Virtual Mentor
American Medical Association Journal of Ethics
June 2012, Volume 14, Number 6: 489-493.

MEDICINE AND SOCIETY

Determinism and Advances in Neuroscience

Nada Gligorov, PhD

Novel medical treatments and advancements in medical technology have given rise to numerous ethical questions including the just allocation of medical resources, end-of-life dilemmas, and most recently the permissibility of human enhancement. These advances have also challenged received moral norms and, in some instances, revealed the need to revise not only those received norms but established social policies and even the primary goals of medicine. Most of those changes, however difficult, presume a human ability to adopt moral values, pursue moral goals, and take responsibility for moral choices.

In recent years, however, advancements in neuroscience, psychiatry, neurology, and related fields of inquiry have shaken the presumption that humans are capable of moral decision making by showing that many aspects of human psychology correlate with localized activity in the brain, thus raising the possibility of biologic explanations for all human behavior. This encroachment of scientific explanation into the domain of human psychology and human morality is often characterized as a serious threat to the idea that humans have free will. In this piece I argue that scientific explanation of our moral capabilities does not presently pose a threat to the idea that we possess free will, although it might change our notions of choice and responsibility.

Free Will and Responsibility

Free will is thought of as a necessary precondition for morality. In order for individuals to be held responsible for their actions, they must be free to act in more than one way and be able to choose one action over the other. We seldom, for example, blame people for their physical attributes. It would seem at best strange, and in some instances even cruel, to blame people for attributes such as short stature or eye color. It would be even more inappropriate to ascribe personal blame to an individual for becoming ill, for example developing cancer, if the illness were not in part due to lifestyle. When it comes to physical attributes individuals have little or no agency; they cannot change their physical features or prevent the onset of many diseases.

We do blame people, however, when we think they *could have acted other than they did*, a judgment that entails the presumption of free will. If a father spends all his money on an expensive car and as a result depletes his son's college fund, we hold the father responsible for making a choice that may disadvantage his son. If a person is convicted of murder, that person is held responsible and incarcerated. Even if an

individual can be characterized as having a personality type that makes him or her prone to act in a certain way, there is still a presumption of free will and the corollary ascription of responsibility. Indeed the belief that people can make choices and be held responsible for them plays an important role in medicine as well, evidenced by the customary respect for patient autonomy [1] or, as we often call it, patient self-determination.

We do, however, modulate our ascriptions of blame based on the known characteristics of the people performing an action. Understanding of psychiatric diseases makes us more hesitant to blame those who have psychiatric conditions. For example, people who have schizophrenia and commit violent acts are not considered responsible in the same way as people without severe psychiatric diagnoses who commit the same acts. They might be confined to a psychiatric hospital, but the cause of their violent acts is attributed to their biologically based mental illness, not to choice.

Further advancements in psychiatry, neurology, and neuroscience could explain more of human psychology in terms of its biology, specifically brain activity. If all psychological phenomena that underlie what we regard as moral reasoning and action can ultimately be explained in terms of brain processes, then those psychological capabilities required for morality could be viewed as nothing but a physical process. And, since we explain physical processes in terms of deterministic scientific laws, there would be no reason to assign praise or blame for what we currently think of as free choices. The question then is how to reconcile our increased ability to explain human behavior biologically with our social need for moral norms and moral responsibility and our personal experience of making free choices.

Interpreting Reduction

Let us clarify what is meant by the claim that psychology can be reduced to physical processes. One could mean very generally that psychological states are ultimately the results of physical processes, thereby denying the existence of immaterial souls and rejecting Descartes' argument that there are two substances, the "thinking substance" and the material substance [2]. Such a claim only amounts to the endorsement of materialism or physicalism, i.e., the claim that all there is in the world is physical. This would be the least controversial way of interpreting the idea that psychology can be reduced to physical processes because it does not put forth any specific claims about *how* it is the case that human psychology is nothing other than a physical process. Such an argument would be entirely neutral on whether such reduction entails *determinism,* a term that I will explain next.

If one goes beyond the claim that human psychology results from physical processes and makes a prediction that all there is in the world will one day be explained by the laws of physics, this bolder claim involves not only the reduction of psychological states to physics but also the assumption that such a reduction entails determinism. Determinism is the claim that, given a certain set of initial conditions (for example

conditions that existed at the time of the Big Bang) and the set, unbending laws of physics, every event from the onset of the universe can be explained and predicted.

Now, if psychological processes can be, in some as yet unknown way, subsumed under the laws of physics, the laws of physics will determine human psychology. It would be false, then, to say that persons are free to make choices, in the same way it would be false to say that a ball falling from a height has the choice to follow the law of gravity. The decision one makes is caused by events preceding that decision, and those events in turn were caused by events before them, and so on, forming a long causal chain that reaches all the way back to the beginning of the universe.

The second argument above makes several unwarranted leaps. One of them is that all psychological and physiological processes can be neatly subsumed under the laws of physics. To argue that psychology is determined because the laws of physics are deterministic is to assume that all the distinct theories which aim to capture the various levels of natural organization—from those as complex as human psychology—can be explained by laws that govern lower-level organizations such as neurons, molecules, and particles [3]. This bolder reduction claim depends on the unification of all scientific theories, and it is not at all obvious that theoretical unification is achievable [4].

Finally, scientific theories, from psychology to physics, may or may not have deterministic laws independently of one another. Even if physics has deterministic laws, that fact does not entail that neuroscience have such laws. And neuroscience, thus far, has uncovered only mechanisms that are either random or probabilistic [5]. Just because psychological states occasionally correlate with brain activity does not entail that all psychological responses of the same kind are associated with the same brain activity or that the same brain activity always produces the same psychological responses. The increased ability to localize cognitive processes in the brain, and even in some cases localize individual thoughts [6], does not yet force us to relinquish the socially important notion of moral responsibility.

Determined, but Responsible

If further progress in neuroscience reveals that deterministic laws govern brain processes, which alone would not necessitate believing that moral responsibility is obsolete. Daniel Dennett argues that determinism can be compatible with free will and moral responsibility, saying that it would be wrong to think that, because determinism is true, our nature is fixed. Human nature is not fixed because it has evolved to accommodate external influences and to change in response to those influences [7]. In fact he seems to argue that the more science discovers about human nature, the more responsibility we have to do what is necessary to curb immoral or socially detrimental behaviors [8].

Presume the neurological basis of addiction is identified and some people are discovered to be prone to it while others are less susceptible. It would seem that those predisposed to addiction could be characterized as being less capable of

freedom to resist engaging in addictive behavior. But knowing that a person has this proclivity or sensitivity gives him or her the opportunity to avoid situations that exacerbate the risk of addiction. Hence, a finding that seemed at first glance to absolve people of responsibility results a new obligation: to take measures to protect themselves based on that information.

It seems, then, that in order to establish a clear conflict between determinism in science and free will one must make as yet unsupported assumptions about both. And once the assumptions are revealed it is possible to argue that determinism and moral choice are compatible. It would be an overstatement, however, to conclude that moral decision making will remain unaffected by our increased ability to explain human psychology through neuroscience and other related fields. There is no benefit to assuming the existence of human autonomy, rationality, and ability to act freely if those concepts are not supported by facts about actual human capabilities. In order to prevent our moral concepts and moral expectations from becoming outdated and inapplicable to human circumstances, we should be willing to revise them to accord with relevant scientific findings.

References

1. For more on the social role of free will and other moral concepts, see Kaposy C. The supposed obligation to change one's beliefs about ethics because of discoveries in neuroscience, *AJOB Neurosci*. 2012;1(4):23-30.
2. Descartes R. Meditation II. *A Discourse on Method*. London: Everyman's Library; 1994: 79-87.
3. Nagel E. *The Structure of Science*. New York: Harcourt, Brace, and World; 1961.
4. For more on the view of scientific unification, see Kukla A. *Studies in Scientific Realism*. New York, NY: Oxford University Press; 1998:43-57.
5. Roskies A. Neuroscientific challenges to free will and responsibility. *Trends Cog Sci*. 2006;10(9):420.
6. Kay KN, Naselaris T, Prenger RJ, Gallant JL. Identifying natural images from brain activity. *Nature*. 2008;452(7185):352-355.
7. Dennett D. *Freedom Evolves*. New York: Viking Penguin; 2003:93.
8. Dennett, 289-310.

Nada Gligorov, PhD, is an assistant professor of medical education at the Mount Sinai School of Medicine and assistant professor of bioethics at the Union Graduate College/Mount Sinai Bioethics Program in New York City. She received her doctorate in philosophy from the Graduate Center of the City University of New York. She is primarily interested in neuroethics, most specifically determinism and free will, as well as the impact of brain imaging technologies on privacy. She has also published on personal identity as it relates to biomedical issues such as advance directives.

Related in VM
Neuroethics, August 2004

Thinking about Ethical Issues in Neurology, August 2004

The viewpoints expressed on this site are those of the authors and do not necessarily reflect the views and policies of the AMA.