CURRENT
Edited by M
Faculty of La

Law and Ne
range of ess
interconnec
Based on a
examine ho
in legal thor
pictured in
of controve
legal argum
This volu
criminal lia
juvenile jus
use of neur
law; as wel
two discipl

Michael Fr
University

CURRENT LEGAL PUBLICATIONS

Editor-in-Chief
MICHAEL D.A. FREEMAN

Editorial Board

SIR JOHN BAKER	N. LACEY
E. BARENDT	A. LE SUEUR
I.H. DENNIS	A.D.E. LEWIS
D. GALLIGAN	E. MCKENDRICK
DAME HAZEL GENN	R. MOKAL
SIR BOB HEPPLE	R.W. RIDEOUT
J. HODDER	P. SANDS
J. JOWELL	LORD STEYN

LORD WOOLF OF BARNES

Law and Neuroscience

Current Legal Issues 2010

VOLUME 13

Edited by
MICHAEL FREEMAN F.B.A.
Professor of English Law
University College London

OXFORD
UNIVERSITY PRESS

CURRE
Edited b
Faculty

Law anc
range o
interco
Based
examin
in legal
picture
of cont
legal a
This
crimina
juvenil
use of
law; as
two di

Micha
Univer

OXFORD
UNIVERSITY PRESS
Great Clarendon Street, Oxford OX2 6DP
Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide in
Oxford New York
Auckland Cape Town Dar es Salaam Hong Kong Karachi
Kuala Lumpur Madrid Melbourne Mexico City Nairobi
New Delhi Shanghai Taipei Toronto
With offices in
Argentina Austria Brazil Chile Czech Republic France Greece
Guatemala Hungary Italy Japan Poland Portugal Singapore
South Korea Switzerland Thailand Turkey Ukraine Vietnam
Oxford is a registered trade mark of Oxford University Press
in the UK and in certain other countries
Published in the United States
by Oxford University Press Inc., New York

First published 2011

British Library Cataloguing in Publication Data
Data available
Library of Congress Control Number: 2010941774
Typeset by SPI Publisher Services, Pondicherry, India
Printed in Great Britain
on acid-free paper by
CPI Antony Rowe, Chippenham, Wiltshire
ISBN 978-0-19-959984-4
1 3 5 7 9 10 8 6 4 2

Preface

The essays in this volume are the product of UCL's 13th international interdisciplinary colloquium held in July 2009. We had previously held a conference on this subject in February 2008, which has been published as *Law, Mind and Brain*, edited by myself and Oliver Goodenough (Farnham, Ashgate, 2009).

Neuroscience offers many challenges to the lawyer, and these are taken up in this volume. Both the value and limits of neuroscience to the discipline and practice of law are explored, and there is, appropriately, a note of healthy scepticism. The book brings together many of the leading thinkers on the interdiscipline and thus offers a source for jurists, neuroscientists, practising lawyers (particularly those in the criminal law), and policy-makers. The range of subjects covered is wide. There are several papers on neuroimaging, in particular in relation to criminal responsibility and in relation to evidence. There are papers on juvenile justice, on tort, in particular on emotional harm. There are papers also on end-of-life decisions, for example on the PVS condition. And decisions on the beginning of life are also considered. There is discussion of religion, of the right to silence, and how jurors process information. Papers consider such questions as empathy, and on conflicts between our moral intuitions and legal doctrine. Papers also offer historical insights.

This colloquium and volume could not have been put together without the assistance of Professor Semir Zeki, Professor of Neuroesthetics at UCL. He also gave a public lecture at the colloquium, which unfortunately we are not able to include in this volume. As ever Lisa Penfold provided amazing support, as did Jacqui Bennett and Deborah Burns. I am grateful to all of these people.

It is with some irony that I record that as the volume was going to press I was diagnosed with a neurological disease—Parkinson's. This will not stop me producing further colloquia and volumes in the series. The 2010 one is on 'Law and Childhood Studies' (5 and 6 July 2010), and the next projected one is 'Law and Language' in July 2011. Further information on 'Law and Language' can be obtained from me (michael.freeman@ucl.ac.uk) or Dr Fiona Smith (fiona.m.smith@ucl.ac.uk).

Michael Freeman

April 2010

to institutional constraints. Of course, the question of whether and when the cognitive differences that we observed lead to changes in jurors' behaviour is an empirical question that we will explore in future research.

Finally, we emphasize an important methodological conclusion: namely, that EEG technology has much to offer legal scholars who seek to understand how jurors process information. First, because electricity travels at nearly the speed of light, the voltages that scalp electrodes record reflect the brain's activity at the same point in time; thus, EEG has excellent temporal resolution (approximately 1 millisecond) and provides a continuous measure of the online cognitive processing of information.[22] Given the many behavioural studies of the online processing model and other theories of cognition, it is clear that the direct real-time processing measure that EEG provides would be beneficial to many scholars. Indeed, in their study of the 'hot cognition' hypothesis that underlies the online processing model, Morris, Squires, Taber, and Lodge[23] take advantage of EEG technology to test this hypothesis, arguing that EEG allows for a better understanding of sensory and cognitive processing, as well as the activation of implicit attitudes. We could not agree more.

Second, EEG directly reflects the activity of neurons that are involved in the processing of information; therefore, EEG provides a direct measure of brain activity, in contrast to other neuroimaging techniques, such as fMRI, that provide more indirect measures that are based on blood oxygenation levels or blood flow.[24] Further, unlike other neuroimaging techniques, EEG is much less expensive (the supplies needed to test each subject cost between $1 and $3) and much less invasive (i.e. subjects simply wear a cap atop their heads that contains small electrodes). Thus, EEG provides legal scholars with a unique, practical way of simultaneously observing decision-making and the cognitive processing of information. Further, given the differences that we observed between subjects' behaviour and brain activity in our study, it appears that recording subjects' brain activity via EEG can potentially add a new dimension to our understanding of persuasion, trust and other legal phenomena—a dimension that we cannot necessarily tap if we only record behavioural responses.

[22] Note 16 above.

[23] J. P. Morris, N. K. Squires, C. S. Taber, and M. Lodge, 'Activation of Political Attitudes: A Psychophysiological Examination of the Hot Cognition Hypothesis' (2003) 24 *Political Psychology* 727.

[24] Note 16 above.

21

The Juridical Role of Emotions in the Decisional Process of Popular Juries

*Laura Capraro**

The study of law is, in general, the result of a scientific approach that tends to privilege 'rationale' over the influence of 'emotions' and 'intuitions' within the context of juridical reasoning.

Emotions hold a fundamental role even in instances such as criminal cases, in which results—as supported by research and findings furnished by cognitive neuroscience—are strongly conditioned by 'emotions'. The latter, while belonging to the realm of 'reason', are not an effective impediment to its functionality but, rather, greatly contribute to the reasoning process.

21.1 Background

Even if most trials in common law jurisdictions (e.g. US, UK, Canada, Australia, New Zealand) are conducted—always bearing in mind the difference in the provisions of law of the different countries—without the jury's contribution, it is undeniable that those conducted by jury are the most interesting, since, even if less significant considering its frequency, are those having as main object the most serious crimes.

The jury is one of those topics where one can observe extremely contrasting opinions. There are those who radically oppose it[1] and there are those who embrace its presence within the system.[2] These 'split' views essentially derive from the fact

* Assistant Professor in Criminal Procedure at the University of Rome 'Tor Vergata'.

[1] B. S. Oppenheimer, 'Trial by Jury' (1937) 11 *University of Cincinnati Law Review* 142: 'We commonly strive to assemble 12 persons colossally ignorant of all practical matters, fill their vacuous heads with law which they cannot comprehend, obfuscate their seldom intellects with testimony they are incompetent to analyze or unable to remember, permit partisan lawyers to bewilder them with their meaningless sophistry, then lock them up until the most obstinate of their number coerce the others into submission or drive them into open revolt.'

[2] Lord Devlin, *Trial by Jury* (London, Stevens & Sons, 1966) 164, according to whom '... No tyrant could afford to leave a subject's freedom in the hands of twelve of his country-men. So that trial by jury is more than an instrument of justice and more than one wheel of the constitution: it is the lamp that shows that freedom lives.'

that jury members are not subjects with a formal preparation within a juridical environment, and therefore, in almost all cases, have no specific competence or skill in the field in which they are called to operate. Therefore, according to the opposing view, very often they are not even able to understand fully the 'instructions' received from the judges, and, above all, make their decision and deliver their verdict more on the basis of their prejudices or, at best, by common sense than on the basis of the evidence given by the parties during the trial, according to which they should actually decide. On the other hand, it is interesting to note that several empirical researches—top of which that famous one conducted by Kalven and Zeisel and published in 1966[3]—proved a high level of trust put by the same juridical professionals in this institution: most judges in fact concordantly affirm that, despite the undeniable lack of preparation of the jury members, they perfectly play their role of 'fact-finders', and that themselves—professional judges—would have issued, in three-quarters of the cases, a judgment coinciding with that expressed by the jury's unmotivated verdict. These results attest that jurors not having knowledge of the law do not represent an obstacle to the delivery of a verdict substantially and significantly shared by professional judges. According to Feigenson, this could be explained by the concept of 'Total Justice',[4] whose aspiration guides the jurors' actions and therefore compensates for their objective lack of preparation.

So, if is true that the judges have declared—in these several studies conducted on the matter—that they substantially share the decisions taken by the jury, it is also true that one of the most ruthless critics of the jury system was nonetheless a judge, J. Frank, whose theories are a major source of, as it is well known, American Legal Realism. Frank, starting from empirical observation that the decision seems to be a product of emotion and not of reason, comes to the conclusion that a decision represents an act of will of the subject (judge) or the subjects (jury) summoned to express a judgment, and that therefore the jury's verdict is substantially an act of pure will.[5]

Beyond these extreme positions, the juries' decision-making process traditionally represents a reason for discussion between scholars belonging to different disciplines such as law and mind philosophers, juridical psychologists and jurists and, most recently, neurologists and neuroscientists. Although I examined the whole

[3] H. Kalven and H. Zeisel, *The American Jury* (Boston, Little Brown, 1967). Such work is considered still today a classic on the topic and, even if during the years have been highlighted the numerous methodological mistakes made by the research group, still represents an important landmark on jury research.

[4] N. Feigenson, *Legal Blame, How Jurors think and talk about Accidents* (Washington, DC, American Psychological Association, 2000) 5, 104.

[5] Naturally, reference is to be made to J. Frank, *Law and the Modern Mind* (New Brunswick and London, Transaction Publishers, 2009) (1930): 'The Jury (...) determine the rights of the respective parties and the jury's determination of these rights is guided by no real regard for "rules", abstract or otherwise. The decision of many case are products of irresponsible jury caprice and prejudice' (191), since '... Usually the jury are neither able to, nor do they attempt to, apply the instructions of the court' (185). In the final analysis, the problem for Frank derives from the fact that '[adequate fact-finding] requires devoted attention, skill in analysis, and, above all, high power of resistance to a multitude of personal biases. But these qualities are obviously not possessed by juries' (192).

process of juridical decision-making, I intend to focus on a notorious controversial argument: determining the nature of juridical reasoning. Whether it is directly a product either of reason or of emotion, and, whether it is a result of the interaction of both, and, in that case, how such interaction works.

Beside the strong influence exercised by the rationalistic approach of Immanuel Kant's thought, which still at present significantly influences the most traditional conception of law throughout the western world (at least on the Continent), we are all aware of the increasingly significant presence of a completely different point of view in the light of which emotion is given back the role it should play. From this point of view Neuroscience seems today to put itself on the same line of thought initiated in the mid 1930s by the American Legal Realism whose deeply innovative positions we have previously mentioned.

The Realist School brings to extreme consequences the approach where emotion—or intuition—and not reason governs juridical judgment. This reaches disruptive assertions,[6] which in any case can be credited for giving law scholars food for thought, since, even today we rely too often on rigorous distinctions between what is 'rational' and what is not, and on simplistic juxtapositions between what belongs to the emotional world and expressions of pure rationality, or—as it is preferable referred to nowadays—'logic'.

Today we know that the development of cognitive function requires an extremely complex mental process. Nevertheless, what we are interested in verifying is how jurors reach the decisions they make, and more specifically—in the light of the outcome of the research conducted by cognitive neurosciences—whether it is possible to state that emotion influences the decisional process and, should this be the case, whether such contribution either facilitates or hinders the decision itself. Particular attention will be paid to the problem of the so-called Emotional Evidence, whose solution can be greatly helped by research and techniques developed by neuroscience.

We already anticipated that the most recent neuroscientific studies produced a significant result in regards to the understanding of the nature of decisional processes: they in fact acknowledge an important function to emotions, which work alongside reason as an integrated whole when called upon processing a rational thought inherent to a decision.[7] Therefore, in this sense, we may almost consider definitely overcome—at least in reference to Anglo-Saxon scientific culture—the approach aimed at disowning, or rather denying, the contribution given to decisions by emotions. From this perspective, what I will focus on is how the decisional processes characterize criminal proceedings.

This point of view is considered an outcome of the approaches that are still prevalent in many countries, such as Italy for example, within which rationality is premise. Therefore, in this case, the aim of juridical reasoning and of judicial proceedings is to adopt a mechanistic view of the judicial decision. According to

[6] Note 5, above.

[7] M. Koenigs, L. L. Young, R. Adolphs, D. Tranel, F. Cushman, M. Hauser, and A. Damasio, 'Damage to the Prefrontal Cortex Increases Utilitarian Model Judgements' (2007) 446 *Nature* 908–11.

this traditional approach, based on the criteria that the carrying out of a trial is deemed a product of rational logic, the subject summoned to decide (judge or jury), should restrict himself to applying an abstract provision to an ascertained fact, accurately avoiding, as if it were actually possible, any conditioning by emotions.[8]

21.2 Jury Instructions and the Persistent 'Demonization' of Emotions

It is a generally shared opinion that emotions play an important role in decision-making, even though it is a strongly rooted belief that emotions hinder rational reasoning and moral judgements.[9] The guidelines that the judge[10] usually gives to the jury ('Jury Instructions') confirm such statements. In fact, in US law it is deemed appropriate to recommend to the jury panel to avoid being influenced by their emotions in any way, because there is clearly the conviction—this is the implicit conceptual assumption—that the pursuit for a balanced judgement on a subject's conduct could be diverted by the contribution that emotions may possibly give to the decisional process. Therefore, the belief that emotions are deceitful, once again emerges. In fact, according to such an idea, emotions deeply undermine the possibility of rational thought. Throughout trials leading towards judgment (sentence, verdict) everything must be based on 'pure reason', under the unrealistic assumption that cognitive processes are closer to reality when formed without the negative conditioning produced by emotions.

Jury Instructions, while postulating the possibility of isolating the rational component of cognition from the emotional one, clearly admit what contextually they would like to deny: whenever a decision needs to be taken, emotion certainly exists. Therefore the complication arises when we attempt to erase consequences deriving from such 'interference'. The problem rests entirely in the following question: why are Jury Instructions focused on asking jurors to avoid being conditioned by emotions and not suggest a valid thought process to facilitate their decision-making? Furthermore, *how* can they *concretely* achieve this result, *how can they assure that their judgement does not depend on emotion?*

[8] Within the Italian system, the principle that must govern the judge at the moment of 'evaluation' of evidence is 'libero convincimento', which means, in an extremely brief manner, the absence of predetermined criteria chosen in advance by the legislator. According to the prevailing literal and systematic reconstruction of the meaning of such principle '[In its correct meaning,] "libero convincimento" requires the judge to evaluate the evidence on the basis of *rational* criteria such are those derived from logic, experience and laws of science'. So M. Nigro and P. Tonini, 'Libero convincimento' in G. Spangher (ed.), *Procedura penale, Systematic Dictionaries series* (Milan, Il Sole 24 Ore, 2008) 333.

[9] Kant was surely not the first thinker to deem that the nature of emotions was irrationality (for example, just think about Plato's *Phaedrus*), but surely was the one to stress the supposed irrational nature of emotions, as far as coming to the statement according to which these latter corrupt the moral judgement.

[10] For example, in New Jersey it is recommended to the members of the jury: 'It is your duty to weigh the evidence calmly and without bias, passion, prejudice, or sympathy, and to decide the issues upon the merits' (*New Jersey Criminal* (2007)). In North Dakota jurors are instructed according to the following: 'Your decision must not be influenced by sympathy or emotion' (*State Bar Association of North Dakota* (2008)).

The answer to this is as simple as it is intuitive: the reason why jurors are not guided through the difficult task of 'ignoring' emotion appearing on the path to knowledge they are about to go through, is that the request contained in the 'Instructions' is unrealistic, since, as already acknowledged by almost all fields, from economy[11] to strict finance[12] to broader social studies,[13] emotions play a fundamental and insuppressible role in the decision-making process. It would be, in any case, very difficult, if not totally impossible to demand from the subject summoned to take a decision to separate the two components, emotional and rational, which both contribute integrally although in different ways to the decision-making process and to the expression of a final judgment.

What we would like herewith to highlight is that emotions not only represent a relevant and insuppressible part of the cognitive process, but that, most of all, they considerably contribute to the success of the process, as demonstrated by the studies—herewith below reported—conducted by neuroscientists and neurobiologists on the decisional capability of subjects who have suffered certain kinds of brain damage.

21.3 The Contribution Given by Neuroscience to the Understanding of the Relationship Between Emotion and the Decision-Making Process

According to the rationalistic approach, as well as to common sense, it is always necessary to exclude emotions, which are by definition a corrupting, or at least a contaminating element for thought in order for reasoning to be considered satisfying and be capable of achieving optimal results. On this basis—as appropriately underlined by Antonio Damasio[14]—it is possible to find Descartes' dualistic elaboration, according to which the mind, or thought, is separate from the brain and the

[11] M. Lindstrom, *Buyology: Truth and Lies about Why We Buy* (New York, Doubleday, 2008); *Brand Sense: Build Powerful Brands Through Touch, Taste, Smell, Sight, and Sound* (New York, Free Press, 2005).

[12] D. Salzman and E. Trifan, *Emotions, Bayesian Inference, and Financial Decision Making* (unpublished manuscript, 2005).

[13] Nowadays there is no field immune from the consideration of the relevance to be given to the human brain's emotional component: as one example, we would like herewith to remind that today public social spaces in general, as well as the most commercial ones are to the public's liking—as demonstrated by the studies—when the architecture of the environment manages to stimulate the user's *sensitivity* and therefore to conquer his emotional side (in this regard, we talk about 'emotional' architecture or design or 'neuro–design'); in the same way, in order to sell a product it is now accepted that more than the cost–quality ratio, it counts the marketing strategies' capability to move the client's emotions ('neuro-marketing' or 'emotional marketing'). These last years' focus on the importance that—on the basis of neuroscientific studies—must be acknowledged to emotion, is so evident that it took the features of some kind of revenge of emotion on characteristics that were once preeminent, so that someone even talks about a sort of '*Neuro-mania*': P. Legrenzi and C. Umiltà (Bologna, Il Mulino, 2009).

[14] A. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* [*L'errore di Cartesio*] (Milan, Adelphi, 2008) 336.

body. Theoretically, therefore, the mind that traces back to all human skill and abilities relevant to logic and reason (*res cogitans*)—is actually located outside the body, which in fact represents the so-called *res extensa.*[15] In this perspective, reasoning and moral judgement, as well as all information processing conceived by the human mind, are presumed to be distinctly separate from the structure and function of a biological organism, from which, on the contrary, emotion and passion derive.

Neuroscience, having the need to rely on neurobiology, neuroanatomy, neurophysiology, neurochemistry, together with those disciplines relating to the mind as a specialized subject, in order to understand the mechanisms governing its function, questions the following postulate.[16]

The hypothesis proposed by Antonio Damasio, in particular, is that, of the existence of the so-called somatic marker, which, 'by making more efficient and precise... the decision-making process',[17] represents the link between cognitive and emotional processes. The somatic marker is a hypothesis referring to the phenomenon theorized by neurologists. When given a stimulus, emotionally associated to a given circumstance, the brain produces (*marks*) a signal of activity, either conscious or unconscious, positive or negative; hence the definition: 'somatic marker'. Neurological patients suffering brain damage of a specific region of the frontal lobe—a topic of research from Damasio's group—presented a lack of decisional capacity associated with considerable alteration in the capability to have feelings. From clinical and experimental observation of several cases in a twenty-year span, the group was able to obtain elements supporting the hypothesis that reason is perhaps less 'pure' than we think or hope it would be.[18] The conclusions reached do not surely confirm that feelings and emotions guide our thought and actions, or that humans are not rational beings. Nevertheless, what has been confirmed once and for all is that 'certain aspects of emotions and feelings are indispensable for rationality'.[19]

[15] Reference is made to what is considered as the heart of the Cartesian thought, '*Cogito, ergo sum*': 'I thence concluded that I was a substance whose whole essence or nature consists only in thinking, and which, that it may exist, has need of no place, nor is dependent on any material thing; so that "I," that is to say, the mind by which I am what I am, is wholly distinct from the body, and is even more easily known than the latter, and is such, that although the latter were not, it would still continue to be all that it is': R. Descartes, *Discours de la méthode* [*Discorso sul metodo*] (Milan, Oscar Mondadori,1993) .

[16] '... a full understanding of the human mind requires an integrated perspective: the mind should not only start from a "cogito" not belonging to the realm of biological tissues, but should also be related to an entire organism, having a brain and an integrated body and fully interacting with a physical and social environment. But the mind really soaked into the body as I see it, does not abandon the most refined levels of activity, those constituting its soul and spirit. From my point of view, soul and spirit, in all their dignity and human measure, are now statuses, complex and unique of an organism'; and more, '... I am not affirming that the mind is into the body. I am affirming that the body's contribution to the brain is not limited to regulatory effects or to the support of all vital functions, but also includes *contents* which are an integral part of the functioning of the normal mind': A. Damasio, note 14, above, 341, 309.

[17] Ibid. 245.

[18] Ibid. 18.

[19] Ibid. 19.

Through the hypothesis of the somatic marker, Damasio not only relates cognitive contents[20] to emotions, but acknowledges their determining role as a cognitive *guide.*[21]

According to Damasio, if it were realistically possible to accept Decartes' approach, and if formal logic, product of pure rational thought uncontaminated by passions, which represents the best possible hypothesis of mental elaboration, then subjects suffering prefrontal brain damage, presenting a reasoning deficiency related to areas of the brain governing emotions, should represent examples of perfection regarding logical reasoning and decision-making.

Unfortunately, the studies performed demonstrate that it is not so, and those subjects, whose function of the brain area governing emotions is impaired presented on the contrary a disability in their decisional capability. In other words, pure reason presents disabling limits,[22] contrary to Kant and those sustaining the absolute necessity that the basis for the pursuit of justice judgements should not be contaminated by the bias of emotions.

David Pizarro, when imagining the existence of a rational Kantian mind, recalls a very suggestive analogy: 'the Vulcan' of the *Star Trek* series. Vulcans are completely rational humanoids; nevertheless, they are incapable of feeling emotions. With regard to moral judgements, Vulcans—states Pizarro—by applying the general theory of principles, would be surely able to formulate very accurate ones. However, the dilemma of the insufficiency of having a purely rational mind would emerge in the insuperable incapacity of having such a thought or the awareness of a morally significant fact. In other words, Vulcans would not be able to emotionally conceive nor contextualize a situation and this impossibility to feel emotions[23] would paralyse thought and therefore impair action. This is what actually happens to patients suffering prefrontal brain damage, which from a neurological point of view might seem normal, because they are not affected by any speech impediments, impaired movements, odd sensations, memory loss, logical and mathematical disabilities, but are nevertheless incapable to feel, and therefore *to reason*.

The aspiration for a universal behavioural standard, which emotions would hinder,[24] is what seems to be conditioning moral philosophers in the elaboration of a justice judgement model. However, they forget that for human beings, as well as for all other animals, well before the pursuit of a standardized behavioural code comes the certainty of their undeniable limits. The concreteness of subjectivity prevails on the abstractness of universality. In this sense, the significant discovery is that:

[20] Also the philosopher R. De Sousa (*The rationality of emotion* (Cambridge, MA, MIT, 1987) amongst others, deems and maintain that emotions have contents and nature intrinsically rational.

[21] 'Emotions are not a luxury; they play a role in communicating meanings to others, and may also fulfill the function of cognitive guide': A. Damasio, note 14, above, 191.

[22] Ibid. 271; D. Pizarro, 'Nothing More than Feelings? The Role of Emotions in Moral Judgments' (2000) *Journal for the Theory of Social Behavior* 371.

[23] Pizarro, in this regard, talks more specifically of 'empathy'.

[24] J. B. Rawls, whose theory of distributive justice is more than well-known, hypothesized the necessity for the so-called '*veil of ignorance*', beyond which justice statements should be formulated, with the aim to annul the influence exercised on judgements by the bias of emotions.

the rationality apparatus, traditionally deemed *neo*cortical, does not operate without the apparatus of biologic regulation, traditionally deemed *sub*cortical. It seems that nature built the first not only on top of the second, but also *with* this and *from this*... Neocortex results engaged *together* with the most ancient brain nucleus, and rationality is the effect of their joint activity.[25]

In other words, the systems governing the normal processes of emotion, feelings, reason, and decisions-making are deeply interconnected,[26] and, as matter of fact, reduction of the emotional experience may lead to a significant reason for irrational behaviour.

21.4 'Emotional Evidence'

Studies conducted by juridical and forensic psychology[27] demonstrate that a given category of evidence, usually admitted and considered usable for decision-making purposes,[28] influences the jury towards a bias decision. Contemporary North American doctrine, considering such a hypothesis, talks about 'Emotional Evidence', in order to indicate evidence that, regardless from being presented by either the prosecution or the defence, is characterized by a high emotional content.

In order radically to summarize the results obtained by such research, we may confirm that it has been substantially demonstrated that the so-called Emotional Evidence is potentially suitable to lead the same jury to issue *more severe punitive* judgments, being irrelevant from where such evidence was introduced (whether presented by the defence or the prosecution: 'indiscriminant punitiviness'[29]). All existing literature on the effects on the jury's decisions, for example the showing of particularly gruesome or post-mortem photographs related to the crime they must judge, or of the hearing of victim impact statements, especially in death penalty trials, demonstrate that whenever such evidence having high emotional content (Emotional Evidence) has been admitted in mock trials, the verdicts have ended in

[25] A. Damasio, note 14, above, 188–9.

[26] Ibid. 97.

[27] For example B. Myers, D. Godwin, R. Latter, and S. Winstanley, 'Victim Impact Statements and Mock Juror Sentencing: The Impact of Dehumanizing Language on a Death Qualified Sample' (2004) *American Journal of Forensic Psychology* 40. For a rich and interesting reference bibliography, reference should be made to J. Salerno and B. Bottoms, 'Emotional Evidence and Jurors' Judgments: The Promise of Neuroscience for Informing Psychology and Law' (2009) *Behavioral Sciences and the Law* 273.

[28] The Supreme Court in *Payne v Tennessee* (1991) stated that in the sentencing phase of a death penalty trial, the victim impact statements—representing a classic example of Emotional Evidence—can in no way damage the defendant, since they are only functional to determining the level of the offence perpetrated (thus, without straying from the so-called probative effect). In a more recent sentence (*Kelly v California* (2008)), however, the same court, expressed a negative opinion on the opportunity to admit video tributes to victims, since they would not be useful from a probative point of view, being only 'emotionally evocative'.

[29] J. H. Goldberg, J. S. Lerner, and P. E. Tetlock, 'Rage and Reason: The Psychology of the Intuitive Prosecutor' (1999) 29 *European Journal of Social Psychology* 781–5.

conviction or, in any case, resulted with a more punitive sentence in a significantly higher number of cases.

Therefore, under certain circumstances there are cases in which emotions, vital to the decision-making process, may actually corrupt judgement. In this way the issue becomes that of determining as accurately as possible, the fine boundaries of Rule 403 of American Federal Rules of Evidence[30] which lie between the 'probative' and the 'prejudicial' use of evidence.

Even if no doubt exists in the fact that it is inevitable that during a death penalty trial the jury may examine evidence that may also be very 'emotionally disturbing', the question that we must ask is: should the use of Emotional Evidence be regulated or is such regulation unnecessary? Of course, it is important for the jury to know how the victim was killed, because we have to know whether one deadly blow was inflicted or the perpetrator of the crime tormented the victim's body with 100 stabs; therefore, the admission of photographs aimed at giving ground to a reconstruction instead of another can be considered probative. But the question is: is it necessary to view fifty photographs, or are three photographs to be considered sufficient? From our point of view it would be appropriate to take provisions concentrating on regulating, in a more rigourous manner, the admission of evidence falling under such category.

We were talking about *probative* and *prejudicial* use of evidence. In other words, this means to verify when and under which conditions the emotional aspect of a decision-making process prevails. It is evident, in the case of Emotional Evidence, that we no longer deal with the physiological interaction between rationality and emotion, but we are clearly entering a different field: that of the pathology of such relationship.

Once again neuroscience can assist law. Its contribution plays a determining role in the acknowledgment of the necessity of emotions within the decision-making process. In the same way its contribution can be illuminating[31] towards verifying whether an increased or prevailing influence of emotions exists. These processes must be necessarily linked to a decreased 'cognitive effectiveness' and, therefore, ultimately provide an aid to judges in the interpretation of Rule 403.

Through the fMRI technology, which substantially measures blood flow in areas of the brain during neurological activity, it is possible to relate brain activity recorded in a given area to the cognitive activity the subject is carrying out. In this way, it is possible to record different brain activity in the examined subjects, according to their being exposed to less or more intense emotional stimulation. The results obtained so far by neuroimaging studies[32] demonstrate that a more intense

[30] 'Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless of cumulative evidence.'

[31] Mostly through the use of the functional magnetic resonance imaging (fMRI). For a deeper analysis of the issues related to the problem of Emotional Evidence, see J. Salerno, B. Bottoms, note 27, above, 273.

[32] Amongst others, we highlight those from J. D. Greene, B. R. B. Sommerville, L. E. Nystrom, J. M. Darley, and J. D. Cohen, 'An fMRI Investigation of Emotional Engagement in Moral Judgement'

emotional stimulation produces brain activity that is more significant in those brain areas responsible for emotional reaction and less activity is detected in areas related to cognitive activity in general. For this reason it is probably time to conduct new research and empirical experiments on the matter with a specific focus on legal decision-making, which until now has not been the subject of specialized study, with the goal to either confirm or prove false the results obtained so far.[33]

21.5 Conclusions

As a result of the previous account, the growing potential of neuroscience's effectiveness in the redetermination of numerous juridical categories emerges with great strength, although it will probably, in the near future, be revised in order to accommodate new discoveries.

The importance of the studies conducted in these fields is therefore seemingly taken for granted. Nevertheless, it seems appropriate briefly to highlight at least two aspects related to this matter: on one hand, the limits of neuroscience; on the other, the risks that may arise.

In the first place, even if the strong bond between the mind and the brain is now clear, it would be in any case arbitrary to confine the mind to brain function. In particular, the main problem, which researchers themselves are aware of,[34] derives from the fact that to verify, thanks to technologies like the fMRI, that a certain area of the brain is activated by a given activity performed by the subject, is one thing. But, it is a very different task that of deducing brain function and linking it to brain activity of its relative area: 'Just because we can see activation of particular areas of the brain with fMRI technology does not mean we understand specifically the function of those brain areas'.[35]

Secondly, it would be wise not to underestimate the effects of the use of neuroimaging evidence that may influence the jury's decision-making process; such effects may lead the jury to lose its primary and essential duty: to be the judge of the fact.

Many of the tools that may be made available in the near future to the judicial system (e.g. neuroscientific lie detection; studies aimed at demonstrating the different *brain* configuration and predisposition of certain subjects that develop antisocial behaviour—see the neuroimaging and scientific evidence in general) are considered to be trustworthy by the jury, and therefore present a risk of actually depriving them of their actual role.

(2001) 293 *Science* 2105–8 and H. R. Heekeren, I. Wartenburger, H. Smidt, K. Prehn, H. Schwintowski, and A. Villringer, 'Influence of Bodily Harm on Neural Correlates of Semantic and Moral Decision Making' (2005) 24 *NeuroImage* 887–97.

[33] J. Salerno and B. Bottoms, note 27, above, 273 ss.; O. Goodenough, K. Prehn, 'A Neuroscientific Approach to Normative Judgment in Law and Justice' in S. Zeki and O.Goodenough (eds.), *Law and the Brain* (Oxford, Oxford University Press, 2006) 97–8.

[34] Very recently, P. Legrenzi, and C. Umiltà, note 13, above.

[35] J. Salerno and B. Bottoms, note 27, above.

In fact, the studies carried out demonstrate that when neuroimaging evidence is introduced, for example by the defence, in order to demonstrate the insanity of the defendant, the jury tends to support the relevant request with significantly increased willingness: the jury basically trusts the 'expert witness' presenting 'evidence regarding the defendants' brain abnormalities in murder trials' to the point that their role as 'finder of the fact'[36] is affected. Therefore one can only imagine the direction[37] this may lead us to, not only relative to juries, but finally toward a shift in our conception of the nature of free will in general.

[36] B. Garland (ed.), 'Monitoring and Imaging the Brain' in B. Garland, *Neuroscience and the Law* (New York—Washington D.C., Dana Press, 2004) 21: 'The evaluation of witnesses, and the credibility of and weight given to their testimony, are matters for the "finder of fact", the body charged with determining the facts in the matter before the court. In jury trials this is the jury; in bench trials, it is the judge. In allowing scientific testimony regarding truthfulness into evidence, the court may well be invading the purview of the jury . . . Members of the jury may weight "scientific evidence" more heavily than their opinion as formed by their own sense, and may do so specifically on the matter of truth.'

[37] M. Gazzaniga, *The Ethical Brain* [*La Mente Etica*] (Turin, Codice Edizioni, 2005) 86.