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## PERPETRATOR OR PATIENT: JUDICIAL DISCRETION, BEHAVIOURAL SCIENCE AND NEUROBIOLOGY

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S. Kiruti Ratchaya BA LLB(Hons), LLM (Cyber Law and Cyber Crime Investigation) –  
1<sup>st</sup> year, School of Law, Forensic Science and Policy Studies, National Forensic Science  
University (NFSU), Gandhinagar

S.S. Jyothi Siddhartha, MBBS, Master's in Public Policy (MPP) – final year, National  
Law School of India University (NLSIU), Bangalore

### ABSTRACT

The advancements in neurosciences establish association between neurological abnormalities and propensity for criminal behaviour. Behavioural sciences explains how cognitive biases impact judicial discretion.

**Method:** The research paper follows exploratory, empirical quantitative research methodology. Crime statistics reports of National Crime Records Bureau, UN Office on Drugs and Crime serve as secondary data sources.

**Discussion:** Cognitive biases like confirmation bias, social proof heuristics adversely affect the judicial discretion. In majority of the cases, Neurobiological perspective behind the anti-social behaviour is not given due consideration in the exercise of judicial discretion

**Conclusion:** Relevant neuroscience knowledge and behavioural science of judicial discretion need to be integrated to ensure neurobiologically informed criminal justice systems.

**Keywords:** Neurosciences, Behavioural sciences, Cognitive biases, Anti-social behaviour

## 1. Introduction

The overarching framework of behavioural sciences explains how heuristics and cognitive biases have profound impact on judicial discretion ranging from retribution to reformation and rehabilitation. Recent advancements in neurosciences have revealed the interconnected nature of neurological abnormalities and propensity for criminal and antisocial behaviour. Neurological abnormalities including but not limited to traumatic brain injuries, psychiatric disorders, neuro developmental anomalies influences human behaviour in terms of impaired impulse control, extenuated empathy and deviant decision making. The functional MRI reports of several criminals have exposed the structural and functional neuro-abnormalities in prefrontal cortex, temporo-parietal junction, insular cortex, and cingulate gyrus regions of the brain. This evokes the question over legal responsibility, culpability, penalty, therapy in such cases. This research paper tries to analyse the intersectionality among neural abnormality, anti-social behaviour, judicial discretion, criminal justice system within the realm of behavioural sciences

## 2. Background

One of the most basic principles of justice as stated by Benjamin Franklin and which is also reiterated by the Supreme Court in *Prakash Singh & ors v Union Of India (2006)* is that “1000 culprits can escape, but one innocent should not be punished”. With the advancements in medical sciences, this principle has to be updated to encompass the neurobiological dimension of criminal justice that “1000 culprits can escape but not one patient should be punished”. The causal association between neurological abnormalities and criminal behaviour has long been an intriguing and contentious subject within the disciplines of neuroscience, forensic psychology and criminology. The role of neurological abnormalities in influencing criminal behaviour has become more clear as a result of our growing understanding of the workings of the human brain through developments in neuroimaging technology like SPECT and functional MRI. With respect to conviction of offenders by the judiciary there are many studies that claim that not all perpetrators are offenders but some are patients as well.

Various research establish that structural and functional abnormalities in the regions of the brain like limbic system, prefrontal gray matter, etc are associated with the increased propensity of criminal behaviour and establishes potential neurobiological basis for the

commission of crime (Kiehl et al. 2001; Greene et al. 2004). The question over the theory of punishment either deterrent/retributive theory or reformatory theory arises with respect to the neurobiological basis of antisocial behaviour. The prevention of committing further crimes by offenders with neurological abnormalities cannot be achieved through imprisonment or fine but only through medical intervention.

Neuroscience has to be integrated with the legal decision making to ensure fairness and equity for developing a neurobiologically informed criminal justice system. However, the ethical implications of using neuroscience in punishment-related decision making has to be done with careful considerations and balanced with other relevant factors also (Morse 2019). Hence, there is a need to maintain a balanced approach while considering the role of neuroscience in the criminal justice system. While convicting individuals, all determinants of criminal behaviour has to be considered including neurobiology when assessing an individual's liability and culpability

### **3. Literature Review**

The functional MRI of several criminals revealed abnormalities in the frontal lobe and limbic system and the reason for their anti-social behaviour was due to reduced activation in the amygdala and anterior cingulate cortex, areas responsible for processing emotions (Kiehl et al. 2001). Individuals with reduced prefrontal gray matter volume have antisocial personality disorder that provides evidence for neurobiological basis for their deviant behaviour (Raine et al. 2000). Pathological liars have significantly reduced white matter integrity in the prefrontal cortex when compared to non-liars (Yang et al. 2005) which raises the question over the legal liability of perjury and hostile witness. Neuroscience does not change the law fundamentally but has the potential to significantly impact certain aspects of it by providing valuable insights into various mechanisms underlying deviant behaviour for the legal system. (Greene et al. 2004).

Judicial discretion and behavioural science explores the intersection of law and psychology especially focussing on how the judges exercise their discretion and make decisions in legal proceedings. There are several factors influencing judicial discretion including cognitive biases and heuristics which is evident from the influence of cognitive biases on judicial decision making process, or the effects of judicial training programs on reducing bias. A research paper titled "Inside the judicial Mind" reveals inherent biases such as

confirmation bias and hindsight bias in judicial judgements (Guthrie et al. 2000). Another research paper titled “Extraneous factors in judicial decisions” states that Judicial discretion is considerably shaped by a judge’s expertise and experience, beyond the knowledge of law, affecting overall judgement quality (Danziger et al. 2011).

The application of behavioural sciences in the judicial setting serves as a tool in reducing biases and improving the judicial decision making process. For example, if a judge can apply the knowledge of neuroscience and behavioural science while making decisions regarding punishing an offender, it can increase the understanding of moral culpability, the assessment of punishment severity and the development of effective rehabilitation programs. Neuroscience has the potential to significantly influence the future of the criminal justice system by providing insight into the mental state, moral culpability and the effectiveness of the form of punishment that can be given to an offender.

#### **4. Research Methodology**

##### **4.1. Research Question**

1. How can the neuroscientific knowledge and behavioural science principles of judicial discretion can be integrated for the development of neurobiologically informed criminal justice systems ?
2. What are the potential benefits and challenges this integration poses for ensuring fair, effective, and evidence-based decision-making within the legal system?

##### **4.2 Research Objectives**

1. To analyse the intersectionality among neural abnormality, anti-social behaviour, judicial discretion, criminal justice system within the realm of behavioural sciences
2. To explore the prospects of integrating relevant neuroscience knowledge with judicial decision making
3. To examine the challenges like permissibility, reliability of neurobiological evidence, cognitive biases in judicial discretion, neurobiological information asymmetry in the criminal justice system.

4. To contribute to the academic discourse by filling the neurobiological knowledge gaps in criminal justice.
5. To provide potential policy recommendations to develop a system of neurobiologically informed justice delivery systems will be explored.

### **4.3. Methodology**

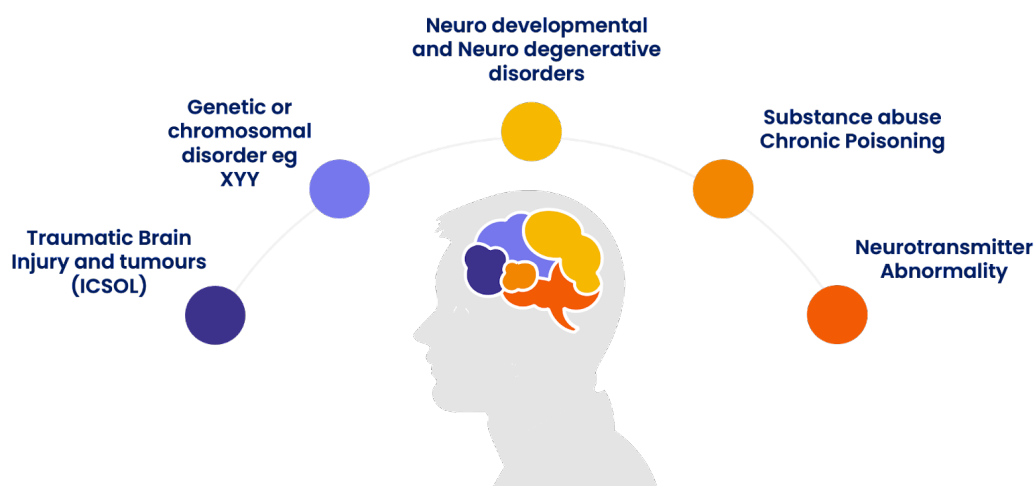
Due to the paucity of scholarly articles with respect to the intersection of neurological abnormalities and behavioural sciences aspect of judicial discretion, The research paper follows exploratory, empirical quantitative research methodology. Crime statistics reports of National Crime Records Bureau, UN Office on Drugs and Crime serve as secondary data sources.

## **5. Neurobiology of Anti-Social Behaviour**

Antisocial behaviour is characterized by violence, impulsivity, a pattern of persistent disregard for other people's rights, and lack of empathy or regret. Human brain is a highly complex organ that regulates emotion, cognition and social control. The ability to control impulses and regulate emotions can be compromised by neurological abnormalities in different brain regions, which raises the likelihood of engaging in antisocial behaviour.

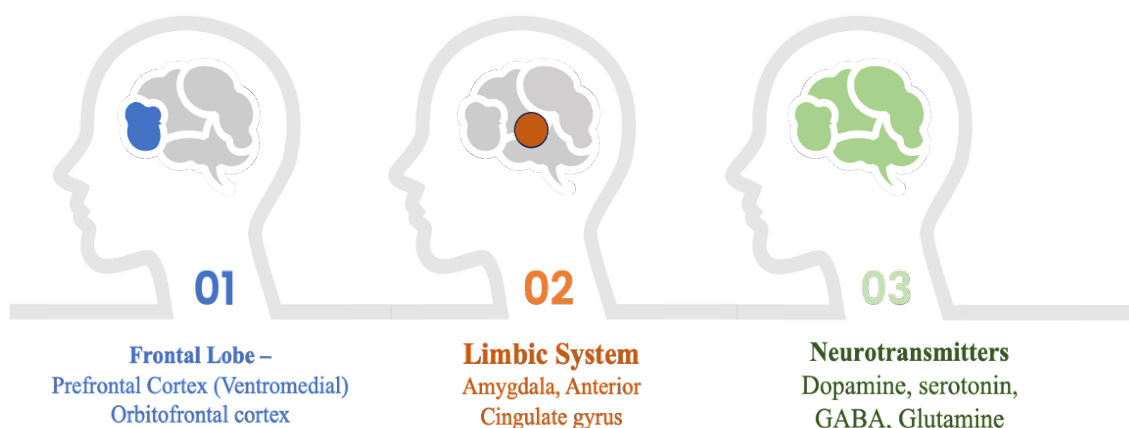
Neurological abnormalities encompass a heterogeneous group of disorders that are the deviations from the normal structure or function of the central nervous system. These deviations include but are not limited to structural anomalies like brain tumours or injuries and functional irregularities such as imbalances in neurotransmitter levels or impaired cognitive capability. Even though not everyone with a neurological abnormality will have propensity for criminal or antisocial behaviour, several researches establish that certain structural and functional abnormalities in the frontal lobe, temporo-parietal junction, insular cortex have potential to make some people more likely to commit crimes and have profound impact on the nature and severity of their offense.

**Figure 5.1 - Various causes for neurobiological abnormalities**



*Source : Conceptualized by the authors*

**Figure 5.2 - Three major neurological components implicated in antisocial behaviour**



*Source : Conceptualized by the authors*

### 5.1 Frontal lobe and Prefrontal cortex

The frontal lobe is located at the anterior region of each cerebral hemisphere. It is the largest lobe comprising nearly one third of the cerebral surface. Prefrontal cortex covers the anterior aspect of the frontal lobe and plays a major role in regulating various higher functions like planning actions, decision making, regulating social behaviour, and impulse control. Lesions in the frontal lobe are associated with aggressive, violent and antisocial behaviour with attenuated empathy. These lesions could be either due to modifiable (preventable) causes like excessive alcohol consumption, narcotic abuse or non-modifiable causes like accidental

traumatic brain injuries, chronic lead poisoning, prenatal alcohol exposure (maternal alcohol consumption during pregnancy), cancer chemotherapy, some chromosomal disorders like XYY.

The strong correlation between prefrontal executive dysfunction and increase in antisocial behaviour has been confirmed by several neuropsychological researches (Brower 2001). Damage to the orbitofrontal cortex has been associated with impaired impulse control, explosive aggressive behaviour, emotional outbursts, extenuated empathy. Hence this orbitofrontal syndrome has been termed as pseudo psychopathy because of various overlapping features with psychopathy in terms of violent and criminal behaviour. Injury in the ventromedial aspect of the prefrontal cortex is associated with deficiency in social awareness, and the ability to comprehend future consequences hence termed as acquired sociopathy. Adult histories of recurrent violent, impulsive and antisocial behaviour have also been noted in those with frontal network injury sustained before the age of eight (Brower 2001)

## **5.2 Limbic System**

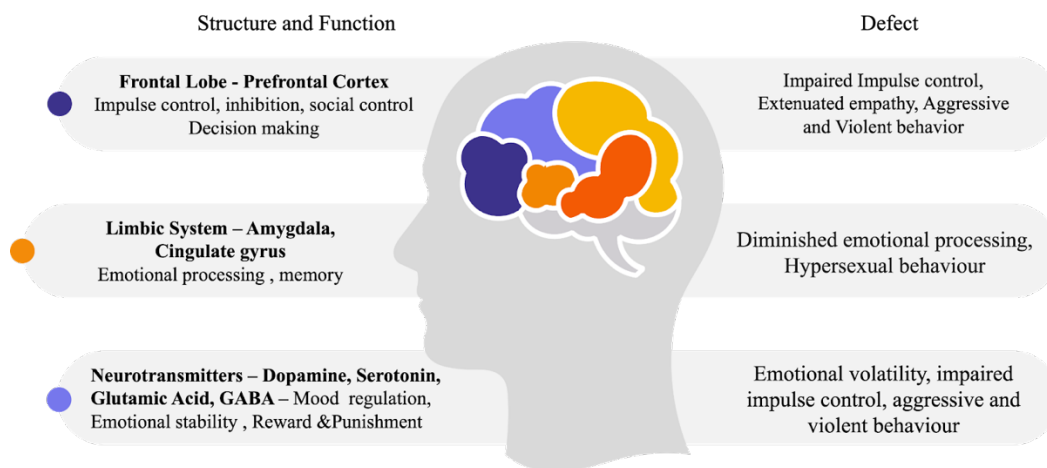
Limbic system refers to the neurological structures located on the either side of the thalamus and medial to temporal lobe. Limbic system comprises amygdala, hippocampus, nucleus accumbens, substantia nigra, cingulate gyrus etc. The Limbic system regulates various functions like emotion, social behaviour processing. The functional Magnetic Resonance Imaging (fMRI) technology was used to analyse anti-social behaviour in psychopaths. It is established that there is diminished emotional processing activity in the regions of the limbic system like amygdala and anterior cingulate cortex (Kiehl 2001).

## **5.3 Neurotransmitters**

Neurotransmitters are chemical messengers that facilitate inter neuronal communication through regulating transmission of impulses. Imbalances or dysregulation in neurotransmitter levels or function adversely impact impulse control, and social behaviour. Dopamine is a neurotransmitter associated with reward and punishment. Dopamine dysregulation due to multiple causes like substance abuse, psychosis may result in uncontrolled pleasure-seeking behaviour and the inability to postpone gratification. This increases the propensity for antisocial conduct like molestation, sexual abuse. Serotonin is a

neurotransmitter that regulates mood and emotional stability. Serotonin dysregulation may result in emotional volatility, impaired impulse control, aggressive and violent behaviour.

**Figure 5.3 - Various Neuro structures, their functions and corresponding defects**



*Source : Conceptualized by the authors*

## 6. Judicial Discretion and Behavioural Science

The criminal justice delivery system comprises a complex web of decisions of multitude of judges in the bench each bearing significant consequences for individuals and society at large. Judicial discretion refers to the privilege that empowers judges to make decisions based on their interpretation of the law. The ability of the judges to exercise this judicial discretion is part of independence of judiciary which is an essential component of the principles of Separation of Power and the Basic Structure Doctrine. Judicial discretion allows the judges to choose their decision from the range of available alternatives established by the constitution, statute or precedent. This ensures that their subjectivity in interpreting the law should be subjected within the scope of objectivity. Judicial discretion plays a major role in drawing the fine line between judicial activism and judicial overreach.

### 6.1 Behavioural Science and Biases

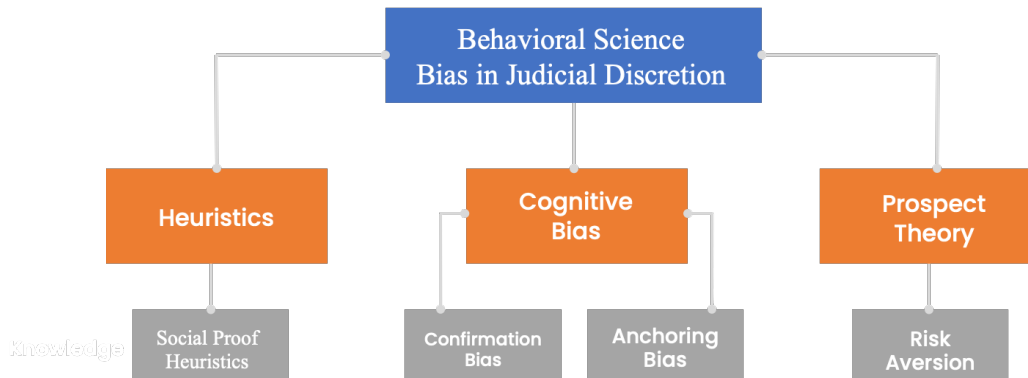
Behavioural science is an interdisciplinary field that explores and analyses human behaviours, actions, decisions and the factors that influence them. Behavioural science draws knowledge from neurobiology, psychology, sociology, anthropology for systematic



understanding of human behaviour. The intricate relationship between judicial discretion and behavioural science, particularly in recognizing cognitive biases and heuristics, is crucial in determining the outcomes of judicial proceedings and to enhance fairness, equity in criminal justice delivery.

In the 1950s, Herbert A. Simon, a cognitive psychologist and economist, established the concept of heuristics. Heuristics refers to a heterogeneous group of mental shortcuts and techniques used to reach conclusions rapidly in a variety of circumstances by simplifying a complex problem. These shortcuts are drawn from past experiences, common sense, personal belief and knowledge systems. Though heuristics can be helpful for making quick decisions, they can also result in cognitive biases and judgment errors. At the beginning of the 1970s, the psychologists Amos Tversky and Daniel Kahneman established the connection between heuristics and cognitive biases. Cognitive bias refers to the patterns of deviation from rationality that influences our thinking processes and decision-making by influencing how we perceive and process information, make choices and decisions.

**Figure 6.1 - Behavioural Science and Bias in Judicial Discretion**



*Source : Conceptualized by the authors*

## 6.2 Bias and Judicial Discretion

### a. Confirmation Bias

Confirmation bias is a type of cognitive bias where individuals rely more on the information that confirms their pre-existing beliefs, and underestimate the contradictory evidence. For instance, if a Judges may have a pre-existing belief that substance abuse offenders pose a significant threat to society and should receive higher sentences as a deterrent

to others. This belief is based on their prior experiences in handling narcotics and drug-related cases. During the trial of the accused, the defence presented evidence that the accused had no prior criminal record, was arrested with a relatively small quantity of drugs, and has shown genuine remorse for his or her actions. However, Judge's confirmation bias leads them to underestimate these mitigating factors and focus predominantly on the severity of the crime and the potential harm caused by drugs to the society. As a result, the judge gave a sentence at the higher end of the penal spectrum and is significantly harsher.

In this case, the accused may have a neurological problem due to neurotransmitter imbalances or abnormality in amygdala, dorsal striatum, insular cortex (George 2016). However, the judge subconsciously prioritizes information that supports his or her pre-existing belief and underestimates the evidence that contradicts it, potentially leading to a disproportionately harsh sentence. For instance, in an infamous drugs on cruise case, the premier investigating agency had arrested a relative of a popular actor. The accused was rejected bail multiple times. Here, the neurobiological perspective of the accused has not been taken into account. Moreover, there could be a possibility of confirmation bias in the exercise of judicial discretion that drug abusers are a threat to society at large and should not be granted bail.

### **b. Anchoring bias**

Anchoring bias is a type of cognitive bias where individuals rely too much on the first piece of information presented to them (the "anchor") when making decisions, even if that information is arbitrary or irrelevant. For instance, a person has been accused of a serious assault (could also be due to some neurological abnormality in the prefrontal cortex resulting in impaired impulse control and aggressive behaviour). During the trial, the prosecutor opens by recommending a imprisonment term of 10 years because of the severity of the assault and its consequences on the victim. This recommendation may serve as an anchor for the judge who is responsible for determining the accused's sentence. The judge may take into account the accused's traumatic childhood, absence of prior criminal history, and displays of remorse when determining the punishment.

However, the judgment may be anchored on the prosecutor's initial recommendation of a 10-year imprisonment. The judge perceived this as a benchmark penalty and assumed that any departure from it would mark a serious deviation from the penal norm. As a result, the

judge ultimately decides to sentence the accused 7 years in prison because the judge considers it to be a fair balance between the prosecutor's suggestion and the defence's evidence of mitigating circumstances. This judicial discretionary choice may still lead to a prolonged prison sentence that does not completely account for the unique circumstances of the accused and opportunity for rehabilitation or reformation. In a infamous dual murder case, the investigation officer framed the chargesheet that the close relatives of the victim committed dual murder despite certain discrepancies in evidence. Anchoring on this charge the lower Court convicted the accused. However, upon appeal the accused were released based on the benefit of doubt.

#### **b. Social proof Heuristics**

Social proof is a type of heuristic in which individuals rely on the beliefs, or opinions of others to shape their own decisions and actions. It often leads people to conform to the majority viewpoint. For instance, in a case a person is accused of a serious crime (which is impulsive and violent in nature). During the trial, both the prosecution and defence present their evidence and arguments with conflicting testimonies and circumstantial evidence. The bench comprises 5 judges. The public opinion shaped by popular media narrative is against the accused. As a result, the bench may reach a unanimous guilty verdict, even though the evidence was ambiguous. This illustration demonstrates how popular opinions and social proof heuristic can impact judicial discretion. The judges may be biased by the opinions of other judges in the bench leading to conformity rather than independent evaluation of the evidence. This conformity can result in a verdict that may not accurately reflect the principles of fairness, equity and proportionality.

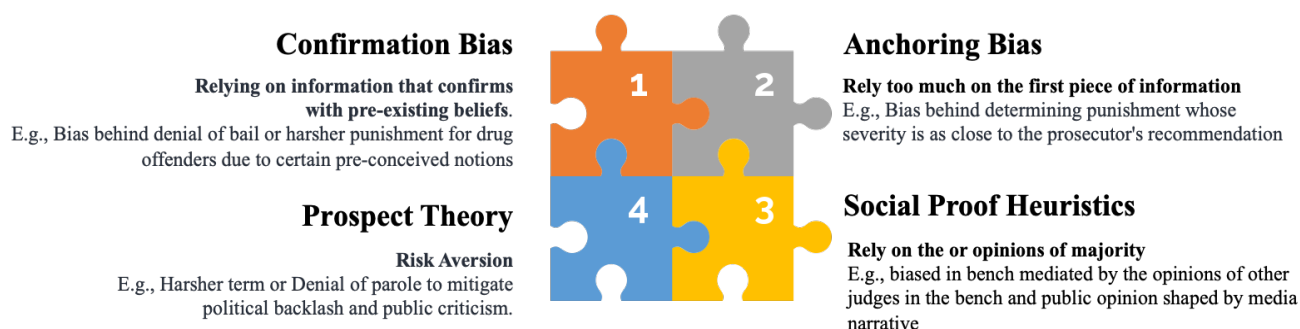
#### **d. Prospect Theory**

Prospect Theory is a behavioural science concept that explains how individuals evaluate potential outcomes based on perceived gains and losses relative to a reference point. For instance, a convict who served a substantial portion of his imprisonment, has shown remorse, and has actively participated in rehabilitation programs in prison. The evidence presented to the judge regarding parole, suggests that the convict has made genuine efforts to reform and poses a low risk of reoffending if released on parole. However, there is significant public and political pressure to maintain a tough stance on his crime. The public opinion influenced by certain media narratives and public statements of many politically influential personalities

emphasized their stance against releasing the convict under parole. This stance has become the reference point for judicial discretion.

The judge may be influenced by Prospect Theory, perceiving that granting parole to the convict might be seen as a loss compared to the reference point of a strict stance on crime in lines with the popular opinion. The judge may be concerned about potential political backlash, negative media attention or criticism for being lenient on the convict. As a result, the judge may favour risk aversion and uses judicial discretion to deny parole to the convict. For instance, in an assassination case of a prominent Indian leader, the arrested individuals were denied parole even after serving more than two decades in jail and also showed due remorse for their action.

**Figure 6.2 - Some of the important biases in Judicial Discretion**



Source : Conceptualized by the author

These situations illustrate how judicial discretion may not accurately reflect the accused's unique circumstances, the principles of proportionality and opportunity for reformation and rehabilitation. Hence it becomes imperative that the judges should be made aware of the potential impact of cognitive biases and heuristics on their decisions, and to formulate a comprehensive policy framework and strategies to mitigate bias in the criminal justice delivery system. In this regard, behavioural science insights could be valuable in the capacity building of the judges to recognize and address cognitive bias in judicial discretions.

## **7. Anti-Social offenses in need for neurobiological perspective: An Empirical Research Overview**

This empirical research tries to explore the association between prevalence of impulse

control disorders and the crimes due to impaired impulse control. The term "impulse control disorders" (ICD) refers to a class of behavioural disorders characterized by an inability to control an excessive urge to do something harmful to oneself or to others, with impulsive, unplanned actions, and little thought given to the potential consequences. In a systematic review, on thirty two studies from twenty two countries, it has been estimated that the prevalence of impulse control disorders in India is around 31.6 % (Parra-Díaz et.al 2020). This data suggest that there is high probability of occurrence of crime associated with impaired impulse control. For the empirical analysis, three crimes associated with impaired impulse control such as murder with enmity or vendetta as a motive, juvenile delinquency, offenses related to substance abuse (particularly possession of drug for personal consumption rather than for peddling) are taken into consideration.

### **7.1 Motive behind Murder and Impulse control disorder**

The motives behind murder and their potential association to neurological abnormalities like impulse control disorder is a potential research area within forensic psychology and neuroscience. In this research , enmity or vendetta as a motive behind murder is focussed to calculate what is the Proportion of Enmity / vendetta as a motive to total murder. This proportion may reflect the burden of impulse control disorder on committing murder. However the data regarding whether the murder happened at the heat of the moment or as a pre-planned crime is absent. Hence this empirical research may not fully translate to determine the burden of impulse control disorder on committing murder. However this data may provide valuable insights on the trends and patterns in Proportion of Enmity / vendetta as a motive to total murder over a period of eight years . The data for this empirical analysis is obtained from Crime Statistics of National Crime Records Bureau.

The data from Table 7.1 shows that while there are fluctuations in both the total number of murders and the proportion of murders motivated by enmity or vendetta, the latter remained a significant factor in a substantial portion of the cases in the range of 8.5 % in 2014 to 17 % in 2016 . Factors such as socioeconomic conditions, changes in law enforcement practices, or shifts in criminal demographics may also influence these trends. However, it's important to note that additional contextual factors and analysis may be needed for a holistic and comprehensive understanding of the underlying causes and implications of these trends in criminal behaviour.

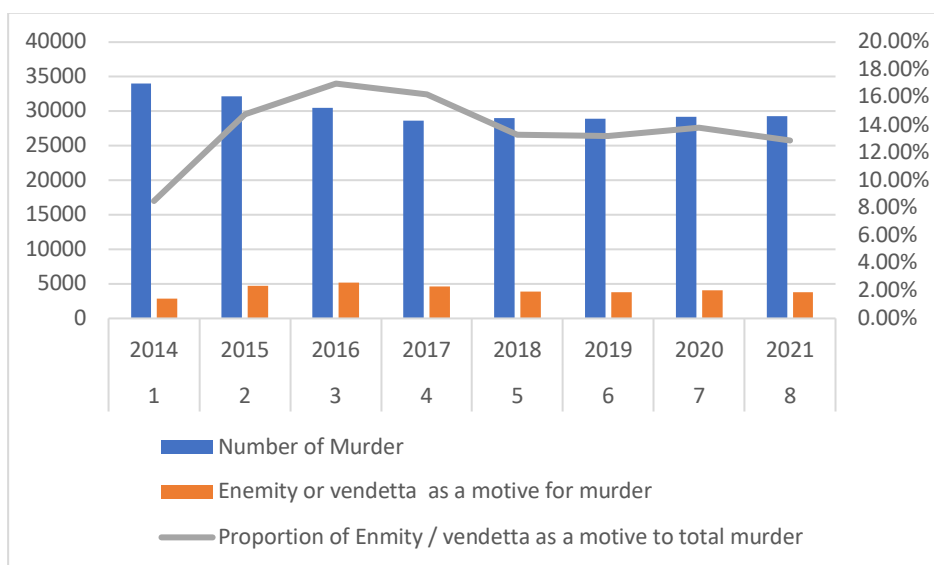
**Table 7.1 – Data regarding Total Number of Murders in and Proportion of Enmity or Vendetta as a motive to Total murder**

S.No	Year	Number of Murder	Enmity or vendetta as a motive for murder	Proportion of Enmity / vendetta as a motive to total murder
1	2014	33981	2912	8.5 %
2	2015	32127	4758	14.8 %
3	2016	30450	5179	17%
4	2017	28653	4660	16.2%
5	2018	29017	3875	13.3%
6	2019	28918	3833	13.2%
7	2020	29193	4034	13.8%
8	2021	29272	3782	12.9 %

*Source : Crime Statistics - National Crime Records Bureau*

*Note: Enmity or vendetta as a motive for murder is perceived as a result of impaired impulse control*

**Graph 7.1 – Graphical Representation showing Total Number of Murders and Proportion of Enmity or Vendetta as a motive to Total murder**



*Source: Graphically conceptualised by the authors based on the data obtained from Crime Statistics - National Crime Records Bureau*

*Note: Enmity or vendetta as a motive for murder is perceived as a result of impaired impulse control*

## 7.2 Juvenile delinquency

Data on juvenile delinquency during an eight-year period, from 2014 to 2021, is shown Table 7.2, with a specific focus on cases perceived as resulting from impaired impulse control. This data provides valuable insights into the prevalence of juvenile delinquency and the potential role of impaired impulse control in these cases. The overall number of juvenile delinquent cases fluctuated, with the maximum number (36,331 cases) recorded in 2014 and the lowest number (30,873 instances) in 2015. The total number of cases suggest that juvenile delinquency remains a significant societal concern.

The cases perceived as a result of impaired impulse control includes murder, culpable homicide, attempt to murder, attempt to culpable homicide, hurt. These cases represent individuals whose actions may have been influenced by a lack of self-control, making them more susceptible to impulsive behaviour. The data shows variations in the number of these cases over the years. In 2014, 4,817 cases were perceived as resulting from impaired impulse control, and this number decreased to 3,074 in 2016. However, from 2017 onwards, there was a significant increase in these cases, reaching 8,244 cases in 2021 (Refer Table 7.2).

**Table 7.2 – Data regarding total Number of Juvenile delinquency cases and proportion of cases for that may be considered as a result of impaired impulse control**

Year	Juvenile delinquency	Murder Sec. 302	Culpable homicide not amounting to murder Sec. 304 IPC	Attempt to Commit murder Sec. 307	Attempt to Commit culpable homicide Sec. 308	Hurt	Cases (perceived as a result of impaired impulse control)	Proportion of these acts to total Juvenile delinquency
2014	36331	841	52	728	60	3136	4817	13.2%

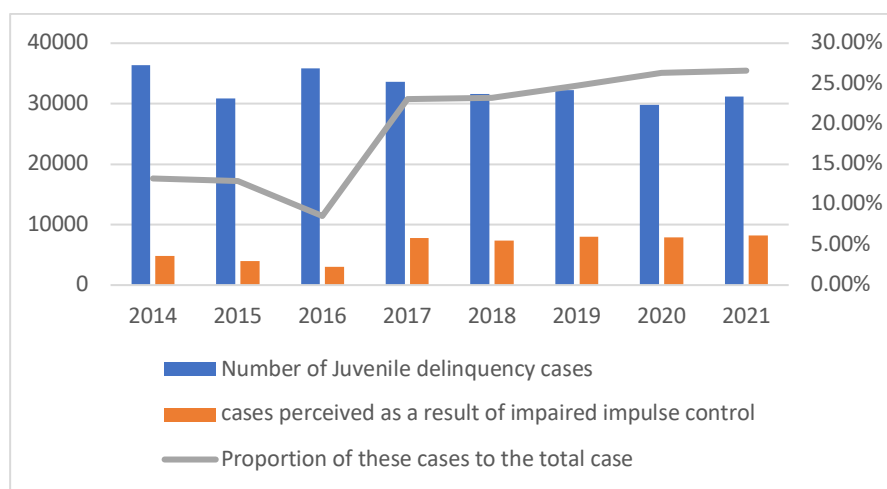
2015	30873	853	36	980	60	2054	3983	12.9%
2016	35849	892	45	933	53	1151	3074	8.57%
2017	33606	727	37	844	67	6092	7767	23.1%
2018	31591	767	28	830	68	5640	7333	23.2%
2019	32269	827	30	994	71	6055	7977	24.7%
2020	29768	862	50	981	92	5867	7852	26.3%
2021	31170	899	68	1291	87	5899	8244	26.6%

Source : Crime Statistics - National Crime Records Bureau, Ministry of Home Affairs

Note : Cases that may be considered as a result of impaired impulse

control includes murder, culpable homicide, attempt to commit murder, attempt to commit culpable homicide, hurt

**Graph 7.2 – Graphical representation of data regarding total Number of Juvenile delinquency cases and Proportion of cases for that may be considered as a result of impaired impulse control**



Source : Graphically conceptualised by the authors based on the data obtained from Crime Statistics - National Crime Records Bureau

Note : Cases that may be considered as a result of impaired impulse control

includes murder, culpable homicide, attempt to commit murder, attempt to commit culpable homicide, hurt.



The empirical relationship between impaired impulse control cases and the total number of juvenile delinquency cases, can be calculated by the proportion of such cases relative to the total cases. This proportion increased consistently over the years, indicating a growing concern regarding impaired impulse control in juvenile delinquency. In 2014, impaired impulse control cases accounted for 13.20% of the total cases, and by 2021, this proportion had risen to 26.60%. The data highlights the complex and evolving nature of juvenile delinquency, with a significant proportion of cases attributed to impaired impulse control.

### 7.3 Substance abuse

The data in Table 7.3 analyses the relation between the number of cases under the Narcotic Drugs and Psychotropic Substances Act (NDPS) and the proportion of these cases that are specifically related to the possession of drugs for personal consumption. It has been established by many studies that propensity for drug abuse and neurological abnormality have bi directional cause effect relationship. The data shows fluctuations in the total number of cases under the NDPS Act over the five-year period, ranging from 63800 cases in 2017 to 78,331 cases in 2021. This suggests that the drug-related offenses have remained a significant societal concern for law enforcement agencies during this period.

The number of cases related to the possession of drugs for personal consumption also varies from year to year. In 2017, there were 41,056 such cases, and this number increased to 46,029 cases in 2021. While there have been fluctuations, there is a general upward trend in these cases over the years.

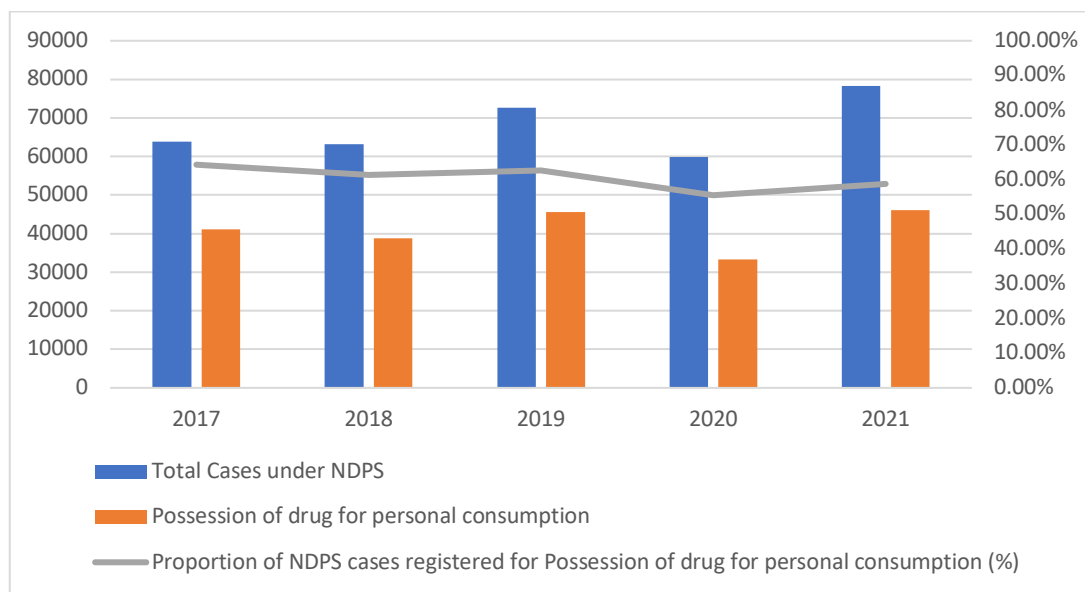
**Table 7.3 – Data regarding Total Number of cases under NDPS and Proportion of cases for possession of drugs for personal consumption**

S.No	Year	Total Cases under NDPS	Possession of drug for personal consumption	Proportion of NDPS cases registered for Possession of drug for personal consumption (%)
1	2017	63800	41056	64.3%
2	2018	63137	38715	61.3%

3	2019	72721	45616	62.7 %
4	2020	59806	33246	55.5 %
5	2021	78331	46029	58.7 %

Source : Crime Statistics - National Crime Records Bureau, Ministry of Home Affairs

**Graph 7.3 – Graphical Representation showing total Number of cases under NDPS and Proportion of cases for possession of drugs for personal consumption**



Source : Graphically conceptualised by the authors based on the data obtained from Crime Statistics - National Crime Records Bureau

The proportion of NDPS cases registered for the possession of drugs for personal consumption is an important metric as this percentage reflects the focus of law enforcement efforts on users rather than major drug traffickers. The proportion fluctuates within a relatively narrow range, from 55.5% in 2020 to 64.3% in 2017. This data shows that nearly two third of NDPS cases are associated with the personal substance abuse. This has a huge repercussion on overall psychological health of the society at large.

## **8. Neuroscience, Behavioural science, Judicial Discretion: Convergence**

Neuroscience, behavioural science and judicial discretion in criminal justice delivery system are three distinct fields but they converge in various ways within the legal system context and decision making process. Behavioural science provides valuable insights into human behaviour and factors that influence an individual's actions and on the other hand neuroscience examines the biological basis of behaviour and the functioning of the brain. Together these fields contribute to the decision making by the judge and influence the judicial discretion.

Judicial decision-making engages a complex interplay of brain regions associated with emotion regulation, cognitive control, and social cognition. It suggests that understanding the neural mechanisms underlying judicial discretion can provide valuable insights into the factors influencing legal judgments. (Johnson 2015) Neurolaw is an interdisciplinary field that combines neuroscience and law. The branch of subject explores how a growing understanding of the brain can impact legal proceedings and decisions. For example, neuroimaging of the brain can be used to assess factors such as intent or mental state of accused in criminal matters. This in turn influences how judges evaluate the evidence and make decisions. Behavioural science can help explain biases, heuristics, and other cognitive factors that may influence a judge's decisions (Brown 2012). Understanding these factors can lead to more informed discussions about the role of the bias and potential interventions to mitigate the same (Smith 2010).

Neuroscience has been a topic of discussion around sentencing and rehabilitation. For example, research on the brain can provide insights as to the abnormalities in the frontal lobe, prefrontal cortex and other parts of the brain and suggest some treatment measures that will help in rehabilitation of the individuals. This information and research can influence a judge's decisions in sentencing and parole hearings. (Miller 2018). Behavioural science and neurobiology help in assessing the mental health disorders and judges rely on expert opinion of psychologists, psychiatrists and neuroscientists to make determinations about an individual's mental state, competency and liability.

## **9. Way Forward : Policy Recommendation**

### **9.1. Robust Data Repository for Evidence based, data driven policy intervention :**

Comprehensive data framework regarding the motives for crimes associated with impulse control disorders is needed to analyse the neurobiological basis behind such crimes. For instance, whether the murder happened at the heat of the moment or as a pre-planned crime in NCRB is essential to establish neurobiological perspective of motive for murder. Robust data regarding criminal demographics, forensic psychologic pattern, socio – cultural contextual factors is needed for a holistic and comprehensive understanding of the underlying causes and implications of these patterns in anti-social behaviour.

### **9.2 Criminal justice system reform – interdisciplinary integration**

The integration of neuroscience, behavioural science, and bias mitigation strategies can play a crucial role in improving the fairness and effectiveness of the criminal justice delivery system. Neuroscience helps in better understanding of the biological and psychological factors that contribute to criminal behaviour. By analysing neuro imaging technologies like functional MRI, SPECT brain scans, researchers can identify patterns associated with impulsivity, aggression, and other behaviours that may lead to criminal activity. This knowledge can inform early intervention programs and help identify individuals who may benefit from mental health or rehabilitation services instead of punishment. Behavioural science can provide deep insights on judicial decision-making by understanding factors such as cognitive biases, heuristics that impact judicial discretion. Addressing bias in the criminal justice system is critical to ensuring fairness. Cognitive biases can lead to wrongful convictions, discriminatory sentencing, and unequal treatment. Implementing bias mitigation strategies through capacity building and training judges, can help reduce bias at various stages of the criminal justice process.

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