nature neuroscience

Does neuroscience threaten human values?

An unusual conference[1] was held recently in Washington DC, with the bold title "Neuroscience and the Human Spirit". Its purpose was to examine the extent to which modern brain research threatens traditional views of humanity, including the western religious tradition. The participants included such well known (in the USA) public figures as William Bennett—the former 'drug czar' under President Bush—and the columnists William Safire and Charles Krauthammer; other speakers included the current and former directors of the US National Institute of Mental Health, Steven Hyman and Frederick Goodwin respectively; the president of the American Psychological Association, Martin Seligman; and a roster of distinguished neuroscientists, psychiatrists, geneticists, legal scholars, philosophers and theologians.

The conference was organized by Goodwin in association with the Ethics and Public Policy Center (EPPC, of which he is a director), a conservative Washington think-tank whose stated agenda is to reinforce links between the Judeo-Christian moral tradition and public policy. Goodwin himself professes agnosticism, but he became involved in the EPPC because he believes that modern neuroscience raises important ethical concerns that have not been adequately addressed, either by scientists themselves or by the bioethics community.

In the Judeo-Christian view, humans were created by God and endowed with knowledge of right and wrong and the ability to choose between them. This idea is, of course, deeply seated in many societies, and the belief in free will and moral choice forms the basis for our concepts of responsibility and culpability, and hence for our legal systems. Moreover, such concepts are by no means confined to those who believe in God (as anyone will discover who throws a brick through the window of even the most reductionist neurophilosopher). For most of us, they are among our most fundamental assumptions when dealing with other people. Yet, there is an uncomfortable tension between these widely held beliefs and the intellectual views of many scientists. In particular, the rapid progress of neuroscience has been interpreted by some as providing new ammunition for a materialist account of human nature, and thus as an attack on traditional belief systems.

First, neuroscience presents a challenge to the concept of free will; as we gain a deeper understanding of the brain, it seems increasingly unlikely that the circuits responsible for making decisions are different in kind from those that underlie more lowly functions. A number of researchers are already attempting to account for simple 'decisions' in terms of quantitative mechanistic models, and it seems parsimonious to assume that similar mechanisms, albeit more complex, could account for human decisions, including those that involve emotional, logical or moral considerations. Free will is a notoriously difficult concept to explain, and Francis Crick has suggested that the sense that we all experience is exactly what would be expected if some part of the brain is responsible for making future plans, and if we are conscious of our plans but not of the computations that led to them.

Second, whatever one's philosophical position on free will, it is now clear beyond doubt that many behaviors are to some extent 'determined' by biology. People who inherit certain genotypes or who are exposed to certain environments are more likely to engage in criminal or antisocial conduct, and our ability to predict behavior from biology is likely to improve, perhaps greatly, as a result of the human genome project. Even if the predictions are imperfect, to the extent that behavioral choices are constrained by biology, it is difficult to regard them as truly 'free'. As knowledge advances, the argument goes, evil will seem less culpable and virtue less praiseworthy.

Third, religious and moral beliefs are now themselves seen as legitimate objects for scientific study and explanation. Religiosity has a genetic component (although specific behaviors such as church-going show a stronger effect of family environment), and it is reasonable to ask whether religious beliefs and ethical precepts may represent evolutionary adaptations. Furthermore, how children acquire a sense of right and wrong is a question that can be addressed by cognitive neuroscience. The relative contributions of genes and upbringing remain unclear, but regardless of whether ethical beliefs represent evolutionary adaptations or cultural creations, it is difficult to identify any scientific basis for our intuition that they have some claim to absolute truth; on the contrary, they seem to many scientists to be arbitrary accidents of our evolutionary and cultural history.

These arguments represent a clear challenge to traditional belief systems, and they have recently gained force from being articulated by a number of leading scientists, some of whom have not sought to conceal their antipathy toward religion. Crick, for instance, states in *The Astonishing Hypothesis*: "Not only do the beliefs of most popular religions contradict each other but, by scientific standards, they are based on evidence so flimsy that only an act of blind faith can make them acceptable." Steven Pinker, in his recent book *How the Mind Works*, asks how the human mind could have evolved to believe what is "palpably not true" and characterizes religion as "a desperate measure that people resort to when the stakes are high and they have exhausted the usual techniques for the causation of success…". Richard Dawkins, author of *The Selfish Gene*, was similarly blunt: "The kinds of views of the

universe which religious people have traditionally embraced have been puny, pathetic, and measly in comparison to the way the universe actually is."[2]

Not surprisingly, such comments have not always been well received, and these authors were criticized by a number of speakers at the conference. Many of the critics were conservative commentators and theologians, but their concerns were shared by at least some of the scientists who were present. Goodwin, for instance, says that he is troubled by the comments of Crick, Pinker and Dawkins, who he feels should be more careful to distinguish their beliefs from their abilities to prove their points scientifically.

Goodwin uses the term "scientism" to refer to scientists who overstep their authority and expertise when pronouncing on broader questions. The boundary between evidence and faith is of course difficult to define, as Goodwin readily acknowledges; great scientists have always tried to go beyond their data and to draw bold hypotheses. Many would disagree with his characterization of (for example) *The Astonishing Hypothesis*, given the clarity with which Crick has stated his assumptions and weighed the evidence in support of his views. Nevertheless, Goodwin has raised a concern that should be taken seriously by anyone who cares about the relationship between the neuroscience community and the public on whose support it depends. The concern is particularly acute because the writers he charges with scientism are not only respected scientists, but also among its best popularizers. Books such as *The Astonishing Hypothesis*, *The Language Instinct* (Pinker's previous book) and *The Selfish Gene* are modern classics, popular expositions that are at the same time serious and influential works of scholarship.

Many scientists prefer not to discuss religion or morality in public, arguing that science and values are mutually independent and cannot address each others' concerns. Few would deny the importance of distinguishing between questions of fact and questions of value, but when the biological basis of the value system is itself the subject of scientific inquiry, the distinction becomes more difficult. In addition to these perennial philosophical issues, however, Goodwin believes that there are some urgent practical reasons for encouraging more open discussion and debate.

Firstly, he argues, public support for science, both in the US and elsewhere, is more fragile than is generally realized. Polls in the US imply a state of 'creative tension' in public opinion; scientists are consistently listed among the most highly esteemed groups in society (typically second only to doctors), while at the same time a very high percentage of people also profess religious beliefs that are not shared by most scientists. (Although a recent study found that almost 40% of American scientists believe in God, the percentage was far lower among the supposed scientific elite who are elected to the U.S. National Academy of Sciences; the great majority of members surveyed professed not merely agnosticism but disbelief, whereas only 7% of members and 5.5% of biologists described themselves as believers[3].) Scientists clearly have a right to express their personal views, as well as an obligation to taxpayers to explain what they are doing and what they think it means. Goodwin urges sensitivity, however, because (as was apparent from the conference) there is already a growing perception that biology, and neuroscience in particular, is trampling somewhat gleefully on beliefs that are dear to many people.

Goodwin also believes that scientists have a poor track record when it comes to engaging in public discussions of ethical issues. He argues for instance that biomedical researchers have been ineffectual in defending themselves against attacks by the animal rights movement, because they chose to debate details instead of confronting the central weakness of the anti-vivisection position, namely its contention that animals are the moral equals of humans. Neuroscience will always be vulnerable to animal rights concerns, especially when it seeks to understand higher brain functions that can only be studied in animals with complex brains. The best defense against such criticisms is to convince the public that understanding the brain is a valuable goal, but their support will be weakened if they see this understanding as a threat to their beliefs.

Finally, society is likely to need guidance from scientists as it faces some difficult questions arising from progress in behavioral neuroscience and behavior genetics. Evidence from twin and adoption studies suggests that many human cognitive traits show a substantial degree of heritability, and it is likely that as the human genome project advances, many genes and combinations of genes will be identified that predispose individuals toward particular personalities and behaviors. How will this affect our conception of responsibility and justice? Adrian Raine, a psychologist at the University of Southern California who studies neurobiological correlates of violent crime, argued at the conference that an individual whose biology predisposes him toward criminal behavior cannot be considered as culpable for his actions as someone who is not so disadvantaged. He considers such people as having 'partial free will' but many speakers were uncomfortable with this formulation. Whatever the terminology, however, it seems difficult to deny Raine's claim that not all behavioral choices are equally available to all people, and that the concept of free will, as normally understood, does not sit well with the existence of biological predisposing factors.

Although our understanding of ethical decision making remains very crude, it seems likely that better cognitive models will be developed in the future, which may affect our thinking about issues of culpability. Imagine for instance a person with a predisposition to violence struggling to control his behavior; one can speculate that the outcome would be determined not only by the intensity of his urge to violence, but also the extent of his moral compunctions, the impulsiveness of his decision making and the strength of his ability to resist temptation. Any of these might in principle be influenced by biological factors that would presumably alter our view of the individual's culpability.

The law recognizes the concept of diminished capacity, and the consensus among the lawyers at the conference seemed to be that existing legal concepts are sufficient to accommodate any foreseeable scientific progress. The U.S. public, however, is notoriously unsympathetic to claims of diminished capacity, in part because of abuses such as the so-called 'Twinkie defense' (named for a celebrated murder case in which the defendant received a lenient sentence because he was allegedly acting under the influence of sugary junk food). A high level of public understanding and support will be needed if the behavioral sciences are to play a more constructive role in future legal debates.

In sum, there are compelling reasons for further discussion. Neuroscientists should recognize that their work may be construed as having deep and possibly disturbing implications, and that if they do not discuss these implications, others will do so on their behalf. The diversity of views expressed at the conference suggests that reconciliation is not imminent, but it will nevertheless be valuable to define the areas of agreement and disagreement more precisely. The EPPC has performed a useful service in promoting that goal.

1. *Neuroscience and the Human Spirit*. Conference sponsored by the Ethics and Public Policy Center, Washington DC, 24-25 September 1998.
2. Quoted in Brockman, J. *The Third Culture* (Touchstone, New York, 1995).
3. Larson, E.J. & Witham, L. *Nature* 394, 313 (1998).