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Reconstructing the Concept of Criminal Responsibility Capacity: Neurocriminology in Indonesia's National Criminal Code: Law No. 1 of 2023 in Conjunction with Law No. 1 of 2026

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Abstract

Recent developments in neurocriminology pose significant epistemological challenges to the legal construction of the capacity for criminal responsibility (*toerekeningsvatbaarheid*) under Indonesia's National Criminal Code (Law No. 1 of 2023 in conjunction with Law No. 1 of 2026). Although Articles 38–39 of the National Criminal Code represent an advancement over Article 44 of the *Wetboek van Strafrecht* (WvS), their legal construction continues to rely on conventional clinical-psychiatric diagnostic parameters that have yet to adequately accommodate scientifically established variations in neurological capacity. Drawing on Progressive Legal Theory (Satjipto Rahardjo) as the grand theory and overarching philosophical framework, and the Theory of Criminal Responsibility (*toerekeningsvatbaarheid*, as developed by Van Hamel, Pompe, and Sudarto) as the middle-range/applied theory and normative-doctrinal analytical framework, supported by Neurocriminology (Glenn and Raine) and Graded Responsibility (Hirstein) as supplementary analytical instruments, this normative legal study employs statutory, conceptual, and comparative approaches to identify three doctrinal inadequacies: the exclusive reliance on *Visum et Repertum Psikiatrikum* (VeRP) as the sole assessment instrument; the failure to accommodate subclinical neurological impairments; and the structural conflict between the strict liability provisions of Law No. 1 of 2026 and the principle of *geen straf zonder schuld* enshrined in Article 36(1) of the National Criminal Code. This article proposes a reconstruction based on the Neuro-Contextual Capacity Model, comprising three elements: the expansion of the criteria for assessing the capacity for criminal responsibility, the strengthening of the double-track system through neurological parameters, and the establishment of constitutional limits on strict liability for offenders with measurable neurological impairments.

Keywords: Capacity for Criminal Responsibility; Neurocriminology; Progressive Legal Theory; Strict Liability; *Toerekeningsvatbaarheid*.

A. Introduction

Scientific advancements in the twenty-first century have opened new perspectives on understanding human beings as biological organisms whose behavior is not always the product of entirely free and rational choices. Through neuroimaging technologies such as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET), modern neuroscience can directly map brain activity and establish associations with patterns of human behavior, including criminal behavior. These findings have laid the foundation for the emergence of neurocriminology, an interdisciplinary field that examines the etiology of criminal behavior through interactions among biological, neurological, environmental, and experiential factors (Glenn & Raine, 2014).

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Empirical evidence from neurocriminological studies consistently indicates that individuals with impairments in the prefrontal cortex, particularly the dorsolateral prefrontal cortex (dlPFC), which plays a role in planning and rational decision-making, and the ventromedial prefrontal cortex (vmPFC), which is involved in moral judgment and risk processing, experience significant difficulties in impulse control, emotional regulation, and moral decision-making (Friedman & Robbins, 2022). Similarly, dysfunction of the amygdala has been strongly associated with deficits in empathy, an impaired ability to respond appropriately to threat-related signals, and a tendency toward recurrent antisocial behavior (Silalahi & Susanti, 2024).

Further studies have demonstrated that these conditions do not necessarily manifest as mental disorders detectable through conventional psychiatric assessments. Individuals with acquired brain injuries resulting from accidents or tumors, individuals with Fetal Alcohol Spectrum Disorder (FASD), offenders with antisocial personality disorder associated with measurable neurological deficits, and even adolescent offenders whose prefrontal cortex has not yet fully matured may all exhibit neurological profiles that are legally relevant but frequently remain undetected in standard clinical examinations (Sturges et al., 2022; Silva et al., 2020). This empirical reality creates a gap between what scientific evidence can demonstrate and what criminal law is capable of accommodating.

The relevance of these findings to the criminal justice system is further emphasized by Kamondi et al., who advocate the development of forensic neurology as a distinct subdiscipline at the intersection of neurology, neuroscience, and law. In this context, a question previously regarded as belonging exclusively to the medical and clinical domains—the extent to which an individual's neurological condition affects their capacity for criminal responsibility—has become a pressing legal issue that modern criminal justice systems must address (Kamondi et al., 2024).

At the sociological level, growing concerns have emerged among the public, legal scholars, and judicial practitioners regarding substantive justice in criminal sentencing. Formal justice based on the principle of equality before the law does not necessarily produce genuine justice when the actual circumstances of the individuals concerned differ fundamentally. As emphasized by Rawls, genuine justice requires treatment that takes individual differences into account to ensure that the resulting outcomes are proportionate and non-arbitrary (Rawls, 1971).

In the context of criminal law, this issue becomes increasingly apparent when the sentencing system applies identical standards to offenders with scientifically established impairments in neurological capacity and those with unimpaired capacities. Research by Greely and Farahany, indicates that offenders with prefrontal cortex dysfunction do not respond to the threat of punishment in the same manner as offenders without such impairments, thereby undermining the deterrent function of criminal punishment. Sentences imposed without considering offenders' neurological conditions are therefore not only unjust at the individual level but also ineffective from a broader social perspective (Greely & Farahany, 2019).

Furthermore, a socio-legal study conducted by Kadir et al., identified that legal systems which disregard the biological dimensions of human behavior risk adopting disproportionate approaches to the attribution of criminal culpability. Such approaches may, in turn, undermine public confidence in the criminal justice system, as an increasingly scientifically informed public may question the moral legitimacy of punishment that disregards established

neurological evidence (Kadir et al., 2025).

At the same time, data from Indonesian correctional institutions reveal serious concerns regarding recidivism. A meta-analysis conducted by Beaudry et al., published in The Lancet Psychiatry and examining 29 randomized controlled trials, demonstrated that psychological and cognitive therapeutic interventions within correctional settings were associated with a statistically significant reduction in recidivism (OR = 0.72; 95% CI: 0.56–0.92). These findings further underscore the urgent need for a sentencing system that is more responsive to offenders' psychological and neurological conditions (Beaudry et al., 2021).

At the juridical level, this issue has become increasingly pronounced following the entry into force of Indonesia's National Criminal Code, Law No. 1 of 2023, on January 2, 2026, alongside the enactment of Law No. 1 of 2026 concerning Criminal Penalty Adjustments. This criminal law reform represents a historic milestone while simultaneously introducing normative challenges unprecedented in the development of Indonesian criminal law.

Under the framework of the *Wetboek van Strafrecht* (WvS), which remained in force for more than seven decades, Article 44(1) recognized only two conditions for excluding criminal responsibility on the basis of an offender's mental condition: a mental condition characterized by impaired development or a mental disturbance resulting from illness (Moeljatno, 2021). This formulation was binary and highly general, as it did not recognize gradations of capacity, distinguish among different types of impairment, or provide a structured assessment mechanism. Consequently, judges frequently encountered uncertainty when evaluating offenders with complex mental conditions. This situation reflects what Rahardjo's Progressive Legal Theory criticizes as the failure of law to evolve in accordance with human realities: statutory provisions remain stagnant while scientific knowledge and social realities continue to develop.

Indonesia's National Criminal Code introduces a significant paradigmatic shift that merits recognition. Article 38 of the National Criminal Code provides that any person who, at the time of committing a criminal offense, has a mental disability and/or intellectual disability may be subject to a reduced criminal sentence and/or measures. Article 39 further stipulates that individuals with mental disabilities experiencing acute relapse accompanied by psychotic symptoms and/or individuals with moderate or severe intellectual disabilities cannot be subjected to criminal punishment but may instead be subject to measures. These two provisions introduce gradations in the capacity for criminal responsibility, ranging from incapacity to diminished capacity, representing a substantial conceptual advancement (Alvat, 2025).

Nevertheless, three unresolved legal issues remain. First, the parameters of "mental disability" and "intellectual disability" under Articles 38–39 continue to rely entirely on conventional clinical-psychiatric diagnostic criteria. Consequently, neurologically based impairments in capacity that are legally relevant but do not meet formal diagnostic criteria fall outside the scope of these provisions. This creates a doctrinal gap between normative legal standards and neurological realities. Second, the elucidation of Article 39 of the National Criminal Code requires an assessment of incapacity for criminal responsibility following the presentation of expert testimony, thereby positioning the *Visum et Repertum Psikiatrikum* (VeRP) as an indispensable assessment instrument. However, an accurate evaluation of capacity requires a multidisciplinary approach (Kamondi et al., 2024). Third, a significant internal normative tension exists between Article 36(1) of the National Criminal Code, which expressly codifies the principle of *geen straf zonder schuld* (no punishment without culpability),

and Article 37 in conjunction with Law No. 1 of 2026, which permits strict liability. When these provisions are applied to offenders with neurological impairments, serious constitutional concerns arise under Article 28D(1) of the Constitution of the Republic of Indonesia and the standards established by the Convention on the Rights of Persons with Disabilities (CRPD) (Barsky & Stein, 2023).

These three legal issues have not yet been examined systematically and comprehensively within a single study specifically assessing the compatibility of the legal construction of the capacity for criminal responsibility under Indonesia's National Criminal Code by integrating two complementary theoretical frameworks—Progressive Legal Theory and the normative standards of *toerekeningsvatbaarheid*—with findings from neurocriminology. This article seeks to address this research gap through a systematic and comprehensive analysis.

Studies on the capacity for criminal responsibility have been extensively conducted within Indonesian legal scholarship; however, significant research gaps remain. Oratmangun, examined the concept of the capacity for criminal responsibility under Article 44 of the Indonesian Criminal Code, emphasizing the requirements for criminal responsibility from the perspective of classical criminal law doctrine (Oratmangun, 2016). Kusumawardhani, subsequently focused on the legitimacy of temporary insanity, or temporary mental disability, as a ground for exemption from criminal punishment within the Indonesian legal system (Kusumawardhani, 2023). Hafidz, further examined the legal construction of Articles 38 and 39 of Indonesia's National Criminal Code by analyzing these provisions from the perspectives of criminal law and the concept of *taklif* in Islamic law (Hafidz, 2024). These three studies have made important contributions to the development of the doctrine of criminal responsibility; nevertheless, they remain predominantly oriented toward psychiatric approaches and conventional legal dogmatics. No study has specifically integrated neurocriminological findings as a normative analytical instrument to assess the compatibility of the legal construction of the capacity for criminal responsibility under the National Criminal Code while simultaneously addressing issues of neurological evidence, the applicability of strict liability, and the reconstruction of criminal responsibility based on developments in modern neuroscience.

Based on this comparison, the novelty of the present study lies in three principal aspects. First, this study integrates neurocriminology into the analysis of the doctrine of *toerekeningsvatbaarheid* as an interdisciplinary approach that has not yet been comprehensively employed in Indonesian criminal law research. Second, it systematically identifies three doctrinal inadequacies in the regulation of the capacity for criminal responsibility under the National Criminal Code: the predominance of psychiatric diagnostic parameters, the failure to accommodate subclinical neurological impairments, and the normative conflict between the principle of *geen straf zonder schuld* and the application of strict liability. Third, this study proposes a normative reconstruction through the Neuro-Contextual Capacity Model, a conceptual framework that connects developments in neurocriminology with Indonesian criminal law reform, thereby providing both theoretical contributions and practical recommendations for the development of criminal legislation and judicial practice.

Based on the foregoing background, this study formulates three research questions. First, how is the normative construction of the capacity for criminal responsibility under Indonesia's National Criminal Code, as regulated by Law Number 1 of 2023 in conjunction with Law Number 1 of 2026, understood from the perspective of the theory of criminal responsibility (*toerekeningsvatbaarheid*)? Second, what doctrinal inadequacies exist in the regulation of the capacity for criminal responsibility under the National Criminal Code when

examined in light of developments in modern neurocriminology? Third, how can the concept of the capacity for criminal responsibility be reconstructed to accommodate developments in neurocriminology without disregarding the fundamental principles of Indonesian criminal law?

This study aims to analyze the normative construction of the capacity for criminal responsibility under Indonesia's National Criminal Code, identify the doctrinal inadequacies arising from developments in modern neurocriminology, and formulate a reconstruction of the concept of the capacity for criminal responsibility through the Neuro-Contextual Capacity Model as a recommendation for developing a national criminal law framework that is more adaptive, scientifically informed, and oriented toward substantive justice.

B. Research Methodology

This study employs a normative legal research method, as described by Marzuki, which examines law as a system of norms by treating legal materials as its primary objects of analysis (Marzuki, 2021). This method was selected because the study focuses on analyzing doctrinal inadequacies and formulating a normative reconstruction of the concept of the capacity for criminal responsibility under Indonesia's National Criminal Code, rather than empirically testing hypotheses. The research employs three approaches: a statutory approach to examine the provisions of Law Number 1 of 2023 and Law Number 1 of 2026, particularly Articles 36–40 concerning criminal responsibility; a conceptual approach to examine the concepts of *toerekeningsvatbaarheid*, neurocriminology, graded responsibility, and the Neuro-Contextual Capacity Model; and a comparative approach to analyze differences and similarities in the regulation and judicial application of neurological evidence within the criminal responsibility frameworks of Italy and the United States. These jurisdictions were selected because they represent advanced developments in the integration of neuroscience and criminal law. Italy provides an example of the judicial application of neuroimaging evidence within the civil law tradition, whereas the United States has developed relevant practices through judicial proceedings, neurocriminological research, and forensic neurology that serve as international references.

Legal materials were collected through a literature review encompassing primary legal materials, including statutory provisions and judicial decisions; secondary legal materials, including books and reputable scholarly journal articles; and relevant tertiary legal materials. The analysis was conducted using a qualitative-prescriptive approach by identifying and comparing the legal regulation of the capacity for criminal responsibility, mechanisms for the use of neurological evidence, and their legal implications across the respective jurisdictions. The findings were subsequently synthesized through the frameworks of Progressive Legal Theory, the theory of *toerekeningsvatbaarheid*, and neurocriminology to formulate *lex ferenda* recommendations in the form of the Neuro-Contextual Capacity Model for the reform of Indonesian criminal law.

C. Results

C.1 Changes in the Normative Construction of the Capacity for Criminal Responsibility under Indonesia's National Criminal Code

A review of the legal provisions governing the capacity for criminal responsibility reveals changes in the normative construction between the *Wetboek van Strafrecht* (WvS) and

Indonesia's National Criminal Code. Article 44(1) of the WvS classifies an offender's mental condition into two principal categories: a condition in which an individual's mental development is impaired and a condition in which an individual's mental functioning is disturbed by illness (Moeljatno, 2021). This formulation does not distinguish between different degrees of diminished capacity for criminal responsibility, nor does it provide an intermediate category between full capacity and incapacity for criminal responsibility. Furthermore, the structure of Article 44(1) of the WvS does not establish specific classifications concerning mental disabilities, intellectual disabilities, or neurological conditions that may affect an offender's capacity at the time the criminal offense is committed.

Indonesia's National Criminal Code, enacted through Law Number 1 of 2023, establishes a different normative framework. Article 38 provides that any person who has a mental disability and/or intellectual disability at the time of committing a criminal offense may receive a reduced sentence and/or be subjected to measures. Article 39 stipulates that individuals with mental disabilities experiencing acute relapse accompanied by psychotic symptoms and/or individuals with moderate or severe intellectual disabilities cannot be subjected to criminal punishment but may instead be subjected to measures. These two provisions establish distinct legal consequences, differentiating between the reduction of criminal punishment and/or the imposition of measures, on the one hand, and exemption from criminal punishment with the possibility of imposing measures, on the other (Alvat, 2025).

The differences between the WvS and Indonesia's National Criminal Code are evident in their regulatory foundations, recognition of different degrees of capacity for criminal responsibility, and the types of legal consequences that may be imposed. Article 44 of the WvS relies on impaired mental development or mental disturbances caused by illness without establishing a graduated classification of capacity. In contrast, Indonesia's National Criminal Code adopts the terminology of mental disability and intellectual disability and distinguishes between conditions that permit reduced punishment and those that preclude the imposition of criminal punishment. Moreover, the WvS does not establish a structured framework for the imposition of measures within Article 44, whereas Articles 38 and 39 of the National Criminal Code explicitly recognize measures as legal consequences applicable under specified conditions.

Article 36(1) of Indonesia's National Criminal Code establishes intent or negligence as the basis for criminal responsibility. This provision stipulates that individuals may only be held criminally responsible for offenses committed intentionally or through negligence. At the same time, Article 37 allows for the possibility of criminal responsibility without fault for certain offenses when expressly prescribed by law. This normative configuration incorporates the principle of fault-based criminal responsibility, diminished capacity for criminal responsibility, incapacity for criminal responsibility, and strict liability within a single legal framework under Indonesia's National Criminal Code.

C.2 Mapping the Inadequacies in the Regulation of the Capacity for Criminal Responsibility

A review of Articles 38 and 39 of Indonesia's National Criminal Code reveals that the categories explicitly recognized under these provisions remain limited to mental disabilities and intellectual disabilities. Conditions involving impairments in neurological function or structure that do not result in a formal diagnosis of mental or intellectual disability are not

independently recognized under either provision. These conditions include neurological impairments that may medically affect impulse control, executive functioning, risk processing, or decision-making but do not necessarily manifest as psychiatric disorders that meet formal diagnostic criteria.

An examination of the neurocriminological literature identified at least four categories of conditions relevant to assessing offenders' capacity for criminal responsibility. The first category comprises individuals with acquired brain injuries resulting from head trauma, accidents, tumors, or other causes affecting the functioning of prefrontal brain regions. The second category includes individuals with Fetal Alcohol Spectrum Disorder (FASD), who may exhibit deficits in executive functioning and impulse control (Sturges et al., 2022). The third category encompasses individuals with severe attention-deficit/hyperactivity disorder (ADHD) or antisocial personality disorder associated with specific neurological deficits in prefrontal functioning (Silva et al., 2020). The fourth category consists of adolescent offenders whose prefrontal cortex has not yet reached the level of maturation typically observed in adults, a developmental characteristic that was also considered (United States Supreme Court, 2005).

An examination of evidentiary mechanisms highlights the significant role of the *Visum et Repertum Psikiatrikum* (VeRP) in assessing offenders' mental conditions. The VeRP involves psychiatric assessments conducted through diagnostic interviews, behavioral observations, clinical examinations, and psychometric instruments to obtain information regarding an individual's mental condition. However, these assessments do not directly generate data concerning brain structure or activity of the kind obtainable through neurological examinations and neuroimaging techniques. The literature examined in this study identifies forensic neuroimaging, standardized neuropsychological testing, and clinical observation as several forms of information that may be incorporated into multidisciplinary assessments (Kamondi et al., 2024).

The case of Brian Dugan in Illinois illustrates the introduction of functional magnetic resonance imaging (fMRI) evidence into criminal proceedings as an example of the use of neurological information. The evidence revealed patterns of neurological activity associated with psychopathic characteristics but was not accorded decisive weight in the judicial assessment (Khalid et al., 2024). This finding demonstrates that the presence of neurological evidence does not automatically determine an offender's capacity for criminal responsibility or the legal consequences imposed on the defendant. Legal assessment continues to require an established relationship between the neurological condition, the offender's capacity at the time of the criminal offense, and the applicable evidentiary standards in criminal proceedings.

The findings identify three forms of inadequacy in the regulatory construction of the capacity for criminal responsibility. The first is instrumental inadequacy, as existing assessment mechanisms primarily rely on psychiatric approaches, whereas information concerning certain neurological impairments requires additional neurological and neuropsychological examinations. The second is substantive inadequacy, as Articles 38 and 39 explicitly recognize only mental disabilities and intellectual disabilities, thereby providing no specific category for subclinical neurological impairments. The third is structural inadequacy, arising from the coexistence of Article 36(1), which establishes fault-based criminal responsibility, and Article 37, which permits criminal responsibility without fault for certain criminal offenses.

The normative configuration of Articles 36(1) and 37 is particularly relevant to offenders who experience impairments in neurological capacity but do not fall within the categories established under Articles 38 or 39. Such offenders are not explicitly classified as individuals with mental or intellectual disabilities, while strict liability provisions may nevertheless apply when expressly prescribed by law. This normative position reveals a regulatory gap in which neurological conditions are not specifically linked to mechanisms of criminal responsibility without fault.

The neurological conditions identified in this study also exhibit distinct characteristics. Acquired brain injuries may be associated with alterations in executive functioning and impulse control; FASD may involve neurodevelopmental deficits; severe ADHD or certain forms of antisocial personality disorder may be associated with prefrontal functioning; and neurological immaturity among adolescent offenders is related to the development of behavioral control and decision-making capacities. These four categories are not automatically equivalent to the mental or intellectual disabilities specified under Articles 38 and 39. Consequently, they create an area of capacity assessment that requires examinations extending beyond conventional psychiatric diagnoses.

C.3 Formulation of the Neuro-Contextual Capacity Model

The synthesis of legal materials and scholarly literature resulted in the formulation of the Neuro-Contextual Capacity Model as a framework for reconstructing the concept of the capacity for criminal responsibility. The model comprises three main components: expanding the criteria for assessing the capacity for criminal responsibility, strengthening the double-track system by incorporating neurological parameters, and establishing limitations on the application of strict liability to offenders with measurable neurological impairments. These three components constitute the research outcomes addressing the instrumental, substantive, and structural inadequacies identified within the normative framework of Indonesia's National Criminal Code.

The first component involves expanding the criteria for assessing the capacity for criminal responsibility by introducing the category of "measurable neurological capacity impairment." This category refers to neurological dysfunction or structural brain damage that can be demonstrated through forensic neurological examinations and is associated with an offender's capacity at the time of committing a criminal offense, even when the condition does not meet the formal diagnostic criteria for mental or intellectual disability. This mechanism does not position neurological examinations as substitutes for the *Visum et Repertum Psikiatrikum* (VeRP) but rather as additional sources of information that may complement psychiatric assessments. The identified assessment methods include VeRP, forensic neuroimaging, standardized neuropsychological testing, neurological examinations, and other relevant clinical data (Scarpazza et al., 2021).

The second component involves strengthening the double-track system based on offenders' individual circumstances. Cognitive Behavioural Therapy (CBT) is one of the interventions supported by the clearest empirical evidence identified in the materials examined. A meta-analysis by Beaudry et al., encompassing 29 randomized controlled trials, identified an association between psychological and cognitive interventions in correctional settings and reduced recidivism, with an odds ratio (OR) of 0.72 and a 95% confidence interval (CI) of 0.56–0.92. These findings provide an empirical basis for considering psychological and cognitive interventions as a form of rehabilitative measure for certain groups of offenders (Beaudry et al., 2021).

Transcranial Magnetic Stimulation (TMS) was identified in the literature as a neuromodulation approach that remains under development and clinical investigation for certain conditions (Evancho et al., 2023). Neurofeedback programs were also identified as approaches aimed at improving self-regulation and specific neurological functions. However, the evidentiary status of these two approaches differs from that of CBT, as support for their application within criminal justice settings has not reached a comparable level of maturity. Accordingly, CBT is positioned as an intervention with a more established empirical evidence base, whereas TMS and neurofeedback require further investigation and development.

The third component involves establishing limits on the application of strict liability to offenders who have measurable impairments in neurological capacity at the time of committing a criminal offense. The proposed model requires evidence establishing the existence of a neurological condition, the relationship between that condition and the offender's capacity, and its relevance to the offender's ability to avoid committing conduct that satisfies the elements of a criminal offense. Articles 36(1), 37, 38, and 39 of Indonesia's National Criminal Code constitute interrelated legal provisions within this formulation. Article 28D(1) of the 1945 Constitution of the Republic of Indonesia and Law Number 19 of 2011 concerning the Ratification of the Convention on the Rights of Persons with Disabilities are also identified as components of the legal framework governing individual protection and the assessment of legal capacity (Barsky & Stein, 2023).

The findings of this study establish three stages of assessment within the Neuro-Contextual Capacity Model. The first stage involves identifying mental, intellectual, and neurological conditions relevant to the offender. The second stage involves examining the relationship between these conditions and the offender's capacity at the time of committing the criminal offense through relevant psychiatric, neurological, and neuropsychological assessment instruments. The third stage involves determining the legal consequences based on the capacity assessment, which may include full criminal responsibility, reduced criminal punishment, the imposition of measures, a combination of criminal punishment and measures in accordance with applicable statutory provisions, or exemption from criminal punishment when the prescribed legal requirements are satisfied.

D. Discussion

D.1 Normative Construction of the Capacity for Criminal Responsibility under Indonesia's National Criminal Code in Conjunction with Law No. 1 of 2026

When examined through the perspective of Progressive Legal Theory, which emphasizes that law must continuously evolve to serve humanity and should never be regarded as final, the transformation of the legal construction of the capacity for criminal responsibility from the *Wetboek van Strafrecht* (WvS) to Indonesia's National Criminal Code represents a significant yet incomplete progressive development. Article 44 of the WvS employs two highly general categories, namely "impaired mental development" and "mental disturbance resulting from illness." These binary and undifferentiated categories neither recognize gradations of capacity nor establish structured assessment mechanisms (Moeljatno, 2021). This paradigm reflects a traditional understanding of mental disorders as conditions that are either present or absent in an individual. When assessed against the normative standards of *toerekeningsvatbaarheid* developed by Van Hamel, Pompe, and Sudarto, the binary construction of the WvS is insufficiently nuanced to proportionately determine whether the three psychological capacities are fully present, diminished, or entirely absent.

Indonesia's National Criminal Code departs from this binary paradigm. Articles 38 and 39 not only distinguish between two degrees of diminished capacity for criminal responsibility—reduced capacity and incapacity—but also classify mental conditions more specifically into mental disabilities and intellectual disabilities. Furthermore, these provisions introduce a double-track system that distinguishes criminal sanctions from rehabilitative measures (Alvat, 2025). From the perspective of Progressive Legal Theory, these developments reflect a more human-centered legal framework that recognizes the complexity of human conditions and acknowledges that such conditions cannot always be adequately understood through rigid dichotomies.

Nevertheless, as emphasized by Satjipto, no statutory formulation can be considered absolutely correct, complete, or comprehensive (Rahardjo, 2009). The progress achieved through Indonesia's National Criminal Code has not yet addressed a fundamental question raised by neurocriminology as an empirical analytical instrument: how should the law treat offenders whose neurological capacities have been scientifically demonstrated to be impaired in one or more of the three psychological capacities underlying *toerekeningsvatbaarheid*, but whose conditions do not satisfy the clinically defined diagnostic categories of mental or intellectual disability? This constitutes the doctrinal gap at the core of the analysis developed in this article.

Before examining these doctrinal inadequacies, it is essential to understand the foundational principle of criminal responsibility established under Indonesia's National Criminal Code. Article 36(1) expressly provides: "Every person may only be held criminally responsible for a criminal offense committed intentionally or through negligence." The word "only" constitutes a legally significant limitation, excluding forms of criminal responsibility that are not grounded in either of the two recognized forms of fault: intent (*dolus*) or negligence (*culpa*).

This provision represents the formal codification of the principle of *geen straf zonder schuld* (no punishment without culpability) within Indonesian positive criminal law. This principle directly reflects the normative standards of *toerekeningsvatbaarheid*: criminal responsibility may only be imposed on individuals who possess the psychological capacity to consciously choose between acting and refraining from acting, namely individuals who, at the time of committing the offense, possess the three psychological capacities identified by Van Hamel and Sudarto. Article 36(1) of the National Criminal Code therefore occupies the position of a fundamental norm against which all other provisions within the National Criminal Code must be assessed, including the strict liability provisions under Article 37.

When examined through the central principle of Progressive Legal Theory that law must serve human beings in their entirety, the principle of *geen straf zonder schuld* is not merely a procedural requirement. Rather, it constitutes a substantive prerequisite for ensuring proportionality in criminal punishment: criminal sanctions should only be imposed on individuals whose capacity for culpability corresponds to the severity of the punishment imposed. Without satisfying this requirement, the entire framework of criminal punishment loses its moral legitimacy and conflicts with the objective of progressive law to achieve substantive justice.

The most critical normative tension within Indonesia's National Criminal Code, in conjunction with Law No. 1 of 2026, arises between Article 36(1), which establishes fault as an absolute prerequisite for criminal responsibility, and Article 37, as reinforced by Law No. 1 of 2026, which permits punishment based on strict liability. Under this framework, an

individual may be subjected to criminal punishment solely on the basis of proof that the prohibited act was committed, without requiring proof of fault.

When evaluated against the normative standards of *toerekeningsvatbaarheid*, the application of strict liability to offenders with measurable neurological impairments raises serious concerns. The doctrine of *toerekeningsvatbaarheid* requires that, before criminal punishment may be imposed, it must be established that the individual is capable of understanding the consequences of their actions, recognizing the wrongful nature of their conduct, and freely determining their own course of action. The absolute application of strict liability disregards the examination of these three capacities by imposing punishment without verifying whether the offender possesses the requisite capacity for criminal responsibility.

From the empirical perspective of neurocriminology, offenders with prefrontal cortex dysfunction do not respond to the threat of punishment in the same manner as offenders without such impairments (Greely & Farahany, 2019). Consequently, punishment based on strict liability not only fails to satisfy the normative standards of *toerekeningsvatbaarheid* but also lacks social effectiveness. From the perspective of Progressive Legal Theory, this represents a situation in which law serves the formal interests of the legal system rather than the human beings it is intended to protect, effectively punishing biological conditions rather than culpable human agency. The constructive framework of Graded Responsibility proposed by Hirstein, further demonstrates that the binary distinction between "fully responsible" and "exempt from criminal responsibility" does not adequately reflect the actual spectrum of human capacities (Hirstein, 2022).

D.2 Three Doctrinal Inadequacies in the Regulation of the Capacity for Criminal Responsibility After January 2, 2026

The first inadequacy is instrumental, concerning the mechanisms used to assess the capacity for criminal responsibility. The elucidation of Article 39 of Indonesia's National Criminal Code stipulates that an individual may only be deemed incapable of criminal responsibility after a psychiatric expert has been presented to confirm the findings of the *Visum et Repertum Psikiatrikum* (VeRP). Although this provision represents an advancement over the *Wetboek van Strafrecht* (WvS), which did not even require expert testimony, it establishes a monopoly of the VeRP as the sole mechanism through which limitations in an offender's capacity may be legally recognized.

The VeRP is a clinical instrument designed to assess mental conditions through diagnostic interviews, behavioral observations, and psychometric testing. It is intended to identify medically defined mental disorders based on diagnostic criteria such as those established in the DSM-5 or ICD-11. However, the VeRP cannot directly measure neurological functioning through neuroimaging data, detect subtle structural abnormalities in the prefrontal cortex or amygdala that do not manifest as clinically apparent symptoms, or provide real-time representations of brain activity.

Kamondi et al., writing in Nature Reviews Neurology, emphasized that accurate capacity assessments require a multidisciplinary approach integrating forensic neuroimaging, standardized neuropsychological testing, and clinical observation (Kamondi et al., 2024). The Brian Dugan case in Illinois provides a concrete illustration: although fMRI evidence demonstrating neurological activity patterns associated with psychopathy was presented, the court did not assign substantial weight to this evidence because of the absence of a normative framework capable of substantively integrating neurological information into judicial assessment (Khalid et al., 2024).

When examined against the three psychological capacities underlying the doctrine of *toerekeningsvatbaarheid* as developed by Van Hamel and Sudarto, the exclusive reliance on the VeRP may produce assessments that fail to accurately verify whether all three psychological capacities are present, particularly the capacity to freely determine one's will, which may be impaired by neurological conditions undetectable through the VeRP. From the perspective of Progressive Legal Theory, the monopolization of the VeRP exemplifies a legal framework that has failed to keep pace with scientific developments, a condition that Satjipto characterized as the failure of law to serve human beings in their entirety (Rahardjo, 2009).

The second inadequacy is substantive: Articles 38 and 39 of Indonesia's National Criminal Code do not accommodate offenders with legally relevant neurological impairments that do not satisfy the formal diagnostic criteria for mental or intellectual disabilities. This article refers to such individuals as offenders with subclinical neurological impairments, namely conditions that are not apparent through conventional psychiatric examinations but are neurologically measurable and demonstrably affect an offender's capacity to satisfy the three elements of *toerekeningsvatbaarheid*.

When examined through the empirical framework of neurocriminology, at least four categories of conditions fall within this classification. First, individuals with acquired brain injuries resulting from accidents, head trauma, or tumors that damage prefrontal regions and impair impulse control, without necessarily resulting in a diagnosis of mental disability. Second, individuals with Fetal Alcohol Spectrum Disorder (FASD), which may cause neurologically measurable deficits in impulse control but often remains unidentified within the criminal justice system (Sturges et al., 2022). Third, individuals with severe attention-deficit/hyperactivity disorder (ADHD) or antisocial personality disorder associated with measurable neurological deficits in prefrontal regions (Silva et al., 2020). Fourth, adolescent offenders whose prefrontal cortex has not yet reached full maturity, a developmental characteristic recognized by the United States Supreme Court.

All these conditions are neurologically relevant to an individual's capacity to satisfy the three psychological requirements of *toerekeningsvatbaarheid*, particularly the capacity to freely determine one's will and the ability to understand the consequences of one's actions. However, because these conditions do not fall within the diagnostic categories specified in Articles 38 and 39, affected individuals are treated under the law in precisely the same manner as offenders with unimpaired neurological capacities. This constitutes a direct violation of the normative standards of *toerekeningsvatbaarheid*, which require individualized assessments of psychological capacity, while simultaneously reflecting the failure of law to serve human beings in their entirety, as envisioned by Progressive Legal Theory.

The third inadequacy is structural and concerns the internal coherence of the legal system. As previously analyzed in Subsection A.3, an unresolved normative tension exists between Article 36(1), which affirms the principle of *geen straf zonder schuld* (no punishment without culpability), and Article 37 in conjunction with Law No. 1 of 2026, which permits strict liability. This inadequacy becomes particularly critical in cases involving offenders whose neurological capacity is impaired but whose conditions are not covered by Articles 38 and 39.

This problem operates at two interconnected levels. At the first, more general level, an internal conflict arises between two provisions within the same statute: Article 36(1) guarantees that an individual may only be punished for conduct committed intentionally or negligently, whereas Article 37 permits punishment without establishing either form of fault.

This conflict requires a clear hermeneutical resolution: does Article 37 constitute a *lex specialis* in relation to Article 36, or does Article 36, as a fundamental norm, occupy a superior position that limits the scope of Article 37? From the perspective of *toerekeningsvatbaarheid*, Article 36(1) must be accorded a higher normative position because it codifies the capacity requirement that constitutes an indispensable prerequisite for criminal responsibility.

At the second, more specific level, the problem becomes particularly critical when an offender subjected to strict liability is found to have a neurological capacity impairment that falls outside the scope of Articles 38 and 39. Under these circumstances, the legal system simultaneously: (1) fails to recognize the offender's neurological condition because it does not satisfy the criteria established under Articles 38 and 39; and (2) imposes criminal punishment on the basis of strict liability without requiring proof of fault. The offender consequently occupies what Kadir et al., describe as a "threshold position," in which the legal system refuses to recognize the offender as having diminished capacity while simultaneously imposing punishment without establishing culpability (Kadir et al., 2025).

From a constitutional perspective, these circumstances may violate Article 28D(1) of the 1945 Constitution of the Republic of Indonesia. Barsky and Stein emphasized that the standards established by the Convention on the Rights of Persons with Disabilities (CRPD), which is binding on Indonesia through Law No. 19 of 2011, prohibit legal systems from disregarding the individual legal capacities of persons with neurological disabilities during criminal sentencing (Barsky & Stein, 2023). When examined through Progressive Legal Theory, this represents a situation in which law serves the formal interests of the legal system rather than the human beings it is intended to serve.

D.3 Reconstruction Model: Neuro-Contextual Capacity Model

Building upon an integrated framework of two complementary theories—Progressive Legal Theory as the overarching philosophical foundation and *toerekeningsvatbaarheid* as the normative standard—supported by neurocriminology as an empirical analytical instrument and Graded Responsibility as a constructive framework, this article proposes the Neuro-Contextual Capacity Model as a doctrinal reconstruction model designed to address the three previously identified inadequacies. The model comprises three hierarchically structured elements.

1. Expansion of the Criteria for the Capacity for Criminal Responsibility. Grounded in the principle of Progressive Legal Theory that law must evolve in response to scientific developments and calibrated against the three psychological capacities underlying *toerekeningsvatbaarheid*, the first element proposes introducing a third category under Articles 38–39 of Indonesia's National Criminal Code, namely "measurable neurological capacity impairment." This category refers to neurological dysfunction or structural brain damage demonstrated through forensic neurological examinations to affect an offender's capacity to satisfy the three elements of *toerekeningsvatbaarheid* at the time of committing a criminal offense, even when the condition does not meet the formal diagnostic criteria for mental or intellectual disability. This element simultaneously addresses instrumental inadequacy by proposing that evidence of measurable neurological capacity impairment should complement, rather than replace, the *Visum et Repertum Psikiatrikum* (VeRP), through a combination of VeRP findings, forensic neuroimaging data, and standardized neuropsychological testing—a multidisciplinary approach advocated (Scarpazza et al., 2021). Neurocriminological assessment instruments provide an empirical basis for identifying neurological impairments relevant to each of the three psychological

capacities underlying *toerekeningsvatbaarheid*. From a legal and technical perspective, this expansion could be implemented through amendments to the elucidation of Article 38 of the National Criminal Code or through the issuance of a Supreme Court Regulation (*Peraturan Mahkamah Agung*, PERMA) providing technical guidance for judges on evaluating forensic neurological evidence.

2. Strengthening the Double-Track System through Neurological Parameters. Grounded in the progressive legal principle that law must respond comprehensively to human circumstances, and calibrated against the normative standards of *toerekeningsvatbaarheid*, which require individualized assessments of capacity, with Graded Responsibility Hirstein serving as a constructive framework, the second element proposes expanding the range of measures (*maatregel*) within the double-track system of Indonesia's National Criminal Code on the basis of individual neurological profiles (Hirstein, 2022). This development draws on three approaches with differing levels of evidentiary maturity. First, Cognitive Behavioural Therapy (CBT), incorporating cognitive remediation, is proposed for offenders with executive functioning deficits. A meta-analysis by Beaudry et al., published in The Lancet Psychiatry and encompassing 29 randomized controlled trials, demonstrated that CBT was associated with a significant reduction in recidivism (OR = 0.72; 95% CI: 0.56–0.92) (Beaudry et al., 2021). CBT is therefore considered the approach most suitable for immediate institutionalization within the double-track system under Indonesia's National Criminal Code. Second, Transcranial Magnetic Stimulation (TMS), intended to modulate aggressive impulses among offenders with specific prefrontal dysfunctions, is positioned as a potential long-term intervention that remains at an early stage of clinical research within the criminal justice context (Evancho et al., 2023). Third, neurofeedback programs aimed at improving self-regulation capacities are similarly positioned as a prospective direction for *lex ferenda* development that requires further investigation.

3. Constitutional Limits on Strict Liability for Offenders with Measurable Neurological Impairments. The third element addresses structural inadequacy by proposing the introduction of a constitutional exception clause: strict liability shall not apply to offenders who, at the time of committing a criminal offense, are proven to have measurable neurological capacity impairments that causally affect their ability to avoid engaging in conduct satisfying the elements of the offense, as established through comprehensive forensic neurological examinations. The justification for this clause rests on three foundations. The first concerns the internal coherence of Indonesia's National Criminal Code: Article 36(1), as a fundamental norm guaranteeing the principle of *geen straf zonder schuld* (no punishment without culpability) and codifying the capacity requirements of *toerekeningsvatbaarheid*, cannot be interpreted in isolation. Applying strict liability to offenders whose neurological conditions limit their ability to choose not to engage in prohibited conduct constitutes an exception requiring particularly strong justification in light of the fundamental humanistic values underlying the National Criminal Code. The second foundation concerns constitutional obligations: Article 28D(1) of the 1945 Constitution of the Republic of Indonesia guarantees every person's right to fair legal protection. The third foundation concerns international legal obligations: the standards established by the Convention on the Rights of Persons with Disabilities (CRPD), ratified through Law No. 19 of 2011, require mechanisms for individualizing criminal responsibility that take offenders' neurological conditions into account (Barsky & Stein, 2023).

4. Implementation of the Neuro-Contextual Capacity Model in the Indonesian Criminal Justice System. The implementation of the Neuro-Contextual Capacity Model should not be understood as replacing existing evidentiary mechanisms within the Indonesian criminal justice system but rather as strengthening the assessment of the capacity for criminal responsibility through a multidisciplinary approach. Within this model, forensic neurological evidence is not intended to replace the *Visum et Repertum Psikiatrikum* (VeRP) or judicial authority in evaluating evidence. Instead, it functions as scientific corroborative evidence that provides more comprehensive information regarding the defendant's neurological capacity at the time of committing the criminal offense. The application of this model remains within the framework of the evidentiary system established under the Indonesian Criminal Procedure Code (KUHAP), which places judges in the position of independently assessing the probative value of evidence based on the totality of legally admissible evidence.

Implementing this model requires strengthening institutional capacity in three principal areas. The first concerns evidentiary standards, particularly the development of national standards governing the use of forensic neurological evidence in criminal proceedings. These standards should regulate the types of examinations that may be employed, the qualifications of experts authorized to provide testimony, the scientific validity of neuroimaging methods, the causal relationship between neurological findings and the capacity for criminal responsibility, and evidentiary limitations to ensure that neurological evidence is not automatically regarded as grounds for excluding criminal responsibility. Such standardization is essential for maintaining a balance between legal certainty and scientific advancement, ensuring that neurological evidence remains one component of judicial assessment rather than the sole determinant of judicial decisions.

The second area concerns human resource preparedness. The use of forensic neurological evidence requires closer collaboration among judges, prosecutors, defense counsel, forensic psychiatrists, forensic neurologists, forensic psychologists, and neuropsychological experts. These requirements demonstrate that implementing the proposed model cannot be achieved solely through normative legal amendments but must also be accompanied by improvements in the capacity of law enforcement and judicial personnel to interpret neuroscience-based scientific evidence. Continuous education and professional training in neurocriminology, forensic neuroimaging, and the fundamental principles of forensic neuroscience are therefore prerequisites for ensuring that all actors within the criminal justice system develop a consistent understanding of the scope and limitations of neurological evidence in criminal proceedings.

The third area concerns infrastructure preparedness and institutional governance. Forensic neurological examinations require supporting facilities, including functional magnetic resonance imaging (fMRI), positron emission tomography (PET) scanning, standardized neuropsychological assessments, and forensic neurology laboratories, which remain limited in Indonesia. The implementation of this reconstruction model should proceed gradually through the designation of national referral hospitals, the development of joint technical guidelines involving the Supreme Court, the Attorney General's Office of the Republic of Indonesia, the Indonesian National Police, the Ministry of Health, and relevant professional organizations, as well as the establishment of multidisciplinary assessment mechanisms before neurological evidence is presented in court. This phased approach would enable the model to be implemented realistically without disrupting the effectiveness of the existing criminal justice system.

Based on these three areas, implementing the Neuro-Contextual Capacity Model would not only enhance the accuracy of assessments of the capacity for criminal responsibility but also maintain a balance among legal certainty, substantive justice, and the utility of law. Accordingly, the reconstruction proposed in this study extends beyond the conceptual level of *lex ferenda* by providing an implementation framework that may be realized through regulatory amendments, the issuance of a Supreme Court Regulation (*Peraturan Mahkamah Agung*, PERMA) concerning the use of forensic neurological evidence, the development of national examination standards, and the strengthening of institutional capacity within the Indonesian criminal justice system.

At the operational level, the proposed exception clause could be implemented through two mechanisms. First, an additional provision could be incorporated into the elucidation of Article 37 of the National Criminal Code to establish an exception for offenders with forensically established neurological impairments. Second, the Supreme Court could issue a Supreme Court Regulation (PERMA) governing submission procedures, evidentiary standards, and the legal implications of forensic neurological evidence in the context of strict liability.

E. Conclusion

The normative construction of the capacity for criminal responsibility under Articles 38–39 of Indonesia's National Criminal Code represents a paradigmatic advancement compared with the *Wetboek van Strafrecht* (WvS), particularly in its efforts to adapt the law to societal developments. Nevertheless, as a dynamic and evolving legal system, these provisions continue to exhibit doctrinal gaps in accommodating advancements in modern neurocriminology. These inadequacies arise primarily from the continued predominance of conventional clinical-psychiatric approaches, which have not fully accommodated the complexities of individual neurological capacities, particularly when assessed against the normative standards of *toerekeningsvatbaarheid* developed by Van Hamel, Pompe, and Sudarto. Furthermore, an integrative analysis drawing on Progressive Legal Theory, neurocriminology, and the concept of Graded Responsibility identifies three principal shortcomings: the limitations of evidentiary mechanisms that remain dominated by the *Visum et Repertum Psikiatrikum* (VeRP), the failure to accommodate offenders with subclinical neurological impairments, and the normative conflict between the principle of strict liability and the doctrine of *geen straf zonder schuld* (no punishment without culpability) under the National Criminal Code. These findings underscore the need to reconstruct the concept of the capacity for criminal responsibility through the Neuro-Contextual Capacity Model, which emphasizes expanding the criteria for criminal responsibility, strengthening the double-track system through graduated neurological parameters, and establishing constitutional limits on strict liability to achieve a criminal justice system that is more scientifically informed, equitable, and normatively consistent.

The Supreme Court of the Republic of Indonesia should promptly issue a Supreme Court Regulation (*Peraturan Mahkamah Agung*, PERMA) establishing standards for the use of forensic neurological evidence, including neuroimaging procedures and neuropsychological testing in assessing the capacity for criminal responsibility. Such a regulation should also provide guidance for judges in evaluating this evidence and determining the limits of strict liability. Strengthening academic capacity is equally crucial; therefore, legal education programs, particularly at the postgraduate level, should integrate neurocriminology into their curricula. This measure is essential to ensure that future law enforcement and judicial

professionals possess sufficient interdisciplinary literacy to apply Indonesia's National Criminal Code more accurately, fairly, and responsively to the complexities of offenders' neurological conditions.

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