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## Neuroscience and the law: concerns, questions and promises

Matthias Mahlmann\*

### Abstract

*In recent years there has been increasing interest in the relation of neuroscience and the law. Far reaching questions are asked about the forensic use of neuroscientific insights. Fundamental conceptions of the law have been questioned as well in the light of what appears to be known in cognitive science. Debates have focused on freedom and responsibility but are in no way limited to these issues. The article explores what appear to be central topics in this field.*

### 1. Some problems

There is considerable interest concerning the impact of cognitive and neuroscience on human self-understanding<sup>1</sup> and on the law in particular.<sup>2</sup> This interest has to do with the generally increased importance of an empirical study of the human mind – from cognitive science to behavioural economics or neuroeconomics and ethics.<sup>3</sup> In addition, in recent years matters that are of importance for the law have been the object of many forms of enquiry – psychological, neurophysiological, philosophical, etc.

There are three main areas where important and far-reaching questions are asked, that merit special attention:

First, there is the area of practical – potentially systematic – forensic use of neuroscientific research. Most actors in the judicial arena are the object of such

enquiry. An example is the question, which principles are actually, in the real world beyond textbook conceptions of judicial decision making, guiding judges or laymen entrusted with judicial functions like juries when they decide about the facts or the law in a concrete case. In this context, questions of bias are asked, e.g., as to social or racial profiling. Mental heuristics play an important role in this respect, too. Other investigation concerns witnesses, their biases or the structure of their memory, or possibilities of cognitive enhancement. Defendants are of special interest: A classical problem concerns limits of culpability because of some kind of mental illness or impairment that makes it impossible to act responsibly. The question of lie detection is another example reframed through modern brain imaging techniques. A last matter of discussion is the prediction of behaviour because of insight in neural structures of human beings or genetics. The possible use of such techniques for sentencing and questions of crime prevention, perhaps even before the committing of an illegal act, stirs the interest of some commentators.

The second area of interest is theoretical and conceptual. It concerns a rather grand and wide topic, the understanding of the foundations of law. In this context, neuroscience is used to account for the material content of the law. Three strands of enquiry are of particular importance for these conceptual questions. The first approach is what one may want to call varieties of neuroethical emotivism. The second approach of evolutionary psychology is often connected with this kind of new emotivism, though not necessarily so. Finally, there is the attempt of formulating a mentalist theory of ethics and law.

Apart from the material content of law, the question of the origin and nature of human action and thus the classical problem of free will is another important issue for the foundations of law. If one looks at many discussions, this problem is at the forefront of the interests of many lawyers. In addition, it has certainly reached the debates of the wider public.

The third and final area of relevance of neuroscience for the law are the social, cultural and political consequences of our understanding of the architecture of the human mind. These consequences are potentially far reaching. It is widely perceived that neuroscience has renewed old questions about the nature of hu-

<sup>1</sup> Cf. e.g. the reflections on the limits of human self-objectivation by L. Wingert, Grenzen der naturalistischen Selbstobjektivierung, in: D. Sturma (ed.), Philosophie und Neurowissenschaften, 2006, p. 240 et seq.

<sup>2</sup> Cf. e.g. the report B. Garland (ed.), Neuroscience and the Law, 2004, or S. Schleim/T. M. Spranger/H. Walter (ed.), Von der Neuroethik zum Neurorecht?, 2009.

<sup>3</sup> On the new interest of psychology for ethics e.g. K. A. Appiah, Experiments in Ethics, 2008.

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man beings. Cognitive science forces human beings to ask questions about their mind and will and thus about the very core of their humanity. At least some forms of research seem to provide uncomfortable answers, challenging dearly held convictions about human reasonableness and autonomy. Any of these answers are not only important for the self-image of human beings, but for the social structure at large, because the social structure is evidently dependent on the picture we have of our own nature. This is particularly true for the law, which is a central instrument to create a civilised architecture of human individual and social life. The concept of law depends on our vision of human existence. It is important to notice that this impact on the law is not limited to the criminal law that tends to be the focus of attention, wrongly so. The questions asked are relevant for all branches of the law, the civil law not less than public law. They are relevant as well for the material, substantive core of the modern civilisation of law, the culture of human rights. If there are any reasons to change our conceptions of human beings as autonomous beings, the whole intricate fabric of human rights has to be reconsidered, that evidently relies on this conception and thus the core of modern law.

It should be noted at the outset that to tackle these far reaching problems, not only the insights of neuroscience are important to assess the impact of neuroscience on the law. Equally important are the false claims of some neuroscientific research. If such false claims are widely believed to be true, social consequences may be drawn that have the double disadvantage of being possibly detrimental to the legal system and of being based on scientific error.

The following remarks will shortly address some of these problems.

## 2. Forensic use

From a certain perspective, the forensic use of neuroscientific research should not be contentious in principle. Any new insights for example about pathologies or other forms of impairment of legal responsibility foster a humane legal order that does not want to impose legal consequences on people who cannot be held responsible for what they do.

The same is true for research in biased judgements or operative heuristics. It is a piece of welcome enlightenment to learn about such mechanisms. Any insight in this matter is the precondition to avoid the influence of such mechanisms in practice, to reach for example judicial or jury verdicts unbiased by racial profiling. There are many questions to be asked about the concrete content of the research on these

matters, about what we really know about psychopaths, for example, or which biases and heuristics are in place. But any insight in this area does not pose any problem of any fundamental nature. To the contrary, neuroscience adds potentially something important to traditional fields of research like forensic psychiatry or critical views on judicial decision making that are familiar parts of any developed conception of the law.

Other aspects of the wide and heterogeneous debates in cognitive science pose more severe problems. The use of neuroscience for lie detection is a good example. There are many studies on deception and even commercial interests connected with it. There are two short things to say about this matter. The first concerns the fact that lie detection in any kind of reliable form for a concrete individual is beyond the scope of current research and poses questions that will not be easily overcome. Such questions include particular problems of the artificial experimental setting, e.g., paradigms without spontaneous decisions to lie or serious sanctions and the familiar general problems of neuroimaging studies, including the impossibility of reverse inferences about mental processes from brain activity. Lie detection seems to be therefore a first (though not most important) example of the dangers of false claims of some neuroscientific research and its applications in the fields of law. If believed, one may consider relying on lie detection through, e.g., fMRI<sup>4</sup> though in fact one might be led astray. Secondly, we should bear in mind that even if lie detection were feasible, the question about its normative admissibility has not been answered yet. One reason why, e.g., European jurisdictions are reluctant to admit lie detection is the lack of its reliability. A more important reason is, however, a normative one: The normative prohibition to use somebody as a witness against herself is firmly rooted in central rights of the human person.

## 3. Conceptual questions

### 3.1. The neo-emotivist challenge

A central perspective of some studies on material contents of normative orientation is what one may wish to call neuroethical emotivism.<sup>5</sup> This in recent years quite widely discussed strand of research forms a somewhat heterogeneous, but identifiable cluster of ideas.

<sup>4</sup> Functional magnetic resonance imaging.

<sup>5</sup> E.g. as a much discussed example Greene, J. D., Sommerville, R. B., Nyström, L. E., Darley, J.M. & Cohen, J. D., An fMRI Investigation of Emotional Engagement in Moral Judgment, 293 *Science* 2005 (2001) and subsequent work in the same direction. In a similar vein: J. Haidt, The Emotional Dog and its Rational Tail: A Social Intuitionist Approach to Moral Judgement, 108 *Psychological Review*, 814 (2001).

The leading research hypothesis is that what appears to traditional views to be manifestations of processes of rationally controlled reasoning about normative matters are in fact hard-wired emotional reaction patterns. People are emotionally averse to certain forms of personally encountered harm and feel empathy. This view is often based on considerations of evolutionary psychology. The emotional patterns are explained in an adaptionist framework: Reactions of empathy against harm that is up close and personal are interpreted as increasing reproductive success in small groups in which human ancestors lived. There are other material contents of the law that are explained in the context of evolutionary psychology, but this is for the topic pursued the perhaps most relevant one.

The first step to assess such claims<sup>6</sup> is an analytically convincing concept of morality. It is indispensable to develop a descriptively adequate account of moral judgement. This is a complicated task, but central elements of any system of ethics are certainly principles of altruism and principles of justice. With some simplification one can say that the basic principle of altruism is, that it is morally good to foster the interest of another person without regard to the interest of the agent. The basic principles of justice are connected with proportional equality maintained between the reason of an act and the act that is the object of moral judgement or between persons. The first principle accounts for cases like good evaluations for good performance, the latter for default principles of equal distribution if no criteria for differentiation are of relevance. The details of these principles are the object of differentiated discussions dating back to the very beginnings of the history of ideas.<sup>7</sup> But these statements catch certainly some core elements of moral judgement. If that is the case, an interesting observation can be made: Moral judgements generated by such principles depend on more than an emotional appraisal of a situation. They depend on a complex structural analysis of the evaluated objects, for example human volitions, an assessment of the content of intentions, aspects of agency, consequences of acts and the subjective attitude of agents to these consequences or relations of equality. Such structural analysis constitutes a clear cognitive content of moral judgement. The establishment of the content of intentions or of relations of equality is – if anything is – a cognitive component, not an emotional act. This cognitive component is an element

of what is called reasonable moral deliberation. This concerns for example questions about the subject of agency, or whether entities regarded as equal or unequal are in fact equal or unequal and the like.

A second observation is worth mentioning in this respect. Moral judgement is not just about empathy and harm avoidance. This is rather obvious if one thinks about cases of inflicted harm that is morally justified, say through a system of lawfully administered sanctions.

These observations show that moral judgements have cognitive content. Neuroethical emotivism can consequently not be on the right track. Neuroimaging studies used to buttress emotivist claims do not change this conclusion. The interpretation of these data is itself theory-dependent, as the interpretation of any data. If the analytical theory of moral judgements makes their cognitive content plausible, these studies have to be re-interpreted accordingly, leading to quite different results than those of the emotivist theoretical preconceptions.

Another problem in this context concerns evolutionary explanations.<sup>8</sup> There is certainly a tendency to wed certain kinds of cognitive science approaches to ethics and law with evolutionary psychology, as the example of neuroethical emotivism illustrates. This is unfortunate because the adaptionism domineering most of evolutionary psychology is not the best theory of evolution available today. A more plausible account takes other factors than reproductive success like non-adaptive mutations or architectural constraints, and further factors into account, that make any substantive theory about the evolution of the higher cognitive faculties of human beings much more difficult.<sup>9</sup>

### 3.2. The mentalist paradigm

These findings do by no means imply that an approach to the foundations of ethics and law that is informed by cognitive science and the current theory of the mind is not promising, to the contrary. A possible way ahead is the mentalist research paradigm, as pioneered among others in the study of language.<sup>10</sup> The

<sup>6</sup> Some more remarks in M. Mahlmann, *Ethics and Law, and the Challenge of Cognitive Science*, German Law Journal vol. 8 (2007), p. 577 et seq.

<sup>7</sup> Cf. e.g. on these matters M. Mahlmann, *Rechtsphilosophie und Rechtstheorie* 2010, p. 240 et seq., 283 et seq.

<sup>8</sup> Cf. for an example S. Pinker, *The Planke Slate*, 2002, p. 241 et seq., M. D. Hauser, *Moral Minds*, 2005, p. 307 et seq. on the discussion M. Mahlmann, *Naturgeschichte, Ethik und die Theorie des Rechts*, in: *Nach Feierabend* 4, 2008, p. 107 et seq.

<sup>9</sup> Cf. the sceptical and still quite relevant assessment of R. Lewontin, *The Evolution of Cognition: Questions We Will Never Answer*, in: D. Scarborough/S. Sternberg (eds.), *An Invitation to Cognitive Science*, Vol. 4, 1998, p. 107 et seq.

<sup>10</sup> Cf. on the linguistic analogy e.g.: G. Harman, *Using a Linguistic Analogy to Study Morality*, W. Sinnott-Armstrong (ed.), *Moral Psychology*, Vol. 1, 2008, p. 345 et seq.

basic assumption is that among the higher human mental faculties there is an inborn moral faculty.<sup>11</sup> This moral faculty generates moral judgements according to principles of what one may metaphorically call a universal moral grammar. The properties of this universal moral grammar are a matter of further research. There are good reasons, however, to think, that these principles include those of altruism and equality, agency, intention, consequence mentioned above, among others. These principles are the way to explain the phenomenon of morality, the content of a descriptively adequate account of moral judgement. Of core interest are judgements which one may call *Grundurteile*, foundational judgements at the heart of normative constructions. These judgements have emotional and volitional consequences, like obligations, permissions or prohibitions. These foundational judgements are not full and thick ethical codes. They are however at the very base of the constructive processes that lead together with other factors to plausible ethical systems, say an egalitarian, liberal humanism. These foundational judgements constitute even less a developed legal system. Legal systems are evidently artificial constructs highly influenced by historical, political, religious, economical and social factors. Any theory of the legitimacy of law and the ethical standards guiding the interpretation of law, however, will not convincingly be established without recourse to such judgements. A mentalist theory of ethics and law does consequently not substitute normative ethics and legal deliberations. It may, however, be helpful to clarify the cognitive preconditions of the possibility of practical thought.

#### 4. A note on autonomy and free will

Human autonomy is a classic concern of human culture. It is an assumption underlying much of the fabric of ethics and the law. Not surprisingly, the question whether neuroscience has done away with free will has caught the imagination of many, even the general public<sup>12</sup> sometimes leading to quite robust statements as to the end of human freedom. The problem, it seems to some, is only how to deal with these findings, not to question the foundations of these assertions.<sup>13</sup> The debate on free will is as old as human thought and this is not the place to attempt a

remark doing justice to the complexities of the struggles of determinists, indeterminists and compatibilists with their many sub-theories and side-branches. Three remarks, however, may be useful: First, there is no *a priori* constraint on the possible structure of the world, including human nature. This structure may be “deterministic” in the sense this term is used in the respective debates, but not necessarily so. What is the case in this respect can only be answered by the best explanatory theory at hand. Second, human freedom may be a strange phenomenon to swallow. This kind of experience is, however, the daily bread of science which is full of ideas that challenge folk conceptions about the real – from the structure of matter to the origin of the universe. Thirdly, there has been no deterministic theory formulated yet of human volition and acting, despite many studies and self-confident assertions in this area, that satisfies necessary standards of explanatory and predictive power. There is therefore no reason to shelf the problem of self-determination, e.g., by declaring the subjective experience of self-determination to be an epiphenomenon, an illusion of folk-theories that covers for the agent the reality of prior determination and the like. Accordingly, ethics and the institutions of the law have good reasons to base their normative edifices on human responsibility and protect the autonomy of human beings.<sup>14</sup>

#### 5. A mixed balance sheet

In consequence, there is a mixed balance sheet as to the impact of neuroscience on the law. Many interesting and challenging questions have been formulated and more is certainly to come. Any progress should be welcomed in this respect. It is, however, a misperception to regard neuroscientific perspectives on the law to be homogeneous and to tell a simple, irrefutable, depending on taste pleasant or unpleasant story of the end of practical rationality and human autonomy. Perhaps, as more than one time in the history of human thought, these concepts may turn out to be more durable than it seems to some, not despite but because modern research in the structure of the human mind. ■

<sup>11</sup> Cf. M. Mahlmann, *Rationalismus in der praktischen Theorie*, 2nd ed. 2009; *ibid.*, *Ethics and Law, and the Challenge of Cognitive Science*, *German Law Journal* vol. 8 (2007), p. 577ff; J. Mikhail, *Universal Moral Grammar: Theory, Evidence and the Future*, 11 *Trends in Cognitive Science* 143 (2007); *ibid.*, *Elements of Moral Cognition*, 2011.

<sup>12</sup> Cf. the public debate around the Libet-experiments some years ago, in: C. Geyer, *Hirnforschung und Willensfreiheit*, 2004, followed by others of that kind.

<sup>13</sup> For an example to base the system of criminal sanctions on norm protection, R. Merkel, *Willensfreiheit und rechtliche Schuld*, 2008.

<sup>14</sup> Cf. for a more detailed reconstruction with further references M. Mahlmann, *Rechtsphilosophie und Rechtstheorie*, 2010.