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What do you have in mind? Ethical questions in neuroscience

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New methods for examining and influencing brain activity have led to better treatments for disabling neurological and psychiatric diseases, but they also pose ethical questions about their use inside and outside of medicine.

"Experts from many fields are weighing in on the practical use of neuroscience findings and their philosophical implications," said Dr. Michael N. Shadlen, UW professor of physiology and biophysics, Howard Hughes Medical Institute investigator, and a researcher at the Washington National Primate Research Center, who was among the panelists at the first-ever meeting of the Neuroethics Society in Washington, D.C., this past month. "People at this meeting were not out to prove what is right or wrong, but were there to provide input on public policy." The meeting was held at the American Association for the Advancement of Science (AAAS) headquarters.



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Michael Shadlen

Shadlen was on the panel, "The Science of Decision-Making and Free Will." He studies the neurobiology of decision-making. The most important advances in this area, he noted, come from recordings made from neurons in the brains of monkeys, who are trained to make difficult decisions based on evidence. The goal of his research team is to learn more about the nerve cells in the brain that evaluate evidence and convert it into a verdict and a plan of action. They have gathered data about the tradeoff between accuracy and speed in picking choices.

"The choices people make are one aspect of their personality," Shadlen said. "Neurobiology is starting to illuminate the workings of the brain that are the grist of the ethical dialogue that we have with ourselves and with other people. We engage in this dialogue and defend our acts as reasonable."

"What is it about our brains that values the expression of being ethical?" asked Shadlen, who described himself as being a "closet hack philosopher" in college. As an undergraduate, he said, he became interested in how people think, decide, and reason.

"There's a fear that understanding the neurobiology of decision making turns people into machines. If that is the case, then free will and responsibility become myths that have been contrived to hold society together," Shadlen said. "I think this fear is based on faulty reasoning. Neurobiology doesn't threaten, but instead shows, what makes us ethical."

Studies of how the brain functions and malfunctions, Shadlen said, also have implications in law and in criminal justice. When is a person responsible for his or her actions? He gave an example: If people have brain tumors, do we hold them negligent for making hasty decisions? Should they have taken extra precautions because they know they have a problem?

"Decision-making is a hot research topic in the neurosciences," Shadlen observed, "because it brings together studies of the sensory and the motor systems. It looks at how the brain determines actions based on what it perceives." Shadlen added the study of decision-making also may lead to discovering the neural basis of many other higher brain functions that use information in a contingent fashion and in a flexible time frame, free from the immediacy of sensory events or the need to react right now. In addition to the panel discussion at the Neuroethics Society meeting, Shadlen also gave a special lecture at Neuroscience 2008, the annual meeting of the Society for Neuroscience, on "Neurobiology of Decision-Making: A Window on Cognition."

Shadlen said what motivates him as a medical scientist is to grasp the fundamentals of how the brain works and to

alleviate suffering from debilitating conditions.

"Some people see a commercial potential in being able to detect and measure brain functions," Shadlen said. "But in some cases they are being sold a bad bill of goods." For example, he noted, despite claims, there is no scientific evidence that functional magnetic resonance images or brain wave recordings reveal lying.

Another major question in neuroethics stems from the healthy high-achievers seeking more brain power and mental stamina by taking drugs intended for neurological or psychiatric disorders. College and university campuses are witnessing a climb in "cognitive enhancement" among some faculty members and students. The societal implications of cognitive enhancement were discussed at the national neuroethics meeting.

Other debates revolve around military uses of neuroscience developments. The military provides soldiers in combat with drugs to keep them awake and vigilant and to protect against nerve toxins, and researches other defensive strategies. University of Pennsylvania's Jonathan Moreno, author of *Mind Wars: Neuroscience and National Defense*, was among the moderators at the neuroethics meeting. (Listen to Moreno's talk at UW Psychiatry Grand Rounds: <http://depts.washington.edu/fadu/>)

Additional emerging topics in neuroethics are diagnosing childhood bipolar disorder, deep-brain stimulation, national intelligence and neuroscience, and the business of neuroscience.