From predictive neuroscience to preventive phrenology

Bernard Baertschi[a]

a Université de Genève

Forecasting has always been an important part of medicine. A good physician is able to make a correct diagnosis and, on this basis, to issue a prognosis. A familiar problem arises when the prognosis is grim and state of the art medicine offers no curative treatment. Huntington's disease is in the present era a paradigmatic illustration of the difficulty: the diagnosis is easy to make, the prognosis is obvious, but the physician is powerless to help his or her patient. Huntington's disease is a genetic condition, a field evermore able to offer reliable predictions. Neurology is a new field, as is, more generally, neuroscience. With the help of various imaging devices, it is increasingly possible to see inside the brain and to detect abnormalities, both at the level of structures and functions. For instance, Walter Glanon has observed that a patient affected by schizophrenia: "has less gray matter in the frontal and temporal lobes, as well as in the cingulate gyrus. […] Most significant about this study was that the images predicted this mental disorder before the subjects developed full-blown symptoms. This suggests the possibility of using structural MRI scans to predict later-onset neurological and psychiatric disorders."[1]

In the case of schizophrenia and of many psychiatric illnesses, medicine has something to offer, even if being diagnosied with such conditions remains very serious and can disrupt the life of the individuals affected and their families. However, the novelty introduced by brain imaging is the possibility to predict a disease before any existing symptoms enable a clinical diagnosis. This is not a radically new situation in medicine, but by considering the brain, medical science observes the heart of our person, and for individuals to find out, before suffering from any symptoms, that their personality is in jeopardy is obviously psychologically devastating.

On the other side, to know in advance can improve control and, consequently, one may hope, the patient's autonomy. One requisit for that is that the prediction be accurate and reliable, a challenge never completely met by contemporary medical science. However, does prediction really enhance autonomy? The paper of Frédéric Gilbert and Mark Cook addresses this question based on research on brain implants (cochlear devices and Deep Brain Stimulation).

The gain in autonomy is especially salient if, in addition to predict, we can heal or prevent. Prevention would be the best solution for medicine. However, brain imaging is also used in the social field, particularly in order to assess different antisocial tendencies or personalities. Here, the ethical problems are much more tricky.

Glannon ponders: "The question is especially contentious in the case of children with severe abnormalities in the prefrontal cortex and no moral sensibility. A bleak future of psychopathy and violence may be written into their neurons. Unless they had structural or functional brain damage that was beyond repair, intervening pharmacologically at an early age to correct or ameliorate brain dysfunction might prevent a lifetime of criminal behavior."[2] Preventive phrenology? Of course, all means would not be permissible: risks must be assessed and the principle of proportionality respected. In particular, invasive brain surgery such as lobotomy would have to be precluded, but what of DBS or drugs? If we discovered some behavioural or educational means to prevent the onset of such conditions, nobody would object to them, as long as they respected the physical and psychological integrity of the child. Why then object to non-behavioural means, if they respect the same constraints?

What is good for children will be good for adults. If we discover some behavioural or educational means to prevent recurrent crimes, that is, to heal dangerousness, nobody would object to them. Why then object to non-behavioural means? One may contend that there is an important normative difference between children and adults: the requirement of informed consent. This is often true, but it is not always the case. Prison is in part a behavioural or educational means to prevent the recurrence of crimes, although it is not conditioned by informed consent. The same can be said of fines. But let's take seriously the requirement of informed consent and imagine that a drug that prevents relapses has been discovered. A convict who has spent time in jail, and thus paid his debt to society, his victim's desire for revenge is appeased, his dangerousness has been assessed; however there is a good chance that his release will be a menace for society. Could we or should one offer him: to be released and to take the drug or to remain in some kind of closed hospital (i.e. confinement)? Think of the castration of sexual offenders offered in some countries.

This is just one exemple of the ethical difficulties raised by recent neuroscience. Others come easily to mind, highlighted by the different viewpoints taken. They regard mainly the legal aspect of the question. Stephen

1 Neuroethics, Bioethics. 2006;20/1:43.

2 Art. cit., 42.

Morse insists that behaviour and not brain matters for the law, Gérard Niveau recalls that the law sets standards for the admission of scientific and technological devices in courts, Ugo Gilbert Tremblay address the thorny question of the legal consequences of predictions of dangerousness and risks of repeated offences. Here as elsewhere, scientific and technological progress challenges medicine (psychiatry and neurology), ethics and law.

Correspondence
Bernard Baertschi
Université de Genève

E-mail: bernard.baertschi[at]unige.ch