



Interpreting Neuroscientific Evidence in the Legal Domain: Do the Stereotypes Come In?

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Abstract

The current article explores the meaning of neuroscientific evidence in the legal domain. It takes a social-psychological perspective to discuss how group-based stereotypes affect legal decision-making critically. Examining how any interpretation is anchored and objectified is interesting as evidence is interpreted in the context. Dominantly, with the ubiquity of neuroscience in different domains, the brain is positioned as an authentic source of nurturing authenticity. It is observed that sometimes unquestionable scientific knowledge may surpass the rationality and intuition of judges. In one way, it is a boon; in another, it is shaping the whole framework of our knowledge system, where knowledge from brain studies reifies our understanding of human actions and thinking.

Keywords Brain · Evidence · Interpretation · Stereotype · Law

Brain researchers are mostly called neuroscientists and neurologists who investigate the nervous system, brain structure, and its functioning during engaged thought processes, free-thinking, behaviour, or actions in some context. Since the brain is a complex organ and neuroscientists have shown its importance in our behaviour, the rise of research in neuroscience and its interdisciplinary connection and application to many domains has increased its significance as normal science. Though its application is ever rising in court, its spread among the masses seems like the ‘other world’ of science and little evidence is there about how the brain comes to common sense or ‘meaningfully infiltrated lay thinking’ (O’Connor & Joffe, 2014). Using words in our everyday discourses requires the logic of culture and community to interpret the meaning of the discourses. Since the court had kept an essential check over the fake

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science or wrong distribution of knowledge among the public, it is inevitable to check the social representations of technology with which people construct their social reality and meaning system. Also, according to Rose and Abi-Rached (2013),

“The brain now seemed open to environmental inputs, not just at the level of the synapse, at the level of cortical mapping, or at the level of the neuron and neurogenesis, but at the level of molecular processes of the genome with consequences that might pass from parents to children and even on to their children. The developing brain of the child now seemed to be a key site through which a range of social problems could be understood; once mapped onto the brain, paradoxically, they became more, not less amenable to intervention-governing through, and in the name of the plastic brain” (p. 51).

The dominant assumptions in neuroscience systematically correlate brain functions with the organism’s behaviour. The strict neurological evidence related to brain disorders (e.g., tumours) and any neurotransmitter defects appropriate to the person’s actions are further interpreted as abnormal, criminal, or both. The sociocultural psychological approach departed from this neuroscientific strict advocacy of the persons’ agency. Also, “there is no causality from the brain to the action. Just because a person has some neurological defect does not mean that the person will commit this or that crime. For example, Vygotsky argued that people with neurological defects can be part of society by introducing adequate tools and sign systems with which they can neutralize their defects. So, again, the person and its culture can circumvent brain defects and do so already (see Vygotsky, 1925)”¹. It is also needed to assert that “it is not the brain which does something with us; it is us doing something with our brain” (De Kessel, 2016; p. 16). The brain is not like a computer’s central processing unit, which requires command from the operator. Still, as a natural operating unit, it is as flexible and ready for change as per the person’s will. Imposing determinism on the human agency is contrary to the idea of freedom humans deserve. The brain is not separate from the human conditions and corporeality. It is a matter of interpretations, theoretical framework, metatheory, and epistemologies, which either separate the brain and human agency or take it as holistic. The big debate on mind and body often creates a separation, which is aptly rejected by the legal domain (see Pardo & Patterson, 2013). Reducing human agency and freedom to natural laws is also an interpretation that goes beyond chaos and gives clarity for brevity. The rampant stereotypes through which an individual is understood have remarkably affected interpretations of evidence and decisions with racial, casteist or minority connotations. There is much reporting in the research in psychological jurisprudence and the legal domain in general about the discrimination people from the depressed classes and minority groups face. The rampant misuse of science and technology, junk science and unsuitable metatheory shaped the interpretations of evidence or even the selection of evidence. The biases based on stereotypical knowledge about the people and group are often seen in the incarceration process. The treatment of the accused in the courtroom from lower classes, rampant thick-skinned biases based on social classes and system-

¹ I am thankful to the reviewer for their insightful comments.

atic channelizing of the cases to the lower status lawyers coming from low-income groups. The rights of the victims and defendants to have their cases discussed carefully and, if needed, go through the available avenues of reliable scientific techniques are sometimes ignored because of their lower status. Under the idealism of law or legal rights, the structural differences in the social positioning of the individual ultimately led to deprivation. The whole Innocent project² facilitated the movement to help the innocent go awry because of ignorance due to these class differences. There are legal clinics and legal aid facilities, but most people are either unaware or don't find a person who can help them. The conviction of innocence and duration of the incarceration for the cases in process stigmatize the person in the society and reification of their imposed criminal identity. One agenda is whether the developments in neuroscience at least help in rethinking the taken-for-granted criminal identity of the individual or reify the generated categorization and confirm by misinterpreting the neuroscientific evidence. Even the rights of the victims for their mental status examination and brain study do not involve due process and fair treatment. In the following sections, this paper debated the role of stereotyping in interpreting evidence and whether neuroscientific evidence is immune to it. One of the concerns here is about the meaning of stereotype, which is not an individual's mental template but is shaped in the socio-cultural context in the collective sensemaking and enactments. The brain operates as a holistic and non-dual system in human beings. The brain doesn't define our agency, nor is it separate from ourselves. In our collectivities, we shape our agency and the meaning of life. This was the crux of social identity theory, which invented the social meaning of stereotypes that construct our reality (Turner et al., 2016). The possibilities of stereotypes and prejudices are prominent in the legal domain, which is seen in the incarceration of minorities and judgements of dominant groups whose representation in the judiciary is quite high (80% in the case of India). Since stereotypes are not neutral concepts but a political reality, the deep divides in society based on social categorization are systematically observed in sentencing and suspecting. This paper discusses the limits of neuroscience and metatheory, which may lead to faulty interpretations. For the law, the testifying theory needs solid experimental evidence. However, it is quite a minority but prominent view that something social psychological sneaks into the interpretations of evidence on the hotbed of the courtroom. Authenticity is established since evidence is associated with facts, proofs, congruency, and consensus among experts and legal agents. The quick assumptions about human nature, such as motivation and intent, derive from the implicit theory people hold about others. This has very much formed the backbone of legal realism and legal thinking. As the statistics show, the number of minorities incarcerated in India and across the world is high as compared to the upper caste and dominant races. The role of a social class, comprised of income positioning and criminal charges, has a clear relationship (Reiman & Leighton, 2016). The group-based biases are observed in the incarceration process, which further led to explain that minorities and lower-income people are at increased risk of criminal activities due to low representation in the job market, stereotypes and prejudices, and historical exclusion.

²<https://innocenceproject.org/>.

Neuroscience brought all the stakeholders under its evidentiary radar, whether the defendant, plaintiff, lawyers, or judges. In the emerging domain of neuroscience and law, these stakeholders are no longer neutral and the bearer of precedential mechanisms, but they assert their experiences and intentions. If given opportunity and social support, even the low-income victim feels free to open up in the courtroom. Though the pro bono law system supports these groups, freedom is still bound to the periphery of law. The achievement of the practical goal is the agenda of law and neurosciences, with its most established model, which can be the best possible addition to the evidential status. This pragmatic influence on law is both justified and feasible and quite observable in the judges' verdicts, which can be seen as a kind of pragmatic maxim as consequentialists attempt to generate wisdom feeding the future course of action. For neuroscience, concrete facts are better than abstract truths. This was William James' pragmatic influence throughout practical actions, which directly addressed the concerns of the legal agents. The critical dialogues and debates in the neurosciences are out of scope in the legal domain unless the dominant legal agents and judges instigate it. The dominant assumptions of the powerful in society define the logic of interpretations and legal decision-making through the interpretations of evidence. How is the political party agenda in a country like India also congruent with the court's decisions? This interpretive paradigm also needs verification of the propositions that derive the evidence's meaning. The Pramana and facts require proof and corroborations to stand admissible in the courtroom. The burden of proof is a vital avenue of verification that can bring uniformity to evidence interpretation. The psychologist's stance on getting experimental evidence to substantiate the theory does not always satisfy the courtroom. However, the neuroscientist claim becomes an unquestionable acceptance. The critical understanding of the neuroscientific facts further requires philosophizing and theoretical positioning through the lens of social justice. Even interpretations based on faulty assumptions and stereotypes based on the superficiality of information and incompetent data seem violent, so Thomas Teo aptly rounded them as epistemological violence (Teo, 2010). Evidence search belongs to the domain of legitimate science and authority, and any alternative way of approaching the cause is dismissed in the legal domain. In the courtroom, the possibility may usually arise that neurological evidence and forensic evidence can be seen as admissible. Roskies noted, "neuroscience might enable us to develop a more sophisticated view of responsibility that takes into account both the cognitive demands and the contextual demands made by intuitive and legal notions of responsibility and reconciles them with a scientifically informed view of the brain as a physical system that governs our action (2006; p. 423).

The Future of Brain-Based Evidence in Law

It was argued that the law is an instrument of oppression that elite members of society wield against those who are disadvantaged, especially members of a racial and ethnic minority group (Sidanius & Pratto, 1999; Tyler & Jost, 2007). The rise of evidence and metatheoretical speculations that sharpen the evidence can have various meanings for lawyers and scientists. Some articles, such as "Is Science Different

for Lawyers” (Faigman, 2002), showed a positive picture of experts from different disciplines who can contribute to courts. My concern here is to look for a metatheory that steered the experts’ orientations in the design of methods and data assessment, both at the group and individual levels. There were many cases in which the biases in the form of stereotypes attributed towards the people of minority and disadvantaged communities based on one’s gender, caste, and social class. As the court looks for evidence linked to the data-based impression of some phenomenon under observation, it is equally possible that data may be wrongly attributed or categorized. For example, gross bias was discovered in which machines predicted the crime of a convicted person in the future. It was observed that people from minority groups, such as Blacks, were predicted to be at high risk of committing a crime as compared to the White groups as per the computer program (Angwin et al., 2016). The possible intervention of neuroscience in the courtroom may increase the variety of evidence, but the broader perspective under which this evidence is interpreted is not very varied. The improved decision-making quality in the courtroom links to neuroscientific advancements in the study of the brain, mind and behaviour. Law corresponds to human acts either conducive to the sustenance of societal structure or a threat to moral values and sociocultural norms. In the book ‘an invitation to cultural psychology’, Valsiner (2014) noted.

“the notion of *society* is an abstraction—a presumed entity with an implied moral façade. If we try to find it in practice, it is ephemeral—and hence ever-present and powerful. They have no agency but through the participatory collaboration by human beings. Yet through the social positioning of these human beings within a social structure, which is also created by the social roles for these beings, and by giving them goals-oriented functions to carry out as personal accomplishments, society becomes a powerful force of both constructive and destructive potential (p. 210).

Law enforcement is to create a space where injustice can be avoided. However, the dilemma occurs if the law only fits the status quo, facilitating oppression. The law, science and society seem broad and separate, but they are not. The use of neuroscientific knowledge along with other sources of evidence may add value to legal decision-making, provided there are neutralizers, such as the mechanism of diversity in the juries or judge panels and critical advocacy, that may filter against any skewness due to inadvertent fallacies or biases. The role of society as a constructive or destructive force is entirely observed in the representations of juries and judges and how they enforce stereotypical understanding under the shield of law. Neuroscience is neither from societal forces nor immune to stereotypes and interpretations.

As aforementioned research in social psychology also examines how the brain is socially represented (e.g., O’Connor & Joffe, 2014). It has been found that neuroscience has not infiltrated the common sense understanding of brain research much. They showed how the interception of neuroscientific knowledge into the public consciousness happens when they develop any neurological illness. Further, the judges are trained in legal knowledge and judicial practices; however, they can be laypersons in the understanding brain. The chances of being influenced by the neuroscien-

tific knowledge systems through brain imaging may also impact the admissibility of evidence if we go by the various standards of admissibility of evidence. (e.g. Daubert standard; Frye test). The judges need guidelines on understanding brain imaging studies, which are likely part of the courtroom and may influence them (see Jones et al., 2014). Basic neuroscience research is laboratory-based, and its conclusion depends on statistical data analysis. This approach denotes the prominent work of experimental science in sciences and psychology. The latter has confronted debates on the analysis of data and the increasing replication crisis, which, of course, can be avoided with a clear articulation of statistical variations and other sources of uncertainty (see Ting & Greenland, 2024). In the case of neuroscientific knowledge as evidence of the person's intentions and acts, the judges, along with the neuroscientists as amicus curie brief, develop the precedent, which may consist of a model helping in filtering out stereotypical interpretations of the evidence. The conviction of people from historically oppressed backgrounds is high, and sometimes, the death penalty by the lower court also exceeds for them as compared to the criminals from higher classes. Some cases were made that neuroscience has the potential to provide biological justice when there is a mitigating effect on the decisions (Saks et al., 2014, as seen among the mock jurors). Since our societal values do not always coincide with scientific values, in litigation, the presentation of scientific knowledge, such as neuroscience and DNA, can play an essential role if understood and debated among the diversities of juries. However, suppose the political beliefs, identity issues, prejudices, or dominant ideologies overpower the jury. In that case, the polarizations and biases are difficult to avoid. There will be remarkable differences in the interpretations between the members trained in neuroscientific interpretations and those not (e.g., (Roskies et al., 2013). As interpretation depends upon the intuitional knowledge the person in the power position has acquired, sensitivity training to the legal stakeholders seems necessary to fulfil the agenda of biological justice and reject neuroscience's seductive influence (e.g., the seductive allure). For example, one study (Weisberg et al., 2008) briefly described some psychological phenomena to neuroscientifically naïve adult participants. It gave detailed explanations (good or bad in quality), which either contained irrelevant neuroscientific information or no information. They found that an explanation with neuroscientific information was deemed more satisfying. The concern here is how much relevant neuroscientific information is provided in the explanation to the layperson. Any interpretations based on a faulty understanding of neuroscientific knowledge may only affect the dignity of the person hoping for justice from the courtroom.

Neuroscience shows how substantial neuroscientific evidence is for the justice system if carefully considered (see Aono et al., 2019). Jones et al. (2014) advocated that the legal domain needs to investigate different pieces of evidence to come to better conclusions, and the human picture is incomplete if brain studies are excluded from the holistic understanding of human beings. The meaning of evidence is not disconnected from methodological individualism, which shapes the meaning of verdicts and legal decision-making. Brain research is a powerful area since it provides concrete information about the brain and has the potential to connect to various disciplines, claiming to offer applied knowledge about human thoughts, actions and social relationships. Government bodies and institutions aptly take it as a fascinating

knowledge system that can provide insights into governmentality and regulations through biometrics and artificial intelligence representing the dominant value system emanating from the privileged. The possibilities of stereotypes shaping the interpretations and governmentality (see Rose & Abi-Rached, 2013). Brain research steadily progressed as other avenues of psychology and other disciplines moved forward. As the matter becomes complex and a new perspective of thinking and understanding the world emerges, a new challenge is created for brain research. Since brain research cannot stand on its developed platform, as it also corresponds to human behaviour, which is also social behaviour, the continued association is needed to understand the human biological structure, self and its intermingling with the social symbols and everyday interactions.

The question of where brain research leads can also be understood in terms of where society and law advance; since brain science talks about the structure and function of the brain, its propositions always correspond to neurochemical and social actions, a complex network nurtured under the periphery of law. Though law subscribes to its concepts and categories, its emphasis on evidence for the verdict announcement sometimes needs to be more comprehensive to understand the actual cause. Fontaine (2012) conjectured the necessity of logic behind understanding the relevant cause. It is crucial to be logically clear about the relevance of causal relationships and the moderators under which this relationship flourishes. It will be a logical fallacy to relate the irrelevant variables because they always happen simultaneously without understanding the broader environmental, individual, and sociocultural factors. As Hume showed scepticism about the cause and speculated that they are merely impressions, Thomas Reid was more optimistic about the existence of the productive cause, which produces an effect and change by the exertion of its power which is beyond physical exertions (see also Bragues, 2008). He advocated active power without which “we cannot be morally responsible, and yet it is manifest that we do have active power and that we can be morally responsible” (Roeser, 2005, p. 70; Yaffe, 2004). The power to act and not to act despite the contrary circumstances goes beyond the general understanding of the person as merely a shaft moved by the wind.

The legal domain does not first locate the cause; instead, it starts from the instances of any action or crime and moves back to fix upon the reason most fitting into its precedents. Brain data and its evidentiary steps are secondary to the law, and the primary descriptions are, for example, how any legal scene (crime) is described in the court. Here, the court is content with the logic that data may never end; that is, data will always be in dearth, and there will be no time when we can be confident that data are enough. Since it is expected by the legal agents, plaintiff, defendant, media, and general audience that a verdict should come and must be justified logically. The long clash with the experts about the limitations of evidence and insufficiency of data led to the emergence of legal imaginations and strict reliance on the precedents needed for effective legal decision-making and training the prospective lawyers. Evidence determines the linkage of action with the intentions, which is good enough for the agents in the legal circle to appropriate their decisions. Going further into the brain signatures of the intentions or centring their decision on the available neuroscientific data goes contrary to the very ground of the legal domain, which somehow believes in free will. The experts and lawyers utilise the dialectic of determinism and free will

very carefully. Looking into the possible proportions (e.g., what is in control and what is not) forms their impression of the person's responsibility.

It is imperative to discuss how neuroimaging techniques could better provide exact data from the brain (Shamay-Tsoory & Mendelsohn, 2019) and the chances of ecological validity (Frenkel-Brunswik, 1949), which are no less to ignore when it comes to seeing the congruency between brain state and actual response in the real world. Recently, researchers (Holleman et al., 2020) questioned the ecological validity of the psychologists conducting lab experiments that were presumed to be generalizable. They advocated context-specific and context-generic principles of cognition and behaviour. What was done or committed already happened in the various contexts at that time, and fixing upon those actions limits the idea that consciousness is inflow and in movement. Through these techniques, what is in the brain is committed to that context and time. This is a debate that the law finds incompetent and unsubstantiated. However, the “context in which neuroscience evidence is introduced (see Catley & Claydon, 2015) provides an ideal environment where admissibility considerations are reduced, and evidence of a defendant's current physical or mental state is relevant (unlike some liability questions, where the only relevant mental state is the one that existed at the time of the crime and cannot be measured during litigation)” (Meixner, 2016). There was also the debate around the consequences of confounding by non-imaging categorical variables while dealing with the neuroimaging data. In this context, Linn et al. (2016) suggested inverse probability weighting to deal with these confounding variables, such as age and sex, in the process of multivariate pattern analysis (MVPA) of the complex spatial disease effect across the brain. Sometimes, these non-imaging variables have a confounding profound impact on the person, and locating the exact structure of the brain becomes difficult because of their confounding effect on the process of MVPA³.

Other information which showed the power dynamics or critical aspects of neuroscience and forensics is all tertiary and limited to small academic circles. Though the brain-based mind-reading (BMR) techniques are supposed to operate at different phases and sometimes may detect something in the unconscious, it is difficult to match up with the complex problem of consciousness, which says that the person is not aware of what he knows or something that had passed through the person unnoticed. This may lead to information from the brain that even the subject doesn't know, but the examiner knows (Meynen, 2017). The use of implicit association tests and the BMR to understand the deep-seated knowledge that the person uses tacitly seems promising to neuroscience and, hence, the legal domain. The problem comes when BMR is coercively used in forensic psychiatry, and the relationship between psychiatrist and patient is an authentic relationship with the authentic procedure. The chances are high that the law may uncritically process these aspects under evidence.

Neuroscience, with its picture of brain mapping and expert interpretation, offers competing evidence, leading to its admissibility either as a collaborative and eclectic

³ According to Linn et al. (2016), “The goal of MVPA is often two-fold: (i) to understand underlying mechanisms and patterns in the brain that characterize a disease, and (ii) to develop sensitive and specific image-based biomarkers for disease diagnosis, the prediction of disease progression, or prediction of treatment response”. (P. 31)

evidential venture or replacing the evidence based on junk scientific methods⁴. The legal domain's precedents and methods are paramount and based on the defendant's questioning and coming to some conclusion about the person's involvement and responsibility for the restricted action. Other evidence only adds or enriches the set conclusion based on the judges' intuitions and rationality. Conversely, if any swiping evidence intervenes in the court proceedings with clear and appropriate instances of oppositely equal value. Here, scientific evidence with a clear distinction between outdated and updated reconnaissance makes its presence more powerful. The steady rise of interest in neuroscience, with its closely examined picture of the brain, expanded people's knowledge about human socio-cognitive functioning. However, this understanding is more tangible and observable than the understanding of reality gained through experiences and societal interventions. The knowledge acquired from experiences is enacted and demonstrated in the social world and approved by the people, as compared to the scientific understanding that emanates in the laboratory and leaks into the everyday reality of the people through different channels. One of the intriguing points is how neuroscience intervenes in the court and provides a compelling biological insight. The knowledge that neuroscience gathers and situates in discussing the defendant's case is made admissible and facilitated by the judges, depending upon their reliance, as neuroscience can't offer aloof evidence in the name of reliability and validity, but it needs to be interpreted. The idea of the competent interpreter of the expert evidence seems to be a matter of available norms and discourses surrounding the court since neuroscience offers aloof evidence with proper reliability and validity, but that should be persuasively presented and demonstrated in the court. A pertinent point raised (Meixner, 2016) in this direction was about the logical first step in questioning the relevance and value of neuroscientific evidence, criticism of methods of experts, and the seriousness of neuroscientific evidence. It is predicted, for example, that "Neuroimaging is going to be a common form of evidence in the courtroom (Meixner, 2016). However, it also depends upon the culture and different jurisdictions' comfortableness with neuroscience. The concern of the present paper is not to show the superiority of neuroscience but the need for a justice system which may critically utilize neuroscientific evidence. There are some works in the last two decades which emphasized critical social theory and critical psychological approach to have social justice-oriented metatheory in neuroscience (e.g. Choudhary & Slaby, 2012; De Vos, 2016; Malabou, 2008; Pickersgill, 2013; Rose & Abi-Rached, 2013; Satel & Lilienfeld, 2013; Rose, 2005; Sinha, 2023a, b, 2024). The positioning of neuroscience in the legal domain was more or less a mainstream, laboratory-based understanding of the human mind and behaviour. They added to the dualism of mind and body by making the body more prominent. However, that dualism was maintained when it came to the interpretations of evidence in the case of people from the outgroup (e.g. Ambady & Adams, 2011) or historically stereotyped. In India, the available stereotypes in the legal domain against some denotified tribes are so intense that any evidence, if allowed to be presented, is considered a farce. The first impres-

⁴ Douglas Starr in his article titled "framed by forensics" made a case against the use of out-of-date science in court which may eventually lead to the 'tragic miscarriage of justice. Retrieved from: <https://aeon.co/essays/time-to-clean-all-the-junk-science-out-of-our-courtrooms>.

sion is always that they belong to the criminal tribe, and judicial biases become activated as soon they encounter the victims or defendants from that group. Research into the brain and law in the Indian context has recently started in the form of legal curriculum and courses in law schools. It is a distant future when neuroscience will be debated critically and will be taken forward to the jurisprudential system. The recent launch of the elective courses in my university on brain, society and law; Neuroscience, Indian psychology and law, Psychological jurisprudence and neuroscience has dealt with the critical approaches to neuroscience and law domain⁵. The mainstream laboratory use of neuroscientific information at the practice level may be found in the legal forums. For example, in the case associated with the diagnosed mental illness, a person who is also facing the trial may be further stigmatized as dangerous to society, and the courtroom will also confirm it. The mainstream psychopathology and the available rule for proving insanity may look for neuroscientific evidence, such as fMRI imaging, to figure out any brain damage in the person's brain. If a brain defect is found, this will be presented as solid evidence that may be used either to rehabilitate the person for treatment or to interpret it irresponsibly, which may create further shame and disgrace. The role of sociocultural variations may also contribute to interpreting this evidence in legal practice. However, it is upto the wisdom and authority of the juries and judges to critically understand the mainstream psychological and neuroscientific research and call for groundworkers and critical social scientists to have a better view on these matters (e.g. Chiao & Cheon, 2012; Satel & Lilienfeld, 2013; Rose & Abi-Rached, 2013).

Neuroscience is expanding, and so is its fascination. Through neuroscience, the flow of human thought and intentions as per the universal nature of human beings can be projected tangibly in the empirical world. The complexity of nerve entanglements, as depicted in computer-mediated pictures and sophisticated neuroimaging techniques, dramatically affects people's judgment, for example, the general audience and judges in the decision-making position. There is no space to question these forms of the brain, as they look as natural as any other natural object. However, some time back, the paradigms of social science were sceptical about the fascination with neuroscience as it was generally confined among the scholars interested in finding the neural mechanism of human psychology, but not anymore in that aggressive way. The rise of neuroscience and its popularity has gained importance among the scholars of social science who must answer the most basic questions related to human science, the embodiment of consciousness and the history of evolution. However, as time shifts with different forms of fascination and renouncement, neuroscience, with its grand picture, may find alternative critiques that may become more persuasive in explaining human nature.

The question of human existence in the social space is answered in one's best capacity to understand the situational consequences of action and the disciplinary responses. The alternatives to give the best explanation ahead of neuroscience can

⁵ In the last couple of years, as a law school faculty member, I dealt with the pertinent issues related to neuroscience and law confluence. Undoubtedly, students found deep interest in the courses and the future psychological jurisprudence in India will expand and contribute to the paradigms of social justice and critical legal studies.

be systematically rejecting the neural mechanism and adopting a more concurrent view emanating from the socio-political-geographical landscape of everyday linguistic exchanges. However, neuroscience empirically shows the concrete neural basis of human behaviour. However, human behaviour and subjectivities are formed and rejected in the social space, and capturing the atomist cause of various thoughts and actions can only be placed in one systematic format. We cannot say this is the ultimate format for explaining human relationships, actions, and intersubjectivities. Again, what can be inferred over time is the most general view of humans. In our daily lives, we don't go by scientific findings but by a common-sense understanding of them. The difference between the understanding of mechanisms between psychologists or neuroscientists and the general population who don't have to go through the challenging experimental and neuroimaging complexities always persisted since the linearity between cause and effect keeps going on among the different domains of scientists and societal members, in other words, between people who are interested in finding the cause through the sophisticated experiments and people who live on their own experience and precedents to understand the reason behind. However, recognized science, such as medical science, has an important impact on the people, which is also communicated among the general population via government, media and one's interaction with scientific knowledge.

It is a well-established idea that the human brain and consciousness are related. Though the brain seems to be the ultimate starting point of everyday interactions, human science, like psychology, expands beyond neuroscience in explaining the cause of human behaviour. Neuroscience is limited to the brain, and psychology encompasses many terrains of human thoughts, social relationships, languages, and culture.

Amsterdam and Brunner (2000) pointed toward the Whorfian hypothesis, which states that as many languages, the representative thoughts. The emergence of correlative studies in behavioural and cognitive neuroscience can also interpolate the commonsensical way of representing human action and intention and further metaphorize them. The same distortion based on stereotyped characters, plots, and histories can be reproduced in the legal domain with the new culmination of metaphors and technical vocabularies. This is what Amsterdam and Brunner (2000) called a Whorfian distortion. For example, when an incident takes the form of an accident. The misunderstanding of the situation in the factory is that the fuel barrel is empty, and the worker throws a lit cigarette into that empty barrel without realizing that it still contains traces of the fuel. The word empty had 'produced the disaster' (p. 142). The jury or judges may either catch this term empty and the whole decision consensually approved without further thought. This may further raise the issues of culpability and in-culpability depending upon the defendant's cognitive distortion and being swayed by the notion of an empty barrel. Even throwing a lit cigarette into the barrel is an act of carelessness and a breach of the factory's policy against smoking on the factory premises. Even the structure of the language, like the neuroscientific one, influences the communication pattern that directs the thought about gender.

The question is about the way neuroscientists understand the brain. Is it the only way or direction encompassing the understanding of the brain cited as the most critical biological point of the whole human life process? Do we stop here or move fur-

ther in understanding human social life? It is not just a biological makeup; it makes a human sociality and management, with social signs and symbols (see Mead & da Silva, 2011). It is not that we know a person as a brain but holistically as a social being with personality, emotions, political orientations, family affiliation, as an organizational member, a person belonging to some cultural, indigenous or religious group. The concern that only neuroscience has the authenticity of understanding the brain is short-sighted, as clarity is not reached on whether brain neural firing is connected in any causal way to magnificent human thought and behaviour. Blakeslee and Ramachandran (1998) stated that neuroscience is at the stage of Faraday rather than Maxwell, and giving a unified theory about the brain is not possible as happened in physics. The rush to come out with an exact match of brain and consciousness is a hasty effort, just like a parent who may think giving a growth tonic to the child will speed up the development process. There is something about human biological nature that needs to be respected, and reaching some point of maturity doesn't guarantee that a person will not engage in any act considered to be rational.

Bayesian Approach to Self, Law and Neuroscience

The self of the person explained at the personal identity level is more straightforward, as in the work of Laing (1960), where the persons who have some psychological disorder seen in the person's social activities construed or distorted into divided self, where "images of the child is of someone constantly facing the task of self-creation based on available evidence" (see Richards, 2009; p. 250). For example, he traced psychopathological disorder "to the social dynamics of the family during childhood where children create their identities from the messages received from those around them". If these messages "are contradictory or confused, they are driven to increasingly bizarre lengths in trying to understand what is going on" (see Richards, 2009; p. 250). One of the possible approaches is to overcome Cartesian dualism, as Chomsky (see Katz, 2012)⁶ critically noted the rise of the unification of the brain and cognitive sciences. How come this integration of brain and cognitive science will debunk the established theories on intelligence and other cognitive superiority of one over the other? The correlation between brain functioning and outward behaviour has simplified our understanding of human social relationships. It is another way of theorization from the critical perspective or from the approaches of diverse identities that intermingle with their environment in culturally divergent ways, outside the understanding of majoritarian and mainstream views, which may offer a beyond-the-boundary explanation of this interdisciplinarity. The appropriation of this historical knowledge as scientific knowledge embedded through the confirmation biases and ignoring what relieves the marginalized from the shackles of wrong attributions showed the demeaning and devaluation of one agency as volatile, movable, and congruent to the idea of social change. Science itself is a movement where new observations change

⁶ Katz (2012). Noam Chomsky on Where Artificial Intelligence Went Wrong: An extended conversation with the legendary linguist. *The Atlantic*. (<https://www.theatlantic.com/technology/archive/2012/11/noam-chomsky-on-where-artificial-intelligence-went-wrong/261637/>)

or additions to the previous theory, which Popper (1968) stated as the marker of the scientific approach. The confirmation biases in science and social science interdisciplinarity give way to pseudoscience and all sciences, in which generalization based on a few observations may not be representative. However, if science liberates the marginalized from the wrong attribution and historical misunderstanding in the laboratory and public domain, it has the potential to be social change oriented. It can also be the case that two categories of observation, one from the brain activities and the other from the general understanding of others, may co-vary, resulting in immediate association and impressions. As we process various kinds of social information, it will be simplistic to generalize that general social cognition, which neglects consensus information, is human nature. Our engagement with different social and culturally based information is also a matter of our socialization and repetitive engagement with the social stimuli, which are essential in constructing our consciousness and meaning making. It can be inferred that the social context is important in framing attribution about self and others.

Neuroscience can never boast based on something probabilistic and subjective. Thus, it is subsumed in the scientific imageries that seem objective and determinist. However, it is an interpretative approach that claims about brain function and human behaviour (Horgan, 2016). “If it is interpretative, it can never be objective but only shared in a canon of knowledge (Bruner, 1986)⁷”. The way the Bayesian approach is becoming popular in neuroscience, it cannot be certain that its popularity is at an equal level among lawyers. Since the approach is to detect consciousness based on neuroscience, particularly in the legal domain, the role of the brain in understanding how much the person is responsible. The interdisciplinary connection between law and neuroscience may also demand one of these approaches to infer subjectively about the cause of the action, intention, and responsibility. It will be like bootstrapping the small amount of data or generalizing (Lake et al., 2015) based on imagery one holds about others, esp. those who belong to the minority group and live invisibly in the deep psyche of dominant groups. Even a short incident of protest threatens the whole dominant group and stigmatizes the generations of minority groups. There is a slight contradiction that these elementary biases take a massive shape in judgment and reasoning. Does neuroscience have anything to do with this? The way the Bayesian approach appeals to cognitive scientists, evolutionary theorists, statisticians, and many emerging interdisciplinary social sciences, it has a complete chance to influence the law whose expressions in the academic debate strive to draw the line between right and wrong, moral, and immoral, or regular and abnormal. However, the judgment and verdicts are based on some principles of understanding that are very much influenced by the severity and intensity of information and memories about the groups, which are different from the identity of the judges. In the words of Damasio (2012), ‘Our memories are prejudiced, in the full sense of the term, by our history and beliefs’ (P. 133). He further observed that ‘the notion that the brain ever holds anything like an isolated memory of the object seems untenable. The brain holds a memory of what happened during an interaction, and the interaction importantly includes our past, and often the past of our biological species and culture’ (P.

⁷ I am thankful to the reviewer for insightful comments.

133). The estimating ability of our brain is all about the inferences based on the previous recording of the interaction of entities with the objects, both social and physical. Vygotsky and Luria (1993) showed through their cultural-historical approach that the brain doesn't operate its consciousness program in an isolated manner but very much through the organism's activities and engagement within the sociocultural context.

Conclusion: Is There a Politics of Evidence?

It is a proven fact that stereotypes affect human judgement, and juries and judges are not neutral entities. They do their best to tally the available evidence, hear the cases, and give verdicts. Neuroscientists, as amicus briefs in the courtroom, can provide some research-oriented information to the courtroom, and it eventually depends on whether the court should proceed or not. The neuroscientific evidence can have a special say in the courtroom. They are also interpreted, and the psychological attributes they theorize are based on the available psycho-legal knowledge system. If neuroscience remains in the black box of the laboratory, whatever comes out will remain reductive. Our brain, identity and experiences are not reducible to the vocabularies of neuroscience. We make sense of the knowledge system of neuroscience as if it offers something unique and systematic. Taking this along with other areas of science, it can provide evidential support to the courtroom. However, there might be a clash between how neuroscientists present the case and how juries and judges take it. The rise of technology to picture the brain and its fascinating picture from the scanner may affect the judge's understanding of human nature and the mind. This scientific knowledge may surpass the rationality and intuition of judges. In one way, it is a boon; in another, it is shaping the whole framework of our knowledge system, where knowledge from brain studies reifies our understanding of human actions and thinking. In their landmark book, Satel and Lilienfeld (2013) noted,

“In our view, the potential for functional brain imaging to mislead currently exceeds its capacity to inform, although the ratio may eventually shift in favour of the value of scans for some purposes as technical advances emerge. But until neuroscientists and legal experts become able to translate information about brain function into the legal requirements for criminal responsibility, lawyers, jurors, and judges will still need to rely on traditional methods of assessing the defendant: interviews, observations, witness reports, psychiatric history, and well-established clinical assessments. It is from these methods, in any case, that subtler appreciation of the defendant's mental state can be inferred”. (p. 121).

The debate for a long time in law centred on the truth and facts, evidence, data and interpretations, the gravity of the action and intentions, model penal code, deontology and utilitarianism. In that regard, the law showed its controlling and responsive picture depending on history, culture, belief system, and latent social assumptions. People also try to understand how identities, power, and status quo are allied. There is something in the law that the law itself is ignorant about or takes for granted, and anyone not under its periphery becomes the victim of its ignorance. Here, evidence

and data become problematic in their interpretations by the agents. We can take an approach from critical psychology to distinguish facts, the truth about the persons and their stereotypical understanding from the taken-for-granted understanding, which is banal and established as common sense. Few questions require us to dwell on the metaphysics of the mind. For example:

1. Can we understand others' minds and how neuroscience can contribute?
2. How do we infer about the mind based on empirical observation through behaviour and brain studies?
3. Does a dualistic understanding of the mind rule our society?
4. How does any social categorisation become rigid in mind and taken as reality? How can it be re-categorized in the context of unbiased decision-making, and how do the brain studies intervene?

The evidence and observation about the truth statement only changes the opinion about the truth, not the truth itself. So, the people who don't know the scientific explanation of the existence of some phenomenon and have some belief about the phenomenon, when asserting their knowledge about the phenomenon, don't lie or engage in deception but express their understanding. A lie is a conscious act of manipulation of knowledge leading away from the fact and fitting it to the category of truth, like deception, which is also conscious where the truth is hidden under the frame of neutrality. Thus, neuroscience can contribute as an eye-opener to how the human brain works and pose a scientific check over the taken-for-granted assumption about human nature based on group affiliation. The role of critical neuroscience and interdisciplinary contribution may make the justice system more conducive to the idea of justice.

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