Neuroscience and Dangerousness Evaluations: The Effect of Neuroscience Evidence on Judges. Findings from a Focus Group Study

Georgia Gkotsi

Introduction

Neuroscientific research on the relationship between neurobiology and antisocial behaviour has rapidly grown over the last two decades, causing vivid discussions on potential uses of neuropredictive models of violence as indicators of future dangerous behaviour. Forensic neuroprediction, i.e. uses of recent developments in neuroscience in criminal justice contexts, in order to improve predictions about an individual's risk of (re-)engaging in antisocial conduct, is one of the most intriguing challenges for our legal system. While neuroscience holds the promise of adding predictive value to existing risk assessment tools, its potential use for justice purposes raises a variety of scientific, epistemological, legal and ethical issues. One of the relevant concerns is related to the

G. Gkotsi (✉)
Faculty of Law, National and Capodistrian University of Athens, Athens, Greece
e-mail: ggkotsi@law.uoa.gr

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prejudicial nature of neuroscientific data. The latter could be unduly persuasive despite the lack of scientific support for their use to diagnose cognitive or behavioural impairments. Several studies in experimental psychology have demonstrated a number of cognitive effects arising from exposure to neuroimaging data which may bias judgements and lead to (mis)interpretations that can affect legal decisions.

If interpreted by judges or juries as evidence of the fact that the defendant is constitutively, irremediably dangerous, neuroscientific evidence in criminal settings could eventually open the door to unjustifiably severe punishment and/or an overly aggressive use of preventive detention for potentially dangerous individuals in the name of public safety.

A key question is how judges and juries are going to perceive and evaluate this kind of data, and if they are going to give too great a weight to them. The prejudicial impact of neuroscientific evidence remains an open empirical question to be examined. Several studies have been conducted on the potentially biasing effects of neuroscientific evidence, especially in the context of mock juries. These studies gave mixed results concerning the over-evaluation of neuroscience evidence and their potentially biasing effects (Brown & Murphy, 2009; McCabe & Castel, 2008; Weisberg et al., 2008; but see Schweitzer et al., 2011, as cited by Greely & Farahany, 2019). Up to now, little research has been conducted on the impact of neuroscientific evidence and its effects on the decisions made by trial judges (Moulin et al., 2018; Cheung & Heine, 2015; Fuss et al., 2015). In order to investigate this issue, we conducted a pilot study with focus groups, whose preliminary results are presented in this article.

Neuroscience as a Better Tool for Evaluations of Future Dangerousness/recidivism Risk[1]?

Up to now, four generations of tools have been created to evaluate an offender's risk to society: First-generation clinical evaluations, structured or non-structured, have been accused of lack of solid methodology, objectivity and false results, either false positives or false negatives. Violence risk assessment based on clinical evaluation does not have a particularly good track record, and some experts have even suggested that relying on psychiatric predictions of violence is tantamount to "flipping coins in the courtroom" (Nadelhoffer & Sinnott-Armstrong, 2012).

Second-generation tools, based on actuarial prediction, depend on statistical analysis of a subject's objective information. Actuarial methods rely on specific variables that are weighted in predetermined ways (statistical methods of evaluation include Violence Risk Appraisal Guide VRAG, Static-99 and Static-2002). Actuarial methods have better predictive value but are criticized for being based on unchangeable factors that hinder any prospective of change and evolution of the subject (Quinsey et al., 2006).

Third-generation tools, the so-called Professional structured judgement tools (such as HCR-20, LSI-R, The Hare Psychopathy Checklist-Revised-PCL-R) assemble estimates of risk by reviewing and scoring a set list of empirically validated risk factors known to be associated with violence. In this approach, structure is imposed on which risk factors should be considered and how they should be measured. The weighing of their importance into an assigned level of risk is considered as the result of clinical judgement (Philips, 2012).

Recently, a new generation of risk assessment tools has emerged. Fourth-generation tools place emphasis on the individual's strengths,

[1]Dangerousness is a rather mysterious and paradoxical notion, since it implies at once the affirmation of a quality immanent to the subject, and a mere probability, a quantum of uncertainty, given that the proof of the danger can only be provided after the fact, should the threatened action actually occur (Castel, 1991). Characterized mainly by vagueness and polysemy, the notion of dangerousness is abandoned in many countries, especially in Anglosaxon countries since 1980, in favour of the notion of the risk (Pratt, 2001), while in continental countries the term "dangerousness" is still used.

We use the terms "dangerousness" and "recidivism risk" interchangeably.

taking into consideration protective factors that reduce the chances of manifestation of (sexually) violent behaviour or recidivism. "SAPROF" (Structured Assessment of Protective Factors for Violence Risk), designed in 2007, is the most widely used fourth-generation tool and its results are combined with results derived from third-generation risk assessment tools. Fourth-generation tools not only include risk-need assessment but also integrate the assessment with a case management plan. Treatment is adjusted to the individual's needs, while assessments of risk factors (including protective factors) are periodically adjusted and reevaluated (Abbiati et al., 2017; Bonta & Wormith, 2008).

Despite the fact that latest-generation tools have evolved, taking into consideration protective risk factors and incorporating techniques for intervention and treatment strategies, methods of predictions of future dangerousness/recidivism risk in general remain controversial and are constantly criticized for lack of accuracy and reliability (Calcedo-Barba, 2006; Friend, 2003; Douglas et al., 2017; Fazel et al., 2012). In this context, neuroscience emerges as a novel and scientific way to help psychiatrists make a step towards developing more exact tools for the neuroprediction of violent behaviour. Recent findings regarding structural and/or functional brain damage correlated with the manifestation of violent behaviour have paved the way for the use of neuroscience knowledge and techniques in forensic settings and raise increasing interest for forensic psychiatrists, neuroscientists (Simpson, 2012; Silva, 2007; Delfin et al., 2019; Poldrack et al., 2018) and legal scholars (Redding, 2006; Morse, 2015). Several authors consider recent neuroscientific discoveries as a useful tool able to provide justice with credible evidence that will improve accuracy and reduce errors in psychiatric expertise (Aggarwal, 2009; Witzel, 2012; Silva, 2006; Simpson, 2012; Nadelhoffer & Sinnott-Armstrong, 2012).

In hope of improving the accuracy of existing tools, several studies are taking place, seeking to explore potential uses of recent brain imaging developments for taking a step towards the possibility of developing new tools for the "neuroprediction" of violence for forensic uses.

In 2013, the first prospective forensic neuroprediction study was published by Aharoni et al., in which researchers used fMRI in a group of 96 male prisoners and followed them at prison release for 4 years. The

study results indicated that those individuals showing low activity in a brain region associated with decision-making and action (the Anterior Cingulate Cortex) are more likely to being rearrested within 4 years of release. According to the study, the risk of recidivism is more than double in individuals showing low activity in that region of the brain than in individuals with high activity in that region. The results of this study, according to the authors, suggest a "potential neurocognitive biomarker for persistent antisocial behavior" (Aharoni et al., 2013).

Recent studies by Kiehl et al. (2018) suggested that "models that combined psychological, behavioral, and neuroimaging measures provided the most robust prediction of recidivism".

Kiehl and his team set out to discover whether brain age—an index of the volume and density of grey matter in the brain—could help predict re-arrest. The results verify the utility of brain measures in predicting future behaviour and suggest that reduced grey matter in the anterior temporal lobes, amygdala, and orbital frontal cortex was more helpful in predicting rearrest than was chronological age.

Delphin et al. (2019) conducted a long-term (ten-year average time at risk) follow-up study to include neuroimaging data in the prediction of recidivism in a forensic psychiatric sample.

Researchers studied whether the inclusion of resting-state regional cerebral blood flow measurements leads to an incremental increase in predictive performance over traditional risk factors. A Baseline model with eight empirically established risk factors, and an extended model which also included resting-state regional cerebral blood flow measurements from eight brain regions were compared using several predictive performance metrics.

These aforementioned studies suggest that brain scans can theoretically help determine whether certain convicted persons are at an increased risk of reoffending if released. However, given the increasing concern for public safety, there is discussion and several concerns are raised about uses of neuroscientific data for the assessment of levels of risk posed by offenders (Gaudet et al., 2016; Gkotsi & Gasser, 2016; Morse, 2015; Petersen, 2014).

Ethical and Legal Concerns: Neuroscience as a Risk for Offenders' Individual Rights

The use of neuroscientific data in criminal cases raises a variety of scientific, epistemological, legal and ethical issues. One of the relevant issues concerns the extent to which neuroscientific data, used in the context of forensic psychiatry, can influence the judgement and the outcome of decisions made by judges and jurors.

The scholarly empirical literature on the effects of such evidence is mixed (Shen et al., 2017). Recent research suggests that although neuroscience information may be persuasive under certain conditions (Scurich & Appelbaum as cited by Shen et al., 2017), brain images themselves are not independently persuasive. As a result, as Shen et al. comment: "research going forward is likely not to address 'Does neuroscientific evidence affect outcomes?' (inviting a binary Yes/No answer), but rather 'How much and under what circumstances does neuroscientific evidence affect outcomes?'".

Within the current social crimino-political situation, judges, confronted with the pressure to ensure public security, could consider neuroscience as a reliable tool, indispensable in assessing an offender's dangerousness. Within this context, fears are expressed that judges might rely too heavily on neuroscientific evidence and opt for heavier sentences or perpetuating post-sentence measures, on the basis of the offenders' neurobiological profile that allegedly proves that the latter are predisposed to criminal behaviour and thus more likely to recidivate.

According to some authors, if neuroscientific data are interpreted as evidence of dangerousness, it is highly likely that the judge will impose heavier sentences and/or—in European continental systems—security or therapeutic measures, which can be indeterminate in length. Thus, the use of neuroscience in criminal psychiatric expertise might be risky for defendants. This is the "double-edged sword" effect of neuroscience in court, outlined by several commentators (Barth, 2007; Farahany & Coleman, 2009): even if research and neuroscientific data are introduced by defence lawyers in criminal proceedings through a psychiatric expertise with the aim to prove diminished responsibility, these same data can be interpreted by judges as an indication of dangerousness of

the defendant and lead to long-term sanctions/measures based on the assumption of a high probability of recidivism in subjects with brain dysfunction. Although a recent empirical study's findings controvert the image of neuroscience evidence as a double-edged sword (Denno, 2015), discussion continues on the subject.

The use of neurobiology as a neurocognitive biomarker also risks labelling offenders on the basis of their neurobiological profile and discriminating against them in everyday life after release (Fuchs, 2006; Bedard, 2017).

This tendency could be exacerbated by the fact that neuroscientific evidence is often perceived as more objective, reliable, and "scientific" evidence, despite the limitations and difficulties of reliably connecting current brain function to future behavioural patterns. Images—and neuroimages in particular—can have a more profound effect on jury and judge determinations than verbal testimony, as several studies of social psychology have shown (Gurley & Marcus, 2008; McCabe & Castel, 2008; Weisberg et al., 2008; Kulynych, 1997), although Shen et al. (2017) found that "neuroscientific evidence does affect outcomes, but it has a weaker effect than the strength of the case".

Thus, courts might be compelled to use neuroscience to ground responsibility and dangerousness assessments, which could open the door to a more aggressive use of preventive detention for potentially dangerous individuals, undermining the principle of proportionality that lies at the core of criminal sentencing, that is, the idea that the punishment of a certain crime should be in proportion to the severity of the crime itself.

The Effect of Neurobiological Evidence on Judges and Jurors: Findings from Studies

Recent psychological studies indicate that neuroscientific knowledge or neuroimages moderately increase the perceived scientific credibility of accompanying information (Weisberg et al., 2008; Kulynych, 1997), and that "lay readers infer more scientific value for articles including brain images than those that do not, despite their lack of sufficient scientific

evidence and regardless of whether the article included reasoning errors or not" (McCabe & Castel, 2008).

According to several studies, brain images in particular are likely to impact evaluations of an argument's credibility (Gurley & Marcus, 2008; McCabe & Castel, 2008). This is linked to the so-called seeing is believing effect, which has been demonstrated by recent research in experimental psychology and suggests the existence of cognitive bias concerning the reliability and validity of a scientific study, when it is accompanied by a photograph or image (McCabe & Castel, 2008). Even though these results are not confirmed by meta-analyses (Schweitzer et al., 2011; Michael et al., 2013), these studies raise questions about the possibility of neuroscientific data being perceived by jurors and judges as more "scientific" than other types of evidence.

As demonstrated by Moulin et al. (2018), including neuroscience evidence in an expert report may impact the way the report is assessed by non-specialists, such as judges. The study showed that the presence of neuroscience data in an expert report affects judges' perceptions of the quality, credibility and scientificity of the report, and the persuasiveness of the evidence is provided.

Although in some cases neuroscience data actually does have some evidential value and correctly affects perceptions, the question is if this kind of evidence is sometimes unduly persuasive. The overly persuasiveness of neuroscientific evidence has been attributed to the fact that the collection of this kind of data requires a complex technological process, which apparently attributes to the findings greater scientific value. A different explanation could be related to the tendency of non-experts/laypeople to consider sciences, such as psychiatry and social sciences as less reliable, less valid and less rigorous than "hard" sciences such as physics and biology (Munro & Munro, 2014; Simonton, 2009), or their tendency to prefer simple, reductionist, explanations for complex phenomena (Crommelinck, 1995).[2]

[2]Others suggest that neuroscience evidence is more likely to have a prejudicial effect when structural neuroimaging techniques are used as evidence in court: structural abnormalities are more likely to influence judgements and mitigate punishment decisions than functional abnormalities, as the latter have less causal potency than the structural ones. See Choe, S. Y.

In any case, even though more recent studies suggest that neuroscience is not as biasing as feared (Roskies et al., 2013; Michael et al., 2013; Farah & Hook, 2013; Schweitzer et al., 2011, 2013) the prejudicial impact of neuroscientific evidence, i.e. its capacity to often unduly affect perceptions of judges' remains an open empirical question to be examined (Nadelhoffer et al., 2012; Gruber & Dickinson, 2012).

The Effect of Neuroscientific Evidence on Judges: First Findings of a Pilot Study from Focus Groups

Aiming to explore this issue, i.e. the way in which neuroscientific evidence is perceived and the extent to which it can be prejudicial, we conducted a study with focus groups consisting of judges, lawyers, neurologists and psychiatrists, whose aim was to detect eventual "biases" as to the persuasiveness, objectivity and scientific quality of experts' opinions that include neuroscientific tools and findings, especially in comparison with traditional, clinical psychiatric expert evaluations.

This focus group study was conducted in the context of a larger research project[3] whose aim was to examine uses of neuroscientific evidence in criminal trials through psychiatric expert opinions, and more specifically to examine the way in which neuroscientific evidence is perceived by judges, as well as its impact on the kind and length of the sentence imposed on mentally or/and neurologically impaired offenders. The research addressed, among others, the following issues: what is the Judges' opinion on psychiatric expert opinions in general and on expert opinions that incorporate neuroscientific knowledge in particular? What is the judges' perception of the notion of "dangerousness" in general and if/how they associate it with mental illness and neurobiological deficits?

(2014). Misdiagnosing the impact of neuroimages in the courtroom. *UCLA Law Review, 61,* 1502–1548.

[3]The research was funded as a project by the Greek State Scholarships Foundation (IKY): Gkotsi Georgia, "Criminal treatment of mentally ill offenders in the age of neuroscience: uses of neuroscientific data in psychiatric expert opinions" 2016–2018.

The larger methodology of the research included analysis of relevant case law and a combination of qualitative research methods, such as focus groups and interviews with judges.

Selecting the Focus Groups' Method

Focus groups are a qualitative research technique designed to explore a range of perceptions and views of a research subject through the participants' own perspective (Morgan, 1996b; Krueger & Casey, 2010). A focus group is a gathering of deliberately selected people who participate in a planned discussion. It explicitly uses group interaction as part of the method and allows members to interact and influence each other during the discussion. During a focus group, a group discussion is held where participants discuss a specific topic, exchanging views and commenting on their experiences (Kitzinger, 1995), thus, the method is particularly useful for exploring people's knowledge and experiences.

For the purpose of this study and given that neurolaw is an unexplored field in the Greek legal context, focus groups were considered as a suitable method for bringing together all professionals involved in criminal trials (judges, defence lawyers, experts—neurologists and psychiatrists), in order to elicit their perceptions on uses of neurobiological data in criminal trials, in the context of a psychiatric expertise and to detect potential bias on behalf of the judges concerning the use of neurobiological data. Used as a pilot study, focus groups featured the participants' thoughts, opinions and knowledge on the subject, through interaction, highlighting the participants' point of view on the researched subject and reflecting their role in a criminal trial.

Focus groups can generally be used as a method either autonomously, or in combination with qualitative or quantitative methods (Morgan, 1996a). In the context of our larger research, this method was used as a pilot study, in combination with the qualitative method of individual interviews with judges (Lambert & Loiselle, 2008; Merton, 1987). By bringing out the reasoning, way of thinking and diversity of judges' concerns, focus groups' results were taken as sources of new ideas and

contributed to identifying appropriate themes and formulating questions for interviews with judges, which constituted the next stage of our research.

Team Design and Composition

Two focus group sessions were organized and took place in December 2017–March 2018 in Athens, Greece with nine selected individuals. Participants were divided into two teams by professional occupation: legal scholars (lawyers and judges) and psychiatrists/neurologists. Since each discipline uses very different methodology and jargon, the division of the participants in two homogeneous groups according to their professional occupation was considered necessary in order to ensure participants' comfort in sharing their thoughts and knowledge in a familiar group, and to achieve the efficient performance of the group dynamics (Krueger & Casey, 2010; Ritchie et al., 2013, p. 190). In addition, division in two teams was considered necessary in order to prevent a possible infiltration of the analysis by prejudices or stereotypes that one professional group would have against the other, and which would eventually result in an alteration of the data.

The group of lawyers included two Judges servicing in the Athens Court of First Instance, a defence lawyer specializing in the defence of mentally ill persons, a lawyer specializing in bioethics and a lawyer and social anthropologist providing legal aid and advocacy for people suffering from mental health problems. The second group was composed of two neurologists and two psychiatrists with experience as experts in Courts. The discussions were coordinated by the researcher. Participants were briefed on the purpose and subject of the study and completed a consent form by which they agreed to the recording of the discussion and their anonymity was ensured. A plan of semi-guided general questions (discussion guide) provided the basis and stimulus for the discussion.[4] Thematic analysis was chosen as the method of analysis that

[4]Judges were asked to generally comment on the increasing tendency to introduce behavioural genetics and neuroimaging techniques in attempts to exculpate criminal defendants and to mitigate defendants' culpability and punishment. Questions/issues for discussion also included

systematically attempts to identify, analyze and report patterns within data and thereby provide cognitive access to collective significations and experiences (Braun & Clarke, 2006).

For the purposes of this chapter, we will present some findings from the discussion that took place in the "legal" group, consisting of judges and lawyers.

Findings from the Focus Group Consisting of Judges and Lawyers

Four main issues emerged during the discussion: these issues concerned (i) the extent to which participants think that neuroscientific data can contribute to improving the quality of psychiatric expert opinions (section "Contribution of Neuroscientific Data to the Improvement of the Quality of Psychiatric Expert Opinions"), (ii) The principle of free evaluation of evidence and its power when an expert opinion incorporating neuroscientific data is introduced in a criminal trial (section "The Relationship Between an Expert Opinion Incorporating Neuroscientific Data as Means of Evidence and the Principle of Free Evaluation of Evidence"), (iii) The issue of dangerousness and how participants correlate dangerousness with mental illness and neurobiological data (section "The Issue of Dangerousness: Correlation Between Dangerousness, Mental Illness and Neurobiological Data") and (iv) The use of neurobiological data as evidence of reduced responsibility in the context of a defence strategy (section "Neurobiological Data as Evidence of Reduced Responsibility in the Context of a Defence Strategy")

recent trial cases in the context of which neuroimaging techniques were used as evidence in a criminal court, as well as studies which explored uses of recent developments in neuroscience in order to improve predictions about an individual's risk of (re-)engaging in antisocial conduct.

Contribution of Neuroscientific Data[5] to the Improvement of the Quality of Psychiatric Expert Opinions

Concerning the degree to which neuroscience could improve the quality of psychiatric testimony, participants were divided into two subgroups: on the one hand, judges seemed convinced that neuroscientific data could potentially serve as a valuable tool for improving the quality and reliability of psychiatric expert opinions and contribute to a safer diagnosis of a mental illness and to a more exact evaluation of the defendant's clinical status in general (section "Judges: Improving the Reliability of Psychiatric Expert Opinions with Neuroscientific Data"). On the other hand, other participants were more sceptical about the use of this data in criminal proceedings, pointing out several some scientific, legal and conceptual limitations related to their use in criminal settings (section "Scepticism About Improving the Reliability of Psychiatric Expert Opinion Using Neuroscientific Tools—"Pseudo-Objectification". Scientific Limitations and Epistemological Difficulties").

Judges: Improving the Reliability of Psychiatric Expert Opinions with Neuroscientific Data[6]

According to judges who participated in the focus group, neuroscientific data can improve the quality of psychiatric opinion in two ways: contributing to a better diagnosis of the psychiatric mental illness and to

[5]We employ the term "neuroscientific data" as a generic term including general information derived from published neurobiological studies, related to the relationship between brain and behaviour, as well as data obtained from brain imaging techniques. These techniques can be either structural (magnetic resonance imaging (MRI), computerized axial tomography (CAT)), or functional, such as electroencephalogram (EEG), functional magnetic resonance imaging (fMRI), Positron Emission Tomography (PET) and Single-Photon Emission Computed Tomography (SPECT).

[6]In an inquisitorial criminal justice system, procedural guarantees serve a different conceptual logic than adversarial systems, i.e. a conceptual priority has to be given to requirements concerning the 'quality' of the non-partisan state official expert (Decaigny, 2014). Experts must have previously acquired knowledge and skills that allow them to fulfil their mission and to be appointed by judges. In Greece, a country of inquisitorial system, experts are registered in official lists of experts, are commissioned by investigating judges and prosecutors and cannot be commissioned by the defence or the civil parties.

a more exact evaluation of the defendant's clinical condition in general and assisting in the formulation of the judges' opinion.

Safer Mental Illness Diagnosis—More Exact Evaluation of the defendant's Clinical Condition with Neuroscientific Data

The discussion revealed a general mistrust on the part of the judges towards clinical psychiatric expert opinions. As the main reasons of their mistrust, judges mention the ambiguity and lack of scientific objectivity in the documentation of expert opinions and the gaps often encountered in the diagnosis of psychiatric illnesses. They also criticize forensic psychiatry generally for lack of a well-defined methodology, which often leads to erroneous—either false negatives or false positives—results with regard to dangerousness evaluations.

Neurological and biological data, as opposed to "traditional" psychiatric data, are considered by judges participating in the focus group to be of better quality and more reliable, while clinical psychiatric examination is considered inaccurate and not particularly reliable. The foundation of a mental illness on an organic, cerebral basis with the aid of neuroimaging tests, lends credence to psychiatric assessment and is therefore considered by judges as more "objective" and scientifically valid.

As one of the judges noticed:

> … there are gaps in traditional psychiatric methods regarding the diagnosis and, with the rise of neuroscience, these gaps become evident… so I think that this tendency to use neuroscientific tools should be considered positively, because it gives a more adequate portrait of the examined person. Neuroscientific techniques … would help as a safe method of diagnosis …. (E.E. Judge)

Assistance in the Formulation of the Judges' Opinion

Special reference is made by judges to the difficulties of decision-making whenever specialized knowledge (from a different discipline—psychiatry and neurology in the case) is required. The situation in which they

find themselves when having to comprehend and evaluate a psychiatric opinion is emphatically described as "floating in an ocean". Judges highlight the great responsibility they are charged with when judging the future of an accused person. In this context, data derived from neuroimaging techniques and examinations are perceived as an extremely useful tool that should be integrated in psychiatric opinions, in combination with other tests and methods, in order to assist and provide security to the judge and ultimately contribute to more effective administration of justice and provide legal certainty.

In a very characteristic quote, M.B., judge, comments:

> … the use of neuroscientific techniques would prevent us from floating in the ocean of a psychiatric expertise …. combining neuroscience with clinical examination could offer a lifeline in this ocean. Anything that objectifies this vague expertise makes you feel more secure about the administration of justice. (M.B. Judge)

And they add:

> I personally feel that it will untie my hands, it will help me understand this person's problem. (M.B. Judge)

The terms "safety board" and "will untie my hands" emphasize the judge's feeling of helplessness, whenever they are required to base their decision on specialized knowledge with which they are not familiar. An expert opinion incorporating neuroscientific data is perceived by judges as "objective", based on undisputed technical scientific evidence. As one of the judges points out, not only can this kind of knowledge not be ignored, but it is part of a judge's duty to consider latest technology data, in their quest to find the truth.

M.B, Judge, comments:

> … science is evolving, we cannot ignore it, I would not have a clear conscience if I ignored it completely … this kind of knowledge can help the judge establish legal certainty.

Scepticism About Improving the Reliability of Psychiatric Expert Opinion Using Neuroscientific Tools—"Pseudo-Objectification". Scientific Limitations and Epistemological Difficulties

The rest of the group's participants, i.e. lawyers, seemed more sceptical on the reliability of this kind of data and aware of the scientific limitations of neuroimaging technologies.

Lawyers point to the early state of development of neuroimaging technology, as well as the lack of neurobiological diagnostic markers. They question the relevance of group derived data for one person and they specifically refer to the difficulties in establishing causal links in attributing a type of behaviour to a specific brain structure or dysfunction. During the discussion, it was also mentioned that genetic polymorphisms, such as the MAOA gene[7] and, more generally, information regarding genetic predispositions cannot provide precise answers for specific individuals in a personalized way.

In addition, lawyers made extensive reference to the epistemological limitations and difficulties of communication between the judge and the psychiatrist-expert and highlighted the need to distinguish scientific reasoning from legal reasoning.

As one of the lawyers characteristically comments:

> It is one thing how a judge is called upon to judge and how a scientist, a doctor or a biologist, reasons. The judge must judge in black white at the end. Scientists never reason like that. (B.T., Lawyer)

[7]According to part of the scientific literature, MAOA-uVNTR polymorphism points to a "genetic vulnerability" thought to predispose the subject to exhibiting aggressiveness when challenged or excluded socially, see Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., & Taylor, A. (2002). Poulton R. Role of genotype in the cycle of violence in maltreated children. *Science, 297*(5582), 851–854.

The Relationship Between an Expert Opinion Incorporating Neuroscientific Data as Means of Evidence and the Principle of Free Evaluation of Evidence

Articles 177 and 178 of the Greek Code of Criminal Procedure establish the principles of the free evaluation of evidence and the principle of the free use of any evidentiary means. Together, they constitute the principle of moral proof, according to which judges interpret facts, including scientific facts, "in light of their reasoned intimate conviction" (Byk, 2012). Under this principle, judges are free to formulate their opinion without being bound by legal rules of evidence. Thus, according to the prevailing view in theory, expert opinions are freely assessed by the court and experts' conclusions are not and should not be binding for the judge. If they were binding, the expert, whose role is to assist the judge, would substitute the latter, jeopardizing the constitutional requirement for justice administration by the courts (Paraskevopoulos & Kosmatos, 2013). As in any inquisitorial system, in the Greek legal system, scientific data can help to construct the "legal truth", which, however, may not be reduced to these facts and judges are free to distance themselves from scientific data. As a result, according to the dominant view in theory, judges are free not to take into consideration the outcome of an expertise, as long as they provide justification for this decision (Konstantinides, 2009). However, with regard to the justification requirement, it has often been commented that the judge, lacking the necessary specialized knowledge, cannot, de facto, put forward scientific arguments in order to contradict or to reject the expert's findings. This is the reason why it has been partly supported in theory that an expert's opinion as an evidentiary means should be binding (Kaiafa-Gbandi, 1983; Androulakis, 1973).

This issue emerged during the discussion concerning the use of neuroscientific data in criminal settings, given that knowledge that comes from neuroscientific methods and techniques is particularly technical and specialized knowledge.

Again, two subgroups were formulated within the group, expressing two opposite opinions on this matter: on the one hand, lawyers who participated in the focus group express concerns that whenever neuroscientific data is incorporated in an expert opinion, rarely will judges be

in a position to freely assess it, as it will be extremely hard for judges to refute this kind of knowledge (section "Free Assessment of an Expert Opinion is not Possible When It Integrates Neuroscientific Data"). On the other hand, judges do not consider this kind of evidence as a threat to their service, and they emphasize the primacy of legal reasoning and their ability to resist to the "seductive" effect of (neuro)scientific evidence (section "Neuroscientific Tools Are Not Likely to Unduly Affect Judges' Reasoning").

Free Assessment of an Expert Opinion is not Possible When It Integrates Neuroscientific Data

The question was raised by lawyers participating in the focus group, according to which, the use of neuroscientific data in criminal proceedings through psychiatric expert opinion may constitute a "*trap*" for judges: the term "trap" is employed in order to indicate that there is a strong possibility that judges accept this type of data undisputedly. This undisputed acceptance may lie in the interpretation of neuroscientific data by judges as objective technical-scientific, scientifically valid and reliable data. But, according to lawyers, even if judges appear unconvinced and uncertain as to the neuroscientific expert's opinion's credibility, they may eventually end up by accepting it, as—lacking the necessary specialized knowledge—they will not be in a position to refute it.

Concern is also being expressed about judges' opinions being substituted by scientific data, which is identified with an automated way of administering criminal justice.

L.A., lawyer, expresses this concern as follows:

> It is like giving a sort of tool to the judge, which inactivates their judgment and decides at their place if the accused person will be responsible or not. This seems both unscientific and outrageous to me. You're rendering the judge obsolete.

Concerns are also expressed about the possibility that this type of data is used to the detriment of defendant's rights, resulting in a reversal of the

burden of proof in violation of the presumption of innocence and the right to a fair trial.

In the end, the lawyers participating in the group conclude that the support that such data can provide to the judge is not substantial, but only psychological in nature. According to them, neuroscientific tools can act as an "authority" that helps judges only psychologically, as it lifts the burden of a difficult decision, but in reality it hampers judicial work, undermining free evaluation of evidence and acting as a substitute of legal judgement. Lawyers basically express concern that the legal reasoning is going to be replaced by scientific reasoning.

As V.T., lawyer, comments:

> I think that the more scientific tools you put in the game of evidence, the more you drive the judge away from making that decision. After all, you take away their responsibility. (V.T., Lawyer)

Neuroscientific Tools Are Not Likely to Unduly Affect Judges' Reasoning

Judges participating in the focus group take a defensive stance to this issue, seeking to establish the primacy of legal reasoning and emphasize the independence and autonomy of their service: they reply that there is no danger of replacement of their judgement by neuroscience, as it is through legal reasoning that they will be able to refute an expertise/psychiatric testimony. To lawyers' concerns about the risk of judges being overly persuaded and basing their decision on elements of questionable credibility, they oppose the legal framework and established case law, which, according to them, provides them with a means of defence against questionable expert opinions.

E.E., Judge, defends the power of legal reasoning and its ability to resist questionable science in the courtroom in the following words:

> According to the Constitution, it is us that must make the decision and it is us who are called upon to reason…What an expert will say will help me, but the expert will not make the decision for me …. And the

> argumentation/confrontation will be based on a legal criterion, not on a scientific one. (E.E. Judge)

The Issue of Dangerousness: Correlation Between Dangerousness, Mental Illness and Neurobiological Data

Neurobiological Data as Evidence of Dangerousness

In general, dangerousness and recidivism risk of the offender are explicitly mentioned by the two judges participating in the focus group as an important criterion that plays a crucial role in deciding which type of sentence or custodial or therapeutic measure to choose. Taking into account the public opinion in their decision, judges are especially concerned about their duty to protect society.

This concern is emphatically expressed in M.B., Judge's comment:

> Judges have a mission, that is, to protect public safety…dangerousness, as a factor, does exist in the mind of a judge and is always taken into account, in fact, it is the main factor which is taken into account. (M.B., Judge)

During the discussion, judges strongly correlated dangerousness with mental illness and with schizophrenia in particular, an approach which accords with the social stereotypes of the "violent mentally ill offender" that associate severe mental illness—and especially schizophrenia with violence.

E.E., Judge, characteristically mentions:

> Mental illness, to a certain extent, carries a very high degree of risk. You can't release a schizophrenic person. This person objectively constitutes a danger to society …. (E.E., Judge)

Judges interpret the existence of neurobiological abnormalities as indicative of a different biological structure between "violent" and "non-violent" individuals. Brain damage is considered by judges as permanent damage which results in the loss of ability to control impulse.

E..E, Judges, mentions:

> People suffering from a degenerative nervous system have been observed to have impulses and urges, more than normal people, that's for sure.

Potentially dangerous individuals appear to be grouped/characterized as biologically different on the basis of their dysfunctional brain. And it is this particular characteristic, the dysfunctional or damaged offender's brain, that justifies an individualized sentence and is crucial to the judges' decision to impose either a custodial or therapeutic measure. Judges tend to believe that neuroscience can help differentiate between a dangerous person and a mentally ill person.

E.E. one of the Judges' comment indicates that neuroscientific data could indirectly be perceived by judges as indicative of an offender's dangerousness and affect their decision accordingly.

> If a person is indeed completely incompetent because of their damaged brain, this will personally help me understand this person's problem and judge accordingly whether this person should be in custody in case they're dangerous, or receive treatment if they suffer from a disease. (E.E., Judge)

Neurobiological Data as Evidence of Reduced Responsibility in the Context of a Defence Strategy

From the lawyers' point of view, neuroscientific data could prove useful in the context of a defence strategy, in cases where the court is sceptical on the existence of an alleged mental disorder and considers an existing expert opinion to be unreliable. In this respect, these elements could serve as a tangible, "organic" proof of the existence of a mental disorder that excludes (or reduces) responsibility.

Thus, although having previously acknowledged the fact that neurobiological data cannot objectify an existing psychiatric disease, lawyers are aware of the appeal of this kind of data to judges and do not hesitate to give it a try in the context of a defence strategy.

However, lawyers are aware of the limitations of using this kind of data in criminal settings and express concerns about whether it will benefit the

defendant. They are very much aware of the fact that this kind of data is open to interpretation, which makes it flexible and allows its use in the criminal process as strategic tool both for defence and prosecution.

As one of the lawyers, D.S., comments:

> I would use this kind of tool if the court did not believe that my client truly suffers from a mental illness and had doubts or considered the expert opinion unreliable… However, either as a defense lawyer, or as the plaintiff's lawyer, if one was to use it against me, I would definitely have a lot to say to the court about its unreliability.

Indeed, as shown by case studies (Gkotsi et al., 2019) conflicting expert testimony and radically different interpretations of the same neuroscientific data suggest that the latter are open to interpretation by neuroscientists and are susceptible to being presented and interpreted by experts according to the legal side they represent.

This is related to the "double edged sword effect" (Barth, 2007), according to which neuroscience could indeed lead to defendants being found less blameworthy, but such evidence could also backfire, if judges conclude that the neuroscience shows the defendant is constitutively, irremediably dangerous, and hence must be locked away for a longer period of time to protect the public.

Discussion

As a result of the discussion and interaction that was developed in the "legal" group two "sub-groups" were created, judges and lawyers, who disagreed and confronted each other on several of the discussed issues. This confrontation between lawyers and judges reflects their distinguished roles in the criminal proceeding. Lawyers' primary concern focuses on protecting the interests of their clients and they frequently express concern that neuroscientific data may be used to the detriment of the latter. Judges respond defensively to the concerns expressed by lawyers that judges may misinterpret or be "seduced" by such evidence

and support the use of this kind of evidence in criminal settings, believing it will substantially help them in formulating their opinion.

While lawyers are sceptical as to uses of neuroscientific evidence in court, judges are unaware of the scientific limitations of neuroimaging techniques and consider neuroscience to be a valuable tool, one that will "untie their hands" as one of them mentions in a very characteristic way. When they have to make a decision in a field where specialized knowledge is required, judges consider data obtained from neuroimaging techniques to be highly reliable and scientifically valid, as opposed to data obtained through "traditional" clinical psychiatric examination. Judges have high expectations from neuroscience, hoping that it will contribute to the "objectification" of a seemingly opaque discipline, such as psychiatry. Neurobiological data, due to their supposed biological basis, are considered as able to objectify psychological and psychiatric data and thus as "physical" support for psychological and psychiatric conclusions. The foundation of a mental illness on an organic, cerebral basis lends credence to psychiatric assessment, which is therefore considered as more "objective" and scientifically valid, when enriched with findings from neuroimaging techniques or information about the brain. Therefore, this kind of data is hoped to make psychological and psychiatric evaluations more reliable, more coherent and more scientific.

References of judges to neuroscience being able to prevent them *"from floating in the ocean of a psychiatric expertise …. and objectifying vague (traditional psychiatric) expertises* indicate that to the judges' mind, a valid medical approach should be embedded in the positivist tradition, according to which, valid knowledge is identified with scientific knowledge. The latter must be cleared from any metaphysical element derived from "traditional" psychiatry, which, to the judges' mind, constitutes a cloudy scientific landscape.

Even though they acknowledge their potential contribution to a defence strategy, lawyers participating in the focus group are not enthusiastic about the use of neurobiological data in criminal settings, acknowledging their scientific limitations and the fact that this kind of data is open to interpretation, which makes them eligible to serve as strategic tools both for defence and prosecution.

The discussion also shows that non-specialists tend to categorize neurologically impaired individuals by their dysfunctional brain, as having a biologically different structure. According to them, the ability to examine the perpetrators' brain reveals useful information that allows for an individualizing sentencing and facilitates the decision to impose a custodial or therapeutic measure.

There is a common expectation of all the participants in the legal team (judges and lawyers) that neuroscientific data will suggest new ways of treatment and prove useful in selecting the most appropriate therapeutic treatment/measure. This could indirectly point to the fact that participants associate dangerousness with a brain disease or dysfunction which can be treated. Participants believe that new knowledge about the brain could lead to an increased adoption of individualized, socio-rehabilitative measures, which will contribute to reducing recidivism of offenders upon release to the community. In this context, dangerousness could be considered as a clinical condition with a neurological basis that can be identified and treated.

This approach brings in mind current discussions about the uses of neuroscience for assessing the possibility of treatment of perpetrators. It is associated with current discussions on the uses of neuroscience for evaluating a perpetrator's "treatability" and raises the issue of a return to the therapeutic approach to crime promoted through neuroscience, as revived by numerous recent studies on the neurobiological basis of violent behaviour and crime (Raine, 2013).

Throughout the entire discussion, tension is evident between Science and Law which are perceived by participants as polarized disciplines, antagonizing each other. The two disciplines are in constant competition, which reflects their particular relationship and their different social functions and purposes. Law pursues the abstract idea of justice, whereas science attempts to describe and, ultimately, explain real phenomena. Yet, at a lower level, law does deal with real circumstances and events, and so cannot avoid recourse to evidence, including scientific evidence (Eastman & Cambell, 2006). The discussion stresses the need to delineate the scope of each discipline, but also the possibilities of cooperation. What is therefore needed is to overcome the communication barriers

between the judge and the psychiatrist-expert and effectuate a "translation" of the results of neuroscientific research and techniques presented to a court, to the legal language.

Limitations

In the present study, the focus groups' method was selected as a pilot study, with the aim to make a preliminary investigation of the perceptions of professionals involved in criminal proceedings concerning the use of neurobiological data in criminal contexts and to investigate the potential "bias" as to persuasiveness, objectivity and scientific quality of experts' opinions that include neuroscientific tools and findings. The focus group study is part of a larger research and its findings must be combined with findings from individual interviews with judges which constituted the next stage of the research.

The organization of a single session does not allow for the generalization of results. In order to confirm and enrich the findings of this pilot focus group, it is necessary in the future to organize more group sessions per professional category and possibly a final session involving a joint group of legal scholars and neuroscientists—psychiatrists that will interact.

As far as the composition of the teams is concerned, it would be useful that the team of legal scholars be enriched, apart from lawyers, with judicial officers of all levels (Presidents of the Court of First Instance, judges in Courts of Appeals, Prosecutors) of all ages and experience, in order to examine the extent to which experience, age and qualification influences the perceptions of the judicial officers regarding the credibility, scientificity and objectivity of neurobiological data used as evidence.

Conclusion

The preliminary findings from a first focus group suggest that judges do tend to consider neuroscientific data as credible, objective and scientific, useful pieces of evidence that will assist them in deciding. At the same

time, this kind of evidence is, to their mind, able to give an exact insight to an offender's clinical and neurological condition and thus guide them in imposing a suitable sentence or measure. On the other hand, though acknowledging its potential use as a defence strategy tool, lawyers are more sceptical concerning their use in criminal trials, taking into account the interpretative nature of this kind of evidence.

In addition, judges interpret the existence of neurobiological abnormalities as indicative of a different biological structure between "violent" and "non-violent" individuals, which suggests that neuroscientific data introduced in a criminal setting may be interpreted as strong evidence of dangerousness, based on the high probability of recidivism of brain-injured offenders.

Judges distinguish and put special emphasis on neuroscientific data as a decisive and objective factor on which dangerousness assessments could reliably be based upon, disregarding other factors which should combinedly be taken into account in assessing a person's future risk of committing new crimes. However, reducing dangerousness to a single factor, to a specific neurobiological structure in the case, can lead to stigmatization of people with brain malfunctions, who could be defined as dangerous, based simply on a trait they possess: their defected brain. In this context, despite the fact that neuroscience findings can assist, to an extent, in assessing an offender's future dangerousness, there is a danger of returning to a simplistic explanation of violent behaviour, if neuroscientific evidence is presented by the experts or understood by judges as the ultimate scientific and objective tool, able to prove a causal link between some structural or functional brain abnormality and the propensity to manifest criminal behaviour.

The alleged ability to detect dangerousness-based exclusively on brain malfunctions maximizes social expectations of identifying a category of potentially dangerous individuals and exercising social control on them.

Hence, members of the legal profession must be trained in how to recognize the strengths and weaknesses of this new type of evidence expert report. Only by correctly assessing neuroscience data, while remaining aware of its potential impact on their evaluative and decision-making processes, will they be able to exploit its potential contribution to evaluating future behaviours (Moulin et al., 2018).

It is undisputed and suggested by all the participants—judges themselves included—that there is a need to train judges on this matter. Judges, and legal professionals in general, must be trained in how to evaluate this new type of expert report without allowing its perceived objectivity to influence their critical faculties. As judges may overestimate the importance of neurobiological deficits for the assessment of responsibility or the prediction of criminal behaviour, their training would aim to inform them on the limitations and the interpretative nature of this kind of knowledge and make them more vigilant as to the interpretation and meaning attributed to neuroscientific data. Only by remaining aware of neuroscientific data's potential impact on their decision-making processes, will judges be able to exploit their potential contribution to evaluating and explaining behaviours (Moulin et al., 2018).

Finally, assessing the role of the neuroscience for the evaluation of responsibility and dangerousness of a mentally ill person, we should bear in mind that the issue of distinguishing "normal" from mentally ill people is not an exclusively epistemic matter, but to a certain extent, normative. The bipole "normal - pathological" (Canguilhem, 1966) is a fundamental form of organization of medical knowledge that organizes corresponding forms of intervention on the phenomena of health and disease, however, from the standpoint of the philosophy of science, the definition of the concept of "normal" remains fluid and polysemous, directly related to the gnosiotheoretical system in which it emerges and used each time. Whether neuroscientific findings will help solve this issue, offering data which will be useful to distinguish pathological from non-pathological people on the basis of the brain remains uncertain, as it will most likely continue to be, to a large extent, a theoretical/philosophical and normative discussion.

In the current socio-political context, where expectations vis-à-vis psychiatrists are particularly high, often based on the hope of anticipating and eliminating all kinds of risk, we should be aware of the risk of distorting the meaning of neuroscientific data with unrealistic and arbitrary interpretations, resulting in the imposition of heavier sentences and preventive detention for some categories of criminal offenders, based on their defective brain.

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Dr. Georgia Gkotsi is a Research Fellow at the Faculty of Law of the University of Athens, Greece. After receiving a law degree from the University of Athens, she completed a Master's in Philosophy of Law and Bioethics at the same University, followed by a Master's in Comparative Law at the Universite Paris 1 - Pantheon Sorbonne. She received her PhD from the University of Lausanne, Switzerland. Her dissertation dealt with the ethical and legal implications of the use of neuroimaging techniques in criminal courts. Her research expertise lies in the area of mental health law, human rights of mentally disabled persons, neurolaw, and bioethics.