How Neuroscience impacts ethics

„Men‘s judgment is a function of the disposition of the brain“

(guess who said that)

Neuroscience today: goals

- Cure diseases (neural plasticity and repair)
- Understand higher cognitive functions (consciousness)
- Develop „brain-based“ technology (aVLSI, AI)

Neuroscience today: means

- Cellular level: influence of genes (use HUGO results)
- Mesoscopic level: multi-electrode arrays, neuro-chips
- System level: Imaging technologies (fMRI)

Classical ethical problems

- Experiments with humans
- Diagnosing brain-desease-probabilities
- Distributing research money

- Animal experiments (primates)
- Brain death

New ethical problems

- Steps towards naturalizing ethics
- New means to control the „human“

Impact on the concept of responsibility:

- Taking responsibility from humans
- Giving responsibility to machines

Naturalizing ethics

We begin to understand, how we generate our moral judgements/behavior by:

- Imaging studies
- Analyzing brain lesion patients

Moral thinking has emotional and abstract reasoning aspects. Situations, that are judget the same by reasoning are processed different in the brain (Greene, Haidt, Trends Cog. Sci. 6(12) 2002).

Comparable developments: evolutionaly ethics, game theoretic approaches to explain altruism etc.

Controlling the „human“

The „soul“ becomes accessible for technology:

- Development of brain-machine-interfaces
- Sensory prosthetics
- Transplating neural tissue

And some „science fiction“...

- New senses
- Perfect drugs
- Psychosurgery rises again

Menzinger: We may have to decide, what kind of consciousness we want / we allow.

The concept of responsibility

Responsibility is quite a new philosophical concept, however a very important one in actual discussions of science and ethics (e.g. Hans Jonas). Conditions for applicability of the concept are:

- An action has been / can be performed
- The causality is known
- A person (Kant) is involved
- The person acts freely, conscious and with some knowledge of the consequences of the action
- There is a social norm system

$R(x_1 \ldots x_n)$ $n = 3 \ldots 7$

Taking responsibility from humans

The more we know about the brain, the more we affect some fundamental aspecs of the „human“, the more we become „l‘homme machine“ (La Mettrie):

- How deterministic is our behavior?
- „Not guilty“ due to brain lesions?
- Can we trust our ability to do moral judgemens
  - when reason and emotion conflict?
  - when our memory is changed (Loftus, Nature rev. neurosci. 4, 2003)

This aggravates some „modern“ problems of the concept of responsibility: the causality in complex social and technological systems is unclear.

Giving responsibility to machines?

The development of „brain-based“ technology might also lead to further problems:

- When machines learn, is still the designer responsible for unwanted system behavior?
- When we give systems the ability to be autonomous, do machines „act“?
- What about the causality in learning systems?