
Books Forum Introduction

Prosocial primates for benevolent biosocieties

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Something significant seems to be happening to our conception of human nature. The book market, both popular and academic, is currently flooded with publications on empathy, altruism, trust and cooperation. A wide range of disciplines – from anthropology, economics and population genetics to developmental psychology, primatology and philosophy – have begun to call into question the idea that *anthropos* naturally behaves in predominantly selfish ways and can only be brought to care for and collaborate with others through a precarious process of enculturation. The bottom line of the historical narrative promoted by this body of literature is that, for at least four centuries, Western thought has been led astray in presupposing an essentially egoistic human nature, to be restrained by the state or let loose to serve the common good on free markets. This not very flattering self-conception is currently brightened up by research showing so-called prosocial behavior to be as deeply rooted in our biological constitution as purely self-serving and aggressive conduct. As this reassessment of our species marks an event of biopolitical import in both the life sciences and social sciences, *BioSocieties* dedicates this Books Forum to new publications in this field.

Historian Paul Erickson discusses three books on evolutionary game theory and related attempts at unifying the behavioral sciences (not yet by adding neuro-prefixes to humanities disciplines, but by mathematically modeling the choices of rational actors). Herbert Gintis's *The Bounds of Reason*

explains prosocial behavior with the help of game theory as a general lexicon for life and behavior. Erickson historicizes Gintis's contemporary push toward a unified behavioral science through his discussion of Mark Borrello's *Evolutionary Restraints*, an account of the group selection controversy in evolutionary theory from the 1960s until today, and Oren Harman's *The Price of Altruism* on George Price's game theoretical analysis of the evolution of traits that are beneficial to the group rather than to individual organisms. Erickson then raises a reflexive question: How do theories facilitate and impede cooperation between groups of researchers (itself a 'prosocial' behavior)?

Against the backdrop of this twentieth-century development of evolutionary theory, contemporary primatologists have come to portray humans and apes as inherently moral beings. Historian of science Erika Milam situates Frans de Waal's *Age of Empathy* and Michael Tomasello's *Why We Cooperate*, both published in 2009, in the optimistic political climate of the early days of Obama's presidency. She then contrasts the underlying notion of primate nature with the focus on aggression in comparable mid-twentieth-century publications. Interestingly, Milam points out that de Waal makes deliberate use of the looping effects of human kinds (Ian Hacking's term, not hers) when trying to bring about a kinder society by redescribing *homo sapiens* and his closest relatives as more benevolent creatures.

As an anthropologist studying the trading zone between brain research and philosophy of mind, I doff my hat as Reviews Editor and instead don the hat of reviewer of neurophilosopher Patricia Churchland's *Braintrust*. This book draws from social neuroscience and other behavioral sciences to argue for a naturalist ethic. As many scholars in the humanities and social sciences are highly critical of Churchland's reductionism and eliminative materialism, I could not resist the anthropological urge to foster understanding for the 'native's point of view', which, at closer inspection, might not be as alien as some of my fellow anti-reductionists take it to be.

Like the other books reviewed in this Books Forum, *Braintrust* is indicative of a reassessment of

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our animal nature now highlighting its moral rather than its beastly traits – a process that initially received important impulses from game theory despite this field's emphasis on self-serving actors who came to be seen as 'rationally' choosing to

engage in cooperative behavior that benefits the group. At the end of the day, the behavioral research discussed might show human nature to be neither inherently egoistic nor prosocial. Instead, that very opposition might simply collapse.

The uses of theory and the study of social behavior

Herbert Gintis

The Bounds of Reason: Game Theory and the Unification of the Behavioral Sciences. Princeton University Press, Princeton, 2010, US\$32.84, ISBN: 978-0691140520

Mark E. Borrello

Evolutionary Restraints: The Contentious History of Group Selection. University of Chicago Press, Chicago, 2010, US\$28.91, ISBN: 978-0226067018

Oren Harman

The Price of Altruism: George Price and the Search for the Origins of Kindness. Norton, New York, 2010, US\$12.89, ISBN: 978-0393339994

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At first blush, these books may seem an odd trio to review in concert. The first is in large part a work of mathematical exposition by a prominent game theorist. By contrast, the last two, written by historians of science, treat chapters in the history of contemporary evolutionary biology – specifically, the controversy over V.C. Wynne-Edwards' theory of 'group selection' during the 1960s, and the

remarkable career of George Price, a unique contributor to evolutionary theory who (among other things) is also generally credited as a co-founder of the tradition of evolutionary game theory. Put together, however, the three can potentially shed much light on the historical dynamics undergirding ongoing debates over the nature and origins of prosocial behavior in humans and animals, from the development of ethology to socio-biology to recurring controversies in evolutionary psychology. In particular, they focus attention on the opportunities and problems that flow from a particular style of theorizing that has emerged in the social and behavioral sciences during the later twentieth century focused on modeling the choices of rational actors. Such modeling – game theory, decision theory, optimization theory and so on – has proven quite visibly productive in a number of areas from evolutionary biology to political science and economics. Yet as these books reveal, the nature of its productivity, its uses and its potentialities have perhaps been misunderstood.

On one level, it is possible to read Gintis's book as a fairly accessible survey of game theory, as mathematical exposition (complete with some casual exercises) forms a significant chunk of the book. The first chapter covers the theory of decision making by an isolated individual (the logic of preferences, utility and Bayesian statistics), before moving on to the basics of game theory, that is, the theory of choice by interacting individuals (extensive and normal forms of the game, and the Nash Equilibrium) in Chapter 2. These preliminaries out of the way, the central chapters of the book (4, 5, 8, 9) focus on developing concepts of epistemic game theory – a theory of strategic interaction that explicitly takes into account the knowledge and beliefs of the players – and the generalization of the Nash Equilibrium relevant to such games, the 'rationalizable' strategy, strategies that are compatible with some consistent set of beliefs about one's opponent and the state of the

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world. The presentation is suitable perhaps for an audience that has some familiarity with the mathematics of linear spaces, probability, and elementary set theory and logic. For someone with training in economics or political science, this material will be familiar; for other audiences Gintis seems to have in mind (sociologists and anthropologists, not to mention most historians), this may be a barrier to comprehension.

These audiences are important, as they are the logical target of Gintis's larger argument in this book: that game theory (and rational actor models of behavior more generally) holds out the promise of unifying the 'behavioral sciences', a broad swath of disciplinary territory stretching across parts of sociology, political science, anthropology, psychology, economics and biology. Given the prevalence of rational choice modeling approaches in their fields, economists and political scientists probably need relatively little convincing on this score, yet scholars in other disciplines have been more skeptical. Since at least the 1970s, cognitive psychologists in the tradition of Amos Tversky and Daniel Kahneman have documented the myriad ways that human subjects violate many of the grounding principles of rational conduct. Nevertheless, Gintis's running argument is that these principles are worth keeping (or at least, not worth discarding), for a variety of reasons. Individuals may make particular mistakes of comprehension or execution, yet respond reasonably to advice and correction; apparent preference intransitivities are often an illusion caused by assuming preference consistency over time; and action in accordance with principles like utility maximization can arise both from rational calculation and evolutionary processes.

While individual rationality remains a starting point for the analysis of prosocial behavior, Gintis is clear that this analysis cannot stop there. One of the key lessons he draws from epistemic game theory is that methodological individualism, with its insistence that all social phenomena can be explained in terms of the properties of individuals, fails in explaining a wide range of social phenomena. 'Epistemic game theory suggests that the conditions ensuring that individuals play a Nash Equilibrium are not limited to their *personal* characteristics, but rather include their *common* characteristics, in the form of common priors and common knowledge' (p. 162). In particular, social *norms* are emergent rules of behavior that can coordinate action in strategic settings and resolve a number of social dilemmas surrounding the division of labor, property rights, fairness and

so forth. This result would seem to offer a place in a unified science of behavior for sociologists or anthropologists who take norms, customs, culture or society as foundational concepts of their disciplines.

Yet even if the abstractions of rational choice mathematics are not irrelevant to actual human behavior, and if game theory is potentially compatible with disciplines that have hitherto resisted methodological individualism, it is not precisely clear why behavioral scientists should embrace game theory as a basis for unifying the behavioral sciences. Ever since the notion of 'behavioral science' gained currency in the immediate postwar period, attempts to provide a unifying theory for this broad area of inquiry have emerged with striking regularity – cybernetics, general systems theory, socio-biology and, more recently, anything with a 'neuro' prefix. What unique claim does a theory of rational choice have on the study of behavior across the breadth of the behavioral sciences? For Gintis, one answer seems to be that game theory, like 'behavior' in general, is rooted in biology itself. As he puts it, 'Game theory is a general lexicon that applies to all life forms. Strategic interaction neatly separates living from nonliving entities and defines life itself' (p. 45). In addition, throughout the book, Gintis frequently justifies the rational choice approach to the study of human behavior by appeal to evolutionary game theory and the fact that evolutionary processes often produce organisms that behave as if they are rational actors in the game-theoretic sense.

However, the notion that game theory provides a 'general lexicon' (or, p. 239, a 'universal lexicon') for life and behavior deserves further scrutiny. Assuming this to be true, it is possible to argue that the 'unification of the behavioral sciences' is perhaps grounded in nature, and to assert (with Gintis) that 'the self-conceptions and dividing lines among the behavioral disciplines make no scientific sense' and that 'in the name of science, these arbitrariness must be abolished' so that 'comfort and tradition' do not impede the 'struggle for truth' (pp. xv–xvi). Yet a lexicon is generally valuable to human beings precisely because it is convenient, efficient, 'comfortable' and 'traditional' (or more precisely, 'conventional') for the individuals who use it to communicate effectively. This fact suggests that in assessing Gintis's provocative suggestion, we might consider the kind of social as well as intellectual work this area of mathematics might be used for – not just what game theory allows behavioral scientists to *say*, but what it permits them to *do* in

terms of the establishment of cross-disciplinary communication and the organization of research. In short, how can a theory of individual decision making and social organization remake the social organization of social scientists? How precisely can it overcome ‘the virtually impassible feudal organization of the behavior disciplines in the contemporary university system, [and] the structure of research funding agencies that mirror this feudal organization’ (p. xv) to catalyze interdisciplinary collaboration on a number of problems with broad interest: ‘substance abuse, crime, corruption, tax compliance, social inequality, poverty, discrimination, and the cultural foundations of market economics’ (p. 222)? Such a victory, if it occurs, seems unlikely to abolish institutional structures of knowledge production in the behavioral sciences altogether, but to replace the existing order of things with a new set of institutions, and potentially, with new sets of controversies, challenges and blind spots.

It is here that the historical work of Borrello and Harman is of potential relevance. The two works intersect at the history of the so-called ‘group selection controversy’ that was key in spurring the development of evolutionary game theory, a specialty that is critical in justifying Gintis’s argument for the pan-behavioral science utility of game theory. V.C. Wynne-Edwards, the Scottish ornithologist who is the focus of Borrello’s book, proposed the term ‘group selection’ in his 1962 book, *Animal Dispersion in Relation to Social Behavior*, to refer to a process by which natural selection might act to preserve traits that are beneficial to groups of organisms rather than to individual organisms. In particular, group selection allowed Wynne-Edwards to argue that many features of animal sociality (for example, the formation of status hierarchies and mating ceremonies) had evolved to regulate populations at sustainable sizes. By contrast, George Price, the subject of Harman’s book, subsequently played a central role in developing highly sophisticated theoretical frameworks – evolutionary game theory, the so-called ‘Price Equation’ and computer simulations – for peeling apart the role of individual and collective advantage in ensuring the evolution of a range of traits (such as restrained aggression) that had commonly been attributed to some form of group selection. Price’s work, together with that of William D. Hamilton, John Maynard Smith, Richard Dawkins and others, is often viewed as part of a successful attempt to forge an alternative framework to group selection that takes natural selection acting on individual organisms or genes as its starting point.

Taken together, these works illustrate the simultaneous challenges and opportunities of attempts to transfer models of human behavior and social interaction across disciplines, and between the social sciences and biology in particular.

Borrello’s book is at once a history of an idea and a biography. Taken as a whole, it traces the history (and a substantial amount of the pre-history) of ‘group selection’, starting with Darwin’s *On the Origin of Species*, moving through the period of the so-called ‘modern synthesis’ in evolutionary biology, and concluding with the latest updates on the status of the idea today. At the same time, Borrello tells much of this history by looking over the shoulder of V.C. Wynne-Edwards, drawing extensively on Wynne-Edwards’s archive in the Queen’s University special collections. *Evolutionary Restraints* is thus a paragon of deeply engaged intellectual history: classic texts are read critically and put into dialogue with one another and with contemporary scholarship, and personal notebooks and archives are painstakingly explored. Perhaps as a result, it is really only in the final chapter that Borrello begins to step back from his subject matter and explore the larger implications of this history. Why did Wynne-Edwards develop and continue to profess this theory of evolution by group selection when he did? Less explicitly asked is another, related question: Why did the controversy over group selection persist with such overt vituperation and rancor throughout the 1960s and 1970s? After all, Wynne-Edwards did not simply make a mistake of fact or propose a provocative thesis that was ultimately discarded after subsequent research: instead, his work was pilloried as ‘bad science’ or ‘heresy’. Moreover, subsequent research seems to be vindicating the notion that his ‘theory’ as such was not even really proven ‘wrong’ or even seriously engaged: rather, a new set of modeling techniques like evolutionary game theory emerged that seemed to make a theory of group selection superfluous.

Borrello’s final verdict on Wynne-Edwards hints at some of the answers. Unlike other proponents of theories resembling group selection, like the *fin-de-siècle* Russian zoologist and theorist of anarchist communism Peter Kropotkin, Wynne-Edwards’s theory does not straightforwardly spring from his political or socio-economic background, thus making any charge of political corruption of science harder to sustain. Rather, Borrello attributes the theory of group selection to Wynne-Edwards’s experience as a naturalist approaching organisms through ‘field study’ – and this, during an era when the center of

gravity within biology was tilting on one hand toward the laboratory, and on the other, toward increasingly sophisticated mathematical modeling of the evolutionary process. But rather than setting up a straightforward conflict between Wynne-Edwards's observational approach and the array of mathematically inclined theorists – most prominently, John Maynard Smith – who attacked the idea of group selection, Borrello notes that both sides of the debate observed nature through the lens of theory. Like Darwin, who turned to Malthusian political economy to formulate his notion of a 'struggle for existence' in nature, Wynne-Edwards's theoretical framework in *Animal Dispersion* drew substantially on the social sciences, especially the work of demographer Alexander Carr-Saunders, who had argued that human customs surrounding marriage, birth control and infanticide served the social function of stabilizing human populations. And upon further reflection, it is hard not to understand why this kind of a theoretical framework, taken from disciplines like anthropology, would seem much more useful to a naturalist like Wynne-Edwards than the austere statistical techniques, optimization models and computer simulations that were growing in influence within evolutionary biology at the time. Such a theory would provide a natural language and set of analogies for categorizing and classifying the diversity of behavioral phenomena and social structures in animal populations that it was the job of a naturalist to observe. In this regard, Wynne-Edwards's story reminds us that a theory, like a 'lexicon', is perhaps best evaluated in terms of the kind of intellectual work it allows one to do: the distinctions it makes and those that it elides, the program of research activities it permits a researcher to mark out, and the conversations it enables her to have. Considering these kinds of questions in greater detail could in the future help shed light on the sociological underpinnings of the group selection controversy which, Borrello's excellent work notwithstanding, remains something of an enigma.

Harman's account of the life of George Price provides a portrait of an individual who represented many of the trends in biology that thwarted acceptance of Wynne-Edwards's theory of the evolution of social behavior through group selection. Price was not trained as a biologist; indeed, as Harman appears to have found, it is difficult to place the man in any particular lineage whether familial, socio-economic or disciplinary-intellectual – a difficulty almost certainly experienced by Price himself. While

his academic career runs through Harvard, a PhD in chemistry, and the Manhattan Project, it subsequently veers into technical writing at IBM and science journalism before concluding as a researcher in theoretical biology at the Galton Laboratory, University College London. It was there that he did much of the research for which he is best known today, developing the so-called 'Price Equation' as the cornerstone of a general theory of selective processes. During this time, he also collaborated with John Maynard Smith to develop agent-based modeling techniques in evolutionary biology, as well as the basic formulation of the 'evolutionarily stable strategy' in evolutionary game theory as part of a larger attempt to explain the social behavior documented by Wynne-Edwards in terms of natural selection operating on individuals or genes. In coping with the confusing nature of Price's career, Harman spins it as part of a larger story, beginning with Darwin, of the search for the evolutionary origins of altruistic and social behavior. As a result, much of the first half of the book is devoted to providing this back story, while the second half narrates the last 6 or 7 years of Price's life when he performed much of his research in evolutionary biology while simultaneously undergoing a remarkable conversion to Christianity.

Many aspects of Harman's story are refreshing and novel, especially the light he sheds on the relationship between Price and other prominent evolutionary biologists of his day. His descriptions of Price's religious experience and his performance of altruism among the alcoholics and homeless people of central London toward the end of his life are moving indeed. Yet in the end, by casting the life of Price as a chapter in the history of the problem of altruism, I wonder if Harman has obscured another story that helps make yet better sense of this seemingly inexplicable person. With its incongruous mixture of ESP, codes, evangelical Christianity, chemistry and computers, Price's life and thought constitute a veritable microcosm of the world of American science during the Cold War era. Indeed, it is hard not to read him as a man possessed, as it were, of a kind of cultural Rosetta Stone, a mastery of the major discursive frameworks (information theory, game theory, probability theory, statistical physics and new programming languages) that ran underneath so much of science during this period. This is not to mention the centrality of these frameworks to many of the era's more popular fantasies of UFOs, coded signals arriving from space aliens, doomsday machines and more. For a man

obsessed with codes, perhaps because of his perpetual sense of being an ‘outsider’, an interloper in the elite world of research science, he seems to have been unaware that he had in fact found the cipher of his age. In addition, it was precisely this ability to speak the language of game matrices, genetic codes and automata that allowed a man with almost no background in biology to swap ideas and co-author articles with some of the emerging luminaries in a field that was rapidly unifying itself around molecular biology and genetics. This unification, however, had relatively little room in it for the kind of descriptive fieldwork that Wynne-Edwards practiced.

The historical works of Borrello and Harman thus have the potential to help us critically assess the tantalizing vision that Gintis lays out for a unified science of behavior organized around game theory and the mathematics of rational choice. The saga of Wynne-Edwards suggests strongly that we focus greater attention on the *uses* of theory by researchers concerned with the study of social behavior, especially the way that theory fosters or impedes communication between groups of scholars, and the way that theory helps to structure the kind of

day-to-day work that researchers are engaged in. Moreover, while theories have the potential to facilitate connections between particular groups of researchers, they also have the potential to exclude others from the conversation – something Wynne-Edwards found out the hard way. On its surface, the story of George Price’s life and career is a walking advertisement for the establishment of a common ‘lexicon’ of life and behavior. Without a common language of computers, information, codes and games, it seems unlikely that this remarkable individual could vault so nimbly between chemistry, engineering, biology, and in the closing months of his life, economics. Yet more careful consideration should reveal the potential vulnerabilities of such lexicons. For one thing, it is unclear how exactly they become established. Are they the inevitable result of the way nature works, or are they potentially specific to a particular time and place (for example, America during the Cold War)? If so, they may change just as quickly as they emerge, for reasons that are as obscure as they are powerful. With these caveats in mind, it may be possible to chart a better course for theory in the cross-disciplinary study of social behavior.

On playing well with others

Michael Tomasello, Carol Dweck, Joan Silk,
Brian Skyrms and Elizabeth Spelke
Why We Cooperate. MIT Press, Cambridge, MA,
2009, US\$14.95, ISBN: 978-0262013598

Frans de Waal
Age of Empathy: Lessons for a Kinder Society.
Harmony Books, New York, 2009, US\$17.00,
ISBN: 978-0307407771

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Frans de Waal opens *Age of Empathy* with optimism, noting that ‘Greed is out, empathy is in’. Recalling a speech that Barack Obama gave at Northwestern before he was elected president of the United States, de Waal proclaims a seismic shift in American politics, heralding a ‘new epoch that stresses cooperation and social responsibility’ (p. 1). Reading this book in 2011 evoked my own memories of Washington DC in the days surrounding Obama’s inauguration in January 2009. Class and racial barriers were temporarily forgotten as thousands celebrated together – after all, well over 90 per cent of DC residents voted for him in the election. How much more complicated the future turned out to be.

That failure of liberal American political hopes aside, in recent decades, scientists have dramatically changed how they discuss what it means to be human. Titles containing the words empathy, cooperation, kindness or altruism fill the shelves at local bookstores and assert the cultural authority of biologists and primatologists to define and

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describe human nature.¹ Although they build on the tradition of popular books about human nature from the 1960s and 1970s – Robert Ardrey's *Territorial Imperative* (1961), Konrad Lorenz's *On Aggression* (1966) and Desmond Morris's *The Naked Ape* (1967) – these new volumes provide radically different messages. Instead of highlighting man's aggressive drives or his innate tendency to kill, current books illustrate how humans have evolved to be social, moral beings.²

Why the dramatic shift in message? The answer surely cannot be that we live in a more peaceful time. This change of theory reflects a deeper appreciation of primate communication and social behavior than was possible 40 years ago. It also requires a fundamental change in the constellation of traits, and therefore disciplines, scientists identify as key to unlocking the secret of human nature. In the 1960s, authors drew readers' attention to the similarity of conclusions emerging from paleoanthropology, comparative animal behavior (ethology), cultural anthropology and primatology. The nexus of disciplines today includes developmental psychology, but paleo- and cultural anthropology are missing. In part, this reflects a difference in goals. Whereas the older literature sought to create a causal story that identified the major factors determining *why* we had become human, more recent literature seeks merely to *define* the essential characters that do differ between humans and our closest living non-human relatives. In *Why We Cooperate*, Michael Tomasello, for example, never speculates about how or why humans have come to cooperate and conform, but merely observes that we have and that it is this difference that sets us apart from apes (p. 89). Primates and children have replaced what was once called primitive humanity as the windows to our collective soul.

Both de Waal and Tomasello are part of a new tradition advocating a kinder, more collaborative vision of what it means to be human. Frans de Waal is quite explicit about this, arguing that economists and politicians need to completely overhaul their

assumptions that humans are by nature competitive creatures (p. 7). He takes particular issue with their use of an outdated vision of selfish humanity to justify social policies that increase wealth and power inequities in the United States. Tomasello, on the other hand, has a finer-grained point to make – that the evolution of kindness in humans need not require that individuals learn to help others at the expense of themselves (altruism), but could instead result from learning to cooperate with each other for shared benefit (mutualism). I will return to Tomasello in a moment.

The biological argument at the heart of de Waal's *Age of Empathy* is that empathy itself is 'multi-layered' (p. 209). At a basic level, he suggests that our compassionate core relies on our capacity to match the emotional state of other beings. Because of this ability, emotions are contagious; fear, for example, can spread instantly in a crowd, even when people are preoccupied with only their own safety. Overlaid on this are more complex tendencies, including feelings of concern for others, and finally our ability to feel our way into the perspective of another individual. This final stage, which de Waal calls empathy in English (although he prefers the German word *Einfühlung*), emerges from our very nature (p. 65). He thus suggests psychologists and philosophers are wrong when they posit the origins of empathy in cognition. We are not selfish at our core and *decide* to act kindly toward others; we automatically do so unless we are taught otherwise. Part of the confusion here, de Waal suggests, arises from the persistent belief that 'altruism' and 'selfishness' are easily parsed despite the well-known fact that helping other people also makes us feel better (p. 75). Acting in the interest of others can be in our own self-interest too.

Empathy, for de Waal, is only one of the key components of human nature. He describes how children develop the ability to imagine the feelings of others around the same time as they learn how pronouns work, are able to pretend play and can recognize themselves in a mirror – all aspects of

1 For example: Ridley (1996), Sober and Wilson (1998) and Dugatkin (2006). References to other books will follow throughout the review.

2 Another fundamental difference, of course, is our understanding of what it means to be male. Historically, women have almost always been described as cooperative, attuned to the needs and desires of their closest companions, and empathetically bonded to their children and families. Now these traits are taken as representative of all humans – no one is claiming that females alone drove the cognitive and intellectual development of humanity. It is perhaps testament to the work of primatologists like Sarah Blaffer Hrdy (2009) challenging stereotypes about maternal love that within biological circles women are now considered just as capable of manipulation and competition as men, and men just as capable of cooperation and empathy as women.

learning how to position themselves in a world full of other people (pp. 123, 247). In advocating this co-emergence hypothesis, de Waal links our cognitive development as children (ontogeny) to the evolution of these traits in human history (phylogeny) and to the ways our brains function (neurobiology). Humans may have a greater capacity than primates for empathy, de Waal insists, but 'it's just inconceivable that perspective-taking and self-awareness evolved in a single jump in a few species without any stepping stones in other animals' (p. 139). Similarly, he argues that the differences between the cooperative behaviors of humans and primates, like the bonobos he studies at the Yerkes National Primate Center in Atlanta, Georgia, are differences in degree, not in kind. What distinguishes us from other animals, then, is that we have *more* of everything – 'more empathy, more VEN cells [large spindle-shaped neurons present in the brains of humans and other animals with complex social behavior like elephants, dolphins, and the great apes], and more self-awareness' (p. 139).

Perhaps surprisingly, de Waal does not insist that thinking of humans as naturally aggressive (along the lines of the 1960s tradition) is entirely wrong-headed. He submits that a great deal of the richness of our lives, including sports teams, entrepreneurship and musical one-upsmanship, would be impossible without competition (p. 203). The horrific consequences of war are rarely due to our aggressive nature gone awry. In general, he points out, people do not like killing other people and modern warfare has become so deadly because it is automated and allows killing at a distance (p. 219). Yet as a society, he notes, Americans are far more likely to attribute characteristics we do not like about ourselves to biological 'nature' than we are to recognize continuity with other animals in our more noble traits (p. 207). There is a danger in such attitudes, de Waal warns. If people think they are acting according to the dictates of their genes and that 'everyone else' would act the same way, then believing in a biologically constituted selfish aggression undermines the very framework on which notions of political and social equality are built (p. 162). I suspect it was precisely this fear that motivated de Waal to direct *Age of Empathy* at a non-scientifically trained audience – if members of

a society can be persuaded that they are by nature cooperative, then they will surely act more kindly toward others in their community and hopefully to people from other cultures as well (p. 225).

In striving to reach a popular audience, de Waal relies heavily on narrative anecdotes about animal and human behavior to illustrate the points he wishes to communicate. *Age of Empathy* contains accounts of bonobo behavior he has personally witnessed, as well as stories from other scientists about the animals with which they spend their professional lives. Arguably, these enchanting descriptions of individual elephants, dolphins, ravens and chimpanzees may be more effective at convincing non-specialist readers of humankind's innate moral sense than detailed descriptions of repeatable experiments in developmental psychology and primatology (although these are present too).³

Why We Cooperate, on the other hand – based on the 2008 Tanner Lectures on Human Values at Stanford University – is directed toward a more scholarly audience. As I noted earlier, Tomasello's main concern is the evolution of mutualism, not altruism. The advantages of this argument are apparent – it is far easier to explain the evolution of cooperation for mutual benefit than the evolution of altruism, where helping someone else can actually hurt us (Kitcher, 2011). Mutualism also makes common sense of our everyday lived experiences. As we look out for a friend today, we can trust that they will keep our interests in mind tomorrow. Given these differences, he is asking much the same question as de Waal – What makes us uniquely human? – but provides a much richer account of why systems of moral reinforcement and cooperation are possible in humans.

Tomasello refers to his two main arguments as *Early Spelke*, *Later Dweck* and *Silk for Apes*, *Skyrms for Humans*, based on the research of Elizabeth Spelke, Carol Dweck, Joan Silk and Brian Skyrms. In the first case, Tomasello argues that infants and young children are born ready to be 'helpful, informative and generous in the right situations' but as they grow up, they learn where (and where not) to direct their mutualistic tendencies. Whereas Spelke's work (Olson and Spelke, 2008) suggests that important early behavioral reactions and knowledge are innate, Dweck (1999) convincingly demonstrates that children's beliefs are constructed and learned

3 Reviews of *Age of Empathy* have appeared in publications as diverse as the *Economist*, *Seed Magazine*, *Slate* and *Psychology Today*. Such a strategy, of course, engenders its own dangers, and Tomasello (2009) dismissed *Age of Empathy* in *Nature* as insufficiently scientific and for failing to grapple with the question of how this transformation in human nature took place.

through interactions with other people. Tomasello describes this as an ‘ontogenetic reflection’ of Robert Axelrod’s (1984) famous tit-for-tat cooperative strategy in iterative prisoner’s dilemma scenarios, where players start out altruistic and only ‘defect’ in retaliation for non-cooperation on the part of the other player (pp. 45–46; see also Nowak and Highfield, 2011). In the second case, he suggests that the reason humans cooperate is that we are able to reliably engage in *shared intentionality*. Shared intentionality implies more than simply participating in the same activity at the same time, as many animal species forage in groups where each individual is responsible for only its own nutrition. Both you and I must *know* that we are working on a common goal together. Even other ape species, he argues, are not capable of such awareness and coordination (pp. 71, 98).⁴ Thus, whereas Silk’s research (see Boyd and Silk, 1997) has demonstrated that apes work according to kinship, nepotism and direct reciprocity, Skyrms (2008) has shown the centrality of cooperation for mutual payoff to many human societies (for example, group hunting works this way).

By combining evidence from early child psychology and observations of chimpanzee behavior – two fields that have enjoyed largely separate intellectual traditions for decades – Tomasello identifies three aspects of our behavior that must have changed for the transition from ape group activities to human collaboration to have taken place (p. 59). First, our socio-cognitive skills and motivations evolved toward a capacity for shared attention. This increased our coordination and communication with other members of our community. Second, we became more trusting and tolerant of each other, especially with regards to sharing food. Third, we developed public social norms and institutions of behavior. Through individual imitation of others and resulting conformity, humans engage in a kind of cultural group selection, with a high degree of similar behavior within cohorts and radically different behaviors among them. Cultural evolution, Tomasello posits, can act much more quickly than biological evolution (p. 96). All together, these changes enable us to participate in mutually beneficial group activities through our capacity for shared intentionality (p. 98).

We can think of these changes as affecting humans biologically, psychologically and culturally, although

Tomasello does not use this language. This is not a return to a layer-cake model of behavioral causality, however, that would stretch from biological urges or drives to psychological desires, social institutions and cultural habits. For Tomasello, all three steps are co-constitutive and interwoven, a position very similar to de Waal’s advocacy of the co-emergence hypothesis. He suggests that unlike other primates, normal human development requires a cultural dimension. We learn how to play well with others through understanding how members of our community expect us to behave. ‘[W]ithout the human cultural niche, and the skills and motivations for participating in it, a developing human child would not become a normally functioning person at all’ (pp. 106–107).

Tomasello’s essay in *Why We Cooperate* is followed by a series of critical responses, authored by none other than Spelke, Dweck, Silk and Skyrms, each of whom provided a commentary to his original lecture at Stanford. In her essay, Silk questions whether mutualism will do all the work Tomasello requires of it, pithily commenting, ‘Mutualism will not generate concern for the welfare of others. Instead it will generate manipulative tactics. We don’t get from mutualism to Nelson Mandela, we get from mutualism to Niccolò Machiavelli’ (p. 119). She posits instead that the mutualism he patiently observes in human children may be the result of underlying altruistic social senses, rather than the other way around (p. 122). Dweck, on the other hand, interrogates how innately mutualistic human infants are – they may be prepared for reciprocity but if greeted with abuse and neglect quickly lose their capacity for empathetic connections to other people (p. 132). Skyrms, for his part, reflects on the wide array of non-ape cooperative species on Earth, including meerkats, mole rats, social insects and communal bacteria. These species manage to be cooperative without any of the mechanisms Tomasello requires to explain the high levels of mutualistic behavior in humans (pp. 145–146). Given the final word, Spelke wonders if true language was required for humans to develop our unique cognitive abilities, rather than (as Tomasello posits) being a consequence of shared intentionality (pp. 156, 164).

In sum, despite the similarity of their topics and ultimate rejection of humans as killer apes, *Age of Empathy* and *How We Cooperate* are very different books, from their intended audiences, to the kinds

4 In *Age of Empathy*, de Waal disagrees with Tomasello’s characterization of chimpanzees as entirely lacking in empathetic sharing, although he does note that, ‘they are less inclined than humans to engage in such behavior’ (p. 252).

of evidence they marshal in defense of human cooperation, and the nuances of the arguments they make. Where de Waal is proscriptive, hoping to change the way Americans think of themselves and devise social policies, Tomasello is persuasive, raising new questions about the mechanics of the evolutionary process.

The evolution of altruism or mutualism, however, presented or constituted, represents a diverse area of interdisciplinary research. It also prompts us to recall the 1960s as a time when experts on animal behavior (including primates, but certainly not limited to them) were eager to apply their research to the question of human nature (Milam, 2010). Simultaneously, cultural anthropologists questioned whether humanness could ever be reduced to a single trait or set of biological traits – if culture and nature were co-constitutive then any search for a universal human nature was surely bound to fail (for example, Geertz, 1973). This disagreement widened into a rift between factions of the natural and social sciences during the contentious fights over sociobiology in the 1970s (Segerstråle, 2000). One of the most promising facets of the rapidly proliferating body of literature on the evolution of human cooperation is that it brings these two traditions back into conversation with one another.

References

- Ardrey, R. (1961) *African Genesis: A Personal Investigation into the Animal Origins and Nature of Man*. New York: Atheneum.
- Axelrod, R. (1984) *Evolution of Cooperation*. New York: Basic Books.
- Boyd, R. and Silk, J. (1997) *How Humans Evolved*. New York: W. W. Norton.
- Dugatkin, L. (2006) *The Altruism Equation: Seven Scientists Search for the Origins of Goodness*. Princeton, NJ: Princeton University Press.
- Dweck, C. (1999) *Self-Theories: Their Role in Motivation, Personality, and Development*. Philadelphia, PA: Psychology Press.
- Geertz, C. (1973) *The Interpretation of Cultures*. New York: Basic Books.
- Hrdy, S.B. (2009) *Mothers and Others: The Evolutionary Origins of Mutual Understanding*. Cambridge, MA: Belknap Press of Harvard University Press.
- Kitcher, P. (2011) *The Ethical Project*. Cambridge, MA: Harvard University Press.
- Lorenz, K. (1966) *On Aggression*, Translated by M.K. Wilson. New York: Harcourt Brace & World.
- Milam, E. (2010) The equally wonderful field: Ernst Mayr and organismic biology. *Historical Studies in the Natural Sciences* 40(3): 279–317.
- Morris, D. (1967) *The Naked Ape: A Zoologist's Study of the Human Animal*. New York: McGraw-Hill.
- Nowak, M.A. and Highfield, R. (2011) *Supercooperators: Altruism, Evolution, and Why We Need Each Other to Succeed*. New York: Free Press.
- Olson, K.R. and Spelke, E. (2008) Foundations of cooperation in preschool children. *Cognition* 108(1): 222–231.
- Ridley, M. (1996) *The Origins of Virtue: Human Instincts and the Origins of Cooperation*. London: Penguin Books.
- Segerstråle, U. (2000) *Defenders of the Truth: The Battle for Science in the Sociobiology Debate and Beyond*. New York: Oxford University Press.
- Skyrms, B. (2008) *The Stag Hunt and the Evolution of Social Structure*. Cambridge, UK: Cambridge University Press.
- Sober, E. and Wilson, D.S. (1998) *Unto Others: The Evolution and Psychology of Unselfish Behavior*. Cambridge, MA: Harvard University Press.
- Tomasello, M. (2009) Society need not be selfish. *Nature* 461(7260): 41.

Aristotelian neurophilosophy for big children

Patricia S. Churchland

Braintrust: What Neuroscience Tells Us About Morality. Princeton University Press, Princeton, 2011, US\$16.47, ISBN: 978-0691137032

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At the beginning of the twentieth century, Max Weber (1958 [1919], p. 143) did not exaggerate much when he claimed that, ‘aside from certain big children who are indeed found in the natural sciences’, few people still believed that science could serve as a key to moral action. David Hume’s eighteenth-century dictum that *ought* sentences could not be deduced from *is* sentences had just been cemented by G.E. Moore’s ruling against the ‘naturalistic fallacy’ (Shapin, 2008, p. 10f). The conviction that empirical findings had no moral philosophical implications was closely associated with philosophers’ emergent opposition to the philosophical significance of scientific knowledge *tout court*. By forcing empirically oriented researchers out of philosophy departments, philosophy was temporarily constituted as the domain of purely conceptual thought (Kusch, 1995). In the 1960s, at about the same time as French structuralists and poststructuralists began to do away again with the separation of philosophy and the human sciences, American philosophers such as Wilfrid Sellars and W.V.O. Quine also called into question the opposition of the empirical and the conceptual in analytic philosophy. In this vein, Patricia Churchland and her husband Paul Churchland reconnected philosophy and brain research in what they called neurophilosophy (Churchland, 1986). After the bulk

of their work had focused on the philosophy of mind and the philosophy of science, Patricia Churchland’s new book *Braintrust* provides an account of what neuroscience tells us about morality. Pace Weber, Moore and company, Churchland self-consciously regresses to being one of those ‘big children’ who maintain the ethical significance of brain research. But maybe it is time to pause before lapsing into Weber’s infantilization of ethical naturalists.

Anticipating that her neurophilosophical approach to morality will be dismissed as a naturalistic fallacy, Churchland opens the book with her own reading of Hume as a thinker who not only denied that one could logically derive an *ought* statement from statements about what *is*, but also advocated naturalism in moral philosophy grounding moral behavior in human nature, especially in the passions, rather than in the supernatural or in reason. She agrees with Hume that, in terms of deductive logic, *ought* never follows from *is*. But Churchland also points out that most practical and social problems, including moral ones, do not require logical deduction, but probabilistic inference and circumstantial deliberation. ‘Our brains’, she argues, usually have to ‘figure out’ what are better or worse choices (without there being a uniquely right one) by drawing on knowledge, perceptions, emotions and an understanding of a given situation, balancing a multitude of considerations against each other (pp. 4–7).

Neuroscience helps us to understand the physiological mechanisms involved in such moral decision making. Churchland provides a well-informed overview of the current state of research in a broad range of relevant fields, from behavioral genetics to neuroeconomics and from primatology to biological psychiatry. She is particularly interested in the role of the hormone and neuromodulator oxytocin as one of the endocrinological foundations of ‘brain-based values’. What human brains care about, Churchland argues, is the organism’s own well-being, but also the welfare of kith and kin – which can lead to inner conflicts to be resolved by cultural practices, conventions and institutions (p. 12f). In the evolution of mammalian sociality, oxytocin has come to play a central role in caring for others by mediating attachment as the ‘neural platform for morality’ (p. 16). Churchland dismisses the doctrine of the naturalistic fallacy because she believes that our values – at least, in their most basic form – are in the

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world, more specifically in the brain. Thus, morality is rooted in our animal nature.

With this assumption, *Braintrust* follows the neo-Rousseauian turn prefigured by primatologists (for example, de Waal, Tomasello) and social neuroscientists (for example, Gallese, Rizzolatti). In contrast to late nineteenth-century Darwinians such as T. H. Huxley or their present-day heir Richard Dawkins, they conceive of morality as part of our (at least partially good) animal nature rather than a cultural institution keeping our (depraved) animal nature in check. According to these moral naturalists, altruism, empathy, cooperation and care for others are not a thin cultural veneer hiding an otherwise selfish and brutish life form, but are key to our biological makeup and survival as a species.

However, Churchland's claim that morality is deeply rooted in the brain does not entail that the brain alone determines moral behavior. Drawing from a range of neuroscientific studies, she demonstrates that oxytocin, for example, is not simply the 'cuddle hormone', as the popular press has presented it. In fact, oxytocin was shown to increase hostility and aggression toward individuals not belonging to one's group while facilitating trust, cooperation and tenderness within the group (pp. 50, 75). Consequently, one and the same neuroendocrinological agent can have diametrical effects in different social contexts. However, as anthropologist Allan Young has recently pointed out, the discovery of this bivalent nature of oxytocin sheds a critical light on some of the other studies used by Churchland, which construct the effects of the neuropeptide in univocal terms without paying attention to their modulation by social relations of test subjects in experimental settings.

Churchland also questions the simulation theory of mirror neurons, which postulates that we understand the intentions and feelings of others with the help of a set of neurons automatically activated by both the performance and the perception of a certain action or facial expression. She objects to this account, which has recently gained much currency in neuroscience, but also in some neuro-enthusiastic corners of the humanities such as neuro-art history: 'Observing that someone is angry may not produce anger in the observer, but fear or embarrassment or, depending on the situation, possibly even laughter' (p. 152). Even though social and moral behavior has a biological foundation, it is neither innate nor universal, but contingent on local conditions and contextual interpretation, argues Churchland (p. 139f). Understanding it, an

anthropologist might add, requires what Clifford Geertz (1973) called 'thick description'.

Churchland's emphasis on social and cultural context throughout the book might come as a surprise to many social scientists and humanities scholars who have so far identified Churchland with reductionism and eliminative materialism. Unlike the still fervent attacks on monotheistic religions in general and the Catholic Church in particular, her radical rhetoric announcing another scientific revolution displacing folk psychology by a neuroscientifically enlightened image of humankind has been toned down. In *Braintrust*, the decidedly modern iconoclastic zeal characteristic of her earlier publications takes a new form by being rearticulated with the philosophy of Aristotle, as if to remind readers that revolutions are also instances of a revolving motion. Aristotle has always played a role in Churchland's writings as a philosopher who made a serious effort to understand the nature of things in empirical ways more than two millennia before the specialization of academic disciplines separated philosophy from the natural sciences. As a post-disciplinary enterprise, Churchland's neurophilosophy turned back to this pre-disciplinary philosophical engagement with the natural world. In *Braintrust*, however, Churchland also comes out as an Aristotelian virtue ethicist following the revival of neo-Aristotelian context-sensitive but naturalistic approaches in moral philosophy and bioethics – a development that began in the 1950s and gained momentum in the 1980s. Thus, her new book takes the literary form of a contemporary assemblage combining the latest neuroscience with philosophemes both ancient and modern.

Even though the term is never used, eliminativism returns through the backdoor in the form of a dismissal of rule-based moral philosophies, which are to be replaced by a casuistic approach. Case-based reasoning is, Churchland claims, what the brain relies on when facing the messiness of real-world moral conundrums rather than the thin, detail-stripped school-masterly dilemmas presented to test subjects in neuroethical experiments (p. 182f). At least in the eyes of Patricia's husband Paul Churchland (about whom she says that she is 'never very clear about whether an idea is his or mine and we agree it does not matter', p. 260), rule-based moral philosophies à la Kant or Rawls are based on an empirically false background theory of human cognition – 'our dear beloved "folk psychology"'. The assumption that moral behavior was guided by rules understood as 'just hidden, silent versions

of external statements' as they appear in our overt speech is about to be displaced by a non-linguistic, 'neuronally based and mathematically embodied alternative, specifically the vector-coding, matrix-processing, prototype-activating synapse-adjusting account' supported by computational neuroscience (Churchland, 2007, p. 63f). Such an account will eliminate from our moral vocabulary all terms that map poorly on brain processes such as 'strength of will', Patricia Churchland predicts (p. 126f). Both the Churchlands take moral behavior as primarily shaped by cerebrally incorporated and actively cultivated social skills or virtues. Interestingly, this turn to virtue ethics aligns them with Francisco Varela's (1999) neurophenomenology and Andy Clark's (2000) extended mind theory, which are often presented as antipodes to the Churchlands' neurophilosophy in the field of empirically oriented philosophies of mind. Although Patricia Churchland's account of morality is partly reductionist and eliminativist, its Aristotelian twist reconciles it with the kind of contextualism emphasized by Varela and Clark, but also by social scientists and humanities scholars. After all, Aristotle was not only a naturalist regarding the good life as the consummation of human nature, but also a 'nurturist' who took the realization of the virtues as an achievement of pedagogy and practice. The same is true for the author of *Braintrust*.

In anthropology, sociology and history of science, Churchland's reductionism and eliminative materialism have never received a particularly warm reception. In her presidential address at the 1999 Spring Meetings of the American Ethnological Society, Emily Martin (2000), for example, articulated a sense of alarm, even panic, that cultural anthropologists might experience ('like a deer in the headlights of a Mack truck') in the face of the steamrollering eradication of the social and the cultural by neuroreductionists like Churchland. Sociologist and philosopher Martin Kusch (1997) argued that the replacement of folk psychology by neuroscience advocated by the Churchlands would amount to the elimination of the social institution that is the basis of all others – with all due consequences. Rival philosophies of mind, on the other hand, have been taken up more favorably. References to extended mind theorists and neurophenomenologists backed up ethnographic critiques

of neuroimaging (Roepstorff, 2001; Cohn, 2008). In addition, arguments against the confusion of brain and person (which would also apply to *Braintrust*), as developed in ordinary language philosophy, inspired a critique of the identity politics of 'cerebral subjects' in the neurodiversity movement (Ortega, 2010). In large part, the aversion to Churchland's neurophilosophy and the embrace of competing philosophical camps might be explained by an epistemic form dominating the social sciences and humanities that values relationalities and engagements,¹ and is therefore ill-disposed to the reduction of the human mind to a brain so isolated from its surroundings that it is occasionally imagined in a vat. But the emphasis that *Braintrust* places on social context might take the edge off this combat of forms.

In comparison with her *Neurophilosophy*, this book appears less radical and more 'brainwise' (to use another book title by Churchland). Three decades have gone by since eliminative materialism began to haunt the sciences of the social, and, if the institutional foundations of Euro-American societies have been eroded in the meantime, even the most materialist of philosophers are not to blame (despite their frequent denunciation as ideologues of neo-liberalism in social scientific scholarship). When, on rare occasions, a particular concept is indeed eliminated from a scientific vocabulary or from everyday language, no epochal break ensues. Scientific revolutions are an invention of twentieth-century historical epistemology. Churchland's turn to Aristotle is less insurgent than conservative: it aims at providing a biological foundation to explain, not to change moral behavior.

Of course, much historical and social scientific scholarship published in recent years has argued that, under the spell of the brain, Euro-Americans have come to conduct their lives differently. Through such looping effects, a seemingly value-neutral scientific or philosophical account can factually inform moral behavior. In this sense, Churchland's neurophilosophical colleague Thomas Metzinger (2009) warned against an 'ethical vacuum' following on the heels of the neuroscientific destruction of the Judeo-Christian image of humankind – a destruction that both he and Churchland promote. The reason why *Braintrust* is free of such gloomy diagnoses of the present is that, unlike Metzinger and many in the social sciences and

1 See Emily Martin's lecture 'Identity, Identification, and the Brain' at mediathek.mpiwg-berlin.mpg.de/mediathekPublic/versionEins/Conferences-Workshops/Neurocultures/Emily-Martin.html and the work of the Detachment Collaboratory at www.detachmentscollaboratory.org.

humanities, its author trusts the brain to guarantee social cohesion. Trust between parents and children, mates, partners, colleagues or in institutions, Churchland argues, is what maintains human sociality. But, as this-worldly forms of moral wisdom such as Confucianism or Taoism demonstrate, it does not require the belief in the transcendent God of Judaism or Christianity. More important than a supernatural moral authority, Churchland (p. 198, 202) argues, is the excretion of oxytocin enabling human beings to create and rely on stable institutions, which allow people who hardly know each other to mutually enhance their well-being. This only partially reductionist account nurtures a human self-conception that takes ethical behavior as a preexisting natural capacity that can be cultivated more or less, but is too deeply ingrained in our species to be eradicated by the comings and goings of contingent discourses.

The book concludes with the acknowledgment that the most pressing ethical problems of our time raise questions of how best to regulate certain practices, organizations and institutions (for example, the regulations of drugs, stem cell research or religious freedom), but leaves these issues to social scientists and journalists, government administrators and citizens (p. 204). Especially on the institutional level, these more substantive engagements might well counter the thrust of Churchland's argument by bringing the importance of rule-based forms of moral reasoning back into view. Although *Braintrust* describes, with very broad strokes, some brain-based values (basically self-welfare and the welfare of relatives, friends and acquaintances), the inquiry largely remains on a metaethical level arguing for a biological foundation of morality in general rather than for or against particular ethical evaluations or virtues.

What (if any) use *BioSocieties* readers can make of Churchland's very readable book might depend in no small part on how they assess Churchland's dismissal of the naturalistic fallacy. Those convinced by the arguments of Moore and Weber cannot but reject her ethical naturalism and, thus, the entire project. Less modernist minds, impressed either by the reemergence of Aristotelian virtue ethics or by Latour and Haraway's critiques of the opposition of nature and culture or facts and values will find a scientifically well-informed philosophical reading of the neuroscience of moral behavior. It tends toward the Rousseauian side in

the ongoing debate over whether human beings are born cooperative and helpful (and society later corrupts them) or, as contemporary Hobbesians claim, whether they are born selfish and unhelpful (and society teaches them better). But, whatever side one is on in these controversies, after the heated interdisciplinary disagreements over the elimination of folk psychology, *Braintrust* provides an opportunity to rediscover the philosophy of Patricia Churchland – and, alongside, perhaps one's inner big child?

References

- Churchland, P. (1986) *Neurophilosophy: Toward a Unified Science of the Mind-Brain*. Cambridge, MA: The MIT Press.
- Churchland, P.M. (2007) *Neurophilosophy at Work*. Cambridge, MA: Cambridge University Press.
- Clark, A. (2000) Word and action: Reconciling rules and know-how in moral cognition. *Canadian Journal of Philosophy* 26: 267–290.
- Cohn, S. (2008) Making objective facts from intimate relations: The case of neuroscience and its entanglements with volunteers. *History of the Human Sciences* 21(4): 86–103.
- Geertz, C. (1973) Thick description: Toward an interpretive theory of culture. In: *The Interpretation of Cultures: Selected Essays*. New York: Basic Books, pp. 3–30.
- Kusch, M. (1995) *Psychologism: A Case Study in the Sociology of Philosophical Knowledge*. London: Routledge.
- Kusch, M. (1997) The sociophilosophy of folk psychology. *Studies in History and Philosophy of Science* 28(1): 1–25.
- Martin, E. (2000) Mind-body problems. *American Ethnologist* 27(3): 569–590.
- Metzinger, T. (2009) *The Ego Tunnel: The Science of the Mind and the Myth of the Self*. New York: Basic Books.
- Ortega, F. (2010) The cerebral subject and the challenge of neurodiversity. *BioSocieties* 4(4): 425–445.
- Roepstorff, A. (2001) Brains in scanners: An Umwelt of cognitive neuroscience. *Semiotica* 134(1/4): 747–765.
- Shapin, S. (2008) *The Scientific Life: A Moral History of a Late Modern Vocation*. Chicago, IL: University of Chicago Press.
- Varela, F. (1999) *Ethical Know-How: Action, Wisdom, and Cognition*. Stanford, CA: Stanford University Press.
- Weber, M. (1958 [1919]) Science as a vocation. In: H.H. Gerth and C. Wright Mills (eds.) *From Max Weber: Essays in Sociology*. New York: Oxford University Press, pp. 129–146.