "beliefs about the world" is, as Churchland and Flanagan both recognize, a consequence of the "standard view that descriptive-genealogical ethics can be naturalized, but that normative ethics cannot" (1996b, 194; see also 1996a, 119).

Various reasons exist for skepticism about the possibility of naturalizing normative ethics, but there are two central, interrelated problems.<sup>3</sup> The first problem is the traditional view that descriptive ises and normative oughts "are on opposite sides of a great epistemic divide" (Lauden 1990, 45) and that naturalistic accounts fall on the descriptive *is* side of that divide, while normative accounts fall on the other. The attempt to bridge this gap and provide a naturalistic account of ethics commits the so-called naturalistic fallacy.<sup>4</sup> This is the fallacy of supposing that descriptive, naturalistic accounts of beliefs, feelings, and actions are subject to the same forms of adjudication as accounts of what we should believe and feel and

how we should act (Darwall, Gibbard, and Railton 1992, 145).<sup>5</sup> Representing the view that ethics cannot be naturalized, Virginia Held writes that it is a mistake to want to reduce human experience to what can be explained scientifically; rather, we should “assert that in ethics we seek recommendations rather than explanations” (1996, 75; see also Copp 1990, 239ff.).

The second problem is that, even if we could somehow bridge the descriptive-normative gap, the cost of making such a bridge would appear to render the resulting ethical account unacceptably relativistic. This is the worry identified by Hilary Putnam when he writes that one of the principal problems with a naturalized ethics is that it would “deny that ethical sentences are expressions of *judgments*, of thoughts that can be described as true and false, warranted and unwarranted, without some such ‘rider’ as ‘in the relevant social world’” (2002, 131). For example, suppose that we can fully capture moral knowledge in explanations of those complex socialization processes by which we come to feel, think, and act in socially relevant contexts. In this case, there seems nothing more to moral education and moral choice than successful social assimilation. Thus, even if a naturalistic account of descriptive-genealogical ethics is forthcoming, what is problematic, in Paul Churchland’s words, is “whether this process [of learning to make moral distinctions] amounts to the learning of genuine Moral Truths, or to mere socialization” (1993, 300). If “the learning of genuine Moral Truths” is nothing more than “mere socialization,” the normative component of naturalized ethics seems to become, at best, relative to the society in which the social assimilation takes place and, at worst, committed to the view that there “are no moral facts, no moral truths, no moral knowledge” (Harman 1977, 27), and so nihilistic.

For people such as Dewey and Churchland who seek to integrate ethics and values into a naturalistic, scientific conception of the world, these are important and difficult questions. Especially interesting in Churchland’s case is his attempt to use the resources of cognitive science to affect such integration. While, as Alvin Goldman writes, there is general acknowledgment that “findings and theories in cognitive science have been increasingly important in many areas of philosophy, especially philosophy of mind, epistemology, and philosophy of language” (1993, 337), the same cannot be said for the importance of such findings and theories to ethics. In many ways this is surprising. Although the expression “cognitive science” did not really emerge until the 1970s, the practice of what we now call cognitive science emerged as early as September 1948 with the Hixon Symposium on Cerebral Mechanisms in Behavior. Although it may sound as if such a conference would have little to say to people working in ethics, what emerged out of the conference was the beginning of a consensus about the importance of issues that bear directly on ethics. As Howard Gardner writes, the conference laid the foundation for a consensus that

cognitive science asks “what it means to know something and to have accurate beliefs, or to be ignorant and mistaken . . . to understand what is known—the objects and subjects in the external world—and the person who knows . . . [to understand] the differences among individuals: who learns early or with difficulty; what can be known by the child, the inhabitant of a preliterate society, an individual who has suffered brain damage, or a mature scientist” (Gardner 1987, 5). So understood, it would be more surprising if the findings and theories of cognitive science did not have something substantive to contribute to ethics.

Accordingly, in what follows I critically examine Churchland’s exploration of the ways that studies in cognitive science can contribute to our understanding of the values and purposes that should direct our lives. My conclusion is twofold. First, with reference to Churchland, I argue that it is possible to bridge the descriptive-normative gap in such a way as to articulate an ethical naturalism that addresses the so-called naturalistic fallacy and is not committed to an unpalatable relativism. Second, and perhaps more controversially, I argue that the sort of ethical naturalism that emerges has affinities to postmodern ethical perspectives such as those of Jean-François Lyotard.

#### PAUL CHURCHLAND’S DESCRIPTIVE-GENEALOGICAL CONCEPTION OF NATURALIZED ETHICS

As a starting point, it is important to recognize that Churchland’s descriptive-genealogical component of naturalized ethics embodies a conception of inquiry that runs counter to the traditional view of cognitive inquiry. According to the traditional view, the goal of cognitive inquiry is to maximize the ratio of true beliefs to false beliefs in our overall cognitive architecture (see Pollock and Cruz 1999, 176; Alston 1989, 83–84).<sup>6</sup> In contrast, Churchland follows the British philosopher Gilbert Ryle and develops the position, within a cognitive science context, wherein “the claim that propositional knowledge (*knowing that*) is not primary, but rests on *knowing how* to perform certain activities” (Bechtel and Abrahamsen 1997, 152). More specifically, basing his views on an acceptance of a parallel distributed processing (PDP) account of mind and cognitive development (see Paul Churchland 1996b, 107), Churchland writes, “On these neurocomputational models, knowledge acquisition is primarily a process of learning *how*: How to recognize a variety of complex situations and how to respond to them appropriately. The quality of one’s knowledge is measured not by any uniform correspondence between internal sentences and external facts, but by the quality of one’s continuing performance” (1993, 298).

Churchland goes on to explicate this account of cognitive inquiry by means of prototypes. For instance, within a PDP model, children come, through their many experiences within the social world, “to recognize cer-

tain prototypical kinds of social situations, and they learn to produce or avoid the behaviors prototypically required and prohibited in each" (1993, 299). "How the learning child subsequently reacts to a novel learning situation," Churchland continues, "will be a function of which of her many prototypes that situation activates, and this will be a matter of the relative similarity of the new situation to the various prototypes on which she was trained" (1993, 299; see also Patricia Churchland 1998, 248–49).

In his adoption of a prototype account of categories, Paul Churchland moves away from the classical theory about how human beings represent concepts. According to the classical theory, the origins of which, as Edward Smith and Douglas Medin note (Smith and Medin 1981, 22; see also Goldman 1993, 338ff.; Lakoff 1987, 17), go back to Aristotle in philosophy<sup>7</sup> and to Clark L. Hull's 1920 monograph on concept attainment in experimental psychology, concepts are represented by a collection of properties that the category members share. More important, the central idea of the classical view is that the collection of properties that the category members share is singly necessary and jointly sufficient to define the concept. Thus, according to the classical theory, no member of the category is any more representative than any other member of the category. In philosophy, Wittgenstein challenged this classical theory with his claim that the structure of many categories is in terms of family resemblances rather than by the presence of singly necessary and jointly sufficient properties. However, Wittgenstein's methodology leading him to this claim was not systematic, and, arguably, in many respects was *a priori*. It was in the 1970s that the psychologist Eleanor Rosch combined her empirical research with that of earlier psychologists such as Brent Berlin, Paul Kay, and Roger Brown, to name only three, to come up with an alternative to the classical view. This alternative is "the theory of prototypes and basic level concepts." Although there are several different versions of prototype theory,<sup>8</sup> the one most directly relevant to Paul Churchland's account is the probabilistic prototype theory. According to this theory, an object is categorized as an instance or subset of a category if and only if the object possesses some critical sum of the weighted properties that constitute the category. It is this sum of weighted properties constituting the category that is the prototype. Thus, rather than an object needing to possess a certain set of properties to be categorized as an instance or subset of a category, the process of categorization is a probabilistic function of the object's similitude to the prototype. As Medin and Evan Heit write, "membership in a category can thus be graded rather than all-or-none, where the better members have more characteristic properties than the poorer ones" (1999, 100). What Churchland does is to interpret prototypes as weighted patterns of neural activation vectors. This account categorizes an object as a certain sort by virtue of the weighted pattern of activated neural vectors.

There are many interesting and provocative features of Churchland's account of prototypes as defined within a PDP network and, more specifically, within a vectorial kinematic and synaptic weight dynamics network.<sup>9</sup> However, a detailed discussion of the advantages and disadvantages of psychological theories making use of prototypes is beyond the scope of this article. Instead, I assume that there are good reasons for accepting the use of prototypes in characterizing important parts of people's psychological architecture and focus on the procedural conception of inquiry implicit in Churchland's account.<sup>10</sup> In particular, accepting the paradigm of inquiry provided by the PDP account of mind and cognitive development entails a rejection of psychological sententialism. Thus, it entails rejecting the view that the psychological architecture of human beings is constituted by an internally stored set of sentences and that human predictive and explanatory activities are "a matter of *deductive inference* from those sentences plus occasional premises about the case at hand" (Paul Churchland 1993, 111–12).<sup>11</sup>

Not only does the rejection of sententialism lead Churchland to the eliminativist view that "beliefs and desires are of a piece with phlogiston, caloric, and the alchemical science" (1993, 125),<sup>12</sup> it also leads to his willingness to surrender "classical truth and reference" as the goals of cognitive inquiry (Paul Churchland 1998, 42; 1993, 149–50). As he writes, if the "unit of representation in the new paradigm [the PDP account] is something other than the propositional attitude [e.g., prototypes], then presumably its virtue will be something other than *truth*, and its relation to the world will be something other than *reference*" (1998, 42).<sup>13</sup> In place of truth and reference, Churchland proposes that we seek for some "more worthy and more penetrating evaluative and semantical notions" (1998, 43; also see 1993, 150–51) by which to assess those processes that generate prototypes. In a discussion of Bas van Fraassen's critical empiricism, Churchland writes that "if we are to reconsider truth as the aim or product of cognitive activity [something about which he and Van Fraassen are in agreement] . . . we should move in the direction of *pragmatism*" (1998, 149–50).

At this point, the question is what exactly it means to "move in the direction of pragmatism" and displace truth as the goal of inquiry with some worthier "target." A rather long tradition in Western intellectual history has held that the psychological architecture of human beings is constituted by representational structures that, in one way or another, mirror the world. Indeed, Patricia Churchland and Terrence Sejnowski write that "the central epistemological question, from Plato on is this: *How is representation of a world by a self possible?*" (1990, 343) As they suggest, from the point of view of philosophers the motivation for postulating such representational structures has often been explicitly linked to questions of knowledge and the conditions that must be satisfied in order to have knowl-

edge. As we live our lives, we discover that there is sometimes, perhaps often, a difference between the way that the world appears to us and the way that it really is. For example, something can appear near when it is really far, and two lines can appear to be of equal length when they are not. Thus, there seems to be a difference between appearance and reality—between the way the world is represented (the appearance) and the way the world is (the reality). What we are aware of and what we think about are representations of a real world; representations serve as the “interface between the knowing subject and what is known” (Hacking 1975, 187). Writers such as René Descartes, John Locke, and David Hume accounted for this representational architecture in terms of ideas, and all three struggled with whether and how to ensure that the interface between the knowing subject and what is known, as provided by ideas, gave us knowledge of the real world.

More recently, the representational architecture of human beings has been understood in terms of mental states such as beliefs and desires having sentential structure. As Gilbert Harman writes, “just as we can talk about Paul Benacerraf, we can have beliefs about him, as well as fears, hopes, desires, and so forth. Just as our remarks can represent Benacerraf as wise, so can our beliefs, fears, hopes and desires. And just as what we say can be true, beliefs can be true and fears, hopes and desires can come true” (1973, 57). It is because of the functional similarity between sentences and mental states such as belief, fears, hopes, and desires that people refer to such mental states as propositional attitudes. To the extent that such mental, sentential structures accurately mirror the world they are true or can become true, and, according to representational sententialism, the goal of cognitive inquiry is to maximize the ratio of true mental, sentential structures to false ones.

However, the PDP model of inquiry denies this kind of psychological architecture. Specifically, it denies that the architecture of representational mental structures is sentential. An important implication of this denial is that if representational mental structures are not sentential, their value cannot be that they are veridical. In this case, it is necessary to evaluate representational mental structures in some other way. Here cognitive scientists and philosophers differ in their reasons for supposing that the psychological architecture of human beings is representational. Whereas philosophers typically focus on issues of epistemology and how what appears to the senses may be different from the way the world really is, cognitive scientists typically focus on issues of dynamic adaptability. One of the distinguishing characteristics of intelligent systems is their ability to adapt to novel situations to achieve some particular goal. Such adaptability requires an ability to be sensitive to the changing conditions in which a system finds itself relative to the goals sought by the system.

A central thesis of cognitive science, then, is that any adequate explanation of such a dynamic relation between environmental (both inner and outer, perhaps) sensitivity and goal-seeking behavior requires referring to a representational structure possessed by the system. Thus, representational structures must be understood as distinguishing characteristics of our embodied agency, the loci of human beings' directions and actions within the world. In other words, cognitive science generally, and PDP more particularly, moves away from the idea that representational structures are coded sets of stored facts or declarations and toward the idea that they are coded sets of procedures or actions to be carried out. From the PDP perspective, "the basic kinematics of cognitive creatures is a kinematics not of sentences but of high-dimensional activation vectors being transformed into other such vectors by passing through large arrays of synaptic connections" (Paul Churchland 1993, xvi). Once representational structures are conceived in this way, their assessment is no longer in terms of truth but instead in terms of procedural success. This, though, is not something that can be assessed independent of a context in which the procedures and actions occur. It is only within a larger "ecological" context of success and failure that it is possible to assess procedures and actions. Thus, in assessing representational architecture, we need to examine how human beings evolved to have the psychological architectures they do. We must seek to understand human beings as the products of a long process of natural selection within a dynamic environment. What is important is not how human beings picture the world but how they deal with it.

Here we have the key. For both Patricia and Paul Churchland, representational structures are neurologically instantiated psychological architectures that have evolved to permit humans to "move appropriately" within their natural and social environment (see Patricia Churchland 1987, 548). As Patricia Churchland writes, "Looked at from an evolutionary point of view, the principal function of the nervous system is to enable the organisms to move appropriately . . . a fancier style of representing is advantageous *so long as it is geared to the organism's way of life and enhances the organism's chance for survival*. Truth, whatever that is, definitely takes the hindmost" (1987, 549). It is in this sense that the Churchlands move in the direction of pragmatism. In the language of Dewey, representational psychological structures emerge in response to unsettled, uncertain, and disturbed "organic-environmental interactions" (Dewey [1938] 1991, 109) so as to affect "an active organization of the given environment, a removal of some specific trouble or perplexity" ([1920] 1991, 156).<sup>14</sup> Thus for Dewey inquiry was a distinctively instrumental activity. In his *Logic: The Theory of Inquiry* he defined it as "*the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent directions and relations as to convert the elements of the original situation into a unified whole*" ([1938] 1991, 108). We judge inquiry that results in struc-



tures that systematically affect—both diachronically and synchronically—such active organizations as successful. Successful resolutions to situated struggles and challenges come out of, and are conditioned by, specifically human needs within natural and social environments, which is the goal of inquiry. As Stephen Stich writes, “cognitive processes, pragmatists will insist, should not be thought of primarily as devices for generating truths. Rather they should be thought of as something akin to tools or technologies or practices that can be used more or less successfully in achieving a variety of goals” (1993, 131).

Recognizing that there is a variety of goals against which to measure cognitive inquiry does not mean that the displacement of truth by “an active organization of the given environment, a removal of some specific trouble or perplexity” leads to some sort of unrestricted relativism—an “anything goes” relativism. Paul Churchland, in response to a question put to him by Stich, insists that his view is a properly scientific realist view. Churchland writes that he remains “committed to the idea that there exists a world, independent of our cognition, with which we interact, and of which we construct representations; for varying purposes, with varying penetration, and with varying success” (1993, 151).<sup>15</sup> However, this is just what we would expect from someone who advocates a movement in the direction of pragmatism. For the pragmatist, cognitive inquiries are conducted through a negotiated self-reflexive social dynamic within the natural world. This kind of dynamic imposes constraints on the Deweyan “active reorganizations” so that they are not just a matter of social consensus—not, that is, a matter of mere socialization. The social and natural worlds structure, and are in turn structured by, one another. The natural world, the social world, and the inhabitants of both are all complexly interdependent in such a way that a change in any one of the three changes the other two. Thus, proposed resolutions of specific struggles and challenges must, to be successful, take account of and be sensitive to how those resolutions affect changes throughout the entire interdependent system (see Pickering 1994, 118ff.). “We know that some methods of inquiry are better than others,” writes Dewey, “in just the same way in which we know that some methods of surgery, farming, road-making, navigating or what-not are better than others. . . . They are the methods which experience up to the present time shows to be the best methods for achieving certain results” ([1938] 1991, 108).<sup>16</sup> In the spirit of Lorraine Code, the position advocated is one in which practice “will show, not once and for all but case by case, whether conclusions are reasonable and workable” (Code 1993, 41; see also Dewey [1920] 1991, 175). In this respect, claims of successful resolutions to challenges and struggles derive from, and are conditioned by, specifically human needs. Successful resolution of these challenges and struggles at the broader community level of organized inquirers constitutes the objectivity of inquiry’s end and prevents a slip into some sort of

unrestricted, anything-goes relativism. Putnam writes that “our image of the world cannot be ‘justified’ by anything but its success as judged by the interests and values which evolve and get modified at the same time and in interaction with our evolving image of the world itself” (1990, 29).<sup>17</sup>

#### NATURALIZED ETHICS

We are now in a position to understand how to naturalize the normative component of ethics. As we have seen, pragmatists claim that the goal of cognitive inquiry is not what William James calls “Truth with a capital ‘T’” ([1907] 1991, 102, 106).<sup>18</sup> In other words, cognitive inquiry does not aim at knowledge or justified true belief about some sort of rationalistic, ahistorical, transcultural way that the world is. Rather, the goal of cognitive inquiry is the resolution of situated struggles and challenges within the natural and social environments. According to James, a “new opinion counts as ‘true’ just in proportion as it gratifies the individual’s desire to assimilate the novel in his experience to his beliefs in stock” ([1907] 1991, 31). In this respect, cognitive inquiry is best understood as being itself a kind of practical inquiry—a technology, as Stich suggested.<sup>19</sup> To paraphrase Patricia Churchland (1987, 546), the fundamental epistemological question has now become how, situated in a bodily configuration, within a physical environment, and within a specific social context, a person successfully orients herself or himself for action and removes the specific troubles and perplexities that attend such situated embodiment. Understanding cognitive inquiry in this way entails a collapse of the descriptive-normative gap. What created the gap in the first place was the insistence that we gauge the success of cognitive inquiry by a standard different from that of practical inquiry—namely, represented truth. This, though, is precisely what the pragmatist and both of the Churchlands deny. The traditionally sharp distinction between epistemic reasons and practical reasons has been erased (see Harman 1999, 98) and the goal of cognitive inquiry shifted away from veridical picturing to manifested competence. Dewey, for example, writes:

According to the position here taken, ends, as objective termini or as fulfillments function in judgment as representative modes of operation that will resolve the doubtful situation which evokes and demands judgment. As *end-in-view* they denote plans of action or purposes. The business of inquiry is to determine that mode of operation which will resolve the predicament in which the agent finds himself involved, in correspondence with the observations which determine just what the facts of the predicament are. (Dewey [1938] 1991, 169)<sup>20</sup>

In a similar vein, using the language of the PDP model, Paul Churchland writes that all inquiry results in a “family of abilities encoded as a hierarchy of prototypes and prototypical sequences in the neuronal activation space” of the brain of the inquirer (1996b, 227). Descriptive, naturalistic accounts of our beliefs, feelings, and actions are subject to the same

forms of adjudication as accounts of what we should believe and feel and how we should act. What is distinctive about cognitive inquiry is not that it is a kind of inquiry different from practical inquiry but that it is part of one of the many different types of practical inquiries. In this connection Dewey, in *Human Nature and Conduct*, writes that “physics, chemistry, history, statistics, engineering science, are a part of disciplined moral knowledge so far as they enable us to understand the conditions and agencies through which man lives, and on account of which he forms and executes his plans” ([1922] 1988, 204).<sup>21</sup> This echoes Dewey’s earlier (1908) public lecture at Columbia University, where he said that the business of morals is to “utilize physiology, anthropology, and psychology to discover all that can be discovered of man, his organic power and propensities . . . and to converge all the instrumentalities of the social arts, of law, education, economics, and political science upon the construction of intelligent methods of improving the common lot” ([1910] 1997, 69).

So now we see that it is possible to have a naturalized ethics that does not succumb to the naturalistic fallacy. However, what precisely are the members of society learning when they are engaged in moral learning? Paul Churchland’s answer to this question is that “they are learning how best to organize and administer their collective and individual affairs” (1993, 302; 1996a, 146 ff.). He is saying, again in the spirit of Dewey, that the difference between claims about the natural world and ethical claims is one not of kind but of emphasis (1996b, 92, 106). For instance, whereas science focuses on the natural world, ethics focuses on the social world and the interaction of agents with one another in the social world. This is not intended to imply that ethics ignores the natural world. Embodied agents always find themselves in both the natural and social worlds, so the actions and decisions of embodied agents has consequences in both. However, often the relations with the social world are more unpredictably dynamic than those with the natural world and so require different kinds of skills. Thus, in learning to make moral judgments one is learning “the *structure of social space* and *how best to navigate one’s way through it*” (Paul Churchland 1993, 300). On such an account, the normative component of a naturalized ethics is precisely the pragmatic issue of inquiring into an optimal navigation through a specific social space. More technically, moral learning “will be a matter of slowly generating a hierarchy of moral prototypes, presumably from a substantial number of relevant *examples* of the moral kinds at issue. Hence the relevance of stories and fables, and above all, the ongoing relevance of the parental example of interpersonal behavior, and parental commentary on and consistent guidance of childhood behavior” (1996a, 146; 1996b, 102).

Of course, as the so-called social space changes, what counts as optimal navigation is likely to change as well. Thus, as Mark Johnson writes, “breach of promise is evaluated in one way within a . . . framework of lying to

one's spouse about an extramarital affair, but it has a quite different significance in the context of failure to keep one's promise to an officer of a dictatorial police state" (1993, 191). Accordingly, our ability to navigate successfully in social space depends crucially on behavior patterns that are programmatically gappy—genetically grounded behavior patterns that are dynamically sensitive to experiences and change as experiences fill in the gaps (see Clarke 1990, 237ff.). In this connection, it is worth noting that some psychobiologists argue that the development of social skills in diverse, dynamically complex situations may have been a major impetus for the evolutionarily rapid development of certain parts of the human brain (see Johnston 1999, 164ff.; Damasio 1994).

Although it may seem that something unnatural has been smuggled into the account by use of "optimal" in characterizing navigation through social space, this criticism is misguided. Optimal navigation in social space is no less something natural than is flourishing within a biological context. The flourishing of a plant or a species is determined by its relation to other constituents of an ecosystem. For example, if the actions and demands of an organism exceed the carrying capacity of its environment, the result is a degradation of that environment and the inability of sustained flourishing within the environment. Nature exacts penalties when the demands of the organism exceed the carrying capacity of the natural environment in which it exists. An analogous claim holds for optimal social navigation (see Canton 1987, 415ff.). Optimal social navigation is something decided by the success of navigation through social space as judged by the human interests and values that "evolve and get modified at the same time and in interaction with our evolving image of the world itself" (Putnam 1990, 29; see Walker 1996, 277).<sup>22</sup> Reverting to the language of the PDP model, we can understand optimal social navigation in terms of a configuration of connection weights that partition the system's activation vector spaces into divisions and subdivisions that tend to minimize the error messages.

There is nothing here that does not readily lend itself to a naturalistic account. It is not coincidental relative to Churchland's pragmatism that, while the language is different, a similar sentiment is found in Dewey: "moral science is not something with a separate province. It is the physical, biological, and historic knowledge placed in a humane context where it will illuminate and guide the activities of man" ([1922] 1988, 204–5).<sup>23</sup>

Finally, this leads us to the question of whether the proposed naturalistic ethics is committed to an unpalatable relativism. It is true that, as Paul and Patricia Churchland write (1996, 303), "a human's moral virtues must always be turned to and measured against the abiding features of the local social economy in which he or she is unavoidably embedded" and that "the empirical facts of local social ecology will sharply constrain what reason discovers to be successful modes of behavior." This reflects the facts that human beings are embedded within a rich natural-social environment

in which their cognitive and social navigations take place and that successful navigation must be judged against criteria provided by the natural-social environment. It makes no sense to talk about any sort of navigation, optimal or otherwise, except by reference to the specifics of a natural and social ecology in which the navigation takes place. Dewey writes, “all inquiry proceeds within a cultural matrix which is ultimately determined by the nature of social relations. The subject-matter of physical inquiry at any time falls within a larger social field. The techniques available at a given time depend upon the state of material and cultural culture” ([1938] 1991, 481).<sup>24</sup>

However, just as Churchland’s pragmatism with respect to the natural world does not lead to an unrestricted, anything-goes relativism, this too is the case for ethics. Ethics is not, as the relativist claims, a matter of mere socialization. Flanagan writes, “‘Mere’ socialization is socialization toward which no critical attitude is taken, for which there are no mechanisms for modification and refinement” (1996b, 206). On the Churchland *cum* pragmatist account of naturalized ethics, though, there are almost always mechanisms for modification and refinement. In part, this is a function of people’s biologically based ability to interact dynamically with the natural world. In this respect, the natural environment itself provides feedbacks and constraints on social organizations. Sociologist Otis Duncan provides a vivid example of how air pollution in Los Angeles from 1940 to 1960 caused changes in the affected social structures. The pollution problem resulted in a “complex interplay of interests and pressures” among businesses, private organizations, and various levels of government (Duncan 1961, 144ff.).

Equally, though, it is a function of the account’s implicit rejection of what Lyotard (1991) would call a unifying social metanarrative. The social space within which the individual is partially constituted and seeks for orientation is not some sort of homogenous, monolithic entity. As Lyotard writes, the “social” is “immediately complex” (1988, 139); competing and collaborating local narratives make up the social space. This is what Lyotard means when he writes that what “politics is about and what distinguishes various kinds of politics is the genre of discourse, or the stakes whereby differends are formulated as litigations and find their ‘regulation’” (1988, 142).<sup>25</sup> As each narrative competes with myriad others, a critical reflexive attitude is created within the narrative whereby local and fallibilistic assessments are made as to the value of the social orientation offered by the narrative. It is only in its historically situated encounter with alternative narratives that any given point of view establishes, or fails to establish, its “superiority” relative to its rivals in specific contexts (cf. MacIntyre 1984, 269). As Lyotard writes, “any consensus on the rules defining a [language] game and the ‘moves’ playable within it must be local” (1991, 66; 1988, 157). But, as we have already seen, for Paul Churchland the appropriate

prototype vectors that constitute a person's general knowledge and skills are a configuration that partly emerges in response to the social environment in which the person finds him- or herself. Thus, to the extent that the psychological architecture of a person is a function of these competing narratives, one finds a constitutive critical attitude conducive to continuing modification and refinement.

Indeed, in the conditions of what some call late modernity, it is the agonistics of an ever-increasing number of narratives that threatens the stability of the self (Giddens 1991). The breakdown of a dominant, historical narrative that provides a framework for competing local narratives leaves only the fracturing effect of those competing local narratives. While it is true that such narrative agonistics lead to critical attitudes conducive to continuing modification and refinement, the concern is that the critical attitudes also threaten to become hypercritical, leading to fragmentation and what some call the madness of modernity. Thus, there is a fine line between the critical self-reflection resulting from a psychological architecture that "represents" diverse and antagonistic narratives and the fragmentation of self-stability and identity. It is worth noting, though, that this is something for which the PDP approach to psychological architecture can account and, perhaps, offer prescriptions.

This concern notwithstanding, it is important to remember that not only individuals seek an optimal kind of navigation through the natural-social environment. In a larger sense, the society created by the interweaving of various local narratives seeks an optimal navigation. Viewed from this broader perspective, the legislative and judicial bodies of societies must themselves be understood as engaged in what Paul Churchland calls a process of "continuously formulating and reformulating social policy of some sort or other—prohibiting certain kinds of behavior, regulating many others, and positively encouraging others still—in an ongoing response to the unfolding environment and to the observed social effects of policies already in place" (1996a, 228). This reflects Lyotard's claim that, in part, what postmodernism teaches us is the importance of paralogical experimentation wherein metanarrative presuppositions of prevailing social orders and organizations are subject to imaginative examination (Lyotard 1991, 60ff.). To the extent that a social narrative is not responsive to, and unwilling to engage the possibilities for social orientation offered by, other narratives constituting the society, the narrative will (eventually) fail. Should large portions of the constituent narratives fail to be responsive and engaging, the entire social fabric will unravel.<sup>26</sup> This is the moral of political theorists from Plato and Aristotle to Machiavelli to Marx and Sandel (Sandel 1996). It is the insight that lies behind the idea of anacyclosis (the cyclical character of political associations and disassociations examined in the sixth book of Polybius's *The Rise of the Roman Empire* and elsewhere) and why forms of political association arise, struggle, fail, and give birth to new

forms of association. The larger systemic view of the dynamics of the social space in which individuals find themselves situated requires a social commitment to self-reflexive scrutiny built into the idea of successful orientation, now construed quite broadly in the pragmatist spirit as the goal of inquiry. As Margaret Walker writes, the success of societies requires “publicly recognized standards and forums which institutionalize and reward evaluation” of moral judgments and “examination of processes and relations of cognitive authority, which must not cloak cultural, political, or economic dominance or suppress relevant criticism from diverse viewpoints” (1996, 275). These requirements of self-reflexive scrutiny at the social level function as additional metalevel constraints on individuals’ successful navigation through localized social spaces.

Once the normative component of a naturalized ethics as a situated practice is understood properly, there are two answers to the charge of relativism. The first answer comes by recognizing that individual humans exist and are informed, though not mechanistically determined, by what Lyotard calls a complex fabric of competing and agonistic social narratives (Lyotard 1991, 15). There are no transcendental egos or voyeur-puppeteers that constitute the “core selves” of individual humans. The “essential psychology” of human beings is not something that can be understood and studied solipsistically in the fashion of Descartes’ *cogito*. Instead, the psychological architecture of human beings is a complex, dynamic structure that “represents” the agonistics of the natural and social worlds within which it evolved. Every human being is, to a greater or lesser extent, a microcosm of the larger critically reflexive natural and social environment in which he or she develops and lives. Thus, as Anthony Giddens noted (1991, 53), self-identify is “the self as understood by the person in terms of her or his biography,” and this biography is itself a narrative occurring within the natural and social worlds and the interactions between the two.

The second answer to the charge of relativism comes by way of the presence of systemic social constraints governing societies’ optimal navigation through the natural and larger social worlds (Flanagan 1996a, 129–30). According to this “ecological viewpoint” (see Duncan and Schnore 1959, 135ff.), societies are systems in which dynamic collective adaptations of a population to its environment occur, and within this adaptation are many local adaptations reflecting the contingencies of particular situations and uncertainties. It follows that in the Churchland *cum* pragmatist view, the worry that “moral education” might turn out to be mere socialization and that ethics might fall prey to some sort of unrestricted relativism is misguided.

In conclusion, by incorporating insights from cognitive science and pragmatism, advocates of naturalized ethics are able to resolve at least two of the important problems with which such a view has traditionally been associated. More than this, the aims of cognitive science, far from being

removed from the concerns of ordinary life, are intertwined with it. The triangulation of cognitive science, pragmatism, and ethics suggests, in the words of Dewey, no “impersonal and purely speculative endeavors to contemplate as remote beholders the nature of absolute things-in-themselves” but rather “a living picture of the choice of thoughtful men [and women] about what they would have life to be, and to what ends they would have men [and women] shape their intelligent activities” ([1920] 1991, 94).

#### NOTES

1. No implication is intended concerning whether a naturalistic account of the psychological life of human beings will be either reductionist or not reductionist. On at least some construals of naturalism, it is possible to be a naturalist without being either a psychological eliminativist or an advocate of intertheoretical reductions of psychology (and other “special sciences”) to some more basic science such as physics.

2. Also see Flanagan 1996a, 119, and G. C. Hempel (1983), who draws a distinction between “descriptive-naturalistic” and “normative” methodologies. Hempel argues for a position that combines the two.

3. These are two of the three arguments that Ronald Giere (1985, 333) writes that “one would expect to be raised against any proposal to naturalize the philosophy of science.” The third argument, called the “circle argument” by Giere, says that “the use of scientific methods to investigate scientific methods must be circular, beg the question, or lead to a regress.”

4. As Stephen Darwall, Allan Gibbard, and Peter Railton note (1992, 115), strictly speaking, the naturalistic fallacy is no fallacy at all; what the so-called fallacy really exemplifies is “an argumentative device [the open question argument] that implicitly but effectively brings to the fore certain characteristic features of ‘good’—and other normative vocabulary—that seem to stand in the way of our accepting any known naturalistic or metaphysical definition as unquestionably right.”

5. Giere writes, “A naturalistic study of science, it is claimed, could at most *describe* the methods scientists use in coming to adopt hypotheses or theories. The goal of the philosophy of science, however, is not merely to *describe* the methods scientists employ, but to *prescribe* what methods they *should* employ. We want to know not merely what criteria scientists in fact use in adopting theories; we want to know which are the *right* criteria. A naturalistic philosophy of science would be powerless to answer such questions” (1985, 333–34).

6. Not everyone is an enthusiastic advocate of PDP models of cognitive architecture. See, for example, Fodor and Pylyshyn 1997.

7. As Goldman (1993) notes, the account in philosophy is also prominent in Plato.

8. It is also interesting to note that, as George Lakoff writes, in the late 1970s “Rosch abandoned the ideas that prototype effects directly mirror category structure and that prototypes constitute representations of categories” (1987, 43). This raises an interesting question: Even if a PDP model of cognitive architecture naturally lends itself to an understanding of categories in terms of prototypes, to what extent is prototype theory, of some form, supported by empirical evidence?

9. See, for example, Paul Churchland 1993, 122–25. Jerry Fodor has argued that any account treating concepts as prototypes is mistaken. See, for example, Fodor 1998, chap. 5. Also see Rey 1983 for a critical discussion of prototypes.

10. For Paul Churchland, knowledge is encoded as a set of procedures or actions to be carried out as opposed to a set of stored facts or declarations. See Gardner 1987, 161ff., for a discussion of the distinction between procedural and declarative representations.

11. Also see Paul Churchland 1993, 150, where he writes that “it is far from obvious that sentences or propositions or anything remotely like them constitute the basic elements in cognition. . . .” In fact, a consistent theme in the work of both Patricia Churchland and Paul Churchland is that we ought to reject psychological sententialism. Andy Clark (2000) also argues that we ought to reject sententialism.

12. Unlike many, I do not find the eliminativism of Paul Churchland’s position particularly objectionable. Geologists may not “quantify over” mountains in their geological qua scientific



account of the world, but this does not mean that they must (or would) deny the existence of mountains. Similarly, cognitive scientists may not quantify over beliefs, desires, etc. in their scientific account of the world, but this does not mean that they must (or would) deny the existence of mountains. The point is, as Valerie Hardcastle notes in her discussion of the “hard problem of consciousness” (1998, 67), that explanations are “social creatures.” “They are,” she writes, “designed for particular audiences asking particular questions within a particular historically determined framework.” To my mind, the more radical stance is Churchland’s rejection of truth as the goal of cognitive inquiry.

13. Also see Patricia Churchland, who writes that “if representational structures are not sentences (propositions), they are not truth-valuable; if they are to be evaluated, it must be in some other way. Consequently, the very concept of truth appears to be in for major reconsideration” (1987, 545).

14. Also see Heldke 1989, 112–13. In this respect, the pragmatist denies that intellectual activity has its own autonomous ends independent of the “removal of some specific trouble or perplexity.” Although Held disagrees with Dewey’s ethics, this claim of Dewey’s, at least as used in this paper, does seem compatible with her claim that “moral problems . . . do not simply present themselves. We . . . interpret them as moral problems” (1996, 85). The extent to which this interpretation is voluntaristic is an interesting and important one.

15. Dewey writes that the “scientist finds no help in determining the probable truth of some proposed theory by comparing it with a standard of absolute truth and immutable being. He has to rely upon definite operations undertaken under definite conditions—upon method” [1929] 1984, 211.

16. Dewey writes, “If ideas, meanings, conceptions, notions, theories, systems are instrumental to an active reorganization of the given environment, to a removal of some specific trouble and perplexity, then the test of their validity and value lies in accomplishing this work. If they succeed in their office, they are reliable, sound, valid, good, true” ([1920] 1991, 169).

17. This is compatible with the claim that it may well turn out that there is no single cognitive process that is best in all situations. Indeed, I think that this would be a surprising result. As Stich writes, “it may well turn out that one [cognitive] system is best for one person or group, while another is best for another person or group” (1993, 136).

18. For James, such truth is “absolutist truth,” meaning “what no farther experience will ever alter . . . that ideal vanishing-point towards which we imagine that all our temporary truths will some day converge” ([1907] 1991, 98).

19. This formulation of pragmatism may seem to entail a kind of antirealism. However, as Harman writes, “pragmatism might be considered a form of antirealism, but it is probably better seen as a rejection of the distinction between realism and antirealism on the grounds that there is no sharp distinction between theoretical and practical questions” (1999, 93).

20. A similar sentiment is found in Dewey [1920] 1991, 179, where he writes that “inquiry, discovery take the same place in morals that they have come to occupy in sciences of nature. Validation, demonstration become experimental, a matter of consequences.” Also see p. 178, where he writes that pragmatism does away “once for all with the traditional distinction between moral goods, like the virtues, and natural goods like health, economic security, art, science and the like.”

21. Jennifer Welchman writes that for Dewey there is no difference in kind between the “construction of values” and the “construction of facts about physical objects.” In both cases, “one and the same method is used” (1995, 190).

22. In characterizing the “moral person,” Paul Churchland writes that such a person is “one who has acquired a complex set of subtle and enviable skills: perceptual, cognitive and behavioral” (1996b, 105). As he recognizes, this bears more than a passing similarity to Aristotle.

23. Held finds Dewey’s ethics “fundamentally unsatisfactory” precisely because it “was the sort of theory to which the sciences like cognitive science could provide answers” (1996, 84).

24. Dewey also wrote that “*Judgments about values are judgments about the conditions and the results of experienced objects; judgments about that which should regulate the formation of our desires, affections and enjoyments*” [1929] 1984, 212).

25. As Patrick McKinlay writes, the “heart of Lyotard’s explanation of the postmodern condition is the linkage between politics and difference” (1998, 483).

26. Arguably, this is at least part of Lyotard’s message in writings such as “Dead Letter” and “The Wall, the Gulf, and the Sun: A Fable” (1993).

## REFERENCES

- Alston, William P. 1989. "Concepts of Epistemic Justification." In *Epistemic Justification: Essays in the Theory of Knowledge*, 81–114. Ithaca, N.Y.: Cornell Univ. Press.
- Bechtel, William, and Adele Abrahamsen. 1997. *Connectionism and the Mind: An Introduction to Parallel Processing in Networks*. Malden, Mass.: Blackwell.
- Canton, William R. Jr. 1987. "The World's Most Polymorphic Species." *BioScience* 37 (6): 413–19.
- Churchland, Patricia Smith. 1987. "Epistemology in the Age of Neuroscience." *The Journal of Philosophy* 84 (10): 544–53.
- . 1998. "Feeling Reasons." In Paul M. Churchland and Patricia S. Churchland, *On the Contrary: Critical Essays, 1987–1997*, 248–49. Cambridge: Bradford Books/MIT Press.
- Churchland, Patricia, and Terrence J. Sejnowski. 1990. "Neural Representation and Neural Computation." *Philosophical Perspectives* 4:343–82.
- Churchland, Paul M. 1993. *A Neurocomputational Perspective: The Nature of Mind and the Structure of Science*. Cambridge: Bradford Books/MIT Press.
- . 1996a. *The Engine of Reason, the Seat of the Soul: A Philosophical Journey into the Brain*. Cambridge: Bradford Books/MIT Press.
- . 1996b. "The Neural Representation of the Social World." In *Mind and Morals: Essays on Ethics and Cognitive Science*, ed. Larry May, Marilyn Friedman, and Andy Clark, 91–108. Cambridge: Bradford Books/MIT Press.
- . 1998. "Activation Vectors v. Propositional Attitudes: How the Brain Represents Reality." In Paul M. Churchland and Patricia S. Churchland, *On the Contrary: Critical Essays, 1987–1997*, 39–44. Cambridge: Bradford Books/MIT Press.
- Churchland, Paul, and Patricia Churchland. 1996. "Flanagan on Moral Knowledge." In *The Churchlands and Their Critics*, ed. Robert N. McCauley, 302–6. Cambridge, Mass.: Blackwell.
- Clark, Andy. 2000. "Word and Action: Reconciling Rules and Know-How in Moral Cognition." In *Moral Epistemology Naturalized*, ed. Richmond Campbell and Bruce Hunter, 267–89. Calgary, Alberta, Canada: Univ. of Calgary Press.
- Clarke, Murry. 1990. "Epistemic Norms and Evolutionary Success." *Synthese* 85:231–44.
- Code, Lorraine. 1993. "Taking Subjectivity into Account." In *Feminist Epistemologies*, ed. Linda Alcoff and Elizabeth Potter, 15–48. New York: Routledge.
- Copp, David. 1990. "Explanation and Justification in Ethics." *Ethics* 100 (January): 237–58.
- Damasio, A. R. 1994. *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Putnam's.
- Darwall, Stephen, Allan Gibbard, and Peter Railton. 1992. "Toward *Fin de siècle* Ethics: Some Trends." *Philosophical Review* 101(1): 115–89.
- Dewey, John. [1910] 1997. "Intelligence and Morals." In *The Influence of Darwin on Philosophy and Other Essays*, 46–76. Amherst, N.Y.: Prometheus.
- . [1920] 1991. *Reconstruction in Philosophy and Essays*. In *John Dewey, The Middle Works, 1899–1924*, vol. 12, ed. Jo Ann Boydston, 77–201. Carbondale: Southern Illinois Univ. Press.
- . [1922] 1988. *Human Nature and Conduct*. In *John Dewey, The Middle Works, 1899–1924*, vol. 14, ed. Jo Ann Boydston. Carbondale: Southern Illinois Univ. Press.
- . [1929] 1984. *The Quest for Certainty: A Study of the Relation of Knowledge and Action*. In *John Dewey, The Later Works, 1925–1953*, vol. 4, ed. Jo Ann Boydston. Carbondale: Southern Illinois Univ. Press.
- . [1931] 1985. "Science and Society." In *John Dewey, The Later Works, 1925–1953*, vol. 6, ed. Jo Ann Boydston, 53–63. Carbondale: Southern Illinois Univ. Press.
- . [1938] 1991. *Logic: The Theory of Inquiry*. In *John Dewey, The Later Works, 1925–1953*, vol. 12, ed. Jo Ann Boydston. Carbondale: Southern Illinois Univ. Press.
- Duncan, Otis Dudley. 1961. "From Social System to Ecosystem." *Sociological Inquiry* 31 (Spring): 140–49.
- Duncan, Otis Dudley, and Leo F. Schnore. 1959. "Cultural, Behavioral, and Ecological Perspectives in the Study of Social Organization." *American Journal of Sociology* 65 (2): 132–46.

- Flanagan, Owen. 1996a. "Ethics Naturalized: Ethics as Human Ecology." In *Self-Expressions: Mind, Morals, and the Meaning of Life*, 117–41. New York: Oxford Univ. Press.
- . 1996b. "The Moral Network." In *The Churchlands and Their Critics*, ed. Robert N. McCauley, 192–215. Cambridge, Mass.: Blackwell.
- Fodor, Jerry. 1998. *Concepts: Where Cognitive Science Went Wrong*. Oxford: Clarendon.
- Fodor, Jerry, and Zenon Pylyshyn. 1997. "Connectionism and Cognitive Architecture: A Critical Analysis." In *Mind Design II: Philosophy, Psychology, Artificial Intelligence*, ed. John Haugeland, 309–50. Cambridge: Bradford Books/MIT Press.
- Gardner, Howard. 1987. *The Mind's New Science: A History of the Cognitive Revolution*. New York: Basic Books.
- Giddens, Anthony. 1991. *Modernity and Self-Identity: Self and Society in the Late Modern Age*. Stanford, Calif.: Stanford Univ. Press.
- Giere, Ronald N. 1985. "Philosophy of Science Naturalized." *Philosophy of Science* 52 (September): 331–56.
- Goldman, Alvin. 1993. "Ethics and Cognitive Science." *Ethics* 103 (2): 337–60.
- Hacking, Ian. 1975. *Why Does Language Matter to Philosophy?* Cambridge: Cambridge Univ. Press.
- Hardcastle, Valerie Gray. 1998. "The Why of Consciousness: A Non-Issue for Materialists." In *Explaining Consciousness—The "Hard Problem"*, ed. Jonathan Shear, 61–68. Cambridge: Bradford Books/MIT Press.
- Harman, Gilbert. 1973. *Thought*. Princeton, N.J.: Princeton Univ. Press.
- . 1977. *The Nature of Morality: An Introduction to Ethics*. New York: Oxford Univ. Press.
- . 1999. *Reasoning, Meaning and Mind*. Oxford: Clarendon.
- Held, Virginia. 1996. "Whose Agenda? Ethics versus Cognitive Science." In *Mind and Morals: Essays on Ethics and Cognitive Science*, ed. Larry May, Marilyn Friedman, and Andy Clark, 69–87. Cambridge: Bradford Books/MIT Press.
- Heldke, Lisa. 1989. "John Dewey and Evelyn Fox Keller: A Shared Epistemological Tradition." In *Feminism and Science*, ed. Nancy Tuana, 104–15. Bloomington: Indiana Univ. Press.
- Hempel, G. C. 1983. "Valuation and Objectivity in Science." In *Physics, Philosophy and Psychoanalysis*, ed. R. S. Cohen and L. Laudén, 73–100. Dordrecht: D. Reidel.
- James, William. [1907] 1991. *Pragmatism*. Amherst, N.Y.: Prometheus.
- Johnson, Mark. 1993. *Moral Imagination: Implications of Cognitive Science for Ethics*. Chicago: Univ. of Chicago Press.
- Johnston, Victor C. 1999. *Why We Feel: The Science of Human Emotions*. Cambridge, Mass.: Perseus.
- Lakoff, George. 1987. *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*. Chicago: Univ. of Chicago Press.
- Laudén, Larry. 1990. "Normative Naturalism." *Philosophy of Science* 57:44–59.
- Lyotard, Jean-François. 1988. *The Differend: Phrases in Dispute*. Trans. Georges Van Den Abbeele. Minneapolis: Univ. of Minnesota Press.
- . 1991. *The Postmodern Condition: A Report on Knowledge*. Trans. Geoff Bennington and Brian Massumi. Minneapolis: Univ. of Minnesota Press.
- . 1993. *Political Writings*. Trans. Bill Readings and Kevin Paul Geiman. Minneapolis: Univ. of Minnesota Press.
- MacIntyre, Alisdair. 1984. *After Virtue*. 2d ed. Notre Dame, Ind.: Univ. of Notre Dame Press.
- McKinlay, Patrick F. 1998. "Postmodernism and Democracy: Learning from Lyotard and Lefort." *Journal of Politics* 60 (2): 481–502.
- Medin, Douglas L., and Evan Heit. 1999. "Categorization." In *Cognitive Science*, ed. Benjamin Martin Bly and David E. Rumelhart, 99–143. San Diego, Calif.: Academic.
- Pickering, Andy. 1994. "Objectivity and the Mangle of Practice." In *Rethinking Objectivity*, ed. Allan Megill, 109–25. Durham, N.C.: Duke Univ. Press.
- Pollock, John, and Joseph Cruz. 1999. *Contemporary Theories of Knowledge*. 2d ed. Lanham, Md.: Rowman and Littlefield.
- Putnam, Hilary. 1990. *Realism with a Human Face*. Cambridge: Harvard Univ. Press.
- . 2002. *The Collapse of the Fact/Value Dichotomy and Other Essays*. Cambridge: Harvard University Press.

- Rey, Georges. 1983. "Concepts and Stereotypes." *Cognition* 15:237-62.
- Sandel, Michael J. 1996. *Democracy's Discontent: America in Search of a Public Philosophy*. Cambridge: Harvard Univ. Press.
- Smith, Edward E., and Douglas L. Medin. 1981. *Categories and Concepts*. Cambridge: Harvard Univ. Press.
- Stich, Stephen. 1993. *The Fragmentation of Reason*. Cambridge: Bradford Books/MIT Press.
- Walker, Margaret Urban. 1996. "Feminist Skepticism, Authority, and Transparency." In *Moral Knowledge? New Readings in Moral Epistemology*, ed. Walter Sinnott-Armstrong and Mark Timmons, 267-92. New York: Oxford Univ. Press.
- Welchman, Jennifer. 1995. *Dewey's Ethical Thought*. Ithaca, N.Y.: Cornell Univ. Press.