Braintrust: What Neuroscience tells us about Morality by Patricia Churchland (2011)
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Review by Graham Bell

Patricia Churchland is professor emerita at the University of California, San Diego and at several other scientific institutes. Together with husband Paul, both self-styled neurophilosophers, her academic career has focused on the interface between neuroscience and philosophy. She holds that folk psychology concepts such as belief, free will and consciousness will need to be revised as science understands more about the nature of brain function. Her latest book extends this perspective to morality. She wishes to go beyond the observation of Aristotle, Hume and Darwin that humans are social animals to investigate what this means in terms of brain physiology. This has been made possible by recent advances in evolutionary biology, primatology, genetics, experimental psychology and neuroscience. "We can now meaningfully approach the question of where values come from."

The origins and nature of morality

Churchland continues, "Morality seems to me a natural phenomenon – constrained by the forces of natural selection, rooted in neurobiology, shaped by the ecology, and modified by cultural developments." She sees the origin of morality in animal sociality. The opportunities for survival and reproduction are much better for animals living in groups than alone. However, all social animals have had to develop patterns of conduct that curb tendencies towards individualistic behaviour for group living to flourish (1). "Social behaviour and moral behaviour appear to be part of the same spectrum of actions, where those actions we consider "moral" involve more serious outcomes than do merely social actions such as bringing a gift to a new mother." This claim receives moderate support from fMRI data where exactly the same areas of the brain become more active whether subjects ponder purely social tasks or straightforward moral tasks.

An additional factor arose with the evolution of mammals. Whereas animals such as lizards, newts and frogs lay eggs that develop by themselves with the parents playing no part in the care of the offspring, the female mammal suckles her young and cares for them until they are mature enough to become independent. (Caring for the young also occurs for birds and for some species of reptile.) "Female mammals came to regard their young as part of themselves, …. a 'me-and-mine' concern." "Depending on ecological conditions and fitness considerations, strong caring for the well-being of offspring has in some mammalian species extended further to encompass kin or mates or friends or even strangers, as the circle widens. This widening of other-caring in social behavior marks the emergence of what eventually flowers into morality."

Selection pressure for these behavioural traits led over time to the restructuring of the brain and associated neural physiology. Thus, these behavioural propensities are evolutionarily ancient and became encoded in genomes and hard-wired into brains. "My aim …. is to explain what is probably true about our social nature, and what that involves in terms of the neural platform for moral behavior. As will become plain, the platform is only the platform; it is not the whole story of human moral values." The rest of the scaffolding, the culture in which these brains live, is also important. "There is no simple set of steps to take us from 'I care, I value' to the best solution to specific moral problems, especially those problems that arise within complex cultures. It's a messy practical business."

Churchland proposes "that what we humans call *ethics* or *morality* is a 4-dimensional scheme for social behaviour that is shaped by interlocking brain processes: (a) *caring* (rooted in attachment to kin and care for their well-being), (b) *recognition of others' psychological states* (rooted in the benefits of predicting behaviour of others), (c) *problem-solving in a social context* (e.g. how we should distribute scarce goods, settle land disputes; how we should punish the miscreants), and (d) *learning social practices* (by positive and negative reinforcement, by imitation, by trial and error, by various forms of conditioning, and by analogy)." The author recognises that David Hume had in the 18th century reached similar conclusions and she comments, "The earlier chapters of this book can be seen as only providing the details, many newly discovered, to round out Hume's considerable insight." The simplicity of this framework does not mean its form, variations, and neural mechanisms are simple. On the contrary, social life is extremely complex as is the brain that supports our social lives.

Given our shared evolutionary history of the brain, Churchland rejects the anthropocentric view that only humans have *true morality* and that nonhuman animals are *amoral*. Morality does not require the capacity for language and rational thinking. Tendencies towards morality are principally the outcome of practical problem solving for social living. "Because many species of birds and mammals display good examples of problem-solving and planning, this claim about rationality looks narrow and under-informed." "That all nonhuman mammals have social values is obvious; they care for juveniles, and sometimes mates, kin and affiliates; they cooperate, they may punish, and they reconcile after conflict." All social animals have species-specific moral systems. The building blocks of human morality are found in other apes and are the products of natural selection in the highly social primate lineage. "We could engage in a semantic wrangle about whether these values are really *moral* values, but a wrangle over words is apt to be unrewarding. Of course, only humans have human morality, …. a tedious tautology. One might as well note that only marmosets have have marmoset morality, and so on down the line. We can agree that ants are not moral in the way humans are, and that baboon and bonobo social behavior is much closer to our own …. Perhaps we could leave it at that, pending deeper scientific understanding."

How relevant is David Hume's is/ought divide to moral decision-making?

Churchland takes issue with the "old reliable smackdown" employed by some moral philosophers that science has nothing to say about morality because of Hume's dictum that you cannot derive a statement about what *ought* to be done from a set of facts about what *is* the case. For current purposes, this translates as 'you cannot derive moral values directly from facts uncovered by science'. Hume's admonition applies to arguments involving deductive logic. However, rigorous deductive thinking is rarely employed in ongoing social problem solving. Conscious reasoning represents only a minute fraction of human decision processing. Hume's stricture must therefore be employed with care.

"Most practical and social problems are *constraint satisfaction* problems." "Constraint satisfaction …. involves various factors with various weights and probabilities interacting so as to produce a suitable solution to a question. Not necessarily the best solution, but a suitable solution." The information processing performed by the brain to reach such decisions, even in humans in almost all cases, takes place automatically and is not available to consciousness. Deductive logic, this is not. She concludes, "The important point for my project, therefore, is straightforward: that you cannot derive an *ought* from an *is* has very little bearing so far as in-the-world problem solving is concerned."

The author, on the other hand, agrees that Hume's dictum be applied to counter intellectual attempts to derive moral values from scientific findings. For example, she is strongly opposed (2) to the implication in the subtitle of Sam Harris' latest book, *The Moral Landscape: How Science Can Determine Human Values* (3).

The role of neurochemicals in influencing behaviour

Churchland's "favorite story of all time" concerns prairie and montane voles of Canada, her native country. Despite their very close evolutionary relatedness, prairie voles bond for life while montane voles are promiscuous. Male prairie voles protect their pups from harm, provide them with food and fight off other males. Male montane voles play no role in guarding the nest or the female or the pups. If you scatter them across a large enclosure, prairie voles will collect back together in a huddle while montane voles are content to be left alone. A neuroscientist in the 1970s sought answers in the brain to these very different behaviours. She found that in certain areas of the brain, the density of receptors for the neurotransmitter oxytocin was much higher for prairie voles than for montane voles. Later research has shown that the blocking of these receptors in prairie voles alters their behaviour dramatically. For instance, they no longer bond with their mates. The neurotransmitter vasopressin was also found to influence attachment behaviour, but quite differently.

This story provided Churchland with the clue that neurotransmitters oxytocin and vasopressin play a significant part of the neural mechanism for attachment. "The main hypothesis of this book, that morality originates in the neurobiology of attachment and bonding, depends on the idea that the oxytocin-vasopressin network in mammals can be modified to allow care to be extended to others beyond one's litter of juveniles, and that, given that network as a backdrop, learning and problem-solving are recruited to managing one's social life. One might predict, therefore, that cooperation and trust are sensitive to [oxytocin] levels. This raises an important question: can changes in [oxytocin] levels affect human cooperative behavior?"

The answer appears to be yes. Subjects who had had oxytocin sprayed into their nostrils displayed significantly lower stress levels and greater trust and cooperation with their opponents in a variety of game theory experiments compared to control subjects where the spray used was neutral. The author discusses the implication of such findings for therapeutic treatment, for example in the treatment of posttraumatic stress disorder, and the moral implications of such treatments.

The author surveys recent areas of research related to sociality, behaviour and learning, particularly with respect to what can and cannot justifiably be inferred from modern science. With her philosophical scalpel, she attempts to keep science grounded to the facts and to put areas of research prone to over-interpretation into much needed perspective. Thus, 'exaggerated' claims about innate capacities, 'genes for ….', mirror neurons and the function of particular brain structures, neurotransmitters and hormones come under particular scrutiny. A recurring theme of her book is that plausible explanation consistent with a phenomenon is not the same as sound explanation; confirmatory evidence is required. "Speculations are of course useful in inspiring experiments, and are not to be discouraged. The point is, I prefer not to buy into one, or be asked to, until some results bear upon its truth."

One such cautionary tale, "The Parable of Aggression in the Fruit Fly", is illustrative. It had

been experimentally observed that increasing the level of the neurotransmitter serotonin increases the level of aggression in fruit flies and in mice. It was therefore thought that the gene that expresses serotonin might be "*the gene for* aggression", conforming to the "*Gene for* …." category of hyperbole so beloved of popular media. However, two researchers bred 21 generations of fruit flies selectively for aggressive behaviour. They then looked for changes in gene expression between the aggressive and wild-type fruit flies. The expression of over 80 genes had changed up or down but in each case by only a small amount. (A number of these 80+ genes are not in any way related to aggression but are only selected for because they happen to be located on their chromosome very close to genes that are so related.) The gene that codes for serotonin was not even one of the 80+ genes! The crux of "The Parable" is that there is no single big-effect gene for aggression in the fruit fly. Evolved behavioural traits are the result of complex genotype-phenotype relationships. For these traits, the label "*Gene for* ….. " is inappropriate. Asking what does it take, genetically speaking, to build a system is a different question from what does it take to break it. Serotonin is in fact an evolutionarily ancient neurotransmitter that is involved in a wide assortment of brain and body functions. It does affect levels of aggression but only indirectly and according to circumstance in individual fruit flies.

The vain philosophical and religious search for exceptionless moral rules

Churchland rejects the notion that morality is a set of rules and codes handed down from on high without which we would all behave badly. The idea that right and wrong, or good and evil, exist in some abstract sense, independent from humans who only somehow come to perceive them, is a powerful and stubborn illusion, whether the idea originates in philosophy or in religion. Hers is a bottom-up, biological story. Morality turns out to be not a quest for overarching principles but rather a process and practice not very different from negotiating our way through day-to-day social life. She maintains that the search for the "exceptionless rules" has deformed much modern moral philosophy. Moral philosophy needs science. Philosophers must take account of evolutionary biology and neuroscience in their investigations of ethics.

Churchland visits the basic forms of each major philosophical moral system in turn and also principles such as the Golden Rule in its various forms. Using relevant, everyday examples, she shows them all to be wanting in universal and exceptionless applicability. Significantly, given her naturalistic approach to morality, she writes, "Kant recognized the importance of evenhandedness in moral duty …. [H]e thought he saw a way to leverage evenhandedness into a grand moral theory" founded on "completely exceptionless, unconditional rule[s] for moral behaviour." The fair and significant exceptions "that get through Kant's filter … suggest that counting on pure rationality to understand morality is mistaken …. Kant's conviction that detachment from emotions is essential in characterizing moral obligation is strikingly at odds with what we know about our biological nature …. From a biological point of view, basic emotions are Mother Nature's way of orienting us to do what we prudentially …. and socially ought" in the ever-changing stream of situations thrown up by daily life. She points out the problem of logical regression that applies in rule-based morality when fair and significant *exceptions* are found to the *exceptionless* rules or when competing rules conflict in solving everyday problems. "[I]f there are rules *all the way down*, what more basic rule do we invoke" in resolving a higher-level conflict of rules?

"When there is conflict about which option best serves human well-being …. where does one go for clarification?" The answer is "to the world. There is no other place to go …. [T]he

process of reflecting on alternatives, understanding history and human needs, seeing things from the perspective of others, and talking it through with others can lead us to better evaluations of a social problem in the long run. Better that is, than relying on self-appointed moral authorities and their list of rules …. What does not exist is a Platonic heaven wherein the Moral Truths reside – no more than there is a Platonic Heaven wherein the Physical Truths reside." "Sometimes there isn't an answer in the moral domain, and sometimes we have to agree to disagree, and come together and arrive at a good solution about what we will live with." The ugly truth is that morality cannot be grounded on absolute rules. But it does not follow that we must resort to the relativist-type argument that then "anything is permissible" Humans must strive to "play well".

In conclusion

The author has written a well-researched, informative and lucid book aimed at the general reader. It should be a valuable resource for the curious of the advances that science as made in the last few decades in our understanding of the nature and naturalistic origins of morality (4). In many ways it complements Sam Harris' book, *The Moral Landscape*, because it deals clearly with some of the critiques of that book's argument. Her account of the vacuousness, as she sees it, of a vast swath of contemporary moral philosophy should give many philosophically-minded much to chew on. Notably, Patricia Churchland's book, *Braintrust,* should be of interest to members of an Ethical Society.

Notes

1. I gave an account of this aspect of the naturalistic origins of morality in *A response to 'Moral Thinking' by Henry Haslam* in Ethical Record, March 2011
2. Select *Patricia Churchland: Neuromorality* in *Youtube.com* - Listen from 22 mins on
3. Sam Harris' book is to be reviewed in a forthcoming Ethical Record
4. For several videos of the author discussing her book, enter *Churchland Braintrust* into*Youtube.com*