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Neuroethics

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The now-established tendency in *neurophilosophy* and *moral psychology* to look toward neuroscience for guidance in moral questions has led to the rise of *neuroethics* as a novel branch of interdisciplinary research. In a nutshell, neuro-ethics can be defined as drawing relationships between neuroscientific observations and ethical concepts—that is, between factual descriptions and normative evaluations of human life. Neuro-ethics investigates (a) the relevance of neuroscientific findings for the understanding of morality and (b) the relevance of ethics to the application of evidence from neuroscience. The former is concerned with neural and psychological mechanisms underlying ethical concepts, whereas the latter is concerned with the implications of those findings for moral practice. This entry describes the field of neuroethics and the kinds of questions it addresses.

Neuroscience of Ethics and Ethics of Neuroscience

The rapid growth of neuroscience does not merely pose empirical questions about brain functioning but also raises important ethical concerns. For example, new invasive therapies, such as deep brain stimulation and the use of cognitive enhancement drugs, raise ethical questions about informed consent and moral judgment. Adina Roskies called the application of ethical concepts to neuroscience the *ethics of neuroscience.* The investigation of neural correlates of mental functions has evoked questions about the neural mechanisms underlying ethical concepts; this has been called *neuroscience of ethics.*

For example, which neural mechanisms underlie informed consent or moral judgment? Empirical evidence supports the claim that informed consent requires activation in specific brain regions. If this activation is constrained, a likely result is that the ability to give informed consent is impaired. In the case of moral judgment, it has been shown that activation produces a higher degree of distribution of reward-dependent biochemical substances (e.g., dopamine) in the brain. Accordingly, moral judgment could be explained in terms of dopamine-guided reward mechanisms and their neural underpinnings.

It is, however, difficult to draw a clear-cut distinction between neuroscience of ethics and ethics of neuroscience. Reconsider the example of informed consent: How valid is an informed consent of patients whose cognitive and emotional capacities are altered by their disorder—for example, in dementia or schizophrenia? This is primarily discussed in ethics of neuroscience. Yet this question has also triggered empirical investigations of the cognitive and neural functions underlying the possibility of giving a valid informed consent; it thus concerns neuroscience of ethics.

Another example of the convergence of both branches in neuroethics is the case of moral judgment. What is a moral judgment and what is its impact on ethical decisions? This rather conceptual question has concurrently triggered many neuroscientific investigations in the realm of neuroscience of ethics.

Empirical, Social, and Theoretical Neuroethics

Many contemporary proponents of neuroethics forcefully presume that moral considerations about actual human lives demand empirically substantiated answers. This stance is based on the assertion that inquiry into the natural world can increase

moral knowledge in ways similar to the increase of scientific knowledge. For this reason, current neuroethics is strongly empirically oriented and best characterized as *empirical neuroethics.*

Practical concerns in empirical neuroethics, such as the application of informed consent or advance directives, have been discussed with regard to psychiatric and neurological disorders. The conceptual definitions of, for example, informed consent and moral judgment as presupposed by the ethics of neuroscience are commonly based on neuroscientific findings. This has produced substantial implications for the initially, merely philosophically defined concepts. Moral judgment, for example, is now understood to involve emotions, because imaging studies have shown the involvement of brain regions in moral judgment that are known to be integral to emotional processing.

Does it, therefore, follow that people with deficits in emotional processing and empathy have an impaired moral judgment? Psychopaths, for example, show severe idiosyncrasies in their own emotional processing and diminished empathy toward the emotions of others. Are psychopaths therefore unable to make appropriate moral judgments? Social scientific evidence suggests that this is the case. The crime rate of psychopaths is significantly higher compared with the average population and, while committing crimes, psychopaths often remain unaffected by both their own and others' emotions.

This strongly empirical, deterministic line of reasoning brings the danger of an uncritical acceptance of empirical presuppositions and definitions. Proponents of *critical neuroscience* take issue with this empirical bias. Instead of offering merely neural definitions of ethical concepts, they argue that the social and political context of those concepts needs to be taken into account. This is why the "neuronalization" of ethical concepts falls short. In fact, it may have fatal implications, especially within applied questions of neuroethics, which are inevitably considered within the current social and political context. Given these shortcomings, there is a need to complement empirical neuroethics with a subdiscipline that might be called *social neuroethics.*

Besides the neglect of relevant contexts, current neuroethics also often suffers from disregard of theoretical and methodological difficulties. On the theoretical level, the implicit philosophical presuppositions of concepts such as informed consent and free will are often not explicated. On the methodological level, a plausible transition from descriptive concepts of neuroscience to normative evaluations of ethics is not properly developed. The question of how a methodology that allows for a nonreductive linkage of descriptive concepts and normative evaluations could be developed focuses on theoretical rather than on empirical or sociopolitical issues of neuroethics. Consequently, it might be called *theoretical neuroethics.*

A particular challenge in theoretical neuroethics is the aforesaid linkage between norms and facts. Taking the example of informed consent again, the normative act of the person giving or refusing informed consent might be linked with neural activity in order to demonstrate a compelling understanding of informed consent. This formulation already suggests that it is not feasible to merely reduce the person's decision to his or her neural brain activity.

If such a reductive approach is chosen, there is little informative gain for neuroethics

because the question of informed consent cannot be answered by exclusively considering the neural activity alone. Rather, the relevant aspects besides the neural correlates of informed consent are the particular social and political contexts in which consenting takes place. An empirical reduction therefore fails to answer the neuroethical question of informed consent; it simply misses the target.

This leads to a more general point: How can norms and facts be linked validly within neuroethics? One option that has already been briefly mentioned is to disregard the normative level altogether by reducing it to the factual level. When that happens, ethical norms are unilaterally replaced by neural facts. However, this method neglects the principal difference between norms and facts and is thereby subject to the “naturalistic fallacy”—David Hume’s dictum that one cannot infer an “ought” from an “is.” (This is not to deny that the descriptive information from neuroscience can and, in fact, should inform ethical views.)

Alternatively, one may accept the norm–fact distinction and consider them in a parallel way. However, parallelism falls short of acknowledging the close interdependence between norms and facts. Both options cannot account for the close intertwining of ethical concepts and neuroscientific observations.

The aforementioned examples of moral judgment and informed consent point to the fact that descriptive change may entail normative change and vice versa. Therefore, a methodological strategy is needed that captures the close interdependency between norms and facts while not neglecting their principal difference. One way is to go back and forth between ethical concepts and neuroscientific findings. This can be called *norm-fact linkage.* The usual starting point of empirical neuroethics is to scrutinize an ethical concept that is linked to neuroscientific observations. The aim is to either neuronalize the ethical concept or to reveal its relevance for neuroscientific research.

However, what is often neglected is how this first encounter of ethical concepts with neuroscientific observations bears on the ethical concept itself. What, for example, is implied for the concept of informed consent if it is driven empirically by emotions and empathy rather than higher order cognitive functions? What does the fact of empathy involvement in consenting imply for the norms inherent in informed consent? Should conceptualizing the linkage between norms and facts in informed consent occur differently if emotions such as empathy are predominant rather than cognitive functions being so? This consideration may lead to conceptual modifications in neuroethical concepts depending on the neuroscientific findings; thus, the initial ethical concept becomes truly neuroethical.

The interdependent linkage between neuroscientific findings and ethical concepts goes one step further. What is needed is a method that details the different steps of the norm–fact linkage by giving exact methodological prescriptions and measures of validity and reliability. That being so, it needs to be based on a specific methodology rather than on a certain result. Neuroethics needs to be based on the context-dependent linkage between norms and facts in which both levels are alternating adaptively to each other in order to empirically inform and shape questions that traditionally have been believed to be supremely philosophical.

See alsoBrain and Consciousness; Cognitive Neuroscience; Ethics of Therapy; Evolutionary-Psychological Perspectives on Human Nature, Critical Evaluation of; Frontal Lobe Functions; Moral Development; Morality and Moral Emotions;

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Further Readings

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