NEUROSCIENCE AND CRIMINAL RESPONSIBILITY:
AN ANALYSIS OF THE INTERDISCIPLINARY DEBATE

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<td>Brain Overclaim Syndrome</td>
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<td>CJ</td>
<td>Cognitive Jurotheraphy</td>
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<td>DMS V</td>
<td>Diagnostic and Statistical Manual of Mental Disorders Fifth Edition</td>
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<td>DNA</td>
<td>Deoxiribonucleic acid</td>
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<td>fMRI</td>
<td>Functional Magnetic Resonance Imagining</td>
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<td>MRI</td>
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<td>PC</td>
<td>Potential Commentator</td>
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<td>PET</td>
<td>Position Emission Tomography</td>
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<td>PFC</td>
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“In previous generations, people looked to inheritance (genetics), anatomical features (phrenology), a history of emotional trauma or unresolved psychic conflict (psychoanalysis), or socioeconomic deprivation (sociology and economics) to explain why some commit crimes and others do not. Today and tomorrow, it seems that people will look increasingly to the brain (neuroscience).”

INTRODUCTION

Application of social sciences to legal problems has been one of the most important developments in the study of law in the last few decades. Likewise, the great potential has been seen in medicine and sciences, especially in the field of forensic sciences where a broad spectrum of disciplines and technologies are used to investigate and establish the facts in relation to (mainly) criminal law matters. On this ground, neuroscience has started to play a starring role as it is believed to revolutionise the way in which aspects of criminal responsibility, including causality of criminal behaviour, free will, morality, and mental illnesses are perceived. The advances in brain imaging technology that have developed sufficiently to examine human brains while performing cognitive activities expanded the knowledge of the brain functions and their impairments that neuroscience presents. As a result, neuroscientific studies indicate that brain abnormalities originating in several parts of the brain, and more specifically those connected with the limbic system, lead to occurrence of criminal behaviour. These abnormalities may be related to the brain injuries, tumours, and impairments of particular parts of the brain such as the frontal lobe, amygdala, and hippocampus. The medical assessment of these impairments is based on the brain scans performed by various technologies. Hence, studies performed and the results obtained have started to challenge the normative view of criminal behaviour (acting intentionally, recklessly or negligently). The evolving debate on the potential application of neuroscience in the law has led to a new legal discipline called Neurolaw.

When thinking about criminal law one firstly focuses on the punishment of unlawful acts performed by individuals who are required by binding statute(s) to refrain from such commissions or omissions. Nonetheless, imposing any punishment needs to be preceded by several steps, significant for the ascription of criminal responsibility.

Much has been written about the possible application of neuroscientific findings in criminal cases. Some scholars argue that developments in neuroscience will eventually change our perception on mental capacities or lack of thereof required by criminal law. More far-reaching consequences are seen by Professor Robert Sapolsky who claims that neuroscience should and will diminish the role of criminal justice. Others, on the other hand, recognise potential advantages for using neuroscience in criminal law; however they take a caution position indicating that neuroscience may influence the doctrinal theories of responsibility.

The findings presented by neuroscientists, although controversial, add valuable arguments to the discussion on criminal responsibility and capacity criteria that need to be fulfilled in order to be found responsible for criminal act(s). These arguments may influence the awareness of societies forcing the changes in criminal law. More precisely, it is believed that the retributive justice theory may be

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2 As it is accurately pointed out by the authors: “Laws are made by humans, and hence the study of human behaviour is clearly pertinent to study of law”, McCabe K., Smith V., Chorvat T., 2005, p. 68.
3 The most popular ones are magnetic resonance imaging (MRI), functional magnetic resonance imagining (fMRI) and position emission tomography (PET) scans., Koops B. J., Klaming L., [In:] Spranger T. M., Springer, 2012.
4 See generally: Markowitsch, Bandes, Vincent, Lamparello, Sasso, Claydon.
6 See generally: Gazzaniga, Rigoni, Pellegrini, Mariotti, Cozza, Ferrara, Pietrini, Sartori.
7 The retributive justice is a theory of justice that assumes the punishment, if proportionate, to be the best response to crime., Oxford Dictionary of Law, 2003, p. 97 – 98.
replaced by the rehabilitation\textsuperscript{8} of offenders with disrupted mental capacities. This raises the important question of the near future of neuroscience application in criminal responsibility, its assessment criteria and the role neuroscience may have on excuses. Moreover, it is questioned whether 1) the interdisciplinary debate presents a unified position on the role neuroscience can play, and 2) whether this position might direct neuroscience to become the ‘Gold Standard’\textsuperscript{9} for the criminal responsibility assessment.

In establishing the near future of neuroscience for criminal law the thesis proceeds as follows: 1) after introducing the main assumption of the thesis and presenting the methodology of the research; 2) the thesis turns to critical viewpoints and analysis presented by Professor Morse, a well-known and influential person in the field of Neurolaw; and 3) follows with the more moderate and interdisciplinary debate regarding the role of neuroscience and its influence on criminal responsibility; this is proceeded with 4) analysis of presented issues, closing with the answer to the above stated questions that the role neuroscience can currently play is simply secondary, placed along with other scientific disciplines.

\textsuperscript{8} Rehabilitation, on the other hand, is a therapeutic measure rather than a punitive one. Criminal behaviour is seen as a disease that should be treated with available scientific methods to cure the offender, and if successfully applied, restore him/her to the society., Encyclopedia of Criminal Justice, http://pubpages.unh.edu/~nicks/pdf/Rehabilitation.pdf, (04.08.2013).

\textsuperscript{9} This expression is originally addressed to the DNA analysis that revolutionised, dominated and in time became the ‘Gold standard’ of the forensic evidence. The DNA evidence is believed to be a credible forensic assessment, very significant for the criminal justice community.: Jobling M.A., Gill P., 2004; Morling N., 2004; Reilly P., 2001; Opar A., Crime 2006; Lynch M., 2003; Frumkin D., Wasserstrom A., Davidson A., Grafit A., 2009.
1. **Methodology**

Throughout the past year I have focused on the role the neuroscience can play in criminal responsibility and excuses. The literature provided various questions regarding the criminal responsibility criteria, their explicitness and evaluation in the light of neuroscientific findings. Additionally, being interested in excuses, particularly insanity and diminished capacity. I have concentrated on mentally retarded offenders and those with neurological impairments. This led me to the observation of the discrepancies between scientific evaluation and settled criminal law standards. For this reason, the research focuses on the criminal responsibility issues regarding neuroscientific evidence. It was sought to find out whether any changes proposed by neuroscience are needed, why they are needed and how “should” then the aspects of criminal responsibility and excuses be changed.

As it has been observed, it is not easy to explain how the law defines the concept of responsibility. This is mostly connected with the criteria that exist within particular jurisdiction. However, it can be said that generally criminal liability can be attributed objectively (to the act itself) or subjectively (to a state of mind of an offender). Different offences require different objective and/or subjective elements. Thus, some of the systems (common law countries) require two elements: actus reus (unlawful act) and mens rea (guilty mind) that need to be fulfilled in order to hold someone criminally liable. Others (e.g. civil law countries) in the core of criminal liability place culpability – there is no criminal liability without culpability (nulla poena sine culpa). That is why, besides the jurisdictional differences the law focuses on a perpetrator’s mental states that lead to the offence(s).

Above all, the issue of responsibility is also tightly connected with negative elements that are used in case of so-called defences (justifications and excuses). Excuses are represented by the insanity defence (also diminished capacity) that exculpate the defendant based on the lack of certain mental capacities during alleged offence. The criteria of insanity defence are based on the cognitive capacities (i.e. lack of knowledge that what s/he was doing was wrong) and in some jurisdictions the volitional element that constitutes of mental illness and influences offender’s mental states.

On these grounds, the aim of this thesis is to test the arguments presented in the literature in order to answer the central question of the near future of neuroscience application in criminal responsibility, its assessment criteria and the role neuroscience may have on excuses. Accordingly, two sub-questions follow: 1) does the interdisciplinary debate present a unified position on the role neuroscience can play and 2) whether this position might direct neuroscience to become the ‘Gold Standard’ for the criminal responsibility assessment.

Being educated in Forensics, in the context of its value for the criminal law and criminal justice system, I have adopted the ‘Gold standard’ terminology from the forensic DNA literature to ask the question whether neuroscience can become the ‘Gold Standard’ for assessment of a defendant’s criminal responsibility. Being considered a ‘Gold standard’ would indicate that neuroscience is ready to

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11 Article 1 §3 Polish Criminal Code. There is no time and place to explain the doctrinal differences between Polish and English law, therefore the main focus is on the general aspects of responsibility that can be found in these systems.
12 This is mostly evident in the US and England where the M’Naghten case from 1843 became the basis on which the insanity criteria were established. They relate to the defect of reason from disease of the mind at the time of the offence. Additionally, in the US the insanity defence presents the variation of the M’Naghten rule with the further developed Durham test or provided in the Model Penal Code., Ashworth A., 2009, p. 142.; Callahan L., 1987.
13 Anharoni E., Funk Ch., Sinnott-Armstrong W., Gazzaniga M., 2008, p. 150.
play considerable role in assessment or exclusion of criminal responsibility. The literature, nevertheless, implies otherwise.

Above all, the aim is to provide the reader (mainly the law students and academics) who have not been familiarized with the challenges neuroscience has provided for the criminal law theory of responsibility and excuses. Is it proper for the criminal law to hesitate in making changes in the doctrinal assumptions in the context of biological causality and its influence on the criminal behaviour.

Therefore, the methodology is a conceptual analysis of the interdisciplinary debate – an evaluation of the literature to reflect on the near future (next 4 years) of the application of neuroscience in criminal law. The analysis to be presented consists of what has been written about the influence from neuroscience on criminal law. All scholars and researchers that were chosen for this thesis emphasize in general their concerns regarding the application of neuroscientific evidence to criminal responsibility. However, among them only Morse presents the most critical argumentation as he does not yet see a place for neuroscience when it comes to assessment of criminal responsibility. Hence, his position has been separated from other opinions who, although stress the problems neuroscience faces in this area of application, present a more moderate approach than Morse. Moreover, when the attempt was made to contrast critical argumentation of Morse with authors, who see the potential for the application of neuroscience, the argumentation obtained occurred to stay in line (to some extent) with those of Morse.

Morse’s works have been chosen as they have considerable value for the debate. The analysis he conducts and arguments he proposes are firm and well-reasoned bringing closer the theoretical and practical rationale of criminal law, the role of neuroscience and the future of both of these disciplines. Moreover, as a psychologist Morse is well qualified and is a reliable author to follow. Other authors considered in this thesis were chosen based on their argumentation and more moderate position in contrast to those of Morse’s. The selection of relevant literature was based on the main assumption of the thesis, compatibility and limitations of neuroscience and the potential future role it can play. Additionally, to achieve the interdisciplinary analysis the articles consist of authors with a background in law (Morse, Stephens Khoshbin), ethic and philosophy (Glannon, Farisco, Petrini, Sinnott-Armstrong), psychology (Morse, Aharoni, Sartori), neuroscience (Khoshbin) and other sciences (Pellegrini, Mechelli). It is expected that such applied method would explore and provide a deeper understanding of the concerning matter. Although, it was acknowledged that analysed scholars present similar doubts regarding neuroscience as Morse does, they also stress its great potential for clarification or secondary role that could improve the current criminal responsibility assessment. Thus, they were selected to present more moderate approach.

There are also limitations that have to be acknowledged. Because of the limited scope (approximately of 9 000 words) of the thesis some of the aspects of criminal responsibility have to be omitted. The discussion regarding the free will was omitted as it would require the prior description of metaphysical debate, its relevance for law and connection with what is the issue in the context of neuroscientific findings. Therefore, the conscious choice was disregarded from this debate and the focus is only on the general neuro-legal points of the discussion.
2. THE FUTURE OF NEUROSCIENCE IN THE WORK OF PROFESSOR STEPHEN MORSE

Steven Morse is a well-known expert in the fields of Criminal Law, Mental Health Law, Neuroscience and Law. He also presents the most critical analysis of the application of neuroscientific findings and evidence in the assessment and exclusion of criminal responsibility. Moreover, as a lawyer and psychologist, he argues that many lawyers put much greater believe in neuroscience than it can recently offer. In the next sections the main points of the Morse’s analysis are presented in order to contrast them with more moderate positions provided in the following chapter.

2.1. ‘Folk psychology’

“Folk psychological behavioral criteria are always the final pathway, the final standard that must be addressed, the ultimate legal question. All evidence, including what caused the behavior, must help answer the folk psychological questions that the law asks. The law concerns acting agents, not mechanisms.”

The key element of the debate focuses on the new insights neuroscience can add to the settled normative criteria of criminal responsibility and whether these criteria should be reconsidered given the knowledge presented by neuroscience. Therefore, with available and growing neuroscientific data the questions have been raised whether neuroscience could detect specific and legally relevant mental states that would help to assess or exclude someone from criminal responsibility. Indeed, criminal responsibility assessment involves a retrospective evaluation of the defendant’s mental states at the time of the offence (tempore criminis) with the fulfilment of behaviour(s) that describes particular crime(s).

Morse is convinced that the criteria used to establish or excuse criminal responsibility are behavioural (neither biological nor neurobiological). He argues that the law uses the concept of folk psychology that “explains behaviour in part by mental states such as desires, beliefs, intentions, willings and plans.” The folk psychology presents an essential type of folk knowledge that has become the object of growing interest among scholars of various disciplines (philosophy, cognitive neuroscience and criminal law). Thus, the main assumption is that practical reason, including deliberation, plays a potentially action-guiding role in people’s life. Therefore, the folk psychology is based upon human behaviour (our mental states and plans). It presupposes that it will be possible to rationalize human action by mental state explanations or the actions will be responsive to reasons under the right conditions.

Law, similarly to morality, is not focused on thoughts, feelings, character and other variables that reasons do not fully guide. Law focuses on action(s). Morse sees it as an unchangeable condition for the law’s doctrinal criteria of responsibility. However, such explanation is perceived by many scientists and philosophers as primitive. In response to such argument, Morse once more refers to neuroscience. He places it among other sciences and emphasises that folk psychology will remain as a central element of criminal responsibility unless scientific discoveries prove that human perception of ourselves is radically wrong. He puts emphasis on the mechanistic view the neuroscience presents and

14 Morse S. J., 2008, p. 211.  
15 Morse S. J, 2011.  
17 Morse S. J., 2011, p. 530.  
18 Morse S. J., 2005, p. 228.
in that he sees the main problem. In his opinion it is human behaviour that is directed upon particular aim. Neurons and neural networks do not act intentionally; they do not act for the reasons. This is the main difference between neuroscience and folk psychology.\footnote{Morse S. J., 2005, p. 228}

Even if the assumptions provided in the folk psychological concept are true, people still may not be able or may not exercise the reason’s guidance. People behave irrationally, unreasonably, foolishly or thoughtlessly. However, it is presumed that through childhood and adolescence most people develop the capacity to guide their actions by reasons and because of this development it is expected that they will use this capacity in important moments and interests that are at stake.\footnote{Ibid., p. 229.}

Additionally, the rationality plays imperative role in criminal responsibility. As Morse puts it, it is the touchstone of responsibility. It is the criterion that the law requires from the adults – the minimal rationality. As it was stated earlier, the law requires from people “the general capacity to grasp and be guided by good reasons in particular legal contexts”\footnote{Morse S. J., 2007, pp. 205 – 6.}. Morse does not follow the view that capacity and rationality are strictly connected. Even those who possess great capacity sometimes act irrationally. Hence, capacity is not undermined whenever someone fails to exercise it. According to Morse, this also refers to situations when an individual fails to exercise this capacity.\footnote{Ibid., p. 206.} Nonetheless, for Morse, the aspect of rationality is also a normative issue that has no controversial connection to its definition and how much of it is required for responsibility. Following his thought, he reduces human actions to “intentional behaviour potentially guided by reasons”\footnote{Ibid.}. He stresses that such conditions are considered on the normative moral, social, political and legal grounds. He adds that those who want to use the link between biological abnormalities and criminal behaviour as an explanation of direct causation of crime resulting in excuse are committing the psycho-legal error. In his opinion “causation per se has nothing to do with responsibility.”\footnote{Morse S. J., 2004, http://www.dana.org/printerfriendly.aspx?id=1204, (03.08.2013).}

Consequently, the assessment of criminal responsibility is settled by the folk psychological criteria and leaves a small space for neuroscience to be part of such assessment. Morse sees neuroscience as insufficiently developed to intercept the role and point accurate mental states that could be ascribed to states where criminal responsibility or excuse are present. In other words, neuroscience for now lacks the ability to present valid retrospective inferences of one’s criminal actions. Neuroscience needs to show how the agent acted, formed mens rea, or met the criteria to be excused.\footnote{Morse S. J., 2011, pp. 538 –539.} This is, however, not possible at present as there is a lack of empirical data that could indicate proposing changes.\footnote{Morse S. J., 2008, p. 1071.} However, as Morse admits, neuroscience may in the distant future recognize and point precisely mental states that will be required for the criminal liability assessment.\footnote{Morse S. J., 2011.}

\subsection*{2.2. Neuroscience and Excuses}

Neuroscientific studies are also claimed to have an impact on the criteria used to excuse somebody from criminal responsibility. The question introduced by the literature is whether brain

\footnote{Morse S. J., 2005, p. 228}
\footnote{Ibid., p. 229.}
\footnote{Morse S. J., 2007, pp. 205 – 6.}
\footnote{Ibid., p. 206.}
\footnote{Ibid.}
\footnote{Morse S. J., 2011, pp. 538 – 539.}
\footnote{Morse S. J., 2008, p. 1071.}
\footnote{Morse S. J., 2011.}
impairments are legally relevant for the establishment of such criteria. Additionally, mentally disordered offenders or those who are claimed to possess brain abnormalities are seen to benefit from the application of neuroscientific findings to support or eliminate the insanity defence.

The defences of excuses and justification are based on inquiry into the person’s mental states. Such states are obviously influenced by various biological, psychological, sociological and other factors. As Morse emphasises, it is the knowledge, obtained through examining these factors, which enables to establish past mental states. The law only focuses on the mental states itself and not on their causation. Therefore, in Morse’s opinion, neuroscience alone is not competent to measure the lack of capacity required to excuse or diminish one’s responsibility. Once more he emphasizes that existing criteria are normative, placed in a folk psychological context.28

As regards mentally retarded offenders/defendants, Morse presents straightforward opinion that such individuals do not even differ from normal agents as they also have desires, believes and intentions and act upon them. The main argument he points is that mentally disordered people “are intentional agents and not just mechanisms”29, thus the minimal requirement of rationality is fulfilled. As an American scholar Morse investigates and focuses on the insanity defence, formulated in terms of the M’Naughten rule and still used in Anglo-American doctrine. He stresses that the requirements placed there are not medical ones. They are, in fact, normative. Any person who wants to use such defence needs to prove that s/he did not know the nature and quality of his/her act or s/he did not know that the act was wrong. This also needs to be proven by the defendant with a mental condition, however the condition itself (i.e. mental illness) gains a secondary relevance. This means that the knowledge about the wrongdoing (its nature and quality) or the lack of thereof is of prime importance for the law. The mental illness is still required for the defence to illustrate that the disorder undermined the defendant’s capacities (the knowledge).30

What is more important, the law does not hold that people have to constantly reason or behave rationally. The law sees it as the capability to act for a reason and to possess minimal rationality. It is evident that Anglo-American criminal law does not have a common mitigating doctrine applicable during the trial. The only criteria that the defendant can meet are complete excuse in the form of legal insanity or duress. Therefore, Anglo-American law requires that the defendant controls himself despite temptations and provocations.31 Mitigation comes into the picture during the sentencing and is left to the discretion of the judge. Morse argues in favour of the introduction of partial mitigation doctrine where the defendants would show substantial diminished rationality or control capacities. Here, as he admits, neuroscience might corroborate that some defendants have greater difficulty obeying the law, in cases of provocation and temptation, than criminal law and common sense assume. This could help in creating partial mitigating doctrine.32

The causation plays significant role in Morse’s argumentation. Whereas neuroscience correlates neurological impairments to the causation of certain behaviours or mental illnesses, Morse opposes to use such advances as predictions for excusing conditions. He emphasises that causation, including those of neurological origin, cannot be treated as the equivalent of lack of capacity for rationality or

29 Morse S. J., 2007., p. 205.
30 Ibid., p. 208.
31 Morse S. J., 2011, p. 542.
32 Ibid., p. 542.
compulsion. The causation needs to sufficiently diminish rationality in the context in question to result in excuse. As Morse emphasises it is “diminished rationality that is the excusing condition, not the presence of any particular type of cause”\(^{33}\). Excuses involve components of human action (desires and beliefs) that firstly needs to be assessed behaviourally, with the behavioural test devices to assess them. It is the human action that is questionable, not the state of the brain.\(^{34}\) Therefore, when it is established that the person’s rational capacities, inferred from the behaviour, are unimpaired, the responsibility is present despite the indication from neuroscience.\(^{35}\)

Morse position on potential contributions from neuroscience very cautiously. He sees neuroscience as a science that mechanistically presents and explains causality of people’s behaviour. The law with its *folk psychological* view on personhood will be challenged only when neuroscience can convincingly present that this position is false.\(^{36}\) As regards excuses, the causal conditions cannot be treated as mitigating circumstances *per se*. They are the evidence that can only support the legal analysis of the mental states that can result in excuses or might be used as preventive or rehabilitative measures. Excusing conditions are set independently, throughout the criteria settled by the criminal law’s *folk psychological* criteria. Neuroscience cannot be the source of the norms. He points that currently there are no neuroscientific data that would validly be probative about legal insanity or diminished capacity. The only well-characterised illness is epilepsy. Notably, Morse underlines that as the new Diagnostic and Statistical Manual of Mental Disorders (the DSM V) has been published there is no neuroscientific or other biological markers sufficiently sensitive to diagnose mental disorder (even severe ones).\(^{37}\) This statement implies that for Morse the neuro- and biological markers have a modest influence in setting the criteria of mental and personality disorders. Thus, the criteria for establishment of insanity or diminished capacity have to be demonstrated behaviourally. On this ground, Morse emphasizes that the behaviour is the “Gold standard” for legal criteria. This places neuroscientific findings in a hard position of proving its relevancy for the criminal assessment.\(^{38}\) Moreover, Morse’s statement seems to question whether neuroscience might add anything new to law. His answer can be read as follows: neuroscience, for now, adds what is already known, since it identifies behaviours that are already known. It does not yet have much data that is genuinely relevant to the legal questions of responsibility.\(^{39}\)

Although neuroscience may improve the accuracy of the behavioural prediction, the predictability is still not an excusing condition *per se*.\(^{40}\) Although in Morse’s opinion neuroscience is not able to challenge existing doctrines, it can add valuable positions – expanding the categories for those who may be mitigated or excused if it is evident that they have serious difficulty in controlling their behaviour (that behavioural assumptions were false). This is, however, the distant future to reveal as there is no existing data at present.\(^{41}\)

34 Ibid.
35 Morse at this occasion refers to the non-responsibility of young children that was commonly known before neuroscience appeared.; Morse S. J., 2004, http://www.dana.org/printerfriendly.aspx?id=1204, (03.08.2013).
37 Based on the personal mail correspondence with Professor Morse from 4th and 6th February 2013.
38 Ibid.
39 Ibid.
40 Morse S. J., 2011, p. 535.
41 Ibid., p. 558.
Morse sees two ways of applying neuroscience in criminal responsibility. First, in case where the behavioural evidence used to establish liability or a confirmatory defence appears clear. He gives an example where neuroscience could indicate unconscious actions of the defendant when they were assumed consciously (i.e. sleepwalking or in the wake of physical trauma). Additionally, neuroscientific evidence may point lack of defendant’s capacity for rationality. Secondly, it concerns the specific cases where the behavioural evidence is in doubt. For instance, when the defendant’s actions are unclear and it is known that prior to the offence s/he suffered from head injury (a blow to the head). Neuroscience in such case may assist in solving the legal issue, inform more precisely how the behaviour is affected by the brain. However, such application needs to be performed with caution as the neuroscientific evidence often will not be satisfactorily contemporaneous to allow the accurate predictions about tempore criminis. Morse explains in this manner that behavioural evidence is based on the studies which has proven to a greater extent their direct relevance to responsibility assessment. Neuroscientific evidence solely is not able to explain the behaviour based just on the brain imaging. Thus, its relevance to responsibility assessment is partial as it offers a causal explanation of why behavioural differences exist.

2.3. Brain Overclaim Syndrome (BOS)

The abovementioned arguments have led Morse to develop a new disorder called Brain Overclaim Syndrome (hereafter the BOS), which reflects the debate and fascination of scholars in new discoveries in the neuroscience. In particular, the BOS refers to over-enthusiasts and those who put much greater belief in neuroscience than it can offer. These believes are “based on insufficient or irrelevant science, or people [who] are making moral inferences that the science does not entail”

Advances and attractiveness of neuroscience may challenge the claim that it is the brain to be blamed for offences, not the person. In consequence, the concepts of agency and responsibility may be endangered by the possibility of being removed from the legal picture. Morse strongly opposes to such argumentation, as he again emphasises that people are to be blamed for crimes, not their brains. Therefore, the BOS presents several limitations that are recognised and supported by his critical argumentation. He points five limitations:

1) Firstly, brain imaging studies are seen by Morse as “a potent pathogen causing BOS”, meaning that such studies require preserved carefulness in choosing and cooperating with participants. The problem Morse is concerned about is the number of control groups that is relatively small and precise replications are infrequent. There is overlap between brain imaginings of the experimental group and the control one – some of the brains may look alike in both groups.

2) Secondly, discovering the neural correlates of mental phenomena does not explain the chain of their causation. Morse gives the example of the neural correlates of consciousness that even if they may be explained, they do not shed a light on how those parts of the brain make subjective

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42 Morse S. J., 2006, p. 401.
43 Ibid.
45 Morse S. J., 2006, p. 397.
47 Ibid., p. 403.
48 Ibid., p. 403.
experience possible. By this he means that besides biological causation there are psychological and sociological variables that influence behaviour. Thus, he emphasises that complex behaviour cannot be presented in a monolithic way, because it gives only a partial explanation.49

3) Thirdly, neurological impairments may be involved in diminishing human capacities, however as Morse recognises, there are few cases that would present an exact, identifiable neurological mechanism to indicate that there was no criminal responsibility. This, as Morse proclaims, is obvious from the prior behavioural evidence. Therefore, neuroscience currently is not able to exhibit that the people’s view about themselves as generally conscious, intentional, and potentially rational agents is false. There is not much evidence to suggest otherwise.50

4) Fourthly, Morse is concerned with the causation; increasing number of people start to believe that biological causation may excuse per se. He believes that it is the fundamental psychological error to assume that causation leads to excuse. More importantly for him, neurological functions and abnormalities do not influence legal outcomes for responsibility.51

5) The fifth and final limitation concerns misconception about the criteria for responsibility. Morse claims that they are behavioural and normative states of the brain, not empirically demonstrable. Empirical evidences of the brain states play a supportive role for the behavioural states. When the behavioural criteria are met, the person should be held responsible despite the evident neurological responsibilities. Only if the behavioural criteria cannot be met, the person should not be held responsible, despite how normal the brain may look.52

The remedy for the Potential Commentator (as Morse calls a person involved in the debate, hereafter the PC) who appears with the BOS symptoms is the Cognitive – Juroteraphy (the CJ). This is attempted by the awareness the PC should have about the importance of the neuroscientific findings for the criminal law and value of the PC’s arguments. Again, there are three main points that have significant importance for a “complete recovery”. The first step is proposed as a good understanding of the relevance of the new neuroscience to complex behaviour (taking into account an understanding of the relevant in philosophy of mind). Further, the PC should be able to recognise the contribution s/he wants to add to the on-going debate in two broad disciplines (law and neuroscience). Confusions between and within these domains shall be avoided by all means.53 Morse’s point here rests upon the understanding of legal and neuroscientific perspectives and differences they present. More precisely, he suggests that the PC should avoid any misconceptions that may occur by his/her propositions. Thirdly, the PC shall present, in order to introduce new insights about the neuroscience and criminal responsibility, the transparent criteria of criminal responsibility s/he uses with an explicit reference to the current and proposed account for the law. This would evidently illustrate the conclusions the PC derives from neuroscience for criminal responsibility. The last point refers to an appreciation of the positive/normative distinctions that have to be acknowledged by the PC when using brain findings to introduce any legal changes. S/he should be able to identify the normative reasons and support them.54

49 Morse S. J., 2006., p.404.
50 Ibid., p. 404.
51 For Morse the right question to be asked is “whether the neuroscience evidence helps to establish the presence or absence of action, mental states or a genuine affirmative defence, such as lack of rational capacity.”; Morse S. J., 2006, p.405.
52 Morse S. J., 2006, p. 405.
53 Ibid., p. 410.
By emphasising the Brain Overclaim Syndrome, Morse is trying to pinpoint important and realistic arguments that are sometimes set aside by those who enter the Neurolaw debate on criminal responsibility criteria. In doing so, he warns that more sophisticated understandings should precede the application of neuroscientific findings into arguments one’s wants to proclaim regarding criminal responsibility and related legal doctrines.

From the above it can be seen that Morse sees neuroscience drawing a mechanistic picture of the human behaviour. This would put causality as a main explanation for criminal conduct, therefore he opposes to introduce unwarranted changes to criminal responsibility. He argues that such reduction is unjustified and “a neuroscientific causal explanation for criminal conduct (…) does not per se mitigate or excuse” someone from criminal responsibility. Thresholds are normative, thus such findings can only be used as a ground for proving that one of the elements for excuse existed. The only way neuroscience may become relevant to the criminal law is when its findings demonstrate that the current responsibility criteria are incorrect as they are not compatible with a biologically based understanding of behaviour. However, up till now neuroscience has not presented sufficient data that may threaten the behavioural standards of criminal responsibility. Moreover, the prediction to use neuroscience as a tool to adjudicate insanity or diminished capacity defences is seen by Morse as to assist them in making more accurate claims. Criminal responsibility criteria are normative, and unless neuroscience demonstrates that “no one is capable of minimal rationality (or that everyone is always responding to supremely intense and persistent cravings)” those criteria will remain unchanged. Neuroscience might present probative and relevant information about these criteria in the distant future however it could not be the only source of setting those criteria.

56 Morse S. J., 2006, p. 401.
3. **THE ROLE OF NEUROSCIENCE FROM AN INTERDISCIPLINARY PERSPECTIVE**

Prospective and progressive use of the neuroscientific findings applied in criminal cases has been debated not only by the one prominent scholar mentioned above. The issue itself has been vividly argued by numbers of scholars who focus on different aspects of criminal responsibility – the responsibility as a holistic concept or embracing various issues connected to it. For this reason, the field of Neurolaw focuses on the discussion of philosophical, ethical, normative and scientific background, bringing together the aim of the discipline itself – to investigate the relations, implications and possible/actual influence of neuroscience on legal reasoning about criminal responsibility.

### 3.1. **OBJECTIVE EVALUATION**

With the growing application of neuroscience in criminal cases some scholars see the potential of using neuroscience and genetics as an objective data to support claims of the biological aetiology and correlation of a mental disorder with a co-occurrence of criminal behaviour. An Italian group of researchers (Rigoni, Pellegrini, Mariotti, Cozza, Ferrara, Pietrini, Sartori) has investigated a case where a young woman committed a violent and impulsive murder.\(^{58}\) The researchers analysed the defendant’s brain structure, finding structural abnormalities. Moreover, DNA was genotyped in order to identify genetic polymorphism\(^ {59}\) connected with violence and impulsivity. The results revealed five polymorphisms and reduced grey matter volume in the left prefrontal cortex (the PFC), the left middle front gyrus and the left superior frontal gyrus compared with the control group. Thus, it was suggested that biological data supported the occurrence of the biological correlates of a mental disorder characterized by high impulsivity and aggressiveness.\(^{60}\)

The case presented above inclined the researchers to claim that the use of neuroscience and behavioural genetics is essential to provide objective data on the biological bases of a defendant’s mental disorder. In their opinion there is no disruption of the underlying determination of the criminal law’s responsibility definition. The use of such objective evidence, in the view of the researchers, is significant for the insanity and/or diminished responsibility defence, where the proof of the causal link between the pathological mental states as a result of (for example) mental illness and criminal act is required. Thus, the researchers took the position that forensic assessment can benefit from such approach and applied technique used on the basis of Adrian Reine’s “gene-to-brain-to-behaviour" description.\(^ {61}\) Such objectified assessment is claimed to improve forensic evaluation and in combination with other sources of information, provided by other evidence, it is believed to enlarge the knowledge about *mens rea*. This knowledge could be of a great importance for the mentally disordered defendants, especially those with personality disorders, whose psychiatric assessment “has low inter-rater concordance".\(^ {62}\) Such combined technique, as the authors claim, would increase the certainty of forensic psychiatric evaluation, reducing the possibility of malingering.\(^ {63}\) In addition, one could argue that the

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59 “The rationale is that gene alterations result in structural or functional brain abnormalities which in turn affect emotional and cognitive development; deficits in emotional regulation and cognitive performance may in turn confer vulnerability to the development of psychiatric syndromes”; Rigoni D., Pellegrini S., Mariotti V., Cozza A., Ferrara S. D., Pietrini P., Sartori G., 2010, p. 2.
61 This concept refers originally to antisocial behaviour that attributes specific genes’ result in structural and functional brain abnormalities predisposing individuals to antisocial behaviour.; Reine A., 2008, p. 323.
objectified evidence might threaten the criminal responsibility doctrine, based on behavioural criteria, however, as the authors emphasize, such evidence has no aim at changing the underlying rationale of criminal responsibility. It is rather treated as a potential of causal association between a mental disorder and a crime reducing uncertainty of forensic psychiatric evaluations providing a valid description of biological symptoms.

This position stays, however in minority and presents the most liberal approach towards the application of neuroscience in the criminal responsibility assessment. Below more critical voices are raised from the lawyers, philosophers and neuroscientists that indicate more realistic approach and view the potential application, surprisingly, in a matter-of-fact way.

3.2. SECONDARY/SUPPLEMENT ROLE

Regardless the vivid debate on a theoretical ground, the cases where the brain scans are used grow in number. For this reason, the voices of a cautious application are raised to aware not only the legal and scientific scholars, but also the society of the potential pitfalls of neuroscientific evidence. These voices are to some extent in line with Morse criticism, however the hereafter researchers see more potential application of neuroscience in criminal responsibility than Morse. Therefore, their position has been characterised as moderate.

Gazzaniga et al. recognise that “cognitive neuroscience may speak to at least two familiar conditions of criminal responsibility: intention and sanity.” Functional neuroimaging studies involving: motor planning, awareness of actions, agency, social contract reasoning, theory of mind, and others have recently targeted a small assortment of brain networks thought to be instrumental in such determinations. Hence, Gazzaniga et. al. focus on how neuroscience could be used to reduce responsibility rather than to establish it. As they claim, “(...) establishing responsibility seems to require the ability to decipher the content of particular mental states, which is a much harder problem for neuroscience to solve than ruling these states out by furnishing evidence that a defendant lacked the capacity for a certain mental state.”

What transpires from Gazzaniga’s et. al. paper is the general belief that neuroscientific evidence may be a tool used in successful defence leading to a reduced charge or (sometimes) even a release. For instance, neuroscientific evidence could be used in determining the defendant’s intention and if it could be empirically proven that the defendant had difficulties forming intentional actions not only at the time of the study but also during the offence, there would be a possibility to reduce the charge. The authors do not claim that the neuroscience is ready to become a direct mechanism of exculpation, however it may help to clarify individual’s responsibility by testing grounds of accusation and excuses against systematic, real human behaviour’s observation. In this way neuroscience may gain its relevance through the application to legal decisions. Nonetheless, the usefulness of neuroscientific evidence is seen in establishing the lack of capacity to know. This may be supported through the empirical studies

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65 Authors reject the claims that „the presence of risk genes or neuronal abnormalities could be the basis of any mental insanity assessment in the absence of clinical manifestations”, rather they argue for more complete and solid psychiatric assessment that would result from the gene-neuroscientific supplement to the behavioural evaluation.; Sartoria G., Pellegrini S., Mechellic A., 2011, p. 374.
67 Ibid., p. 149.
68 Ibid., p. 149.
69 Ibid., pp. 148 – 9.
that focused on determining intention mechanism, knowing the nature and quality of an act. Such studies, however, are hard to design as neuroscience solely cannot locate responsibility in the brain. As Gazzaniga et al. admit, neuroscience in such case can recognize the disease and offer at least circumstantial evidence against guilt or liability.\textsuperscript{70}

The pitfalls are also recognized by the authors. Firstly, the emphasis is put on the misuse or abuse of the neuroscientific data by lawyers and scientists. Indeed, neuroimaging presents limitations regarding the correlation between brain function, motivational states and behaviour. Hence, the authors question whether neurological evidence helps courts to assess criminal responsibility. They argue that the value of neuroscience in criminal decisions is “far from obvious (…) [as] there is not, and will never be, a brain correlate of responsibility”.\textsuperscript{71} Responsibility requires a normative judgment that is given for the social purposes. Neuroscience cannot be the foundation of ascription of responsibility as it uses different language to describe phenomena relevant for the law. In order to be able to describe mental states in the same manner, law and neuroscience need to develop the common practice for evaluating defendant’s neurological profile that can or cannot meet particular legal criteria.\textsuperscript{72} As Gazzaniga et. al. admit, the creation of such rules suitable for both disciplines is an uneasy task to achieve, taking into account probabilistic findings from neuroscience and categorical legal decisions about guilt and punishment. Hence, to devise such compatible model of rules would reveal when, if ever, neuroscience would be able to be of sufficient use in criminal law.\textsuperscript{73}

Moreover, the point of criticism further invoked is the visual attractiveness of brain scans that is vulnerable to misuse. This means that the visual power of the brain images may not be properly understood by non-qualified observer who will misinterpret what the images show and what they actually mean. Thus, scholars underline that there is a need for appropriate guidelines outside the “scientific room”, namely in the courtroom where the assistance to the judges and juries is especially desired.\textsuperscript{74} These groups are more susceptible to believe in forensic evidence even though they do not properly understand its limitations.\textsuperscript{75} Above all, brain dysfunctions located in specified brain regions and their association with the occurrence of criminal behaviour does not imply that an individual should be immediately excused from responsibility. As Gazzaniga et. al. argue, there are also individuals with similar dysfunctions who have never committed any crime. Thus, there are several divergences between neuroscience and criminal responsibility.\textsuperscript{76} This is compatible with Morse’s statements regarding settled legal criteria and divergence with what the neuroscience may add to the criminal responsibility assessment. However, Gazzaniga et. al. emphasise that neuroscience, despite its current limitations, may still be used as a tool in the defence. Moreover, if the common language for both disciplines is going to be achieved, the relevancy of neuroscience will grow, though it may never solely take over the role of the criminal assessment.

\textsuperscript{71} Gazzaniga M., Aharoni E., Funk Ch., Sinnott – Armstrong W., 2008, p. 145.
\textsuperscript{72} Ibid., p. 146.
\textsuperscript{73} Ibid.
\textsuperscript{74} Stevens Khoshbin L., Khoshbin Sh., 2007, p. 171.
\textsuperscript{75} Many studies have been performed in this manner. The misunderstanding of the technology and its limitation is well-known in the forensics field where the phenomenon of CSI-effect was recognized. This effect reflects the knowledge of jurors based on the television series that present the crime scene investigators who in an episode time collect, examine, identify evidence and solve even complex cases.; N.J. Schwitzer, S. Michael, 2007; Compton E. S., 2010.
\textsuperscript{76} Gazzaniga M., Aharoni E., Funk Ch., Sinnott – Armstrong W., 2008, p. 156.
A lawyer and a neurologist (Stephens Khoshbin and Khoshbin) argue that the only purpose for the brain images to be admitted into evidence is to link a structural abnormality with a specific deficit. By this they mean the relation between particular structural lesion/injury or abnormality that need to be associated with a deficit of some kind. Such association evident on the brain scan should be treated as a tool, discussed and explained by the expert - “only a human brain can evaluate another human brain”. Such limited application would benefit only for the civil litigations (mainly the compensation claims) where the structural brain deficits are associated with the particular injury caused by the particular accident. Thus, they deny that the brain scans shall be admitted for other purposes such as establishment of responsibility, motivation, tendency to commit a particular behaviour or to illustrate an inability to control a particular behaviour. This stays in line with Morse’s arguments, pointing the immaturity of what the brain scans can determine at present. Therefore, the authors strongly emphasize that “the courtroom is an inadequate forum for determining the “truth” of such evidence”. Despite the advancement in technologies that enable scientists to view the structure and function of the brain, the developments have not yet been capable of producing a technology where the motivation, responsibility or the tendency for behaviour can be visualized. Additionally, they stress that those who believe that brain scans can alone be used as evidence of behaviour are wishful thinkers who see neuroscience as science fiction or, more dangerously, pseudoscience.

Glannon, conversely, believes that neuroscience can inform, rather than determine judgments of criminal responsibility. He believes that “[b]y showing correlations between brain dysfunction and impaired cognitive, conative, and affective processing, neuroimaging might support claims of mitigation or excuse from criminal responsibility for certain actions” supplementing (not supplanting) behavioural evidence. This can be achieved to a greater extent, as the author argues, when the question of responsibility depends on impulse control, where the stronger relationship between brain dysfunction and impulsive behaviour can be ascribed. Although such evidence can be appealing, alone it would not influence significantly the desired outcome of the defence. Thus, behavioural evidence, normative evaluation of behaviour and normative evaluation of imaging data are required. This, again confirms earlier points mentioned by Morse. Moreover, below limitations of neuroscientific evidence application in cases of excuse confirms what has been stated by Morse. These limitations are also representative concerns proposed by other scholars:

- **Difficulty with causation** – Although brain scans may indicate a connection between neurological abnormalities and criminal behaviour, this connection is not causation. There may be some cases where the connection will be so strong, i.e. brain tumour in the prefrontal region of the brain, that the causality would be obvious. It is correct to say that in large number of cases, where the

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77 Stephens Khoshbin L., Khoshbin Sh., 2007, pp. 182, 186.
78 Ibid., p. 192.
79 Ibid., pp. 182, 186.
80 Ibid., p. 172.
81 For instance, the authors claim that functional neuroimagining technologies (fMRI) is currently unable to demonstrate multiple networks, each consisting of multiple “centres” and connections creating different systems, which function in space and time.; Stevens Khoshbin L., Khoshbin Sh., 2007, pp. 182, 186 – 7.
84 Ibid., p. 14.
85 Glannon does not name them as difficulties, however for the purpose of this thesis it was suitable to propose clusters of the limitations he refers to.; Glannon W., 2011, pp. 13 – 14, 18.
86 Among them: Roskies, Morse, Bandes, Husted, Pustilnik, Dresser, Brookbanks, Khoshbin &Khoshbin.
neuroscientific evidence is used, the scans indicate the correlation between brain states and behaviour rather than the causal connection. Hence, it is doubtful to derive a claim that a particular brain abnormality caused a particular action.

- **Difficulty with brain regions** – The focus on a specified brain region that mediates cognitive functions associated with reasoning and decision-making can be undermined by the complexity of these cognitive processes located in various brain regions. As Glannon emphasises “[t]he relevant brain-mind connections are not one-one but many-many”\(^87\).

- **Difficulty with clustering** – No two brains are the same. To make inferences from groups to individual there needs to be reliable and solid data gathered. The similarities displayed among group members should be taken with caution. This also refers to the claims regarding brain development and the age. The individual observation should have priority when the establishment of greater or lesser control on the basis of the age is performed.

- **Difficulty with mental capacities** – A brain scan(s) are/would not (be) able to demonstrate that the defendant lack the capacity to restrain from the behaviour at the time of the offence or that he had this capacity, however he failed to restrain from it. Such lack of capacities can only be done by observation; it cannot be solely based on a brain scan(s).

- **Difficulty with the timeframe** – The examination of the impairments as a prove for their causality of criminal behaviour may not be the same as those regions that were activated during the commission of the offence. Worded more directly, the regions under examination post factum may not be similar to those activated at the time of the offence (tempore criminis). Studies investigating emotional responses to pictures or verbal cues are not able to replicate those reactions that led to and occurred during the offence. Worded differently, it is unlikely to replicate the same environmental, neurological and psychological triggers of the act.\(^88\)

- **Difficulty with empirical measures of ascription and exclusion of responsibility** – Dysfunction of the brain and mental illness come in degrees. No empirical measure exists that would give a concrete threshold to point at/over which one is (not) responsible. At present, exclusively neuroscience is not able to point the degree of dysfunction in the brain that could result in excuse from criminal responsibility.

Glannon sees also the issue with the attribution of irrationality and the brain impairment(s). According to him, irrational behaviour does not mean that it was coerced or compelled by brain abnormalities and influenced the lack of control that motivated mental states.\(^89\) Moreover, when the argument has been proposed, as regards brain dysfunction, it is desired by the legal community to expect the degree(s) in which the dysfunction can be measured. For this reason, empirical deliberations cannot be separated from the normative ones, because they can only assist behavioural and legal evaluation. Importantly, Glannon believes that the degrees of the required control and control exercised by an individual will be influenced by “social expectations about how individuals should act in conforming their conduct to social rules and the requirements of the law”\(^90\). Hence, he is strongly

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\(^{87}\) Glannon W., 2011, p.18.

\(^{88}\) Glannon states that individual could be warned and prepared for the task to perform (photos to see) and the brain regions such as the amygdala and other regions would not be active as they were during the commission of the offence., Glannon W., 2011, p.18.

\(^{89}\) Glannon, W., 2011, p. 16.

\(^{90}\) Ibid., p. 19.
convinced that brain impairments exhibited on brain scans solely cannot establish whether individual was so mentally disturbed that s/he could not be criminally responsible for the action(s). However, he sees the potential for its application in cases where the relationship between moderately severe and severe brain dysfunction and mental impairment comes into the picture. If a causal connection can be found between criminal behaviour and brain abnormality(ies), it could then result in excuse from criminal responsibility.\textsuperscript{91} Therefore, Glannon presents more moderate position to Morse believing that under mentioned circumstances neuroscience is able to influence the criminal responsibility assessment. This, however, still needs to be done alongside with behavioural evidence that has normative relevancy.

Additionally, he argues that “even if neuroimaging were perfected to accurately measure the neural processes associated with our motivational states and actions, it would not directly translate into simple answers to normative questions such as whether or to what degree people can be responsible for their behaviour”\textsuperscript{92}. He points out that empirical claims represented by scientific findings refer only to the brain, normative claims, on the other hand, involve much more – the behavioural aspect (how people ought to behave). Normative claims involve more than scientific facts, they refer to social conventions and expectation about how people should act. Moreover, he sees that free will and responsibility can benefit from brain sciences, thus it is for society to decide how those findings would contribute to the law.\textsuperscript{93} Even if neuroscientific techniques disclose brain deficits that may influence one’s capacity to respond to reasons, other questions would arise. The one such question, asked by Glannon, is whether or to what extent one retains capacity and the capacity to be criminally responsible. Seeing the limitations of imagining techniques neuroscience will not determine these answers alone.\textsuperscript{94} The latter statement is dominant and prevailing argument among majority scholars nowadays.

Neuroscience is able to point brain abnormalities that are associated with criminal behaviour, although it cannot alone determine whether individual possessed enough mental capacity to respond to reasons and guide one’s actions against the wrongful/harmful ones – to control one’s impulses and foresee the results of one’s actions. First evaluation that will be used is behavioural one; therefore neuroscience is placed as having supplement (secondary) relevance.\textsuperscript{95} Brain scans are not able to establish that a person lacks the capacity to control one’s behaviour, has limited capacity to do this, or fails to exercise it once or more time, despite the full capacity. Brain scans will also have different psychological and legal interpretations among and within different individuals and groups.\textsuperscript{96} Neuroimaging may be able to support claims of mitigation or excuse from criminal responsibility based on brain dysfunction associated with impaired cognitive, conative and affective processing, however scans can be misinterpreted, because the probative value needs to be established to determine objectively whether an individual has or lacks the essential elements required by criminal rules.\textsuperscript{97} Therefore, clear guidance is required from the neuroscientific experts appearing in the courts. It is their duty to present the findings with a critical assessment. Such role is essential, “if neuroscience is to have a positive effect on law”\textsuperscript{98}.

\textsuperscript{91} Glannon, W., 2011, p. 25.
\textsuperscript{92} Glannon, W., 2005, p. 81.
\textsuperscript{93} Ibid., p. 81.
\textsuperscript{94} Glannon, W., 2011, p. 28.
\textsuperscript{95} Ibid., p. 27.
\textsuperscript{96} Ibid.
\textsuperscript{97} Ibid., p. 20.
\textsuperscript{98} Anharoni E., Funk Ch., Sinnott-Armstrong W., Gazzaniga M., 2008, p. 158.
4. THE NEAR FUTURE OF NEUROSCIENCE FOR ASSESSMENT OF CRIMINAL RESPONSIBILITY

To introduce the potential significance of the neuroscientific findings used in criminal trials in a form of brain scans, it is worth seeing it on the real case(s). This would illustrate the actual potential and limitation of neuroscience for criminal responsibility, and designates its current and prospect position. The examples presented in the literature concentrate primarily on three widely discussed cases: 1) the acquired paedophile with a re-grown brain tumour, 2) juveniles with insufficient brain development which influences maturity and judgment that did not allow the court to a death sentence and 3) theoretical discussion regarding psychopaths’ responsibility. The case of the acquired paedophile is significant, because it demonstrates the correlation between brain abnormality and behavioural changes, shading light on the discussion of whether neuroscience can be seen as a new method to assess criminal responsibility or excuse it.

A 40-year-old married schoolteacher from Virginia began to experience sexual interest in children. He secretly started to view and collect child pornography. He was convicted of molestation of his stepdaughter and admitted to the rehabilitation programme instead of prison. He was further expelled from the programme because of his soliciting sexual behaviour towards staff members and other patients. Just before he was sentenced to prison he was admitted to a hospital with a headache that occurred to be more than what everyone expected. A non-physiological cause was suspected so the man was admitted with a diagnosis of paedophilia. During the neurological examination an MRI scan showed a large orbitofrontal tumour. While being neurologically examined he solicited female team members for sexual favours. Moreover, it was observed that he was not concerned that he had urinated on himself. The examination also revealed that he missed points for delayed recall, impaired copy and an inability to write a clear sentence. Tests on the memory loss revealed that sentences were intact. He presented normal functioning of language skills, olfactory testing and visuoperception. Besides that, his medical history revealed a closed head injuries that were associated with a 2-minute loss of consciousness, a 2-year history of migraines, and hypertension.

As it was previously stated, the tumour was located in the orbitofrontal part. This part of the brain involves the regulation of social behaviour - impulse control and antisocial behaviour. As the man developed paraphilia in his forties, he therefore met the criteria for paedophilia according to the

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99 The discussion about juveniles originates from Ropper v. Simmons case (543 U.S. 551, 2005) and concerns assumption supported by neuroscientific data that juveniles’ brains, and therefore behaviour, are not mature enough to appreciate their acts and be sentenced to death. The relevance of the case is debated as in Morse’s opinion these discoveries are more of “common-sense and rigorous behavioural studies (...) [and neuroscience presented] consistent [data] with the undeniable behavioural data, and provided perhaps a partial explanation of the behavioural differences”; therefore “neuroscience data was (...) merely additive and only indirectly relevant”; Morse S. J., 2011, p. 540.

100 Psychopathy is also widely discussed and has been topic of the author’s previous thesis defended on Maastricht University – The influence of neuroscience on psychopath’s legal responsibility, with an emphasis on English and Polish law. On this occasion it is worth mentioning that the aetiology of the psychopathy is still indefinite. The neuroscientific findings performed mainly on psychopathic offenders draw attention to the dysfunctional parts of the brain that affect the fear and moral decision-making processes. The imaging technology used in studies has begun to discover and associate areas that may indicate characteristic dysfunctions in this disorder.

101 Morse S. J., 2011, p. 559 - 60.

102 Ibid, p.559.


104 To diagnose with a paraphilic disorder, DSM-5 requires that people with these interests: 1) feel personal distress about their interest, not merely distress resulting from society’s disapproval; or 2) have sexual desire or behaviour that involves another person’s psychological distress, injury, or death, or a desire for sexual behaviours involving unwilling persons or persons unable to give legal consent.; http://www.dsm5.org/Documents/Paraphilic%20Disorders%20Fact%20Sheet.pdf, (05.08.2013).
DSM – IV. However, doctors involved in his examination admitted that the orbitofrontal disruption might have intensified a pre-existing interest in pornography, which manifested as a sexual deviancy and paedophilia. Furthermore, because the tumour’s size forced the decision about its immediate removal, the neuropsychological evaluation was limited only to the very basic one. Surprisingly, after surgical removal, the teacher regained his previous normal behaviour. One year later the same signs recurred as the man started to experience persistent headache and he began to collect pornography again. A new MRI scan revealed that the tumour re-grew. Successful surgery was performed with a removal of the impaired part. After the second procedure he regained his capacities again.

This case not only challenges the common view of paedophilia, but also is used generally as an argument to highlight potential indications of neurological causation that disrupts personality and influences the occurrence of criminal behaviour. Hence, the question arises whether the uncontrolled creation of the human body (i.e. brain tumour) could have disrupted this man’s mental states to the extent he was not able to resist the paedophilic urges. To put it simply: whether the tumour changed his personality resulting in criminal behaviour. Additionally, the questions that are posed are: 1) to what extent should he be punished for neurological causation that led to his criminal behaviour and 2) whether he deserves to be punished or be excused based on proven causation of severe brain impairment.

These questions are of great importance and are the starting point for neuro-legal debate. Although these deficits, noticeable by surrounding environment would suggest that the offender was unable to control himself, in the eyes of the law they are not severe enough to excuse a person from criminal responsibility (based on insanity defence). This, of course, depends on the legal insanity standard and other characteristics of the legal system. For instance, the Anglo-American M’Naghten rule assumes that “to establish a defence on the ground of insanity, it must be clearly proved that, at the time of the committing of the act, the party accused was labouring 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 he was doing what was wrong… If the accused was conscious that the act was one which he ought not to do, and if that act was at the same time contrary to the law of the land, he is punishable.” Under this defence a defect of reason refers to “the deprivation of reasoning power, and does not apply to temporary absent-mindedness or confusion”. Moreover, defect of reason is narrowed only to cognitive defects that consequently exclude mental disorders, which entail considerable emotional or volitional deficiencies. Furthermore, the term disease of the mind includes any disease that influenced the functioning of the mind at the time of the alleged offence.

In the presented case, the normative question arises whether he lacked the knowledge about the nature and quality of his acts or that he did not know that what he was doing was wrong. Undoubtedly, the man’s ability to control himself was deteriorated by the time of hospitalization. However, the undetermined issue is how much control he had over his actions. As it was described above, even if the brain impairment (tumour) was evident and correlation with the criminal behaviour was suggested by Burns and Swerdlow, it is questionable whether acting on the paedophilic desires was not an intentional

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109 Ibid., p.143.
action. The legal criteria are focused on the control an individual has over his/her actions and how s/he refrains from the actions that may cause the law-breaking behaviour. Paedophilia is not solely sufficient to support insanity defence. Paedophiles have intense and recurrent sexual urges towards and fantasies about prepubescent children that they have either acted on or which cause them distress or interpersonal difficulty.\footnote{Diagnostic and Statistical Manual of Mental Disorders, 5th Edition. American Psychiatric Publishing. 2013, http://dsm.psychiatryonline.org/content.aspx?bookid=556&sectionid=41101785, (05.08.2013).}

Professor Morse also investigates this case. He strongly opposes the view of causal connection between paedophilia and brain tumour. He refers to the critical argument of causation as an element of excuse. There are more things that are unknown about the defendant’s states of mind though the evaluation should be normative. Which normative evaluation is appropriate, the current proposal or revised one, is a separate issue for Morse, “[a]n abnormal cause for his behaviour does not mean that he could not control his actions”\footnote{Morse S. J., 2011, p. 560.}. These two aspects shall be demonstrated autonomously. Thus, using his previous line of argument the defendant would not be excused from paedophilic acts.\footnote{Moreover, Morse argues that the case has not been fully studied because when the tumour was discovered there was no full examination of the cognitive impairments that would indicate the connection to the criminal behaviour. Therefore, a full examination of his capacities is unknown... Morse S. J., 2011, p. 560.} Additionally, Morse argues that the socio-cultural context is omitted and too much attention is brought to the brain studies. Hence, in his opinion other factors would need to be taken into consideration because everything needs to be evaluated with a view of social environment.\footnote{Morse S. J., 2011, p. 560.}

The issue of causation and its correlation with criminal behaviour is not an easy topic to evaluate. The first thing any commentator comes across is the attractiveness of the evident neurological relationship with the occurrence of criminal behaviour. Brain impairments (i.e. tumour) that influences criminal acts, at first glance, indicate that the correlation is undeniable. Moreover, the re-growth of the tumour and its influence on the paedophilic behaviour support strongly the argument of the direct neurological – behavioural causation that may indicate grounds for an excuse. However, as it was mentioned with the respect to M’Naghten rule, for law the knowledge\footnote{By knowledge it is also meant: awareness and violation that reflects degree of the intention, negligence or recklessness. It is not the place to explain how much of each element is required to act intentionally, negligently or recklessly as particular offence gives the description pointing the exact elements. Here, the general assumption rests on the knowledge or its lack to make a connection to the biological causation of the behaviour.} or its lack plays the leading role. Causation of criminal behaviour can prove that the knowledge lacked as a result of disrupted mental states (based on mental or neurological aetiology). Cases will grow in their number as the detection of the brain abnormalities connected with the co-occurrence of criminal behaviour gains gradually its followers. The neuroscientific advances improved significantly the perception about the brain-behaviour correlation. These might in my opinion will lead to the point when the criminal responsibility either may need to be adjusted to be more compatible with the scientific discoveries or strongly delineated legal criteria required. However, despite the advances achieved by neuroscience, the influence it may have on the legal doctrines of responsibility, for now, need to be postponed. As Morse accurately points and I agree with his argumentation, the responsibility criteria and the prime evaluation of criminal behaviour, for the moment, rest on normative and \textit{folk psychological} concepts. The neurological causation, therefore, recedes into the background, as a point of reference to support and justify decision to excuse criminal responsibility or reduce the sentence.
Summing the arguments presented in previous chapters, Professor Morse’s pragmatic opinion gives the reader argumentation that neuroscience, so far, has not presented any clarified perspective that could be used to abandon or change settled criminal responsibility doctrines, particularly mens rea and the use of (for some groups of perpetrators) excuse defences. As a psychologist himself, he recognises the value of the folk psychological concept of personhood and how behavioural aspects relate to criminal responsibility. He strongly believes that the folk psychological requirements will not be easily changed by the neuroscience - “[u]ntil and unless scientific discoveries convince us that our view of ourselves is radically wrong.”115 The argument he presents is the denial of any responsibility based on causation – no one would be then responsible for any behaviour, thus such statement is unacceptable for him to follow.116 His strong position questions overvalued believes presented by neuroscience that the concept of personhood in criminal law should be changed from mind-oriented (based on the dualism of the mind and the brain) towards the brain-oriented (more mechanistic approach). For him, neuroscience has little to contribute to law at present despite the astonishing advances within the discipline itself. By challenging the proponents of using neuroscience in law, Morse shows that their arguments fall short in presenting the legal relevance of neuroscience for the current criminal responsibility criteria.117 That is why, in Morse’s opinion, the proponents have the burden of showing two things: 1) that neuroscience is sufficiently well-established to be the basis for legal use, e.g. that the results are sufficiently established; and 2) that the data are genuinely and precisely legally relevant. He emphasizes that neuroscience cannot meet mentioned challenges yet, because of the study design. The latter refers especially to studies that are performed only with few participants, and their results are therefore unrepeatable and insufficient.118

Other authors, despite sharing similar concerns regarding the neuroscience, accent its current and potential applications in criminal responsibility. For instance, Farisco and Petrini agree on the combined application of neuro/genetic information that demonstrate more complex interactions between various bio-environmental factors.119 Moreover, scholars take a cautious position in reference to the actual relevance of neuroscience on criminal responsibility. This originates from the divergence between two disciplines - the lack of normative authority of neuroscience. However, as emphasised by Nicole Vincent, scientific findings can have a normative significance. They do not try to undermine or dictate which norms should or should not be introduced, just that scientific findings “should be taken seriously, and that the received wisdom about normative issues should always remain open to scrutiny, to reassessment, to criticism, and even to reform in light of relevant and accurate empirical findings”120. Therefore, neuroscience could explain in a more detailed way how the processes our brains work, which part of the brain if impaired affects behaviour that may be used as a ground for diminishing or excluding moral and also criminal responsibility. Moreover, neuroscience, if not giving an answer, could frame more convenient requirements for assessment of responsibility and its function in society.121

115 Morse S. J., 2011, p. 532.
116 Ibid., p. 534, with the author’s emphasis.
117 Based on the personal correspondence with Professor Morse from 4th and 6th February 2013.
118 Ibid.
The authors’ uncertainty is associated with over enthusiasm and naive believe regarding what kind of information neuroscience can and cannot possibly tell us about mental states during the commitment of a crime. Therefore, it is understandable that the voices of critique and critical appraisal (mainly from Morse) are offered to sensitize not only the academia, but also the society in order not to entrust the new science more than it can currently offer. To satisfy critical arguments that neuroscience has no right for proposing any normative claims, empirical findings can only contribute to norm-setting task by pointing out accurately which mental capacities an individual should possess to be assumed as fully responsible, excused from responsibility or having a diminished capacity.122 This would be the place where neuroscience could fill a gap between law and science, especially in establishing more compatible capacity thresholds. However, the current role neuroscience can play is to assist in providing premises in normative arguments, rather than to be the foundation for any legal conclusions.123 Even if neurodata is informative and reliable enough, it needs to be considered through the obtained behavioural data and its normative considerations. It cannot resolve legal questions without any assist from behavioural sciences.124

As regards the prediction of neuroscience to become the ‘Gold Standard’ for criminal responsibility assessment, it is evident, from the analysis presented, that at present and the near future the criminal responsibility has unchangeable and reliable behavioural criteria to assess defendants’ mental capacities during tempore criminis. Thus, the ‘Gold Standard’ term needs, at least, to be postponed further in the future when, if ever, neuroscience would be ready to propose an alternative and justifiable explanation to the uneasy entity of demonstrating defendants’ mental states that already happened or relevant brain impairments that could conclusively support the biological causation of criminal behaviour. This concern was also stated by Teneille Brown, a Professor of Law at the University of Utah – “Neuroscience is being used by serious scientists in real labs, but the people trying to apply it in the courts are not those same people. (…) So they're taking something that looks very objective, that looks like gold standard science, but then morphing it into a forensic use it wasn't developed for”.125

To close abovementioned deliberations, it is noteworthy to refer to Professor Morse again, who emphasises that “[t]oday we have no idea how the brain enables the mind (and scant information about precisely how it disables it), but when we solve this problem—if we ever do—the solution will revolutionize our understanding of biological processes. Our view of ourselves and all our moral and political arrangements are likely to be as profoundly altered as our understanding of biological processes. For now, however, despite the impressive gains in neuroscience and related disciplines, we still do not know mechanistically how action happens even if we are convinced, as I am, that a physical account of some sort must be correct”.126

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CONCLUSIONS

The aim of the thesis was to present the concerns debated among scholars from various disciplines. By applying this interdisciplinary method, created for the purposes of this thesis, the answer was sought to the question what is the near future the neuroscience can play in criminal responsibility, in particular for its assessments and excuses. Additionally, it was sought to establish whether the interdisciplinary debate presents a unified position on the role neuroscience can play and whether this position might direct neuroscience to become the ‘Gold Standard’ of the criminal responsibility.

Thus, the main presumption of the thesis was that neuroscience, even if provides a significant illustration of the neurological impairments and their influences on criminal behaviour, is not ready to become the ‘Gold Standard’ of criminal responsibility assessment, has been confirmed with the view of the near future. For the moment, the role neuroscience can play in the ascription and exclusion of criminal responsibility is simply complementary and secondary, placed along with other scientific disciplines. The behavioural criteria are at present the ‘Gold Standard’ for criminal responsibility, hence neuroscience alone or combined with genetics may only supplement the behavioural evaluation, creating stronger evidence for the defendant’s impaired capacities.

Significantly, the literature, based on the representative authors, has not indicated that neuroscientific findings are the dead end. It seems that both legal and other scholars have been waiting for further development of neuroscience, for studies that would clarify mental capacities required for attribution or exclusion of criminal responsibility. The authors make an emphasis that neuroscience has not yet provided persuasive evidence to propose substantial changes in criminal law. Moreover, they follow the leading line of argumentation proposed by Professor Morse. It is evident from the presented analysis that their arguments, although find some potential in the current application of neuroscience in criminal law, still emphasise the limitation of the science and differences when compared with legal requirements. These, on the other hand, refers to the need for greater certainty from scientific disciplines when the issue of assessment of criminal responsibility is at stake. For this reason, the current position of neuroscience in criminal law can be described as a conditional - ‘Neuroscience is not yet there.’ Whether it ever will be is a question for the faraway future. Notwithstanding, the debate itself is worth to follow.

What can neuroscience add to the law at the present time is a better understanding of human behaviour; it can clarify the nature of certain behaviours (including some mental and personality disorders). As a result it may provide a more informative judgment about the nature of excusing conditions that may give rise to changes in social and legal perception about mental illnesses and personality disorders. Regardless forensic psychological or psychiatric assessment, neuroscience can point out the actual cause of such behaviour. Again, it cannot explain feelings or emotions that lead to a criminal act itself, nevertheless it can answer how brain deficits, if present, impaired person to such extent that his/her responsibility should be mitigated or excused.

The most suitable expression for the current discussion, shared also by me, is the statement of Professor Glannon regarding presentation of the brain evidence:

“Even when scans show significant dysfunction in regions of the brain associated with reasoning and decision-making, they at most will supplement and not supplant behavioural evidence in legal judgments of responsibility, mitigation, and excuse.”

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