A neurolaw perspective on psychiatric assessments of criminal responsibility: Decision-making, mental disorder, and the brain

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A B S T R A C T
In some criminal law cases, the defendant is assessed by a forensic psychiatrist or psychologist within the context of an insanity defense. In this article I argue that specific neuroscientific research can be helpful in improving the quality of such a forensic psychiatric evaluation. This will be clarified in two ways. Firstly, we shall adopt the approach of understanding these forensic assessments as evaluations of the influence of a mental disorder on a defendant’s decision-making process. Secondly, I shall point to the fact that researchers in neuroscience have performed various studies over recent years on the influence of specific mental disorders on a patient’s decision-making. I argue that such research, especially if modified to decision-making in criminal scenarios, could be very helpful to forensic psychiatric assessments. This kind of research aims to provide insights not merely into the presence of a mental disorder, but also into the actual impact of mental disorders on the decisions defendants have made in regard to their actions.

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1. Introduction

This article explores one way in which neuroscience can contribute to forensic psychiatry. It aims to show that an emerging field in neuroscience, e.g. researching the impact of mental disorders on a patient’s decision-making, could be helpful in improving the quality of psychiatric evaluations of a defendant’s criminal responsibility.

The rationale for (making assessments of) criminal responsibility is often explained as follows: the judicial system requires two elements to hold a person accountable for a criminal offence: the criminal act as such (actus reus) and intent (mens rea). The legal approach to insanity and its concept as it is found in many Anglo-American jurisdictions is related to a famous case from the British courts (1843) in which rules were developed for dealing with a defense on the grounds of insanity. These rules became known as the M’Naghten Rules. The wording of the rules is, “at the time of committing the act, the party accused was laboring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing; or if he did know it, that he did not know what he was doing was wrong.” Although the M’Naghten rule has been very influential, different countries/jurisdictions may have (very) different standards for the insanity defense and the forensic psychiatrist’s task (Elliott, 1996). In fact, the various rules guiding insanity defenses identify ways in which mental disorders may influence a person in a manner that is relevant under the law. Whereas M’Naghten identifies specific kinds of knowledge (concerning the nature, quality or wrongfulness of the act), other types of influence may be relevant as well. For instance, the Model Penal Code (formulated by the American Law Institute), adds that mental disorders may result in the incapacity “to conform his conduct to the requirements of the law.” The Durham Rule, meanwhile, requires that the act is the ‘product’ of the described disease/defect (Elliott, 1996).

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1 In this article, I focus on the psychiatrist, but in many cases, ‘psychiatrist’ can be replaced by ‘psychologist’.
2 I use the term ‘criminal responsibility’ in order to refer to the relevant forensic assessment (see also Eastman & Campbell, 2006). There is some controversy whether forensic practitioners should make a statement about the defendant (not) being responsible (see Gutheil, 2005). I will not go into the differences between moral responsibility and criminal responsibility/legal accountability. See Vincent (2010) for a discussion on different senses of responsibility as related to legal accountability. I use the term ‘moral responsibility’ when I refer to the ethical domain, and legal or criminal responsibility when referring to the legal domain. Within this context, I take moral responsibility to be a requirement for legal responsibility.
3 See, e.g., Rogers & Shuman, 2005.
4 M’Naghten’s Case, 10 Cl. & Fin. 200, 8 Eng. Rep. 718 (H.L. 1843).
5 M’Naghten’s Case, 10 Cl. & Fin. 200, 8 Eng. Rep. 718 (H.L. 1843).
6 American Law Institute (1962), Model Penal Code. Philadelphia: American Law Institute. It states: “…a person is not responsible for criminal conduct if at the time of such conduct as a result of mental disease or defect he lacks substantial capacity either to appreciate the criminality of his conduct or to conform his conduct to the requirements of the law.” The Model Penal Code has been used in the United States, but its popularity decreased after John Hinckley, who attempted to assassinate President Reagan (1981), was acquitted on grounds of insanity. Many states returned to M’Naghten (see Becker, 2003).
7 Durham v. United States, 214 F. 2d 862 - United States Court of Appeals, District of Columbia Circuit 1954. According to Becker (2003, p. 43), “[a] jury was required to answer two questions: 1. Did the defendant have a mental disease or defect? And 2. If so, was the disease or defect the reason for the unlawful act?”
According to Alec Buchanan (2000, p. 80), the morally and legally relevant influence of the mental disorder ultimately concerns the defendant’s ability to choose:

“If psychiatric conditions are to be grounds for exculpation, they must impair the sufferer’s ability to choose. There are many ways in which they may do this.”

Some of the legal rules or legal tests guiding the insanity defense appear to be directly related to decision-making, like the capacity to conform one’s conduct to the requirements of the law (Model Penal Code). The way in which we adapt our conduct is basically via decisions about our conduct. So, if mental disorders affect our decision-making, this could indeed explain why they undermine our capacity – at least in some instances – to conform our conduct to the requirements of the law. Decision-making, therefore, appears to be directly relevant to this requirement in the Model Penal Code. The M’Naghten Rule, meanwhile, focuses on a person’s knowledge, which is less directly related to one’s decision-making. However, the idea underlying M’Naghten appears to be that if the defendant had known the nature/quality/wrongfulness of the act, he or she would not have decided to perform it. In other words, knowledge appears to be relevant to legal responsibility because (the absence of) knowledge influences our decision-making. Therefore, even if legal insanity rules do not mention ‘decision-making’, this does not rule out the relevance of decision-making to the phenomena encapsulated in these standards. In the present article, the influence of a mental disorder on a defendant’s decision-making is considered central to the question of criminal responsibility.

Given this understanding of legal insanity, neuroscientific research focusing on the effects of mental disorders on decision-making becomes directly relevant to the forensic psychiatrist’s task. In fact, many authors have discussed the potential of neuroscience in making assessments of criminal responsibility. The present paper proposes a specific perspective on neuroscience and forensic assessments, which puts recent findings about compromised decision-making in mental disorders at the center. This implies that the significance of the suggested neurolaw perspective relies on a particular view of legal responsibility. Meanwhile, even if one does not conceive of forensic psychiatric assessments in terms of evaluating the influence of a mental disorder on a defendant’s decision-making process, such an influence may still be considered highly important.

The structure of this article is as follows. In Section 2, the idea that mental disorders may exculpate a defendant due to their influence on a person’s decision-making will be further considered. Section 3 presents some recent neuroscientific findings concerning the influence of mental disorders on patients’ decision-making. In Sections 4 and 5, further applications and opportunities provided by this approach are discussed, with respect to risk assessment, treatment, and prevention. Finally, in Section 6, we will reflect on the question: what type of influence of a mental disorder on decision-making can be considered a morally/legally significant influence?

2. Understanding the forensic task: criminal responsibility and decision-making

Apparently, there is an idea that mental disorders have the peculiar characteristic that they can influence a person’s behavior to an extent that we no longer consider that person responsible for his or her actions. This is not only widely reflected in forensic literature and legal rules and doctrines, but also in philosophical literature (Strawson, 2003; Wolf, 1987; Kalis, 2009). According to Buchanan (2000, p. 80, see previous section), the morally and legally relevant influence of the mental disorder concerns the defendant’s ability to choose (or to decide, see also Meynen, 2009b). The concept of decision-making used in this article is in accordance with a model of decision-making suggested by Kalis, Mojzisch, Schweizer, and Kaiser (2008). They distinguish between three phases in decision-making (which they, interestingly, relate to various mental disorders). The first phase is the generation of options, the second phase is the selection of options, and the third phase is the initiation of action. Options are understood here as consisting of both these elements: being a possible action, and having an affective value for the person concerned (Kalis et al., 2008). By this account, decision-making is not merely deliberation about options and picking one of them, but extends from the generation of the options to the initiation of the action itself. Each of the three phases can be affected by mental disorders. For instance, in psychotic

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8 I prefer the term ‘decision-making’ or ‘decision-making process’ to ‘choosing’ or ‘choice’. The term decision-making shows that choosing is a process. Mental disorders may compromise the process of decision-making at various stages and in different ways; they do not merely affect the outcome (choice or decision). Moreover, the term ‘decision-making’ is used in the neuroscientific literature I will be referring to in Section 3.

9 My understanding of the various rules in this article is somewhat different from Buchanan (2000). Buchanan emphasizes that several insanity standards do not address the defendant’s ability to choose and he considers his approach ‘an alternative approach’ (2000, p. 134), at least to M’Naghten. This is correct: the rules do not explicitly address this ability. Meanwhile, the present article emphasizes that the relevance of decision-making can be considered to be at least compatible with these rules. Although they do not mention decision-making or choosing, they may well presuppose a choosing defendant, whose choices are compromised in certain ways by deficits induced by mental disorders.

10 The notion of ‘insanity’ is formulated and conceptualized in different ways in different jurisdictions. It is beyond the scope of this article to look at all the rules and to establish the way in which they relate to ‘decision-making’. Nor is it possible to provide a full argument showing that the impact of a mental disorder on a person’s decision-making is what is essential to the moral and legal notion that mental disorders sometimes excuse what a defendant has done (see Buchanan, 2000, and Meynen, 2010, for an account). Still, if we take the impact of mental disorders on people’s decision-making as relevant to criminal responsibility, then the neuroscience of decision-making in mental disorder is relevant.

11 See, e.g., International Neurolaw: A Comparative Analysis, edited by Spranger (2012), especially the Chapter by Klimang and Koops (2012), Penney (2012), Pogman and Raine (2006), Hirstein and Sifferd (2011). Because of its relationship to both neuroscience and the law, in forensic psychiatry a certain tension exists between the realm of the law and the realm of neuroscience. This tension concerns the fundamental issue of whether neuroscience is compatible with ‘free will’, and, therefore, with holding persons accountable for their actions. The topic of ‘free will’, especially with respect to neuroscience, is experienced as a significant conceptual problem in forensic psychiatry, but I shall not deal with it in this article (Greene & Cohen, 2004; Morse, 2007; Meynen, 2009a, 2010; Schlem, 2012).

12 Hirstein & Sifferd (2011) recently suggested conceptualizing a ‘legal self’, understood in terms of executive processes in which decision-making has its place. In view of the other aspects of the ‘legal self’ (attention, recognition, action and its planning) derive their relevance from their impact on decision-making.


14 In fact, conceiving of criminal responsibility in terms of the influence of a mental disorder on a defendant’s decision-making may seem intuitive. Yet, rather than conceiving of criminal (ir)responsibility in these terms, other authors have used different notions, like “lack of rational capacity” (Morse, 2007), compromised ‘free will’ (Reich, 2005), and Elliott (1996, p. 124) provides: “[T]hese are three general ways in which a person’s mental illness can excuse her from responsibility: if she has acted in ignorance, if she acted under compulsion, or … if her illness is so severe that we can no longer consider her a morally responsible agent.” (Adding: “This is an oversimplification…”). These conceptual approaches to insanity are, although not necessarily incompatible with, certainly different from the one suggested in this article which focuses on the disorder’s influence on decision-making.

15 Other writers who include initiation of the action in their decision-making model include Ernst and Paulus (2005), who, in their review, entitled ‘Neurobiology of Decision Making: A Selective Review from a Neurocognitive and Clinical Perspective’, stated: “Decision making depends on three temporally and partially functionally distinct sets of processes: 1) the assessment and formation of preferences among possible options, 2) the selection and execution of an action, and 3) the experience or evaluation of an outcome.” (p. 597)
disorders options may be generated that are not actually available, like telepathic thought transmission. If the patient thinks she has this option open to her, in the next phase she might actually pick this option. The selection of options itself can also be a problem in psychiatric patients. People suffering from attention deficits may not be able to give each of the options due attention, and consequently, they may pick a disadvantageous option. Finally, mental disorders like depression and addiction may impact on a person’s behavior by interfering with the transference of choices about courses of action into actual behavior (third phase). Notably, it can also be that a mental disorder undermines the very ability to decide (e.g., in a delirium, or certain tics in Tourette’s syndrome, see also Buchanan, 2000). For instance, if an action is in fact a tic in Tourette’s syndrome, then there may be no actual decision-making process preceding the action/tic and this would be relevant information for a judge/jury as well. We may exculpate a person, then, because his decision-making has been bypassed because of a mental disorder.

On this account, what is ultimately decisive morally as well as legally is not the type of disorder in DSM-IV (American Psychiatric Association, 1994) – soon to be DSM-5 – but the nature of the influence of that disorder on the individual’s decisions. To illustrate, depression may have many different features (like feeling depressed, weight loss, sleeping problems, and lack of energy) but only some of them (e.g., delusional thoughts) may have their immediate bearing on a person’s decision-making. Those aspects of the disorder that are relevant to decision-making about courses of (criminal) action might in future be elucidated via the proposed neuroscientific perspective on decision-making processes in mental disorders (see Section 3).

Meanwhile, the argument developed in this article is not meant to suggest that neuroscience provides the only way of looking at the influence of mental disorders on criminal behavior or at interventions aiming to prevent such behavior. The paper basically aims to show that an emerging domain of research – the neurobiology of compromised decision-making in mental disorder – could be one way of improving the quality of forensic psychiatric assessments.

Based on these considerations, the forensic psychiatrist’s task in the assessment consists of three components (see also Meynen, 2009b):

1) Assessing whether a mental disturbance was present at the time of the act.
2) Assessing the decision-making process that led up to the act.
3) Assessing to what extent the decision-making process was influenced by a mental disorder.

In practice, these three elements do not necessarily have to be completely distinct and can be intertwined. For instance, assessing the decision-making process can provide information about the presence and influence of a mental disorder — if a person tells the psychiatrist that he attacked his neighbor because the neighbor was controlling his mind and inserting alien thoughts into his head, this yields information about the presence of a mental disorder as well as about its influence on the legally relevant act (see Meynen, 2009b).

3. Mental disorder and the neuroscience of decision-making

3.1. Neurobiological research on impaired decision-making and mental disorder

Recently, neuroscientists have become interested in relating specific mental disorders to problems with decision-making and brain functioning (Bechara, 2005; Paulus, 2007; see Meynen, 2009b). In this section I present briefly some findings on decision-making derived from studies on groups of patients suffering from different kinds of disorders; some disorders are more directly related to criminal behavior than others.

One of the domains of research is impulsive behavior. Best, Williams, and Coccaro (2002) studied decision-making in patients with intermittent explosive disorder (IED), a disorder characterized by impulsive aggression. They used neuropsychological tests to evaluate functioning of particular brain areas (like the dorsolateral prefrontal cortex) in twenty-four IED patients and in twenty-two controls. They found that on a gambling task, IED patients “continued to make disadvantageous decisions throughout the 100 trials, whereas controls learned to avoid disadvantageous decisions”.16 The link between mental disorders and impulse control problems (especially aggressive impulses) is important from the point of view of criminal law. It is interesting that even researchers who do not themselves target impaired decision-making in mental disorders, recognize the relevance of the neuroscience of decision-making for impulse disorders: Breiter, Aharon, Kahnemann, Dale, and Shizgal (2001, p. 634)17 suggest that “dysfunction of neural mechanisms and psychological processes crucial to adaptive decision making and behavior may contribute to a broad range of impulse disorders such as drug abuse and compulsive gambling”.

 Wilbertz et al. (2012) studied decision-making in adult attention deficit hyperactivity disorder (ADHD) using functional magnetic resonance imaging (fMRI) combined with electrodermal assessment. They were interested in decision-making in ADHD with respect to risk-taking. The results showed differences in medial orbitalfrontal cortex (mOFC) activity in ADHD patients, which correlated with risky decision-making. The authors suggest that their findings could be related to behavioral impulsivity in ADHD.

Another type of disorder that has been studied is schizophrenia. Although most people diagnosed with schizophrenia are not dangerous or violent, the disorder is associated with increased violence and violent crime rates (Singh, Grann, Lichtenstein, Langstrom, & Fazel, 2012). The findings of Sevy et al. (2007) suggest impaired emotion-based decision-making in schizophrenia, which is linked to the ventromedial/orbital prefrontal cortex. Hutton et al. (2002) also studied patients suffering from schizophrenia. They found “significant impairments on several specific indices of decision making performance in both chronic and first-episode patients with schizophrenia.” The patients were “slower to make decisions and made suboptimal choices when provided with information to guide their decisions.” (p. 255) They also observed that chronic schizophrenia patients were more impaired than first episode patients. The pattern of decisional deficits in the chronic schizophrenic patients was similar to that of patients with damage to the orbitofrontal cortex. In these studies on schizophrenia, the link between the cognitive impairments studied and criminal behavior may be less direct than the findings in intermittent explosive disorder. Still, if a patient with schizophrenia commits a crime, it would be helpful to know to what extent schizophrenia may have impaired certain aspects of that person’s decision-making.

Paulus, Hozack, Frank, Brown, and Schuckit (2003) performed an fMRI study on decision-making in methamphetamine-dependent subjects. One of their findings was that, whereas control subjects showed strong “success”-related activation in certain brain areas,16 the activation was attenuated in methamphetamine-dependent subjects. They conclude that these neuroimaging observations “support the hypothesis of an attenuated processing of “success” or “failure” by neural substrates that are important for decision making.” (p. 70)

Problems with decision-making may also obtain in anxiety disorders. Cavedini, Gorini, and Bellodi (2006) performed a review of the neuropsychological findings on decision-making in obsessive–compulsive disorder (OCD). They conclude that, “[w]ith regard to OCD, the combined use of different techniques has shown that the decision-making impairment is specifically related to the functioning of the ventromedial prefrontal cortex.” (p. 12) They also mention that serotonin and dopamine may play a role in the expression of OCD symptoms as

16 Best et al., 2002, p. 8448. The wording is from the abstract of their paper.
17 They studied the neural responses to the expectancy and experience of monetary gains and losses.
18 These areas are: “the right insula [BA [Brodman’s area] 13], right inferior [BA 44, 45], right middle frontal [BA 9] gyrus, and in left middle frontal gyrus (BA 6, 9).”
well as in decision-making in OCD. Anxiety disorders are probably not the type of disorder most relevant from a forensic psychiatric perspective. On the other hand, the effects of (overwhelming) fear on decision-making in psychopathological conditions might eventually be relevant to other disorders of which such fear can be a component. In addition, perhaps it is wise not to rule out the significance of the impact of certain disorders on people’s choices before we have established their actual influence on a patient’s decision-making.

Many more studies on impaired decision-making in mental disorders have been performed. And since it seems likely that mental disorders are able to influence decision-making in different ways (see Buchanan, 2000), it is necessary to study many kinds of disorders in order to clarify their potential impact on the choices people make. Such research on decision-making could enhance the quality of forensic assessments and enable forensic psychiatrists to answer questions posed by judges and juries better and more reliably.

3.2. Criminal behavior, mental disorder, and decision-making

So far, we have considered research that has been done using non-forensic research designs. The best way to proceed, however, might be that forensic researchers start to develop specific (neuroscientific) study designs/paradigms relevant to decision-making, mental disorder, and the violation of legal obligations. As Paulus (2007, p. 605) says in his Science paper on decision-making and mental disorders:

“There is clear evidence of dysfunctional decision-making in psychiatric populations. However, many of the studies have so far used a limited number of behavioral tasks, which are complex and probe multiple decision-related processes. Several approaches will be necessary to gain a deeper and disease-relevant understanding of such dysfunctions.”

One of these approaches might indeed involve addressing the kind of decisions that are directly relevant to forensic psychiatry: those decisions related to criminal behavior. This will certainly be challenging because crimes are not allowed in research, so the difficult task will be to identify elements of decision-making that are directly relevant to crimes, and to study them in neuroscientific research designs. In addition, crimes due to behavior influenced by mental disorders are rare occurrences. It is a lot easier to detect certain cognitive dysfunctions as in the research designs described above, than to determine exactly when and how the disorder may result in a particular crime. Furthermore, the occurrence of a crime is usually not just mind/brain-dependent but also situation-dependent. People may perform certain actions in response to and in interaction with environmental input. Therefore, research in this area is a real challenge. Still, the complexities of human criminal behavior and its relationship with psychopathology should not prevent us from trying to study them in (neuro)scientific research paradigms.

4. Impact in an individual

4.1. General knowledge and neurobiological tests

Psychiatrists know how to diagnose a mental disorder, but how to link the disorder to an actual decision-making process leading up to a crime is more difficult. Neuroscientific efforts as described in the previous section could help to bridge the current epistemically gap between the disorder and the criminal act. But they only yield general information about how certain disorders may affect a defendant’s decision-making. This general type of knowledge about the impact specific disorders may have on people’s decisions would only be the first step. A second step, based on such knowledge, might possibly involve the use of neuroimaging techniques in order to actually examine the defendant’s brain. So, cognitive neuroscience could not only provide the forensic psychiatrist with general knowledge about how exactly a mental disorder like schizophrenia may influence decision-making processes, but via tests it could also inform the psychiatrist through what neurobiological mechanisms a particular defendant the disorder influences his or her decision-making process. In order to show that general knowledge about how disorders influence decision-making may not be sufficient in a particular case, let us consider the phenomenon of ‘commanding voices’ (a type of auditory hallucination) as they may occur in schizophrenia.

4.2. The case of commanding voices

A particular type of voice that patients may experience is a ‘commanding’ voice (Braham, Trower, & Birchwood, 2004). Such voices contain imperatives like “Walk down the stairs!” or “Stop talking!”. Sometimes, their content is ‘criminal’ in nature: the voices order a patient to harm another individual. Patients may respond to such voices in very different ways. Some patients apparently have the freedom to disobey such commands, while other patients cannot but obey at least some of the commands. In forensic assessments, it may be crucial to know whether or not a defendant who experiences commanding voices was actually able not to obey these hallucinations at the moment the crime took place. From the perspective of decision-making, the crucial issue is that some of these commanding voices are capable of directly influencing a person’s decisional process, while other voices lack this capacity.

Why is it that some of these voices cannot be disobeyed, while others lack such impact on a person’s decision-making? Braham et al. (2004) present an overview of factors that have been associated with obeying the commands, like ‘severity of command’ or ‘voice familiarity’. Shawyer et al. (2008) suppose that whether or not patients are compliant towards harmful commanding voices is a result of a complex interaction between various factors. Neuroscientific research along the lines suggested in the previous sections could be helpful in revealing why it is exactly that some voices have the ability to affect decision-making directly while others lack this ability. If, in general, the mechanisms through which certain commanding voices influence decision-making were clarified, it might also be possible to assess whether or not a particular defendant is suffering from this type of commanding voices: the type that cannot be disobeyed. If a patient commits a crime because of such a voice, we may well exculpate the defendant. Alternatively, if the commanding voices can be shown to be of such a nature that the patient should have been able to resist the command, then the situation may be very different: we may feel that the patient is responsible for his action because the voice still left open the possibility not to commit the crime.

The phenomenon of commanding voices illustrates that whether or not certain psychiatric symptoms directly influence a patient’s decisional processes can make an enormous difference as far as such a patient’s (criminal) actions are concerned. More precisely, even symptoms that appear to be identical – commanding voices with harmful content – may be very different from the point of view of decision-making. Sometimes this phenomenon is ‘harmless’ in the sense that it cannot induce any (criminal) behavior in the patient, while in other cases the phenomenon is extremely dangerous because it directly influences a patient’s decision-making.

To sum up, general knowledge about the phenomenon of auditory hallucinations is probably insufficient to determine which kind of commanding voice a particular person is experiencing, while neuroscientific tests could be helpful in establishing the nature of the commands in an individual patient/defendant. Still, it might take years of research before we will be able to detect these voices specifically by neuroimaging and to make a reliable assessment of their impact on an individual’s decision-making.

Neuroimaging can take place only after a crime has occurred. It is impossible to study the defendant’s brain state at the time of the
actual crime (in the past). Therefore, what actually happened at the moment of the crime in a defendant’s brain is not directly accessible to neuroimaging techniques. Nevertheless, based on neuroimaging findings after the crime, psychiatrists may, at least in principle, be able to provide more reliable testimony than without such techniques.

5. Risk, treatment and prevention

If the influence of a disorder on decision-making can be more reliably assessed, this opens new possibilities for risk assessments as well. Currently, these assessments rely on factors including biographical data, crime characteristics, and instruments like the PCL-R. The combination of which results in predictions that are far from perfect. Adding disorder-specific neurological information with respect to the impact on decision-making could be helpful in enhancing the reliability of risk assessments in mentally ill offenders. In a meta-analysis, Bonta, Law, and Hanson (1998) found that clinical or psychopathological values were either unrelated or negatively related to recidivism. Still, various mental disorders have been found to be associated with a variety of crimes (Vinkers, de Beurs, Barendregt, Rinne, & Hoek, 2011). Psychosis, for instance, is related to violence (Lamberti, 2007). Neuroscientific clarification of the impact of a mental disorder on a person’s decision-making might help to make a better distinction between those cases in which a mental disorder is related to an increased risk of recidivism and those in which this is not at all the case (see also Jones & Shen, 2012, p. 362–3).

Making an assessment of risk using neuroimaging techniques does not have to be an endpoint. If neurobiological evidence of a potentially harmful influence on a person’s decision-making is found, this condition could be susceptible to interventions as well. It might well be that such an intervention is not primarily aimed at curing the disorder itself, but rather at preventing the disorder from interfering with a person’s decision-making. Returning to the example of ‘harmful commanding voices’, we can imagine that certain treatments cannot make the phenomenon of commanding voices disappear, but that, based on neurobiological research, it would be possible to prevent the voices from specifically influencing a person’s decision-making. Although still a burden to the patient, the voices would become harmless in so far as they no longer constitute a threat to other people. Thus, in the future, interventions that target the influence of a psychiatric disorder on decision-making may help to sever the dangerous connection between psychopathology and behavior. Whereas general psychiatry is basically interested in alleviating the burden on the patient, reducing the (dangerous) impact on a person’s behavior concerns a specific interest of forensic psychiatry. It might even be that knowledge about the influence of a mental disorder on a particular defendant’s decision-making does not lead to a successful insanity defense, but that, still, it helps to diminish this influence in order to reduce the risk of recidivism.

So, in the end, the value of the neuroscientific clarification of the influence of mental disorders on decision-making with respect to criminal behavior exceeds its potential use in the evaluation of whether or not a defendant is legally insane. It might be particularly relevant for risk assessments and future interventions aiming at treatment and prevention (see also Popma & Raine, 2006). These interventions are not necessarily neurobiological in nature. The fact that the neurobiology of decision-making in mental disorders may be relevant to assessments of criminal responsibility does not imply that the interventions have to target the defendant’s brain directly. Psychotherapy and sociotherapy, for instance, may be effective as well.

6. A normative issue: evaluating the significance of the influence of mental disorders

Defining the forensic psychiatrist’s or psychologist’s task in terms of evaluating the influence of a mental disorder on decision-making and approaching it via empirical neuro-research will not solve all the problems related to these evaluations. In respect to this, I will discuss one important issue.

As Buchanan (2000) makes clear, the ability to choose can be influenced by mental disorder in many ways. This calls for a solid theoretical clarification of what we should consider a normal or ‘uncompromised’ decision-making process, and, more specifically, what should count as a decision-making process that has been significantly influenced by a mental disorder. Although many disorders may have some influence on decision-making, the forensic psychiatrist appears to be interested in influence that is legally relevant.

For instance, when a person is depressed, this may influence his or her decisions and behavior to some extent – like the decision to stay in bed rather than to go shopping – and a person’s fear of flying is likely to influence the decision on how to travel to a holiday destination. But do depression and phobias really undermine the capacity ‘to conform his conduct to the requirements of the law’ (Model Penal Code)?

A forensic psychiatrist aims to assess whether a mental disorder has significantly or decisively influenced a specific choice/decision. The term ‘significantly’ refers to a normative judgment. What constitutes legally significant influence of a mental disorder on a person’s decision-making? The neuroscientific data themselves will not be able to come up with any such normative standard or even a threshold (although they can inform a normative evaluation). In other words, the neuroscience of decision-making leaves open the question about the threshold for what can be regarded as insanity under the law.

Still, profound knowledge, based on neuroscientific research, on how mental disorders may affect a person’s decision-making could lead to adaptations of the rules that are currently used in various jurisdictions. This is ‘neuro-law’ not merely in the sense of neuroscience informing psychiatrists who, in turn, contribute to the procedures of criminal law by assessing a defendant, but this is ‘neuro-law’ in the sense of neuroscience affecting the legal rules themselves. I am not arguing that the present rules should be revised in line with future neurobiological findings, but this could be one of the consequences of this line of research. Although the law is not a neurobiological endeavor, it is probably sensitive to (changing) scientific views of the phenomena (like mental disorders) and their specific relevance for the law.

In any case, the individual psychiatrist who performs the evaluation of the defendant has to make a normative judgment by answering the question of whether or not a certain criterion stipulated by a rule dealing with insanity has been met. Does the psychiatrist feel that the defendant was suffering from a mental disorder at the moment of the crime, and that he or she was unable to conform to the requirements of the law (Model Penal Code)? The psychiatrist’s normative judgment on this central issue may well be influenced by (neuro)scientific results on mental disorders. In fact, such judgments should be based on, at least in part, scientific considerations. The neuroscience of decision-making in mental disorders could provide reasons to the psychiatrist to consider a particular defendant not able – due to the impact of a mental disorder – to conform his actions to the requirements of the law. Implicitly, the

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20 Some have pointed to potential legal and/or moral problems related to neuroscientific risk assessments. For instance, as Nadelhoffe et al. (2012) discuss, the reliability of such techniques is an issue, as is the defendant’s privacy, or the danger of forcing a defendant “to be a witness against himself”. Still, Nadelhoffe et al. (2012, p. 95) “found no novel legal or moral issues that were raised by neuroprediction that were either not already raised by other forms of violence prediction or that would not be easily remedied.”

21 For a discussion of some other problems concerning these assessments, see Morse (1985) and concerning neuroscience and criminal responsibility, see, e.g., Aharoni, Funk, Sinnott-Armstrong, & Gazzzaga, 2008.

22 This goes back to Hume’s distinction between is and ought.
neuroscientific findings may, thus, influence the psychiatrist's normative judgment about a defendant's criminal responsibility.

There is, in fact, an ongoing debate among legal and forensic scholars about how to conceive of the relevant influence a mental disorder might have on a defendant's actions. For instance, as mentioned, M'Naghten focuses on certain kinds of knowledge: “as not to know the nature and quality of the act he was doing; or if he did know it, that he did not know what he was doing was wrong” (emphasis added). But the legally relevant influence has been phrased in various ways, as in the “irresistible impulse” test (Elliott, 1996). This test was developed because people argued that although a person might possess the knowledge as required by M'Naghten, their mental disorder may undermine the capacity to control their actions/decisions. Perhaps, the (neuro)science of decision-making in mental disorders might help to further this debate by providing more information about relevant relationships between disorders and crimes.

In general, it would be good if the future findings on the neuroscience of decision-making were reviewed by a team of experts in order to assist individual forensic psychiatrists who have to interpret them. Identifying the threshold for what can be considered a morally as well as a legislatively significant impact – in view of neuroscientific findings – should be carried out as a multidisciplinary effort including lawyers, psychiatrists and ethicists as well as neuroscientists.

7. Conclusion

Apparently, at present, there is a profoundly held belief, reflected in laws and regulations, that mental disorders are capable of influencing a person's decision-making process to such an extent that we no longer hold that person responsible for actions following from such decisions. Forensic psychiatrists are consulted to satisfy the legal interest arising from this belief: to assess the defendant in cases of an insanity defense. This article has adopted a perspective on such an assessment that specifically focuses, as its central issue, on the impact of the disorder on the defendant's decision-making process, which has resulted in a crime. This perspective introduces the opportunity to benefit from an emerging field in neurobiological research on how mental disorders may affect a patient's decision-making. Using various study paradigms, neuroscientists have been able to detect changes in decision-making due to several kinds of mental disorders and to relate these changes to brain functioning. Future neuroscientific research would be particularly helpful if decision-making about criminal behavior could be specifically targeted in the study designs.

Such research will not only be valuable with respect to our moral and legal judgment of past behavior, but probably also enable more detailed and reliable predictions of future behavior and, possibly, open up treatment options that prevent further harmful behavior. These treatment options could focus on minimizing those symptoms that directly affect a person's decision-making about courses of criminal action. This neurolaw perspective on criminal responsibility emphasizes that not all features of a mental disorder are equally relevant from the point of view of criminal law: only those features which (directly) influence decision-making about certain types of action are of interest.

Although future research could, hopefully, further clarify the extent and nature of the influence of a mental disorder on a defendant's decision-making, we are left with the question of what should count as significant influence by a mental disorder on a person's decision-making process. This question is normative in nature and should be treated as such. It could be addressed by multidisciplinary expert groups, including lawyers, psychiatrists and ethicists as well as neuroscientists.

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