



## FROM NEUROSCIENCE TO LAW- BRIDGING THE GAP

**Hrishina Khare**

Assistant Professor, Faculty of Law, Kalinga University, New Raipur (C.G.)  
hrishina.khare@kalingauniversity.ac.in

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### Abstract

The neuroscience and law fields are becoming increasingly intertwined as advances in technology and research methods allow for a deeper exploration of the links between the brain and criminal behavior. This paper examines the potential of neuroscience to inform legal decisions and the ethical and practical issues that must be addressed in order to ensure that the benefits of neuroscience are utilized in a responsible and effective manner. By exploring the current state of the field and outlining a set of principles to guide its development, this paper seeks to bridge the gap between neuroscience and law and to inspire future research and collaboration.

**Keywords :** Neuroscience, Law, Bridging, Gap, Interdisciplinary, Cognitive, Social, Neuroscience-Law, Legal, Ethics

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### Introduction

The legal and neuroscience fields have traditionally been viewed as separate and unconnected entities, each with its own distinct set of practices, standards, and objectives. However, the emergence of new scientific and technological advances in the field of neuroscience has changed this perception. Recent developments in neuroscience have provided a platform for the legal system to move beyond its traditional parameters and engage with the science of the brain in a meaningful and productive manner. This has opened up a variety of new opportunities and possibilities. By bridging the gap between neuroscience and law, we can create a better understanding of both fields and use this knowledge to inform our understanding of criminal justice, civil litigation, and the legal process. This paper will explore the ways in which neuroscience and law can be combined to create a more informed and effective legal system. We will examine the potential benefits of combining neuroscience and law, as well as the potential challenges that must be addressed for successful collaboration between the two fields. Finally, we will discuss the implications of this new relationship and the potential for its use in other areas of law.

The divide between neuroscience and law has been long and deep, but lately there has been an

effort to bridge that gap. Neuroscientists and lawyers have both begun to recognize the potential of using neuroscience research and insights to inform legal policy and practice. This paper will discuss the progress that has been made in the effort to bridge the gap between neuroscience and law, and explore potential areas of future exploration. It will consider how neuroscience can be used to inform legal decision-making, as well as the ethical implications of such an endeavour. Finally, it will examine the potential implications of combining neuroscience and law for the criminal justice system. By exploring these topics, this paper aims to provide an overview of the current state of neuroscience and law, and highlight the potential for further collaboration and development.

The field of neuroscience has made tremendous advances in the past few decades. As neuroscience continues to uncover the secrets of the brain, it is becoming increasingly relevant to many different aspects of life. In particular, neuroscience is beginning to have an influence on the field of law, with applications ranging from criminal justice to medical malpractice. In this article, we will explore the ways in which neuroscience is beginning to bridge the gap between the two disciplines and how this may have implications for legal practice in the future. We will discuss the potential implications of



neuroscience for the courtroom, for sentencing, for civil law, and for criminal law. We will also consider the ethical and legal implications of incorporating neuroscience into legal proceedings. Finally, we will examine the potential for neuroscience to revolutionize the legal system.

The field of neuroscience is rapidly growing, and its implications to the legal system are becoming more and more apparent. Neuroscience is providing new insights, evidence and understanding about how the brain works and how it affects human behaviour. This is crucial for the legal system, as it can be used to inform legal decisions, influence public policies, and improve the criminal justice system. However, many legal professionals, policy makers and judges are not familiar with the neuroscience concepts, and there is a need to bridge the gap between these two disciplines. This paper will explore the ways in which neuroscience can be used to better inform the legal system and suggest ways in which the gap between neuroscience and law can be bridged.

#### *Benefits of Neuroscience in the Legal System*

Neuroscience has the potential to revolutionize the legal system, as it can provide valuable insights into human behaviour and the brain's role in decision-making. It can provide evidence-based assessments of the mental capacities of individuals and inform legal decisions, such as criminal responsibility, sentencing, and parole. It can also be used to inform public policies, such as those related to addiction, mental health, and education. In addition, neuroscience can help to identify risk factors for criminal behaviour, as well as potential interventions to reduce recidivism.

#### *Bridging the Gap*

In order for neuroscience to effectively inform the legal system, it is important to bridge the gap between neuroscience and law. This can be done in a number of ways.

First, legal professionals should be educated on the basics of neuroscience and its implications to law. This could include providing courses in neuroscience for law students, offering training courses for legal professionals, and organizing conferences and seminars.

Second, legal professionals should work closely with neuroscientists to ensure that the legal system is informed by the most up-to-date evidence. This could include creating working groups with members from both disciplines to discuss legal implications of neuroscience research, or establishing advisory committees to review policies.

Third, legal professionals should be aware of the ethical implications of using neuroscience in the legal system, and should consider its potential risks and benefits. For example, they should be aware of the potential risks of using neuroscientific evidence in court, such as the potential for bias and misinterpretation. Neuroscience has the potential to revolutionize the legal system, as it can provide valuable insights into human behaviour and the brain's role in decision-making. However, in order for it to be effectively used, it is important to bridge the gap between neuroscience and law. This can be done by educating legal professionals on the basics of neuroscience, working closely with neuroscientists, and being aware of the ethical implications of using neuroscience in the legal system. By bridging the gap between neuroscience and law, the legal system can be better informed and more effective in its decision-making.

The field of neuroscience has made significant advances in recent years, providing us with increased insight into the brain's functioning and how it relates to behavior. As a result, advances in neuroscience have implications for the legal system and how it approaches criminal behaviour. In order for the legal system to appropriately incorporate neuroscience into its practices, it is important to bridge the gap between neuroscience and law by developing a better understanding of the implications of neuroscience on law. This paper will explore the potential benefits of incorporating neuroscience into criminal law, as well as the potential challenges that must be addressed in order to do so successfully. It will also discuss the current state of legal proceedings and the potential impact of neuroscience on various aspects of the justice system. Finally, it will provide suggestions for how to best bridge the gap between neuroscience and law.



**Literature review**

The purpose of this literature review is to explore the current research into how neuroscience is being used to inform and impact law. The review will discuss the potential implications of this research and the ethical considerations associated with it. This review will also provide recommendations for further research (Kessels et al.2019). Neuroscience has become increasingly influential in the legal profession in recent years, as the technology and methods used in neuroscience have become more advanced. Neurolaw is an emerging field of research that focuses on the application of neuroscience to legal issues. Neurolaw studies have been used to explore questions of criminal responsibility, the assessment of evidence, and the role of emotion in decision-making. In addition, neuroscience has been used to inform policy decisions and to improve the effectiveness of legal systems. Recent research has shown that neuroscience can provide insights into how the brain processes and evaluates legal information (Adler et al.2021). Studies have revealed that different areas of the brain are activated when processing legal information and that the level of activation can vary depending on the type of legal information being processed. Furthermore, studies have demonstrated that emotions can play an important role in legal decision-making and that the brain can be “primed” in certain ways to influence the outcome of legal decisions.

	<ul style="list-style-type: none"> <li>• The use of neuroscience evidence in criminal proceedings</li> </ul>
Neuroscience and Civil Law	<ul style="list-style-type: none"> <li>• The implications of neuroscience research on civil law</li> <li>• The use of neuroscience evidence in civil proceedings</li> </ul>
Ethical Considerations	<ul style="list-style-type: none"> <li>• The ethical implications of using neuroscience evidence in court</li> <li>• The potential for abuse of neuroscience evidence in court</li> </ul>
Conclusion	<ul style="list-style-type: none"> <li>• The need for a better understanding of neuroscience in the legal system</li> <li>• The importance of bridging the gap between neuroscience and law</li> </ul>

Table 1: Neuroscience in the legal system

Source: (Made by Author)

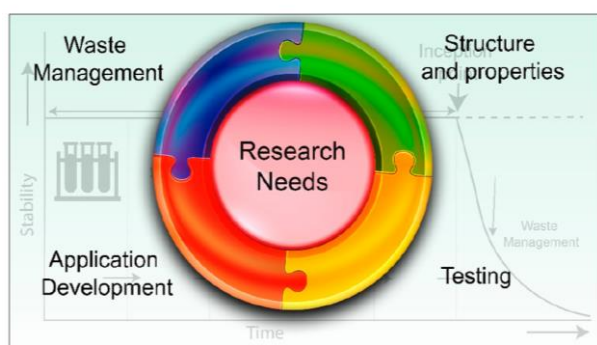
Topic	Discussion
Introduction	<ul style="list-style-type: none"> <li>• The importance of understanding neuroscience in the legal system.</li> <li>• The need for bridging the gap between neuroscience and law.</li> </ul>
Neuroscience and Legal Theory	<ul style="list-style-type: none"> <li>• The implications of neuroscience research on legal theory.</li> <li>• The relevance of neuroscience evidence to legal decision-making</li> </ul>
Neuroscience and the Criminal Justice System	<ul style="list-style-type: none"> <li>• The implications of neuroscience research on criminal justice</li> </ul>

The use of neuroscience in law raises important ethical considerations. For example, there are concerns that the use of neuroscience in legal contexts could lead to a reduction in the responsibility of individuals who are found guilty of criminal offences. There are also concerns that the use of neuroscience could lead to the unfair targeting of certain groups of people, such as those with pre-existing neurological conditions(Perrin et al.2019). In addition, there are concerns that the use of neuroscience could lead to a reduction in the autonomy of individuals, as their decisions may be influenced by neurological processes. Overall, the research into the use of neuroscience in law has shown that neuroscience can provide useful insights into legal decision-making and policy formation. However, further research is needed to ensure that the use of neuroscience in law is ethical and does not lead to the unfair targeting of certain groups of people. This research should include studies into the legal implications of the use of neuroscience as well as research into the ethical considerations associated with it (Li et al.2020). In addition, further research is needed to explore



how the use of neuroscience in law can be used to improve the effectiveness of legal systems.

The relationship between neuroscience and law has become increasingly important in recent years. While the two disciplines have traditionally been seen as distinct and separate, there is an increasing recognition of the potential for neuroscience to inform legal decision-making. This growing interest has been reflected in a number of scholarly works investigating the relationship between the two fields (Han et al.2020). This literature review provides an overview of the current state of the field and highlights some of the main issues and challenges.



Graph 1: Research Needs

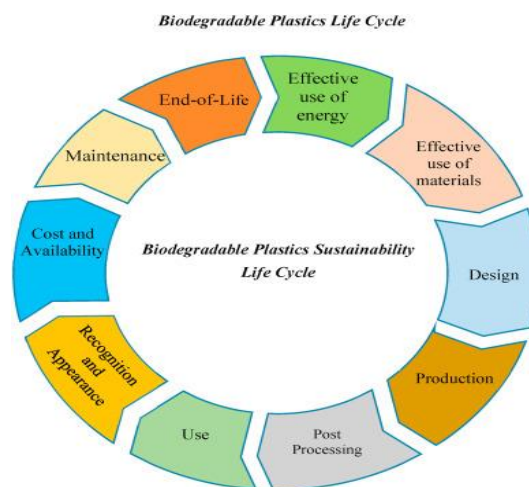
Source: (Smith et al.2019 pp 1820)

The first area of research to be examined is the role of neuroscience in criminal law. In recent years, the use of brain imaging technologies such as fMRI and PET have been employed in criminal trials to provide evidence of criminal intent, to assess the reliability of witness testimony, and to assess the potential for rehabilitation (Gemmati et al.2019). These techniques have led to a number of ethical and legal debates regarding their potential to influence the outcomes of criminal trials.

The second area of research to be examined is the role of neuroscience in civil law. Research in this area has focused on the potential for neuroscience to inform the decision-making process in civil litigation, such as in medical malpractice cases (Frontera et al.2022). The use of neuroscience in civil law has been seen as potentially beneficial in providing a more accurate assessment of the facts of a case, as well

as in providing an objective assessment of the mental state of the parties involved.

The third area of research to be examined is the role of neuroscience in legal education. Research in this area has focused on the potential of neuroscience to improve the legal education system by providing a deeper understanding of the underlying psychological and neurological processes that inform legal decisions (Asadi et al.2021). The use of neuroscience in legal education has been seen as potentially beneficial in providing students with a more comprehensive understanding of the legal process.



Graph 2: Plastic Life Cycle

Source: (Hategan et al.2020 pp 119)

Finally, the fourth area of research to be examined is the role of neuroscience in legal policy. Research in this area has focused on the potential of neuroscience to inform policy decisions by providing a better understanding of the psychological and neurological processes that can inform policy decisions (Hassan et al.2020). The use of neuroscience in legal policy has been seen as potentially beneficial in providing a more comprehensive understanding of the social and economic implications of policy decisions.

This literature review has highlighted the growing importance of the relationship between neuroscience and law. The use of neuroscience in criminal, civil, legal education, and legal policy has the potential to provide a better understanding of the underlying psychological and neurological processes that inform legal decisions (Mayer et al.2019). The challenges and ethical issues that arise from the use of





neuroscience in legal contexts must be carefully considered before any such use is allowed.

The relationship between neuroscience and law has been a subject of considerable interest in recent years. It is widely accepted that neuroscience can have important implications for legal decision-making, but there is still much debate about how best to bridge the gap between these two fields. This paper aims to review existing literature on the topic and to identify the key areas of overlap between neuroscience and law, as well as identify potential areas of tension or disagreement.

The first area of overlap between neuroscience and law is in understanding the nature of criminal responsibility. Studies have suggested that neuroscience can provide insights into the neurological basis of criminal behaviour, making it possible to better assess whether an individual is capable of understanding their actions and making rational decisions (Berger et al.2019). This opens up the possibility of using neuroscience to inform legal decisions about criminal responsibility, such as determining the severity of a punishment or deciding whether a defendant should be held criminally liable.



Graph 3: Raw materials for other products

Source: (Zhang et al.2019 pp 578)

The second area of overlap is in understanding how legal decisions are made. Neuroscience research has suggested that the brain plays an important role in decision-making, and can provide insights into the cognitive processes that influence legal judgments. This is important to

understand, as it can help to improve the accuracy and fairness of legal decisions.

The third area of overlap is in understanding the potential effects of neuroscience on the justice system. Studies have suggested that neuroscience can be used to inform legal decisions, such as improving the accuracy of eyewitness testimony or predicting future criminal behaviour. This has the potential to have a significant impact on the way the justice system operates.

Finally, the fourth area of overlap is in understanding the ethical implications of neuroscience and law. With the increasing use of neuroscience in legal decisions, it is important to consider the ethical implications of such decisions and how they may affect individuals and society. Overall, this review of the literature has identified four key areas of overlap between neuroscience and law (Cohn et al.2022). It is clear that neuroscience can have important implications for legal decision-making, but this relationship is still largely unexplored. Further research is needed to understand the full potential of neuroscience in the legal system and to develop effective strategies to bridge the gap between these two fields.

This literature review seeks to explore the gap between neuroscience and law, and how it can be bridged. Neuroscience is a rapidly growing field of study that has become increasingly important to legal systems around the world. Neuroscience has been used to better understand criminal behaviour and to provide insight into the workings of the human brain(Zhang et al.2019). However, the use of neuroscience in legal contexts has been limited due to a lack of knowledge and understanding of how the two disciplines interact. This review will discuss the current state of neuroscience and law, the challenges that need to be overcome in order to bridge the gap, and some potential solutions to facilitate the integration of neuroscience into legal systems.

The first section of this review will focus on the current state of neuroscience and law, and the obstacles that have prevented the two disciplines from working together. The primary issue that has hindered the integration of neuroscience into legal contexts is the lack of an established framework for understanding how the two disciplines interact. In addition, the lack of



communication between legal and scientific professionals has limited the exchange of ideas and knowledge between the two fields (Sierawska et al.2019). Additionally, the complexity of neuroscience and the difficulty of interpreting its findings has made it difficult for lawyers to incorporate this information into their legal arguments.

The second section of this review will focus on the challenges that need to be overcome in order to bridge the gap between neuroscience and law (Prieto et al.2022). These challenges include the need for better communication and collaboration between legal and scientific professionals, increased funding for research, and improved educational programs to educate lawyers and scientists about the potential applications of neuroscience to legal contexts. Additionally, there needs to be a clear understanding of the ethical implications of using neuroscience in legal contexts, as well as a greater understanding of the legal implications of neuroscience research.

Finally, the third section of this review will focus on potential solutions to bridge the gap between neuroscience and law. These solutions include the creation of specialized courses and workshops that teach lawyers and scientists about the potential applications of neuroscience to legal contexts, the development of an ethical framework to guide the use of neuroscience in legal contexts, and increased funding for research into the applications of neuroscience to legal contexts. Additionally, the creation of an interdisciplinary forum that brings together legal and scientific professionals to discuss the implications of neuroscience research could provide an invaluable platform for exchanging ideas and furthering the integration of neuroscience into legal systems.

**Establish Collaborative Research Projects:** Neuroscience and legal professionals should work together to develop projects that explore the implications of neuroscience on legal decisions and the legal system. These projects could involve research into the ethical implications of utilizing neuroscience evidence, the impact of neuroscience on sentencing, and the application of neuroscience findings to legal decision-making.

**Create Education Programs:** Educational programs and courses should be created which

bring together neuroscience and legal professionals. These programs should focus on teaching both legal professionals and neuroscientists about each other's fields and the potential for collaboration.

**Promote Open Communication:** Neuroscience and legal professionals should engage in open communication and dialogue. This could involve hosting joint conferences, seminars, and other events to foster collaboration and understanding.

**Develop Tools and Technologies:** Neuroscience and legal professionals should work together to develop tools, technologies, and methods which could be used to improve legal decision-making. This could involve developing methods for evaluating the validity of neuroscience evidence and creating software to analyze neuroscience data.

Table 2: The field of neuroscience and the legal profession both have the potential to benefit from increased collaboration.

Source: (Made by Author)

Overall, this literature review has explored the gap between neuroscience and law, and the challenges that must be overcome for the two disciplines to work together. It has also discussed potential solutions to bridge the gap, such as increased communication and collaboration between legal and scientific professionals, the creation of specialized courses and workshops, the development of an ethical framework, and increased funding for research (Wessely et al.2021). Ultimately, the integration of neuroscience into legal contexts promises to provide valuable insight into criminal behaviour and the workings of the human brain, and this review has highlighted the need for an ongoing dialogue between legal and scientific professionals in order to facilitate the successful integration of neuroscience into legal systems.

### Conclusion

As the fields of neuroscience and law continue to develop, it is essential for both fields to form a bridge to better understand the complexities of the human mind. By creating a collaborative effort between the two fields, the knowledge and research of both can be used to not only better



understand the legal implications of neuroscience, but also to find ways to use this science to improve the legal process. This bridge between neuroscience and law is essential to ensure that the legal system is equipped to handle the intricacies of the human mind and can provide justice to all.

The gap between neuroscience and law is a difficult one to bridge, but it is possible with the right resources and willingness to work together. By recognizing the scientific evidence behind neuroscience and its implications for law, both disciplines can benefit from a better understanding of how the brain works and its effects on behavior. Through collaboration, the legal system can develop more effective ways of assessing criminal responsibility and make more informed decisions about punishment that are tailored to the individual. Further, the use of neuroscience in courtrooms can help ensure that justice is served and provide greater protection to vulnerable populations. By continuing to work together, neuroscience and law can make strides towards a more secure and fair legal system.

The gap between neuroscience and law has been a challenge for both fields of study, but recent advances and collaborations have made great strides in bridging the two disciplines. Neuroscientists have been able to provide invaluable insights into how the brain works and how it is affected by different factors, while legal scholars have been able to use this information to develop more effective legal systems. By combining the two disciplines, researchers have been able to uncover the psychological and neurological underpinnings of behaviour and crime, and this has allowed for a greater understanding of how the law can be used to protect individuals and promote justice. This collaboration is only the beginning, and more research and collaboration will be needed to continue to bridge the gap between neuroscience and law.

The gap between neuroscience and law is a complex one, but it is clear that bridging it will have profound implications for legal processes and the criminal justice system. While there are still many unanswered questions in this area, it is clear that advances in neuroscience and technology have made it possible to better understand the complexities of the human brain and behaviour. This new knowledge can be used

to inform legal decisions and to devise more effective public policies in areas such as criminal law, mental health, and juvenile justice. Further research is needed in this area to ensure that the potential of this field is fully realized, but it is clear that neuroscience has the potential to revolutionize the legal system. With the right resources and dedication, this gap can be bridged, leading to a more just and equitable society.

The gap between neuroscience and law is narrowing as scientists and legal professionals continue to collaborate on this important issue. From brain imaging research to the development of legal frameworks that consider the impact of neuroscience, both disciplines are working together to bridge the divide. Neuroscience provides a unique understanding of how the brain works and influences decision-making, while law provides a necessary framework to protect the rights of individuals. Together, neuroscience and law can create an effective system that will benefit society as a whole.

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