

Virtual Mentor

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MEDICAL EDUCATION

Resources for Teaching Neuroethics

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Many of the ethical dilemmas that physicians confront are the result of the research and technological innovation of the last half century. Perhaps the most challenging ethical controversies that will result from scientific advances are expected in the field of brain science. News headlines from recent years demonstrate that this has already begun to happen: “More Students Turning Illegally to ‘Smart’ Drugs” [1] and “A Definitive fMRI Test For Narcissism” [2].

The rapidly evolving field of neuroethics—ethical issues involving neurologic and psychiatric conditions—is concerned with the great promise of newer technologies as well as the ethical questions that they will pose about autonomy, privacy, the definition of “normal,” and the nature of individuality.

The promise and danger of cognitive and emotional enhancement are now being considered. Listed below are some ethically controversial interventions that are either currently possible or are likely feasible in the near-future:

- The use of stimulants (obtained either illegally or through physicians) by significant numbers of college students for the purposes of enhancing concentration;
- Possible pharmaceutical advances of the future that may allow users to select their mood states for the day—perhaps increasing confidence on the day of an important interview or test;
- The use of electrodes placed in the brain to treat depression via deep brain stimulation;
- The use of microelectrodes to allow “locked-in syndrome” patients to control a computer cursor;
- The use of fMRI for “lie detection” in unwilling subjects;
- The detection of Alzheimer disease decades prior to the appearance of clinical symptoms;
- Genetic testing that may someday allow for correlations with personality traits; and
- Possible future advances in stem-cell technology that would allow for the regeneration of damaged brains—the person receiving those treatments would not be the “same” person as before the disease or accident.

Educators should consider the specific dilemmas that arise in assessing and treating brain conditions and the special aspects of brain function that set controversies in neuroethics apart from those involving any other organ system. It is the brain that

determines individuality and makes persons unique. Repairing damaged brain cells with stem cells is a very different proposition than fixing, for example, vascular tissue; replacing brain cells might lead identity to be altered. Similarly, the possibility of enhancing intelligence or mood beyond the normal range could change the social perception of what constitutes a normal or desirable state. If mental states or personality disorders are traced to specific DNA sequences, rapid genome sequencing may lead to a significant loss of privacy.

How will our society view these advances, and what role will physicians play in their implementation? Can scientists determine research agendas, or must society and social norms play a governing role? Considerations of autonomy, social pressure, access to care (another important issue in costly new treatment options) and the possibilities of neuroenhancement make for exciting discussion as trainees explore the social implications of potentially revolutionary innovations in medical care. We recommend several books, articles, and web sites that discuss these issues [3-9].

Critical Thinking and Psychiatry and Neurology Ethics

Critical thinking is reflective consideration leading to reasoned judgments. It can be characterized as a set of skills and habits of mind:

- Reflection: considering one's own emotional reactions and thought processes;
- Avoidance of common cognitive traps like confirmation bias and groupthink (pressure—conscious or unconscious, external or internal—to go along with others' opinions);
- Awareness of strong emotional reactions that can influence decision-making;
- Humility: an awareness and appreciation for one's limitations and knowledge gaps; and
- Tolerance for ambiguity: being able to hold disparate and even contradictory perspectives without immediate resolution, even constructing arguments for and against different points.

Critical thinking is often fostered through the Socratic method, in which instructors use questions to prompt reflection among students, empowering them as thinkers, and model open-mindedness and humility. We recommend several books on critical thinking in medicine and more generally [10-12].

The application of critical thinking to ethics offers numerous advantages and highlights the importance of techniques useful in teaching. Having trainees reflect on their process of ethical reasoning encourages practices that will be useful in the future. Highlighting the dangers of groupthink in ethical dilemmas, and the influence of emotions on supposedly rational analysis, offers important insights for trainees about psychological mechanisms that can influence ethical analysis. Asking trainees to explore their values explicitly, often as their idealism comes into conflict with real-life dilemmas, encourages self-knowledge and stresses the importance that each individual brings to such study.

Trainees can be asked to examine the basis for their beliefs by posing questions like: Where do you believe ethical authority originates? Do you believe in a religious or spiritual basis for morality or does society make rules that we must all follow? Can a decision be right or wrong on its own, or do individuals decide? How might beliefs that arise from these different bases conflict? How should conflicting beliefs and values be treated in a democracy?

The ability to tolerate ambiguity is key to discussions of ethical dilemmas. It is instructive for trainees to ponder how they will act under conditions of uncertainty. Many students and residents feel a strong desire to achieve closure on dilemmas by the end of a class or seminar, often prematurely.

Pedagogical Strategies

Studies demonstrate the limited effectiveness of uninterrupted lectures. Most participants will be excited about discussing ethical issues; it is an instructor's responsibility and charge to build on that enthusiasm, employing different pedagogical approaches such as didactic or informational presentations, Socratic discussion, case presentation and discussion, and other media including articles, advertisements [13], documentaries [14], film clips (see below), and nonacademic web sites [15, 16]. The University of Pennsylvania Center for Neuroscience and Society has online resources teachers may find useful in designing curricula and choosing assignments [17, 18].

The following scenarios can serve as the basis for small-group discussions:

- A college student comes to you asking for a prescription for stimulants. His screen for ADD is largely negative, but he is insistent that he needs more "focus," concentration, and energy. Would you prescribe stimulants for him?
- A woman has a history of severe depression which has not responded to antidepressants, adjunctive agents such as antipsychotics, and ECT. She undergoes deep brain stimulation and experiences significant reduction in her symptoms. In calibrating the stimulation, clinicians believe that they have found the optimal results with one pattern of electrode firing. However the patient reports that she gets more relief from a slightly different pattern, which the clinicians feel places her in a hypomanic state. The patient insists that she should be the one to determine the final settings for the electrodes. How do you respond?
- A woman with a strong family history of early-onset Alzheimer disease asks for genetic testing and analysis of cerebrospinal fluid to determine her precise risk of developing the disease. The patient argues that she can use the information to reduce her risk factors. You counter that she can reduce her risk factors through diet, minimizing other conditions such as diabetes and hypertension, and increasing exercise. Due to the novelty of these tests, you are uncertain how to balance autonomy (the patient's wish for the test) and beneficence (seeking the best outcome for the patient) and your desire to do the least harm (i.e., protect the patient from the emotional impact of the test). How do you proceed?

- As a military physician, you are ordered by your superiors to use an fMRI as a lie-detector test on a prisoner. Advances have permitted increased accuracy and the cooperation of the subject is not a limiting factor. Information from the prisoner could save thousands from a terrorist attack, but its contradiction of your oath as a physician gives you pause. How can you act against the patient's wishes and still maintain your professional integrity?

Films that promote critical thinking about topics in brain-science-related ethics include:

- *Limitless*: Bradley Cooper portrays a man who receives a supply of cognition-enhancing pills; his experience of increased memory, concentration, and insight is especially well-depicted in early scenes, along with the temptation and hubris that might accompany medications that affect not only intelligence but personality.
- *Endless Sunshine of the Spotless Mind*: Jim Carrey's character, Joel, is dismayed to learn that his ex-girlfriend Clementine has elected to undergo a procedure that erases all memories of their relationship. In his despair he decides to undergo the process to erase his memories of their relationship as well; it is only when he has partially completed the treatment that he decides that the painful memories are worth having.
- *Charly*: Cliff Robertson won an Oscar for his portrayal of a man whose intelligence is boosted from subnormal to "genius" level in a scientific breakthrough that is both miraculous and tragic; based on the award-winning novel *Flowers for Algernon* by Daniel Keyes.

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Further Reading

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