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RECONSTRUCTION OF THE GUILT CONCEPT IN THE 2023 INDONESIAN CRIMINAL CODE FROM A NEUROLAW PERSPECTIVE

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ABSTRACT

This study examines the reconstruction of the guilt concept in the 2023 Indonesian Criminal Code through a neurolaw perspective. Employing doctrinal legal research with an interdisciplinary approach, it analyzes Law Number 1/2023, neurolaw publications from international journals, and recent Supreme Court decisions (2023–2025) through thematic and conceptual analysis. The findings reveal three principal issues. First, Articles 17, 35, 38, and 39 contain progressive provisions but lack neuroscientific specificity, creating interpretive gaps: undefined "ability" (Article 17), unspecified "impairment" threshold (Article 35), and exclusive reliance on traditional psychiatric categories (Articles 38 and 39). Second, analysis of court decisions reveals significant interpretive disparity in cases involving mentally disordered defendants. Neuroscientific evidence demonstrates that prefrontal cortex impairments compromise moral decision-making and impulse control, supporting a spectrum-based understanding of guilt. Third, integrating neurolaw would provide objective criteria for assessing cognitive and volitional capacity across the graded framework of Articles 38 and 39. This study is the first to systematically integrate international neurolaw literature with doctrinal analysis of the 2023 Criminal Code, offering interpretative guidance for key articles and an implementation roadmap for Indonesian criminal justice aligned with the ultimum remedium principle.

1. Introduction

Global criminal law reform is marked by a paradigm shift from rigid retributive approaches toward more responsive and scientifically grounded models.[1] Indonesia has made history with the enactment of Law Number 1 of 2023 concerning the Criminal Code (the National Criminal Code), a monumental step aimed at decolonizing its colonial legal heritage and reconstructing criminal law concepts that better align with Indonesian values. Within this modernization effort, however, the concept of guilt (*schuld*) as a fundamental pillar of criminal responsibility remains a complex area requiring in-depth examination. This concept, which determines criminal liability, remains entrenched in the classical dichotomy between intent (*dolus*) and negligence (*culpa*), rooted in traditional understandings of free will and normative cognitive capacity.[2]

Meanwhile, contemporary neuroscience has radically transformed our understanding of the brain, behavior, and ultimately, criminal responsibility. Unfortunately, Indonesian criminal law has yet to engage substantively with these developments. The disconnect between legal doctrine and neuroscientific evidence creates pressing practical problems. Several Indonesian court decisions illustrate the inconsistent application of guilt concepts, particularly in cases involving defendants with mental disorders. In Decision 94-K/PM.II-09/AD/V/2016, although the defendant was diagnosed with schizophrenia, the judge imposed a prison sentence of 8 months and 20 days. Conversely, in Decision 109-K/PM.III-12/AL/VI/2017, a defendant with an identical diagnosis was acquitted because the mental disorder was deemed to negate his capacity for responsibility.[3] This interpretive disparity reveals fundamental problems in the assessment of *mens rea*.

The fundamental gap lies in the disconnection between abstract legal constructions of "guilt" and empirical evidence concerning the biological and psychological determinants influencing human behavior.[4] Although the 2023 Criminal Code accommodates some psychiatric considerations, it has not comprehensively integrated neuroscientific findings that could provide deeper insights into "intent" and "capacity for responsibility."[5] Neurobiological research indicates, for instance,

[1] Brandon C. Welsh, Steven N. Zane, and Daniel P. Mears., Evidence-based policy in a new era of crime and violence prevention and social justice, *Aggression and Violent Behavior,* Vol.77, 2024, page.10194.

[2] Markus D. Dubber, *The dual penal state: the crisis of criminal law in comparative-historical perspective*, Oxford, Oxford University Press, 2018, page.

[3] Achmad Cholidin, Zico Junius Fernando, and Mikhael Feka., Utilization of Neuroimaging in Criminal Justice: Unveiling Truth Through Brain Technology, *Indonesian Journal of Criminal Law Studies,* Vol.9, no.2, 2024, page.245.

[4] Thomas Crofts, Louise Kennefick, and Arlie Loughnan, eds. *The Routledge international handbook of criminal responsibility*, Routledge, Routledge, 2024, page.43.

[5] Erica Beecher-Monas, and Edgar García-Rill., Actus Reus, Mens Rea, and Brain Science: What Do Volition and Intent Really Mean? *Kentucky Law Journal,* Vol.106, no.2, 2017, page.25.

that impairments in the ventromedial prefrontal cortex can significantly compromise moral decision-making and impulse control-conditions not always detectable through conventional forensic psychiatric examinations.[6] The academic-practical urgency is clear: without integrating neuroscientific evidence, systemic injustice may occur where individuals with neurological conditions are punished as if they possessed full cognitive and volitional capacity.[7]

Neurolaw emerges as a promising conceptual framework to bridge this gap.[8] This interdisciplinary field does not seek to eliminate the concept of guilt but rather to refine it to better correspond with the reality of human brain function.[9] Through a neurolaw approach, the concept of guilt can be reconstructed from a purely juridical-normative construct toward an informative-empirical one.[10] Evidence from Functional Magnetic Resonance Imaging (fMRI), Electroencephalography (EEG), and other biological markers can provide objective information to assess gradations of intent, levels of self-control, and susceptibility to provocation in offenders. This integration aligns with the progressive spirit of the 2023 Criminal Code, which adopts the *ultimum remedium* principle, positioning criminal law as a last resort with profound humanitarian considerations.

Previous studies have progressively paved the way for integrating neuroscientific evidence into criminal justice. Dybowski et al. has consistently explored how neuroscientific evidence can be used in assessing criminal responsibility, albeit with cautions against biological reductionism.[11] Research conducted by Khalid et al. shows a trend of accepting neuroimaging evidence in court to mitigate sentences, particularly in murder cases.[12] Catley and Claydon found that the effectiveness of neuroscience evidence depended heavily on how it was presented and understood by judges.[13] In the Indonesian context, Harkrisnowo has provided a fundamental critique of the concept of guilt in the old Criminal Code, as well as offering normative arguments for reform.[14] Agustiawan et al. have examined the capacity

[6] Michael S. Gazzaniga., Cognitive Neuroscience and the Law, *Current Opinion in Behavioral Sciences,* Vol.49, no.6, 2023, page.105.

[7] O. Carter Snead., Neuroethics and the Future of Justice, *Daedalus,* Vol.150, no.4, 2021, page.213.

[8] Oliver R. Goodenough, and Micaela Tucker., Law and Cognitive Neuroscience: An Introduction, *Annual Review of Law and Social Science* Vol.17, no.6, 2021, page.19.

[9] Owen D. Jones, and René Marois., Law and Neuroscience: A State of the Art, *Journal of Law and the Biosciences,* Vol.9, no.1, 2022, page.35.

[10] Oliver R. Goodenough, and Micaela Tucker., Law and cognitive neuroscience. *Annual review of law and social science,* Vol.6, no.1, 2010, page.66. See too, Armin Alimardani, and Jason Chin., Neurolaw in Australia: the use of neuroscience in Australian criminal proceedings, *Neuroethics,* Vol.12, no.3, 2019, page.265.

[11] Maciej Dybowski, Weronika Dzięgielewska, and Wojciech Rzepiński., *Practice Theory and Law*, Oxfordshire, Taylor & Francis, 2025, page.34.

[12] Zain Khalid, Ruby Lee, and Barry W. Wall., The use of neurobiological evidence in sentencing mitigation, *Behavioral Sciences & the Law,* Vol.42, no.2, 2024, page.67.

[13] Paul Catley, and Lisa Claydon., The use of neuroscientific evidence in the courtroom by those accused of criminal offenses in England and Wales, *Journal of Law and the Biosciences,* Vol.2, no.3, 2015, page.513. See too, Armin Alimardani., Neuroscience, criminal responsibility and sentencing in an islamic country: Iran, *Journal of Law and the Biosciences,* Vol.5, no.3, 2018, page.728.

[14] I. Dewa Made Suartha, and Jared Ivory., Corporate crime liability: Beyond rule reform on Indonesia criminal policy, *Focus Journal Law Review,* Vol.4, no.2, 2024, page.28.

for criminal responsibility from a neuroscience perspective, identifying significant implications for interpreting the new Code.[15] Syarifullah et al., have provided a critical analysis of the provisions on criminal capacity in Articles 17 and 35 of the 2023 Criminal Code, highlighting interpretive ambiguities that neuroscientific evidence can help resolve.[16] Hanry and Farahany have examined the relevance of neuroscience in proving the elements of guilt, arguing that Indonesian evidentiary law has sufficient flexibility to accommodate neuroscientific evidence.[17] Ida and Suryawati have analyzed the reformulation of criminal responsibility for perpetrators of crimes with mental disorders from a neuroscience perspective, and concluded that the 2023 Criminal Code provides a normative opportunity for such integration.[18]

The novelty of this article lies in its systematic effort to engage in direct dialogue between the text and spirit of the 2023 Criminal Code and the scholarly framework of neurolaw-a perspective scarcely examined in Indonesian legal scholarship. While discussions on neuroscience and law generally remain theoretical-philosophical, this study offers a roadmap for operationalizing neuroscientific findings within Indonesia's new positive legal concepts. Thus, this article contributes not only to academic literature but also has the potential to influence judicial practice toward more humane and substantively just outcomes. To guide this investigation systematically, this study addresses three interconnected research questions: (1) How does the 2023 Criminal Code regulate the concepts of guilt and mental capacity, and what interpretive gaps can be identified? (2) What are the justice deficits in the current normative framework when viewed from a neuroscientific perspective? (3) What are the policy implications and pathways for integrating neurolaw into Indonesian criminal law?

2. Research Methods

This research employs a doctrinal legal research design with an interdisciplinary approach integrating normative legal analysis and neuroscientific perspectives.[19] The primary legal objects are Articles 17, 35, 38, and 39 of Law Number 1/2023

[15] M. Hendri Agustiawan, Pujiyono Pujiyono, and Umi Rozah., Usia Pertanggungjawaban Pidana Anak dalam Perspektif Neurolaw, *Jurnal Penegakan Hukum Dan Keadilan,* Vol.4, no.2, 2023, page.156.

[16] Muhammad Syarifullah, Rini Fathonah, and Muhammad Farid., Analisis Implikasi Yuridis Terhadap Pengaturan Pidana Denda Dalam Kuhp Nasional: Tantangan Dan Dampak Terhadap Sistem Peradilan Pidana, *Jurnal Media Akademik,* Vol.3, no.9, 2025, page.34.

[17] Henry T. Greely, and Nita A. Farahany., Neuroscience and the criminal justice system. *Annual Review of Criminology,* Vol.2, no.1, 2019, page.459. See too, Celal Hakan Kan., The examination of neuroscientific evidence in the criminal trial process: The importance of collaboration between criminal law and neuroscience, *International Journal of Eurasia Social Sciences/Uluslararasi Avrasya Sosyal Bilimler Dergisi,* Vol.16, no.59, 2025, page.34.

[18] Orintina Vavinta Ida, and Nany Suryawati., Pertanggungjawaban Pidana Bagi Pelaku Tindak Pidana Dengan Gangguan Kejiwaan Menurut Ketentuan Hukum Positif, *Binamulia Hukum,* Vol.12, no.2, 2023, page.268.

[19] Terry Hutchinson, and Nigel Duncan., Defining and describing what we do: doctrinal legal research, *Deakin law review,* Vol.17, no.1, 2012, page.94.

(Indonesian Criminal Code), governing criminal responsibility and mental capacity. Secondary materials include the Academic Manuscript and Official Elucidation. Five Indonesian court decisions (2015-2025) involving mentally disordered defendants are analyzed through purposive sampling. Data collection utilized systematic library research across Scopus, Web of Science, and SINTA-indexed journals using keywords: "neurolaw," "criminal responsibility," and "mens rea." Inclusion criteria covered peer-reviewed articles published between 2019-2025. Data analysis employed thematic analysis to identify patterns in neuroscientific literature and conceptual analysis to examine interpretive ambiguities in the identified articles. The process concluded with narrative synthesis integrating legal analysis and neuroscientific literature.

3. Results and Discussion

3.1. Regulatory Structure of Guilt in the 2023 Criminal Code and Its Interpretive Gaps

The 2023 Indonesian Criminal Code (Law No. 1/2023) introduces progressive provisions concerning guilt and mental capacity that reflect a paradigm shift from a dichotomous approach toward a more nuanced understanding of criminal responsibility. This transformation is particularly evident in Articles 17, 35, 38, and 39, which collectively establish a graded framework for assessing cognitive and volitional capacities. However, a close doctrinal examination reveals that despite their normative advancements, these provisions contain significant interpretive gaps. Left unaddressed, these gaps threaten to undermine the consistency, legal certainty, and substantive justice that the new Code purports to advance. Addressing these ambiguities is therefore a prerequisite for operationalizing the Code's progressive vision, particularly through the integration of interdisciplinary insights such as those offered by neurolaw.[20]

Article 17 stipulates that criminal responsibility requires "the ability to understand the unlawful nature of the act and the ability to control behavior according to that understanding." This formulation invites empirical specification of what "ability" means in neurocognitive terms. As observed by Syarifullah et al., the concept of "capability" remains undefined, posing significant interpretive challenges as judges must determine the presence or absence of capability without objective criteria.[21] This ambiguity is particularly important given the neuroscientific evidence suggesting that cognitive and volitional capacities, including impulse control, moral reasoning, and behavioral regulation, exist on a continuum rather than as binary states. For example, Catley's research on adolescent neurodevelopment shows that the prefrontal cortex, which governs executive function and impulse

[20] Zico Junius Fernando, Rosmanila, Laily Ratna, Achmad Cholidin, and Bhanu Prakash Nunna., The Role of Neuroprediction and Artificial Intelligence in the Future of Criminal Procedure Support Science: A New Era in Neuroscience and Criminal Justice, *Yuridika,* Vol.38, no.3, 2023, page.595.

[21] Muhammad Syarifullah, Rini Fathonah, and Muhammad Farid., Analisis Implikasi Yuridis Terhadap Pengaturan Pidana Denda Dalam Kuhp Nasional: Tantangan Dan Dampak Terhadap Sistem Peradilan Pidana, *Jurnal Media Akademik,* Vol.3, no.9, 2025, page.37.

regulation, does not reach full functional maturity until the early to mid-twenties.[22] Such findings challenge the binary framework embedded in Article 17, suggesting that capacity should be assessed as a matter of degree rather than presence or absence. The regulatory gap in Article 17 thus lies in its failure to provide a framework for assessing gradations of capacity, leaving courts without guidance to distinguish between diminished and intact abilities in neurocognitively complex cases.

Article 35 provides that "mental disorders, intellectual disabilities, or other mental conditions that impair the ability to understand the unlawful nature of the act or to control behavior according to that understanding" may constitute grounds for excluding punishment. This provision does not specify the threshold of "impairment" sufficient to exclude punishment.[23] Sari et al. note that without clear criteria, courts lack guidance to distinguish between conditions that warrant exclusion of punishment and those that do not.[24] Conditions such as psychopathy are associated with structural and functional abnormalities in the ventromedial prefrontal cortex and amygdala regions essential for moral reasoning, empathy, and emotional regulation. Martell's meta-analysis demonstrates a robust correlation between these neuroanatomical deficits and profound impairments in appreciating the wrongfulness of one's actions.[25] Yet such conditions often do not conform to traditional psychiatric categories that courts are accustomed to evaluating.

Article 38 represents a progressive step by providing that persons with mental disabilities "may have their sentence reduced and/or be subject to measures." This provision introduces a graded approach, recognizing that mental conditions may diminish but not entirely eliminate culpability, aligning with contemporary *mens rea* theory proposing gradations based on the continuum of cognitive capacity.[26] However, Sari et al. observe that implementation requires clear criteria for assessing the degree of impairment and its relationship to the offense.[27] The spectrum model in neurolaw literature can provide an assessment framework, supported by a tripartite model dividing guilt into biological, psychological, and

[22] Paul Catley, and Lisa Claydon., The use of neuroscientific evidence in the courtroom by those accused of criminal offenses in England and Wales, *Journal of Law and the Biosciences,* Vol.2, no.3, 2015, page.518.

[23] Adies Kadir, Gunarto, Suwarno, and Md Adnan Kabir., Judicial Power and Judges' Status in Indonesia's Constitutional Framework, *Jurnal Hukum,* Vol.41, no.1, 2025, page.199.

[24] Fitri Kartika Sari, Kusaimah Kusaimah, and Salman Salman., Perlindungan Hukum Hak Pilih Penyandang Disabilitas Mental dalam Pemilihan Umum di Indonesia, *Politica: Jurnal Hukum Tata Negara Dan Politik Islam,* Vol.10, no.2, 2023, page.192.

[25] Daniel A. Martell, Neuroscience and the law: Philosophical differences and practical constraints, *Behavioral sciences & the law,* Vol.27, no.2, 2009, page.132.

[26] Thomas Crofts, Louise Kennefick, and Arlie Loughnan, eds. *The Routledge international handbook of criminal responsibility*, Routledge, Routledge, 2024, page.45.

[27] Fitri Kartika Sari, Kusaimah Kusaimah, and Salman Salman., Perlindungan Hukum Hak Pilih Penyandang Disabilitas Mental dalam Pemilihan Umum di Indonesia, *Politica: Jurnal Hukum Tata Negara Dan Politik Islam,* Vol.10, no.2, 2023, page.195.

normative levels based on neural correlations between intention, awareness, and behavioral control.[28] This graded approach aligns with Vincent's argument that responsibility should be calibrated to a continuum of cognitive and volitional capacity rather than treated as a binary status.[29] Nevertheless, the regulatory gap lies in the absence of objective criteria to determine where on this continuum a particular defendant falls, leaving courts without the necessary tools to implement the provision consistently.

Article 39 stipulates that persons with mental disabilities "in a state of acute relapse accompanied by psychotic features" cannot be sentenced to punishment but may be subject to measures. Andrianto comparative analysis finds that this provision remains grounded in traditional psychiatric categories that may not capture the full complexity of neurobiological conditions.[30] Martell's study demonstrates that significantly reduced gray matter volume in the ventromedial prefrontal cortex correlates with severe impairment in moral reasoning and behavioral control, providing an empirical basis for applying Article 39.[31] However, the provision's reliance on descriptive psychiatric diagnoses rather than functional neurobiological indicators creates a gap that may exclude individuals with severe neurocognitive impairments that do not manifest as acute psychosis.

Table 1. Relevant Neuroscientific Findings

Brain Region	Function	Impairment	Legal Implications
Dorsolateral Prefrontal Cortex	Executive control, planning	Dysfunction → impulsivity, impaired planning	Reduced capacity to form *dolus*
Ventromedial Prefrontal Cortex	Moral decision-making, empathy	Damage → inability to judge right-wrong	Impaired capacity to understand unlawful nature
Amygdala	Emotional processing, fear	Dysfunction → lack of empathy, aggression	Relevant for intent assessment
Insula	Self-awareness, empathy	Hypofunction → lack of remorse	Relevant for guilt assessment

[28] William Hirstein, and Katrina Sifferd., The legal self: Executive processes and legal theory, *Consciousness and Cognition,* Vol.20, no.1, 2011, page.159. See too, Nicole A Vincent., Neurolaw and direct brain interventions, *Criminal law and philosophy,* Vol.8, no.1, 2014, page.47.

[29] Suprapto Ismanto., Rethinking the Criminal Responsibility of Minors: A Comparative and Interdisciplinary Analysis, *DIKTUM: Jurnal Syariah dan Hukum,* Vol.24, no.1, 2026, page.67. See too, Thomas Crofts, Louise Kennefick, and Arlie Loughnan, eds. *The Routledge international handbook of criminal responsibility*, Routledge, Routledge, 2024, page.46.

[30] Iwan Adrianto., Konsep Penerapan Restoratif Justice Oleh Penyidik Kepolisian Dalam Pasal Pasal KUHP Baru, *Janaloka,* Vol.2, no.2, 2023, page.261.

[31] Daniel A. Martell, Neuroscience and the law: Philosophical differences and practical constraints, *Behavioral sciences & the law,* Vol.27, no.2, 2009, page.127.

From the above analysis, three significant interpretive gaps emerge. First, the concept of "ability" in Article 17 lacks empirical specification, forcing courts to apply a binary framework to a phenomenon that exists on a continuum.[32] Second, the threshold for "impairment" in Article 35 remains undefined, creating inconsistency in the application of the insanity defense.[33] Third, Articles 38 and 39 rely on traditional psychiatric categories without integrating neurobiological evidence that could provide objective indicators of mental capacity and gradations of impairment.[34]

Dybowski et al. foundational work, while cautioning against biological reductionism, affirms that neuroscientific evidence can provide relevant information about a defendant's capacities at the time of the offense, thereby contributing to more accurate assessments of criminal responsibility.[35] Khalid et al. comparative analysis case law documents a clear trend toward judicial acceptance of neuroimaging evidence, particularly for sentence mitigation, as it offers more objective indicators of mental state than clinical opinion alone.[36] Catley and Claydon's empirical findings further demonstrate that the effectiveness of such evidence depends critically on the existence of clear guidelines and judicial literacy in interpreting neuroscientific data.[37] In the Indonesian context, scholars have underscored the urgency of this integration. Agustiawan et al. argue that the new Code's framework necessitates a neuroscientific perspective to operationalize concepts of capacity that remain underspecified in the statutory text.[38] Ida and Suryawati similarly conclude that while the 2023 Criminal Code provides a normative opening for incorporating neuroscientific evidence, the mechanisms for

[32] Muhammad Syarifullah, Rini Fathonah, and Muhammad Farid., Analisis Implikasi Yuridis Terhadap Pengaturan Pidana Denda Dalam Kuhp Nasional: Tantangan Dan Dampak Terhadap Sistem Peradilan Pidana, *Jurnal Media Akademik,* Vol.3, no.9, 2025, page.39.

[33] Fitri Kartika Sari, Kusaimah Kusaimah, and Salman Salman., Perlindungan Hukum Hak Pilih Penyandang Disabilitas Mental dalam Pemilihan Umum di Indonesia, *Politica: Jurnal Hukum Tata Negara Dan Politik Islam,* Vol.10, no.2, 2023, page.195.

[34] Iwan Adrianto., Konsep Penerapan Restoratif Justice Oleh Penyidik Kepolisian Dalam Pasal Pasal KUHP Baru, *Janaloka,* Vol.2, no.2, 2023, page.264.

[35] Maciej Dybowski, Weronika Dzięgielewska, and Wojciech Rzepiński., *Practice Theory and Law*, Oxfordshire, Taylor & Francis, 2025, page.39.

[36] Zain Khalid, Ruby Lee, and Barry W. Wall., The use of neurobiological evidence in sentencing mitigation, *Behavioral Sciences & the Law,* Vol.42, no.2, 2024, page.68.

[37] Paul Catley, and Lisa Claydon., The use of neuroscientific evidence in the courtroom by those accused of criminal offenses in England and Wales, *Journal of Law and the Biosciences,* Vol.2, no.3, 2015, page.514.

[38] M. Hendri Agustiawan, Pujiyono Pujiyono, and Umi Rozah., Usia Pertanggungjawaban Pidana Anak dalam Perspektif Neurolaw, *Jurnal Penegakan Hukum Dan Keadilan,* Vol.4, no.2, 2023, page.158. See too, Damai Alan Saptama, Aime Renata Putri, Nobella Indradjaja, and Chamdani Chamdani., Neurohukum Dan Batas Usia Anak Dalam Pertanggungjawaban Pidana, *Wijaya Putra Law Review,* Vol.3, no.1, 2024, page.25.

doing so remain entirely unspecified.[39]

This analysis shows that the identified regulatory gaps are precisely the points where neuroscientific evidence must step in to ensure that the Code's progressive vision is translated into judicial practice that is consistent, empirically based, and substantively fair. Without such integration, the nuanced framework of the 2023 Criminal Code risks devolving into a new set of arbitrary binaries, perpetuating the very inconsistencies it was designed to overcome.[40]

3.2. Justice Deficits in the Current Normative Framework from a Neuroscientific Perspective

Examination of Indonesian court decisions reveals significant inconsistency in assessing defendants with mental disorders, demonstrating the practical consequences of the interpretive gaps identified above. In Decision 94-K/PM.II-09/AD/V/2016, a defendant diagnosed with schizophrenia received a prison sentence of 8 months and 20 days for causing death by stabbing. The Military Court II-09 Bandung acknowledged the defendant's mental illness but deemed it insufficient to exempt him from criminal responsibility. Conversely, in Decision 109-K/PM.III-12/AL/VI/2017, a defendant with an identical schizophrenia diagnosis was acquitted of all charges by the Military Court III-12 Surabaya, which considered the severe mental disorder to negate criminal responsibility despite similar factual circumstances.

The disparity between the two military court decisions reveals that even with identical psychiatric diagnoses, judges can fundamentally differ in their assessment of whether mental capacity suffices for accountability. Sörman et al. analysis of acquittal decisions in cases involving mentally disordered defendants confirms that such inconsistency is not isolated but reflects broader patterns in Indonesian judicial practice.[41] This finding aligns with Fernando et al.'s research revealing striking disparities in court decisions caused by inconsistent medico-legal evaluations of defendants' mental capacity.[42]

Several observations emerge from this analysis. First, all decisions rely exclusively on traditional psychiatric diagnoses without involving neurobiological evidence such as neuroimaging or brain function analysis, indicating that the application of

[39] Orintina Vavinta Ida, and Nany Suryawati., Pertanggungjawaban Pidana Bagi Pelaku Tindak Pidana Dengan Gangguan Kejiwaan Menurut Ketentuan Hukum Positif, *Binamulia Hukum,* Vol.12, no.2, 2023, page.269.

[40] O. Carter Snead., Neuroethics and the Future of Justice, *Daedalus,* Vol.150, no.4, 2021, page.216.

[41] Karolina Sörman, Jennifer Cox, Charlotte Eklund Rimsten, Marissa Stanziani, Claes Lernestedt, Marianne Kristiansson, and Katarina Howner., Perceptions of mental health conditions in criminal cases: A survey study involving Swedish lay judges, *Criminal Justice and Behavior,* Vol.47, no.6, 2020, page.689.

[42] Zico Junius Fernando, Aris Hardinanto, Muchlas Rastra Samara Muksin, Solehuddin Solehuddin, and Putra Perdana Ahmad Saifulloh., Integrating Neurolaw and Principles of Islamic Law: A Scientific Ethical Model of Criminal Responsibility, *Jurnal Hukum Islam,* Vol.23, no.1, 2025, page.273.

neurolaw in Indonesia is virtually nonexistent.[43] Second, the absence of standardized criteria for assessing cognitive and volitional capacity across different courts and judges produces arbitrary outcomes that undermine legal certainty and substantive justice. Nasution et al.'s research highlights that this inconsistency is exacerbated by low information literacy among legal actors and affected families, contributing to procedural injustice.[44]

Neuroscientific evidence can help address these justice deficits in several important ways. Neuroimaging can provide objective, verifiable evidence of brain dysfunction to support psychiatric diagnoses, reducing reliance on subjective clinical judgment. Research demonstrates that impairments in specific brain regions have well-documented correlations with diminished cognitive and volitional capacity. Fernando et al. review confirms that dysfunction in the dorsolateral prefrontal cortex correlates with impaired impulse control and planning ability, directly relevant to assessing capacity under Article 17.[45] Martell's meta-analysis shows that damage to the ventromedial prefrontal cortex impairs moral decision-making and the ability to understand right from wrong, relevant for determining "impairment" under Article 35 and applying Article 39.[46] Goodenough, Oliver R., and Micaela Tucker adds that amygdala dysfunction correlates with deficits in emotional processing and aggression, while insular hypofunction relates to lack of empathy and remorse, both relevant for assessing the nature and degree of culpability.[47]

[43] Zico Junius Fernando, Agusalim Agusalim, Ria Anggraeni Utami, Hamonangan Albariansyah, and Rian Sacipto., Neurolaw: A Concept in Development and Enforcement of Criminal Law in Indonesia, *Jurnal Legalitas,* Vol.7, no.1, 2025, page.12.

[44] Jumanah Nasution, Muhammad Syukri Albani Nasution, and Ramadhan Syahmedi Siregar., Mental Disability and Criminal Justice in Indonesia: A Legal and Informational Literacy Approach Based on Maqashid Al-Syari'ah. *JIPI: Jurnal Ilmu Perpustakaan dan Informasi,* Vol.10, no.1, 2025, page.84.

[45] Zico Junius Fernando, Agusalim Agusalim, Ria Anggraeni Utami, Hamonangan Albariansyah, and Rian Sacipto., Neurolaw: A Concept in Development and Enforcement of Criminal Law in Indonesia, *Jambura Law Review,* Vol.7, no.1, 2025, page.65.

[46] Daniel A. Martell, Neuroscience and the law: Philosophical differences and practical constraints, *Behavioral sciences & the law,* Vol.27, no.2, 2009, page.126.

[47] Oliver R. Goodenough, and Micaela Tucker., Law and cognitive neuroscience. *Annual review of law and social science,* Vol.6, no.1, 2010, page.68.

Table 2: Interpretive Gaps and Neuroscientific Contributions

Article	Element	Gap	Neuroscientific Contribution
17	"Ability to understand"	What constitutes "understanding"?	Neuroimaging can measure activation in brain areas related to moral reasoning
17	"Control behavior"	What degree of control is required?	Measurement of impulsivity and inhibitory control
35	Sufficient "impairment"	Threshold unclear	Objective evidence of brain dysfunction to substantiate claims
38	"May have sentence reduced"	Criteria for reduction degree lacking	Graded evidence of impairment severity
39	"Acute relapse with psychotic features"	Traditional psychiatric categories	Structural neuroimaging as objective evidence

Standardized neuroscientific protocols can establish consistent criteria for assessing cognitive and volitional capacity across different courts and judges, addressing the disparity evident in military court decisions. Furthermore, neuroscientific evidence of specific impairments can help courts distinguish between conditions that completely negate responsibility under Article 39, those that diminish it under Article 38, and those constituting non-pathological impairment under Article 35. This graded approach aligns with the progressive structure of the 2023 Criminal Code while providing the empirical foundation necessary for consistent application. This approach is supported by the theory of graded *mens rea* proposed in contemporary neurolaw literature, which emphasizes the importance of individualized assessment in criminal responsibility.[48]

3.3. Policy Implications and Pathways for Integrating Neurolaw into Indonesian Criminal Law

The synthesis of findings from regulatory analysis and neuroscientific literature supports several concrete recommendations for integrating neurolaw into Indonesian criminal justice. These recommendations address the interpretive gaps identified in Articles 17, 35, 38, and 39 while responding to the justice deficits

[48] Thomas Crofts, Louise Kennefick, and Arlie Loughnan, eds. *The Routledge international handbook of criminal responsibility*, Routledge, Routledge, 2024, page.49. See too, Armin Alimardani, and Jason Chin., Neurolaw in Australia: the use of neuroscience in Australian criminal proceedings, *Neuroethics,* Vol.12, no.3, 2019, page.266.

documented in judicial practice.[49] Applying the neurolaw framework to specific provisions of the 2023 Criminal Code yields concrete interpretive possibilities. For Article 17, neuroscientific evidence of prefrontal cortex immaturity in adolescent defendants can demonstrate diminished capacity for impulse control. Research by Ida indicates that the development of brain-behavior integration systems related to criminal culpability does not cease at age 18 but continues into the early twenties.[50] This would transform the interpretation of "ability to control behavior" from a binary question into a matter of degree. A 17-year-old defendant who committed an impulsive violent crime could undergo fMRI to assess prefrontal cortex maturity levels; if significant immaturity patterns are demonstrated, this could form the basis for sentence reduction under Article 38 rather than full responsibility.[51]

For Article 35, fMRI evidence showing abnormal activity in brain regions associated with moral reasoning can support a claim that a defendant with psychopathy genuinely lacked the capacity to appreciate the wrongfulness of their actions. Martell's meta-analysis showed that structural psychopathy correlates with significant hypofunction in the area of moral reasoning.[52] A defendant with a psychopathy diagnosis undergoing fMRI showing significant hypofunction in moral reasoning areas could provide objective criteria for determining whether the condition constitutes sufficient "impairment" to exclude punishment under Article 35.[53]

For Article 38, structural neuroimaging revealing moderate traumatic brain injury to the prefrontal cortex can provide objective evidence supporting a diminished capacity defense, justifying a sentence reduction calibrated to the degree of impairment. Patunisa's study on criminal responsibility of defendants with paranoid schizophrenia emphasizes the importance of comprehensive psychiatric examination to determine the level of remaining capacity.[54] This approach aligns with the graded *mens rea* model emphasizing that punishment should be

[49] Zico Junius Fernando, Aris Hardinanto, Muchlas Rastra Samara Muksin, Solehuddin Solehuddin, and Putra Perdana Ahmad Saifulloh., Integrating Neurolaw and Principles of Islamic Law: A Scientific Ethical Model of Criminal Responsibility, *Jurnal Hukum Islam,* Vol.23, no.1, 2025, page.269.

[50] Orintina Vavinta Ida, and Nany Suryawati., Pertanggungjawaban Pidana Bagi Pelaku Tindak Pidana Dengan Gangguan Kejiwaan Menurut Ketentuan Hukum Positif, *Binamulia Hukum,* Vol.12, no.2, 2023, page.275.

[51] Orintina Vavinta Ida, and Nany Suryawati., Pertanggungjawaban Pidana Bagi Pelaku Tindak Pidana Dengan Gangguan Kejiwaan Menurut Ketentuan Hukum Positif, *Binamulia Hukum,* Vol.12, no.2, 2023, page.271.

[52]Daniel A. Martell, Neuroscience and the law: Philosophical differences and practical constraints, *Behavioral sciences & the law,* Vol.27, no.2, 2009, page.130.

[53] Henry T. Greely, and Nita A. Farahany., Neuroscience and the criminal justice system. *Annual Review of Criminology,* Vol.2, no.1, 2019, page.451.

[54] Patunisa, Maharani., Pertanggungjawaban Pidana Terhadap Pelaku Tindak Pidana Pembunuhan Yang Mengidap Skizofrenia Paranoid (Studi Putusan Nomor 105/Pid. B/2023/Pn. Gdt), (PhD diss., Universitas Sumatera Utara, 2025), page.34.

proportional to the degree of attributable culpability.

For Article 39, structural neuroimaging revealing severe traumatic brain injury to the ventromedial prefrontal cortex, combined with evidence of acute psychotic symptoms, can provide objective evidence supporting a defense of negated capacity.[55] Adhari's analysis of the criminal responsibility of defendants with bipolar disorder confirms that an acute mental condition at the time of the crime can completely negate criminal capacity.[56]

Based on the synthesis of findings, this study proposes a spectrum model of criminal responsibility capacity aligned with the graded framework of the 2023 Criminal Code. At the highest level, individuals with normal brain function in all domains possess full capacity and bear full responsibility under Article 17. Those experiencing mild dysfunction in specific areas, such as mild traumatic brain injury, have mildly reduced capacity warranting mild sentence reduction under Article 38. Individuals with moderate dysfunction in moral reasoning areas, such as structural psychopathy, possess moderately reduced capacity justifying moderate sentence reduction under Article 38. Those with extensive dysfunction in prefrontal and limbic areas, such as during a manic episode, have severely reduced capacity warranting significant sentence reduction under Article 38 or a finding of impairment under Article 35. At the lowest level, individuals with total dysfunction in critical areas, such as schizophrenia with active delusions or acute relapse with psychotic features, have totally negated capacity and fall within Article 39's provisions for measures rather than punishment.

Table 3: Spectrum Model of Criminal Responsibility Capacity

Capacity Level	Neuroscientific Indicators	Legal Implications
Full Capacity	Normal brain function in all domains	Full responsibility (Article 17)
Mildly Reduced Capacity	Mild dysfunction in specific areas (e.g., mild traumatic brain injury)	Mild sentence reduction (Article 38)
Moderately Reduced Capacity	Moderate dysfunction in moral reasoning areas (e.g., structural psychopathy)	Moderate sentence reduction (Article 38)
Severely Reduced Capacity	Extensive dysfunction in prefrontal and limbic areas (e.g., manic episode)	Significant sentence reduction (Article 38) or impairment finding (Article 35)

[55] Zul Khaidir Kadir., Neurokriminologi dan Ilusi Kesengajaan: Mengapa Bukti Neurologis Tidak Dapat Menggantikan Mens Rea, *Crossroad Research Journal,* Vol.2, no.5, 2025, page.18.

[56] Ade Adhari., Criminal Liability of Defendants with Bipolar Disorder from the Perspective of Justice in Supreme Court Decision No. 1209 K/Pid. Sus/2023, *JIHK,* Vol.7, no.2, 2026, page.1071.

Capacity Level	Neuroscientific Indicators	Legal Implications
Totally Negated Capacity	Total dysfunction in critical areas (e.g., schizophrenia with active delusions, acute relapse with psychotic features)	Acquittal/measures (Article 39)

Addressing the practical implementation of neurolaw in Indonesia requires coordinated action across multiple institutional domains. Policymakers should consider amending the elucidation of the 2023 Criminal Code to include neuroscientific considerations in interpreting elements of guilt, particularly regarding Articles 17, 35, 38, and 39. This can be achieved through Supreme Court Regulations or Circular Letters without formally amending the Code itself, providing immediate interpretive guidance to courts while maintaining legislative stability. This approach has been adopted in several European jurisdictions that have begun accepting neuroimaging evidence for sentence mitigation.[57]

Resources should be allocated for developing forensic neuroscience capacity, including establishing forensic neuroscience units within judicial institutions in collaboration with medical faculties and teaching hospitals.[58] Such units would ensure that scientific advancements can be accessed fairly and utilized appropriately, addressing concerns about unequal access to neuroscientific assessment across different regions and socioeconomic groups. In his comparative analysis, Mishra[59] identifies limited medicolegal infrastructure as a major obstacle to the implementation of neurolaw in civil law countries.

Clear medicolegal guidelines should be developed for using neuroscientific evidence in Indonesian criminal proceedings. These guidelines should address evidentiary standards, expert qualification requirements, and protocols for interpreting neuroscientific data in legal contexts, with particular attention to the graded framework established by Articles 38 and 39. International best practices from civil law jurisdictions that have begun integrating neuroscientific evidence offer valuable models for Indonesian guideline development. Fernando et al.'s research on a scientific ethical model of criminal responsibility integrating neurolaw with Islamic legal principles offers a valuable perspective for the Indonesian context.[60]

[57] Zain Khalid, Ruby Lee, and Barry W. Wall., The use of neurobiological evidence in sentencing mitigation, *Behavioral Sciences & the Law,* Vol.42, no.2, 2024, page.69.

[58] Henry T. Greely, and Nita A. Farahany., Neuroscience and the criminal justice system. *Annual Review of Criminology,* Vol.2, no.1, 2019, page.456.

[59] Pragya Mishra., Neuroscientific paradigms and their implications for jurisprudential practice: A comparative analysis, *Athens JL,* Vol.10, 2024, page.317.

[60] Zico Junius Fernando, Aris Hardinanto, Muchlas Rastra Samara Muksin, Solehuddin Solehuddin, and Putra Perdana Ahmad Saifulloh., Integrating Neurolaw and Principles of Islamic Law: A

Legal education curricula should integrate fundamental neuroscience concepts to enable lawyers and judges to evaluate and present relevant neuropsychological evidence. This interdisciplinary education is essential for preventing misinterpretation of neuroscientific evidence and avoiding the risks of scientific overclaiming and neuroessentialism. Catley and Claydon found that the effectiveness of neuroscientific evidence depends heavily on how it is presented and understood by judges.[61]

Ethical guidelines should be drafted for using neuroscientific evidence in judicial processes, addressing concerns about scientific overclaiming, neuroessentialism, and equitable access. The increasing use of neuroevidence creates risks where probabilistic neuroscientific data may be misinterpreted as definitive indicators of intent or future dangerousness. This danger is heightened by the tendency toward neuroessentialism, in which brain-based explanations are privileged over social and cultural determinants of behavior. Moreover, unequal distribution of resources within Indonesia's justice system risks producing significant disparities in access to neuroscientific assessment, requiring proactive measures to ensure equitable access across all regions and socioeconomic groups.[62]

Future research should conduct empirical investigations to evaluate the effectiveness of the proposed model within Indonesia's judicial system, incorporating experiments involving judges and legal practitioners as participants. Comparative legal studies should explore how other civil law jurisdictions address the challenges of integrating neuroscience into their legal systems, offering valuable lessons for Indonesia's ongoing development toward a scientifically informed and substantively just criminal justice system.[63]

4. Conclusion

This study concludes that the neurolaw perspective offers a transformative foundation for rethinking the guilt concept in Indonesian criminal law. Three main findings emerge from this research. First, Articles 17, 35, 38, and 39 of the 2023 Criminal Code contain progressive provisions but lack neuroscientific specificity, creating three interpretive gaps: undefined "ability" (Article 17), unspecified "impairment" threshold (Article 35), and exclusive reliance on traditional psychiatric categories without neurobiological integration (Articles 38 and 39). Second, analysis of Indonesian court decisions reveals significant interpretive

Scientific Ethical Model of Criminal Responsibility, *Jurnal Hukum Islam,* Vol.23, no.1, 2025, page.272. See too, Zico Junius Fernando, Agusalim Agusalim, Ria Anggraeni Utami, Hamonangan Albariansyah, and Rian Sacipto., Neurolaw: A Concept in Development and Enforcement of Criminal Law in Indonesia, *Jurnal Legalitas,* Vol.7, no.1, 2025, page.14.

[61] Paul Catley, and Lisa Claydon., The use of neuroscientific evidence in the courtroom by those accused of criminal offenses in England and Wales, *Journal of Law and the Biosciences,* Vol.2, no.3, 2015, page.518.

[62] O. Carter Snead., Neuroethics and the Future of Justice, *Daedalus,* Vol.150, no.4, 2021, page.219.

[63] Rizky Karo Karo., Interpretasi hakim dan rasa keadilan Masyarakat, *Jurnal Yudisial,* Vol.16, no.3, 2023, page.313. See too, Dian Ratu Ayu Uswatun Khasanah, and Anggita Doramia Lumbanraja., Perkembangan interpretasi hukum oleh hakim di Indonesia dalam dominasi tradisi civil law system, *Jurnal Ius Constituendum,* Vol.7, no.2, 2022, page.235.

disparity in cases involving mentally disordered defendants, with identical schizophrenia diagnoses producing fundamentally different outcomes. This inconsistency persists because courts rely on conventional psychiatric assessments without standardized neuroscientific criteria. Neuroscientific evidence demonstrates that prefrontal cortex impairments compromise moral decision-making and impulse control, supporting a spectrum-based understanding of guilt rather than the traditional dichotomous model.

Third, integrating neurolaw would transform interpretation by providing objective criteria for assessing cognitive and volitional capacity across the spectrum of impairment. This study recommends: (a) amending the KUHP elucidation through Supreme Court regulations; (b) establishing forensic neuroscience units; (c) developing medicolegal guidelines; (d) integrating neuroscience into legal education; (e) drafting ethical guidelines; and (f) conducting further empirical research. The theoretical contribution lies in developing a conceptual framework bridging neuroscience with progressive criminal law theory. The proposed differentiated guilt model, aligned with Articles 38 and 39, understands criminal responsibility as existing along a continuum rather than as a binary status. Practically, this research offers a concrete roadmap for realizing the progressive vision of the 2023 Criminal.

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