Neurolaw: recognizing opportunities and challenges for psychiatry

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A 40-year-old schoolteacher begins secretly collecting child pornography and making advances toward his young stepdaughter.[1] After evaluation by a psychiatrist and neurologist, an MRI is obtained, and it shows a huge orbitofrontal tumour. As soon as it has been resected, the legally relevant sexual behaviour stops. A few months later, however, the behaviour returns. As becomes clear on MRI, the tumour has also regrown. It is, again, resected, and the legally relevant sexual behaviour stays away, apparently permanently.[2] To what extent should this schoolteacher be considered criminally responsible for his behaviour?[3] What does a case like this mean for the criminal responsibility of people with (acquired) pedophilic behaviour in general?[4] What does it mean for the role neuroimaging should play in criminal cases? These are just some questions that may come to mind regarding this often-cited case, described by Burns and Swerdlow.[1] Such questions can be categorized as "neurolaw" questions.

Neurolaw is a rapidly developing field of interdisciplinary research concerning the relevance of neurosciences to the law, especially criminal law.[5–9] Clearly, psychiatry is closely related to both neuroscience and the law, and this is particularly true for forensic psychiatry. Neurolaw, therefore, is of specific relevance for forensic psychiatry. In this editorial I introduce the 3 main research areas in neurolaw, identify 3 significant opportunities for psychiatry as well as 2 major challenges related to psychiatry and neurolaw, and argue for the active participation of psychiatrists in neurolaw developments.

Three domains of neurolaw research

Three basic areas of research can be identified in neurolaw: revision, assessment and intervention.[5]

Revision

In the revision domain, research focuses on whether findings in neuroscience should lead to revisions of the law and legal practices. A well-known — if not notorious — example is the claim that neuroscience data show that free will is an illusion and that, since free will is considered to be required for responsibility, no one should be held criminally responsible. It has been proposed that this argument should lead to a major revision of criminal law, omitting the elements of guilt and retribution.[5,10] Such a revision may also imply that the insanity defence is no longer relevant, because no defendant is ever criminally responsible. Consequently, psychiatric evaluations of defendants would become obsolete, at least as far as the element of criminal responsibility is concerned.

Assessment

The second domain of research is about assessment of people. Criminal law is often interested in mental states of individuals, such as defendants, prisoners, witnesses and prospective jurors.[9,11] For instance, lawyers may have to answer questions such as the following:[7,11] Is the defendant suffering from a mental disorder? Is he legally insane, or incompetent to stand trial? What is the risk of recidivism for this particular prisoner? What does the witness remember exactly — is she lying? Is the prospective juror biased against certain groups of people? In the future, such questions may be answered with the help of neuroscience techniques — at least, this possibility is a major area of neurolaw research. The reliability of lie detection has always been an issue of controversy, and a brain-based variant is likely to become a huge topic of debate as well — but, regardless of debate, the company "No Lie MRI" is already in business.[11] One fundamental legal issue regarding mind-reading techniques is whether — and if so, under what conditions — these techniques could be used against a person's will.[6]

Intervention

The third domain of research concerns neuroscientific interventions. Currently, very little is actually possible in this respect. But it is hoped — and often expected — that neuroscience will lead, for instance, to treatment options that reduce the risk of recidivism. Recently, a paper was published in this journal on deep brain stimulation (DBS) to reduce sexual drive, which may be applied in sexual offenders.[12] In the future, such brain-based interventions may become available and are bound to lead to multifaceted questions. There are

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other possibilities regarding intervention as well, including brain devices falling into the hands of criminals. Some day, villains may try to manipulate other people using neurotechniques to make them commit crimes. They may hack a person's DBS device, which has been implanted to treat obsessive–compulsive disorder.[13] Should a person whose brain was manipulated to perform a crime be held legally responsible, and if so, under what conditions?[5,14]

These are just some of the intriguing questions in the 3 domains of neurolaw research. Notably, neurolaw researchers need not be neuroenthusiasts. On the contrary, they may be highly critical toward the application of neuroscience in the courtroom.[5–7,15]

Opportunities

Obviously, neurolaw offers opportunities to psychiatry.[16] In fact, the insanity defence has been considered "one of the more plausible avenues by which neuroscience may contribute to the law."[6,17] Basically, neuroscience could contribute to psychiatric assessments of defendants and prisoners in 3 ways. First, in the coming years neurotechniques may start to contribute to the diagnostic process in psychiatry. This would be very helpful, especially since in forensic psychiatric evaluations malingering is a serious risk.[15,18] Generally, the defendant's words cannot be taken for granted. In the future, neuroimaging may be helpful to confirm or reject a psychiatric diagnosis or psychopathological symptoms, like impulse-control problems or command hallucinations.[15] Second, neuroscience may help predict future crimes. A central aim in forensic psychiatry is to predict recidivism in mentally ill offenders. Neuroprediction would be a helpful addition to the currently available risk-assessment tools, of which the predictive value is often (very) limited.[19] Better risk assessment will lead to the release of many prisoners and patients who are not dangerous (anymore) as well as to better prevention of crimes. Third, neuroscience may not only help to assess dangerousness, but also to identify domains that should be the focus of interventions to reduce recidivism in people with severe mental disorders. This would be extremely valuable not just for patients, but also for their relatives and for society.

In sum, diagnosis, prediction, and intervention are 3 areas in which neuroscience could contribute well to forensic psychiatry. Most probably, the coming years will show intensified debates about possible applications and implications of neuroscience techniques in these areas. Of course, the schoolteacher's case mentioned previously and similar cases help to put neurolaw issues on the agenda.

Challenges

Which are the main challenges and risks? I discuss 2 general categories: overenthusiasm and overcriticism.

Overenthusiasm

Overenthusiasm is a risk, because currently there are serious limitations to the application of neuroscience to the forensic psychiatric context. An often expressed worry is that neuroscience usually concerns the group level, whereas the courtroom — at least in criminal law — is concerned with the individual, the defendant.[7,20,21] Reduced prefrontal grey matter volume may be related to antisocial personality disorder at a group level,[8,22] but what does this mean for the individual defendant who happens to have somewhat reduced grey matter volume? What would be needed is a tool or procedure that would help to translate findings at the group level to consequences at the individual level. Furthermore, the proceeds of decades of biological psychiatry call for modesty, rather than enthusiasm.[15,23] So far, neurobiology has not come to play a major role in psychiatric diagnostic procedures and treatment. Developments in neuropsychiatry tend to be slower than anticipated, and many findings are of a preliminary nature.[8,23] Finally, the law is often interested in issues that cannot be directly answered by neuroimanging or other brain-based techniques. For instance, *mens rea* (this term is Latin and means "guilty mind," referring to criminal intent) is a legal concept not readily covered by neuroscientific or neuropsychiatric concepts and approaches.[3,6] Therefore, neuroscience data have to be interpreted with caution[7] not only because they are often preliminary and concern the group level, but also because they may not address the legal matter directly; answering the legal issue requires further interpretation and inferences.

Overcriticism

Overcriticism is not helpful either. Neuroscience is such an enormous and multifaceted endeavour that we should be open to its possible contribution to (forensic) psychiatry. Current assessments and decision-making in forensic psychiatry are often far from perfect; diagnostic processes, treatment and risk prediction are clearly in need of improvement.[16] We are not in a position to disregard potentially helpful neuroscience information and techniques. The profession and society demand from psychiatrists that they use every tool available to offer the best services possible. To remain aloof regarding neurolaw would be unwise and unjustified[24] not only because the developments may have much to offer to psychiatry, but also because psychiatrists have much to offer to neurolaw developments.[15,25] The reason is that some of them concern exactly those issues in which psychiatrists have much expertise, such as insanity evaluations, interventions in mentally ill offenders and risk assessments. In fact, overcriticism may have a serious consequence: that psychiatrists will not be involved in neurolaw advances.

The way forward

In the near future, neuroscience may support forensic psychiatric diagnosis, prediction and intervention. This possibility should be taken very seriously, which means that it should neither be received with overcriticism nor with overenthusiasm. Neurolaw research aims to balance these 2 challenges. The chance of success will increase if psychiatrists actively participate in the developments.

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