




# Unleashing Justice's Future: The Dawn of Neuro-Cognitive Risk Assessments (NCRA) in Transforming Rehabilitation

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## Abstract

Neuro-Cognitive Risk Assessments (NCRA) represent a groundbreaking innovation in the criminal justice system, concentrating on evaluating cognitive and decision-making factors to assess inmate recidivism risk. Introduced initially in Houston, Texas, in 2017, NCRA have shown substantial efficacy, evidenced by a 2020 study reporting an Area Under the Curve (AUC) value of 0.70, signifying a significant advancement in recidivism prediction. This research employs normative legal methods, utilizing a conceptual, comparative, and forward-looking approach, characterized as descriptive-prescriptive with data analyzed through content analysis. Key advantages of NCRA include their emphasis on cognitive factors and their capability to operate independently via digital platforms, reducing bias and enhancing objectivity. The global adoption of NCRA, including in countries like Canada, the Netherlands, and Australia, underscores its recognition as a promising tool in criminal justice practices. However, ethical considerations and responsible usage are



paramount, ensuring the protection of individual rights and involving diverse stakeholders. The integration of NCRA into rehabilitation programs and public policies presents opportunities to enhance efforts against recidivism. By identifying individual needs more accurately and improving predictions of rehabilitation success, NCRA can motivate inmate engagement in rehabilitation initiatives. Moreover, NCRA support the development of effective crime prevention policies, contributing to broader societal well-being. In conclusion, NCRA represent a transformative approach in criminal justice, leveraging cognitive assessments to refine recidivism risk evaluations and enhance rehabilitation outcomes. Ethical deployment and collaborative engagement are critical to maximizing NCRA's potential in promoting justice and reducing reoffending globally.

### **Keywords**

Neuro-Cognitive Risk Assessments, Center for Science & Law, Assessment, Rehabilitation Programs, Criminal Justice reform, Behavioral Analysis

## **Introduction**

Indonesia, with a population exceeding 270 million and a rich socio-cultural diversity, faces a unique set of challenges in its criminal justice and rehabilitation systems. One of the biggest issues is the relatively high recidivism rate, which indicates an urgent need to reform the way offenders are treated. This problem reflects shortcomings in key aspects such as education, job training, and psychosocial support for prisoners. Moreover, the social discrimination and stigma that often accompany ex-prisoners make it difficult for them to reintegrate into society.<sup>1</sup>

Take the case of drugs. In 2019, the Director General of Corrections (Dirjen PAS) of the Indonesian Ministry of Law and Human Rights (Kemenkumham) presented significant data on recidivism cases in

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<sup>1</sup> Ismail Pettanase, "Pembinaan Narapidana Dalam Sistem Pemasyarakatan," *Solusi* 17, no. 1 (January 2019): 57–63, <https://doi.org/10.36546/SOLUSI.V17I1.151>.

Indonesia for 2019. The data represents that the highest number of recidivists came from narcotics cases, reaching almost 9,000 cases in 2019.<sup>2</sup> Another example is terrorism cases. Data released by the Institute for Policy Analysis of Conflict (IPAC) on September 4, 2020 provides important insights into the recidivism rate in terrorism cases in Indonesia. In the time span from 2002 to May 2020, there were 825 convicted terrorists. Of those identified, 94 individuals were identified as recidivists, meaning they were re-engaged in terrorism activities after being released. This figure indicates a recidivism rate for terrorism cases of around 10–11 percent. This statistic reflects significant challenges in deradicalization and rehabilitation efforts.<sup>3</sup> The head of the National Counterterrorism Agency (BNPT) revealed that out of more than a thousand former inmates of terrorism who have undergone a deradicalization program outside prison, about a hundred of them are again involved in terrorism activities. The deradicalization program was attended by 1,192 former prisoners, and of the 1,036 identified, 116 were found to have re-committed acts of terrorism.<sup>4</sup>

**TABEL 1.** Outcomes of the Deradicalization Program

Description	Count
Total attendees	1,192
Identified attendees	1,036
Recommitted terrorism	116

**Source:** HUMAS POLRI

This condition highlights the need for a more effective and strategic approach, especially in the context of the traditional criminal justice system in Indonesia, which tends to focus more on punishment than

<sup>2</sup> Kumparan.com kumparanNEWS, “Dirjen PAS: Selama 2019, Residivis Narkoba Dekati Angka 9 Ribu Orang,” Kumparan.com, 2019.

<sup>3</sup> Arif Budi Setyawan, “IPAC: Ada 94 Residivis Kasus Terorisme Sejak 2002 Hingga Mei 2020 - Dare to Share,” Ruangobrol.id, 2020.

<sup>4</sup> Divisi HUMAS POLRI, “BNPT: 116 Eks Napiter Kembali Jadi Residivis Terorisme,” humas.polri.go.id, 2023.

rehabilitation.<sup>5</sup> There is significant room for transformation. Not only does the current dominant approach raise serious human rights concerns, but its effectiveness in preventing long-term crime is often questioned. In this regard, the application of Neuro-Cognitive Risk Assessment (NCRA) could be the key to the required systemic transformation. NCRA is an innovative approach that leverages knowledge of neurocognitive factors to assess the risk of criminal behavior.<sup>6</sup>

In contrast to traditional methods that are often generalized and do not consider individual differences, NCRA allows for a more personalized and in-depth evaluation. By understanding the neurocognitive factors that play a role in antisocial behavior, such as problems in decision-making, impulse control, or empathy, more targeted rehabilitation programs can be developed. The implementation of NCRA allows for a more holistic approach to rehabilitation.<sup>7</sup> Rehabilitation programs designed based on the results of the NCRA can specifically address issues related to the offender's psychological and cognitive state rather than simply providing punishment. This includes behavioral therapy, social skills training, and support to address mental health issues. Such programs are not only more humane but also have greater potential to reduce recidivism, as they address the root of the problem, not just the symptoms.<sup>8</sup>

NCRA can also play a role in the judicial decision-making process. An accurate and individualized risk assessment can assist in determining the most suitable intervention for each defendant, whether it is

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<sup>5</sup> Samson Baraza, "Criminal Justice Should Focus More on Rehabilitation than Punishment," *SSRN Electronic Journal*, November 2020, 1–7, <https://doi.org/10.2139/SSRN.3727711>.

<sup>6</sup> Andrea L. Glenn and Adrian Raine, "Neurocriminology: Implications for the Punishment, Prediction and Prevention of Criminal Behaviour," *Nature Reviews Neuroscience* 2013 15:1 15, no. 1 (December 2013): 54–63, <https://doi.org/10.1038/nrn3640>.

<sup>7</sup> Elizabeth A. Shirtcliff et al., "Neurobiology of Empathy and Callousness: Implications for the Development of Antisocial Behavior," *Behavioral Sciences & the Law* 27, no. 2 (March 2009): 137–71, <https://doi.org/10.1002/BSL.862>.

<sup>8</sup> Erin H Ross and Peter N S Hoaken, "Correctional Remediation Meets Neuropsychological Rehabilitation: How Brain Injury and Schizophrenia Research Can Improve Offender Programming," *Criminal Justice and Behavior* 37, no. 6 (April 2010): 656–77, <https://doi.org/10.1177/0093854810363104>.

rehabilitation, community supervision, or another form of intervention. This encourages the criminal justice system to move away from a 'one-size-fits-all' approach and more towards individual-focused solutions. Using NCRA gives nations like Indonesia the opportunity to advance human rights and uphold the dignity of every individual, in addition to increasing the effectiveness of their criminal justice system in reducing crime. By providing offenders with opportunity for effective rehabilitation and reintegration into society, this approach can contribute to the creation of safer and more inclusive communities.

## Method

Unleashing Justice's Future: The Dawn of Neuro-Cognitive Risk Assessments (NCRA) in Transforming Rehabilitation is a study that explores the potential use of neurocognitive risk assessments in the rehabilitation system. The research utilizes a normative legal method, which includes based, conceptual, comparative, and futuristic approaches.<sup>9</sup> The nature of the research is descriptive-prescriptive, which means that not only describes the current state of affairs, it also provides recommendations for the future.<sup>10</sup> When used in this way, neurocognitive risk assessment (NCRA) may mean using tools based on neuroscience to figure out how likely it is that a person will commit crimes again or do well with rehabilitation programs. A comparative approach in this study may involve comparing this risk assessment method with existing methods, while a futuristic approach considers how this technology may change rehabilitation practice in the long term. The collected data was analyzed using content analysis methods, which is a common approach in

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<sup>9</sup> Zico Junius Fernando et al., "Robot Lawyer in Indonesian Criminal Justice System: Problems and Challenges for Future Law Enforcement," *Lex Scientia Law Review* 7, no. 2 (November 2023): 1–24, <https://doi.org/10.15294/LESREV.V7I2.69423>.

<sup>10</sup> Akhmad Akhmad, Zico Junius Fernando, and Papontee Teeraphan, "Unmasking Illicit Enrichment: A Comparative Analysis of Wealth Acquisition Under Indonesian, Thailand and Islamic Law," *Journal of Indonesian Legal Studies* 8, no. 2 (2023): 899–934, <https://doi.org/10.15294/jils.v8i2.69332>.

legal and social research to interpret text data.<sup>11</sup> This analysis may involve examining how NCRA can be applied in the legal and rehabilitation systems, as well as the implications for justice, ethics, and rehabilitation effectiveness. Overall, this study highlights how innovations in neuroscience and risk assessment technologies can provide new insights and improve rehabilitation practices, with the ultimate goal of reducing crime and improving rehabilitation outcomes for individuals involved in the criminal justice system.

## **Result and Discussion**

### **A. Neuro-Cognitive Risk Assessments (NCRA) in the Legal World: Changing the Paradigm of Rehabilitation**

The Neuro-Cognitive Risk Assessment (NCRA) is an assessment tool designed to evaluate the risk of recidivism, or the likelihood that a prisoner will commit a crime again after release. The NCRA, created by a group from the Center for Science & Law in the United States with Rice University's Elizabeth Haarsma serving as the team leader, saw its first use in Houston, Texas, in 2017.<sup>12</sup> The NCRA's framework for assessing recidivism risk includes a comprehensive set of cognitive and emotional factors. First, Attention is crucial as it helps an individual focus on relevant tasks and avoid impulsive decisions that might lead to criminal behavior. Second, Aggressiveness is evaluated to determine the tendency towards violent or destructive behavior, which can indicate a likelihood of reoffending. Third, Risk Taking assesses an individual's propensity for engaging in dangerous or harmful behaviors, traits commonly found in criminal profiles. Fourth, Empathy measures how well a person can understand and respond to the others' emotions, with low empathy often

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<sup>11</sup> Zico Junius Fernando et al, "Preventing Bribery in the Private Sector Through Legal Reform Based on Pancasila," *Cogent Social Sciences* 8, no. 1 (2022): 1–14, <https://doi.org/10.1080/23311886.2022.2138906>.

<sup>12</sup> Gabe Haarsma et al., "Assessing Risk Among Correctional Community Probation Populations: Predicting Reoffense With Mobile Neurocognitive Assessment Software," *Frontiers in Psychology* 10, no. January (2020): 1–13, <https://doi.org/10.3389/fpsyg.2019.02926>.

linked to antisocial behaviors. Fifth, Future Planning looks at the ability to foresee consequences and make plans, deficiencies in which might suggest a predisposition to return to criminal activities. Sixth, Emotion Processing involves how an individual processes their own and others' emotions, with poor emotion processing potentially leading to impulsive or aggressive reactions. Seventh, Impulsivity is analyzed because acting without forethought is frequently associated with criminal acts. Collectively, these factors offer a robust basis for predicting the likelihood of an individual's return to criminal behavior, aiding in the development of targeted interventions to mitigate such risks.

NCRA uses this data set to generate a risk score that assists authorities in making decisions related to parole or rehabilitation interventions. This tool plays an important role in the criminal justice system, assisting in more informed decision-making and personalization of rehabilitation programs to reduce the risk of recidivism. The NeuroCognitive Risk Assessment (NCRA) is an efficient and accessible assessment process designed to be conducted in less than 30 minutes. The uniqueness of the NCRA lies in the fact that inmates can do it independently, either at their home during parole or at the parole officer's office. This eliminates the need for lengthy face-to-face assessments and additional resources, allowing assessments to be conducted more flexibly and affordably. The tool operates via tablet, utilizing digital technology to present various neurocognitive tests. These tests are specifically designed to measure cognitive factors that have been identified as having a correlation with recidivism risk, such as attention, aggressiveness, risk-taking, empathy, future planning, emotion processing, and impulsivity. Each test in the NCRA is designed to explore these cognitive aspects in depth, providing valuable insight into the cognitive tendencies and abilities of inmates.

By combining technology and psychology, the NCRA offers a more data-driven approach to assessing recidivism risk. Following the test, parole officers or other criminal justice professionals can use the results to make more informed decisions about how to handle the case of the individual. This includes decisions regarding parole, the need for certain interventions, or tailored rehabilitation programs. The NCRA not only assists in assessing risk but also in formulating more effective and personalized intervention plans to reduce the likelihood of recidivism.

The NeuroCognitive Risk Assessment (NCRA) has been shown to have high accuracy in predicting recidivism risk, achieving significant milestones in the fields of criminal justice and psychology. A study conducted in 2020 highlighted the efficacy of the NCRA, revealing that the tool has an Area Under the Curve (AUC) value of 0.70. This statistical measure is highly significant in the context of predictive assessment. An AUC of 0.70 means that the NCRA has 70% predictive ability in determining whether a prisoner will re-offend after release. This is an impressive figure, given the complexity of human behavior and the challenges of predicting future actions.<sup>13</sup> With such accuracy, the NCRA offers a valuable tool for criminal justice officers in making decisions regarding parole and rehabilitation interventions. The tool helps in identifying individuals who have a high risk of recidivism, allowing authorities to allocate more resources and attention to such cases. Moreover, NCRA's ability to provide quick and accurate assessments also allows for faster interventions, which can go a long way in preventing recidivism. In conclusion, NCRA is not only important in assessing the risk of recidivism but also in helping to formulate more effective and personalized strategies for the rehabilitation of prisoners.<sup>14</sup>

NeuroCognitive Risk Assessment (NCRA) offers several significant advantages over traditional risk assessment tools in the criminal justice system. These advantages provide a more in-depth and objective insight into assessing recidivism risk, which is crucial in decision-making relating to parole and rehabilitative interventions. First, the primary focus of the NCRA is on measuring cognitive factors that have been specifically linked to recidivism risk. These include aspects such as attention, aggressiveness, risk-taking, empathy, future planning, emotion processing, and impulsivity. This approach differs from traditional assessments that often focus more on criminal history and demographic factors. By assessing these cognitive factors, the NCRA provides deeper insights into the mental processes and behavioral patterns that may contribute to one's propensity to re-offend. Second, the prisoner can use a tablet to conduct the NCRA independently. This reduces the potential bias from human judgment that

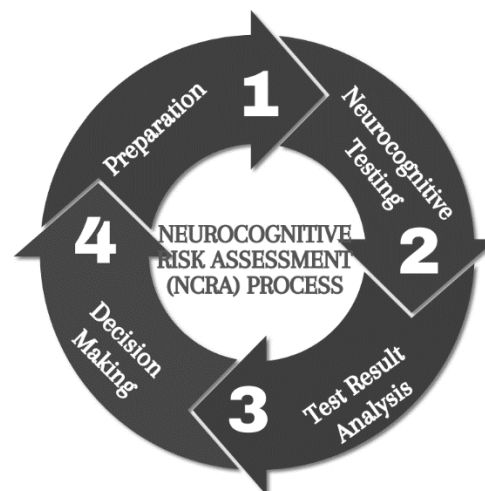
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<sup>13</sup> Haarsma et al.

<sup>14</sup> Haarsma et al.



can occur in interviews or subjective assessments. The ability to conduct this assessment independently not only increases the efficiency of the process but also ensures that the results are more objective, reducing the possibility of human error or prejudice that might affect the results. Third, the NCRA has the ability to assess recidivism risk across a range of crime types, both violent and non-violent crimes. This is an important advancement, as most traditional risk assessment tools are often designed with a focus on a specific type of crime. With its broad capabilities, the NCRA becomes a more flexible and comprehensive tool, able to provide valuable insights on a wider spectrum of crimes. Overall, the NCRA represents a breakthrough in risk assessment technology capable of providing more accurate and objective analysis, aiding in better decision-making processes within the criminal justice system. Its ability to assess objectively, free from human bias, and its broad application to a wide range of crime types make it an invaluable tool in efforts to reduce recidivism and improve public safety.

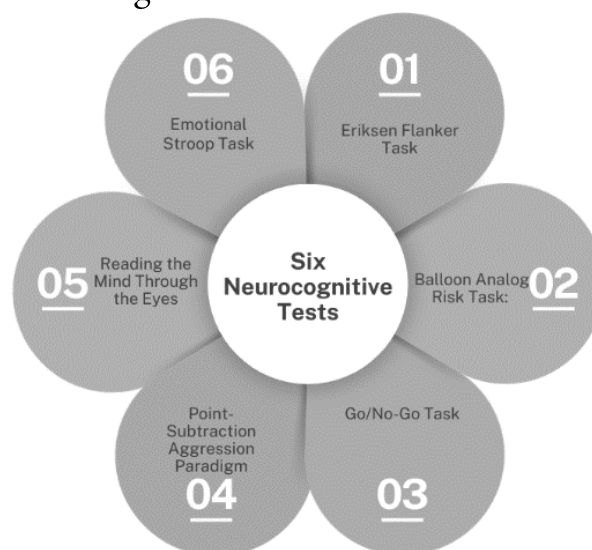


**FIGURE 1.** NeuroCognitive Risk Assessment (NCRA) Process

The first stage, the NeuroCognitive Risk Assessment (NCRA) process, begins with an important stage called preparation, which entails the inmate filling out a questionnaire. It aims to collect baseline data covering various aspects of the inmate's background, which is crucial in providing context for a more in-depth analysis and assessment of recidivism risk. The collected information includes the inmate's age, gender, race, ethnicity,

educational history, and employment history. This data helps in understanding the socioeconomic background of the inmates, which could have significant implications for their behaviors and tendencies. The questionnaire also includes questions on criminal history and drug use. This information is crucial, as it gives an idea of past behavioral patterns and factors that may have contributed to criminal behavior. The collection of this background data not only provides an initial view of the individual being assessed but also helps in interpreting the results of the neurocognitive tests that will be conducted subsequently. By having a clear understanding of the inmate's social, educational, and criminal context, professionals can analyze the NCRA results more accurately, distinguishing between factors that are the result of environmental conditions and those that stem from the individual's cognitive and emotional characteristics. This preparatory stage is therefore a critical step in the NCRA process, ensuring that the assessment is comprehensive and considers all relevant aspects of the prisoner's life, leading to a more complete and nuanced understanding of their recidivism risk.

The second stage of the NeuroCognitive Risk Assessment (NCRA) utilizes a series of six sophisticated neurocognitive tests, each designed to measure a specific cognitive aspect that has been linked to recidivism risk. Each test provides unique and important insights into an inmate's cognitive and emotional abilities, which overall helps determine their likelihood of re-offending after release.



**FIGURE 2.** Six Neurocognitive Tests

1) Eriksen Flanker Task

This test focuses on attention and information processing skills. Prisoners will be faced with the task of pressing buttons that correspond to the direction of the arrow on the screen. This task tests how well they can focus their attention and process information quickly and accurately, which are important aspects of everyday decision-making.<sup>15</sup>

2) Balloon Analog Risk Task

This test is designed to measure risk-taking ability. Prisoners will be asked to make a choice between a safer option with a smaller reward, and a riskier option with a larger reward. This indicates their propensity to take risks, which is often linked to criminal behavior.<sup>16</sup>

3) Go/No-Go Task

This test measures impulse control ability. Prisoners must press a button only when a specific image appears, which tests their ability to control impulsive responses and demonstrate self-control.<sup>17</sup>

4) Point-Subtraction Aggression Paradigm

This test is designed to measure aggression control ability. In this task, inmates are asked to press buttons corresponding to the direction of the arrow, with mistakes resulting in a loss of points. The way they respond to this loss of points can indicate levels of aggression and patience.<sup>18</sup>

5) Reading the Mind Through the Eyes

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<sup>15</sup> C.C.C. van Geest and H.J. Engelbregt, "The Use of the Eriksen Flanker Task as Training Instrument for Cognitive Control in Inhibition Disorder," *Applied Neuroscience And Mental Health* 2, no. 1 (December 2022): 2–7, <https://doi.org/10.31739/ANAMH.2022.2.2>.

<sup>16</sup> C. W. Lejuez et al., "Evaluation of the Balloon Analogue Risk Task (BART) as a Predictor of Adolescent Real-World Risk-Taking Behaviours," *Journal of Adolescence* 26, no. 4 (August 2003): 475–79, [https://doi.org/10.1016/S0140-1971\(03\)00036-8](https://doi.org/10.1016/S0140-1971(03)00036-8).

<sup>17</sup> Ana Sánchez-Kuhn et al., "Go/No-Go Task Performance Predicts Differences in Compulsivity but Not in Impulsivity Personality Traits," *Psychiatry Research* 257 (2017): 270–75, <https://doi.org/10.1016/j.psychres.2017.07.064>.

<sup>18</sup> Beatrice A. Golomb et al., "Point Subtraction Aggression Paradigm: Validity of a Brief Schedule of Use," *Violence and Victims* 22, no. 1 (February 2007): 95–103, <https://doi.org/10.1891/VV-V22I1A006>.

This test evaluates empathy skills. Prisoners will be asked to judge another person's emotions solely from their eye expressions, which is an important indicator of their ability to understand and relate to the feelings of others.

#### 6) Emotional Stroop Task

This test focuses on emotional processing ability. Prisoners are asked to identify the color of a word that appears on the screen, ignoring the emotional meaning of the word. This tests how well they can process emotional information and stay focused on the given task.<sup>19</sup>

Through a combination of these tests, the NCRA provides a comprehensive analysis of the various cognitive and emotional aspects of an inmate. The results of these tests are used to assess the risk of recidivism, providing valuable insights that can be used to make informed decisions about the management, treatment, and interventions that may be required for the inmate. It is a holistic approach that utilizes advanced technology and psychological knowledge to assist in rehabilitation and recidivism risk reduction.

Once a series of neurocognitive tests are completed, the results of those tests will be analyzed using sophisticated machine learning algorithms.<sup>20</sup> This stage is important, as the algorithms are designed to interpret complex data and produce an accurate recidivism risk score. This score reflects an inmate's likelihood of re-offending after release. This risk score is calculated based on various factors measured during the test, such as attention, impulse control, aggressiveness, and others, providing a holistic picture of the individual's potential risk. This score is not just a number but a reflection of in-depth and sophisticated data analysis, resulting in a more precise prediction of future behavior.

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<sup>19</sup> Moshe Shay Ben-Haim et al., "The Emotional Stroop Task: Assessing Cognitive Performance under Exposure to Emotional Content," *Journal of Visualized Experiments: JoVE* 2016, no. 112 (June 2016): 1–10, <https://doi.org/10.3791/53720>.

<sup>20</sup> Chelsea Chandler et al., "Machine Learning for Ambulatory Applications of Neuropsychological Testing," *Intelligence-Based Medicine* 1–2 (2020): 1–11, <https://doi.org/https://doi.org/10.1016/j.ibmed.2020.100006>.

The results produced by the NCRA are extremely valuable in the context of the criminal justice system. The resulting recidivism risk score can be used to make informed decisions about the management of prisoners. For example, based on the risk score, prison authorities or parole officers can decide whether the inmate requires more intensive therapy or rehabilitation programs to reduce the risk of recidivism. This could include programs such as counseling, social skills training, or education and employment programs designed to help the inmate reintegrate into society successfully. NCRA results can also influence decisions about the level of security required for that inmate. For example, individuals with high risk scores may need to be housed in higher-security facilities or may require closer supervision during parole. Conversely, those with low risk scores may be suitable for a more lenient parole program or placement in a lower-security facility.

Several factors may influence the success rate of the NeuroCognitive Risk Assessment (NCRA) in predicting recidivism risk. Although the NCRA is a sophisticated and comprehensive tool, there are certain elements that may affect its accuracy, which are important to consider in the interpretation and application of the results. Firstly, the type of crime can play an important role in determining how effective the NCRA is in predicting recidivism. Some types of crimes may be more related to the cognitive factors measured by the NCRA. For example, crimes involving careful planning or high impulsivity may be easier to predict using the neurocognitive tests contained in the NCRA. On the other hand, crimes that are more influenced by external or situational factors may not be as accurately predicted. This means that the NCRA may be more effective in assessing recidivism risk for certain types of crimes than others, which should be recognized when using this tool in decision-making. Secondly, other factors beyond the scope of the NCRA are also important. Although the NCRA focuses on neurocognitive factors, there are many other aspects of a person's life and experiences that can influence recidivism risk. These include, but are not limited to, family background, socio-economic conditions, education, living environment, and social support networks. For example, individuals who come from a stable and supportive background may have a better chance of avoiding recidivism compared to those who encounter significant social and economic

challenges. Factors such as childhood experiences, trauma, or mental health disorders can also influence one's behavior and are not always fully covered in the NCRA assessment. While the NCRA is a valuable and innovative tool in assessing recidivism risk, it is important to use it as one component in a broader, multidisciplinary approach to the assessment and management of prisoners. This means considering NCRA results along with other relevant factors to get a more complete picture of the individual and their risk. In this way, NCRA can be used to improve the accuracy of recidivism prediction and assist in the development of more effective and personalized intervention strategies, ultimately contributing to reduce recidivism and improve rehabilitation outcomes.

## **B. Global Expansion and Ethical Controversies in NeuroCognitive Risk Assessment (NCRA)**

Since the introduction of the NeuroCognitive Risk Assessment (NCRA) in Houston, Texas, in 2017, it has developed into one of the most promising and innovative recidivism risk assessment tools.<sup>21</sup> The adoption of NCRA by other states in the United States, such as Florida, Georgia, and Illinois, marks widespread recognition of its effectiveness. According to a study by the University of Texas at Houston, NCRA has a recidivism prediction accuracy of 72% over a two-year period, an impressive figure that outperforms conventional risk assessment tools.<sup>22</sup> This suggests that the neurocognitive-based approach applied by NCRA provides a deeper and more accurate insight into an individual's potential to re-offend. Outside of the United States, the application of NCRA in Canada, specifically in Ontario and Alberta, has also yielded encouraging results. Initial studies in Ontario indicate that NCRA can predict recidivism risk with 66% accuracy.<sup>23</sup> In Europe, particularly in the

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<sup>21</sup> Haarsma et al., "Assessing Risk Among Correctional Community Probation Populations: Predicting Reoffense With Mobile Neurocognitive Assessment Software."

<sup>22</sup> "Center for Science & Law," n.d.

<sup>23</sup> Haarsma et al., "Assessing Risk Among Correctional Community Probation Populations: Predicting Reoffense With Mobile Neurocognitive Assessment Software."

Netherlands, the NCRA pilot program in Rotterdam showed a predictive accuracy of 70%, confirming the effectiveness of this tool in a variety of criminal justice contexts.<sup>24</sup> The use of NCRA in these various locations demonstrates how the tool can be customized to meet the unique needs and challenges of different criminal justice systems. In Houston, the NCRA was used to determine the appropriate level of facility security for inmates, while in Florida, the tool assisted in parole decisions. In Georgia, the NCRA plays a role in determining the need for therapy or rehabilitation programs for inmates. This adaptability proves the versatility of NCRA as a tool that can assist in various aspects of inmate management.

Although it is still relatively new and requires further research to confirm its overall effectiveness, the preliminary results that have been obtained indicate that NCRA has great potential as a recidivism risk assessment tool. With its more comprehensive and data-driven approach, NCRA not only helps criminal justice professionals make more informed decisions but also contributes to efforts to reduce recidivism and improve community safety in general. The use of NCRA can be considered a step forward in efforts to understand and reduce criminal behavior, bringing new innovation and effectiveness into the criminal justice system. NeuroCognitive Risk Assessment (NCRA) has attracted global attention as a potential recidivism risk assessment tool, with a number of countries now considering its implementation. In Australia, plans are being made to commence an NCRA pilot project in New South Wales, marking a significant step in the exploration of neurocognitive-based approaches in the criminal justice system there. This demonstrates a growing interest in using scientific and data-driven methods to improve the process of assessing and managing prisoners.

In Europe, the UK Ministry of Justice has shown interest in NCRA, recognizing its potential as a tool that can enhance the way they assess and manage prisoners. This reflects a growing awareness of the need for more

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<sup>24</sup> Jessica J Asscher et al., "Implementing Randomized Experiments in Criminal Justice Settings: An Evaluation of Multi-Systemic Therapy in the Netherlands," *Journal of Experimental Criminology* 3, no. 2 (2007): 113–29, <https://doi.org/10.1007/s11292-007-9028-y>.

sophisticated and objective methods in evaluating recidivism risk. In Germany, although discussions on the application of NCRA are still ongoing and no official decision has been made, the debate signals serious consideration of the application of new technologies in the justice system. Although the potential and accuracy of NCRA have been demonstrated through various studies and applications in several countries, its use is still controversial in some areas. The main concerns revolve around issues of potential bias and invasion of privacy. These questions delve into the ethics of using machine learning algorithms and neurocognitive assessments in the context of law and justice. Concerns about bias may stem from the way data is collected and interpreted, while privacy issues relate to how prisoners' personal and sensitive data is handled.

### **C. Ethical and Legal Impacts of Implementing NeuroCognitive Risk Assessments (NCRA)**

NeuroCognitive Risk Assessments (NCRA) is an innovative tool designed to assess an individual's risk of committing harmful acts such as violence, crime, or substance abuse.<sup>25</sup> It combines advanced methods such as psychological tests, brain scans, and behavioral data analysis to gain a comprehensive view of an individual's potential risk. However, the implementation of NCRA carries significant ethical and legal implications that need to be deeply considered. The implementation of NeuroCognitive Risk Assessments (NCRA) carries significant ethical implications, especially regarding potential discrimination and human rights violations.<sup>26</sup> A major concern is that NCRA predictions of a person's behavior based on their neurocognitive characteristics could be inaccurate, leading to discrimination against individuals deemed to be at high risk. For example, in the context of employment, education, or housing, people identified by the NCRA as being at high risk of violence could experience

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<sup>25</sup> Geoff Dean, *Neurocognitive Risk Assessment for the Early Detection of Violent Extremists* (Springer, 2014), <https://doi.org/10.1007/978-3-319-06719-3>.

<sup>26</sup> Stefan E. Schulenberg and Barbara A. Yutzenka, "Ethical Issues in the Use of Computerized Assessment," *Computers in Human Behavior* 20, no. 4 (2004): 477–90, <https://doi.org/https://doi.org/10.1016/j.chb.2003.10.006>.



unfair discrimination, be subjected to excessive surveillance, or even disproportionate arrests. This creates an ethical dilemma regarding the validity and fairness of using NCRA.

From the perspective of utilitarianism theory, NCRA implementation can be justified if it contributes to the greater good, such as reducing crime or violence. However, this approach could lead to ethical conflicts, as it could justify discrimination against certain groups in order to achieve a greater goal.<sup>27</sup> Meanwhile, from a deontological point of view, NCRA implementation may not be justified if it violates individuals' basic rights, including the right not to be discriminated against.

Furthermore, in terms of human rights, NCRA present challenges in terms of individual privacy and freedom. The use of NCRA to monitor brain activity and identify potentially harmful patterns of behavior could lead to privacy violations. This raises serious questions about the limits of the use of technology in controlling or restricting a person's freedom, especially if this data is used without the clear consent of the subject concerned. In a legal context, the use of NCRA can be viewed from various legal theory perspectives. According to natural law theory, the implementation of NCRA must be in accordance with universal moral and ethical principles. This means that NCRA can only be justified if they are considered natural and just in their essence. From the perspective of legal positivism, the legitimacy of NCRA depends on their conformity with applicable laws. However, this may not be adequate to deal with the ethical complexities that arise from their use. Finally, critical legal theory raises questions about who benefits from the implementation of the NCRA and how this may affect power structures and social inequalities.

Overall, the NCRA poses complex ethical and legal dilemmas. Their use demands a balance between security and justice, between public interest and individual human rights. Decisions on the use of NCRA should carefully consider these aspects, ensuring that decisions are based on fair and ethical considerations rather than driven by narrow group or power interests. In order to mitigate the ethical and legal impacts that may

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<sup>27</sup> William M M Levack, "Ethics in Goal Planning for Rehabilitation: A Utilitarian Perspective," *Clinical Rehabilitation* 23, no. 4 (2009): 345–51, <https://doi.org/10.1177/0269215509103286>.

arise from the implementation of NeuroCognitive Risk Assessments (NCRA), there are several important steps that should be taken. First, NCRA should be developed and used in a responsible and ethical manner. This means involving various stakeholders, including ethicists, legal experts, and vulnerable groups, in the development and implementation process.

This engagement will ensure that various perspectives, especially from those most vulnerable to negative impacts, are considered in the development of NCRA. Secondly, the use of NCRA should be limited to legitimate and non-discriminatory purposes, such as crime or substance abuse prevention. It is important to clearly define the cases in which NCRA can be used, and ensure that their use is aligned with these objectives. The use of NCRA should be avoided in situations that could lead to discrimination or unfair scrutiny of certain groups. Third, NCRA results should be used in a way that respects human rights. This means ensuring that information obtained from NCRA is not used to violate individuals' privacy or restrict their freedoms without a legitimate basis. Decisions made based on NCRA results should be transparent, and assessed individuals should have the opportunity to challenge or request an explanation of the results that affect them. Finally, it is vital to have strong legal protections against the misuse of NCRA. This includes laws that prohibit the use of NCRA for discrimination, unfair supervision, or other violations of human rights. These protections should include mechanisms for oversight and review of the use of NCRA, as well as sanctions for violations.

The implementation of NCRA brings significant potential for improvements in the criminal justice system and public safety. However, it is important to recognize and carefully address the ethical and legal impacts that may arise. With the right approach, the use of NCRA can be a valuable and fair tool, contributing to a more effective and responsive justice system without compromising the fundamental rights of individuals.

## **D. Integration of NeuroCognitive Risk Assessments (NCRA) in Rehabilitation Programs and Public Policy**

NeuroCognitive Risk Assessment (NCRA) is an innovative approach in the criminal justice system that uses cognitive tests to measure factors related to recidivism risk.<sup>28</sup> Although this approach is still controversial, it has a lot of promise to increase the effectiveness of rehabilitation programs and public policies pertaining to the reintegration of ex-prisoners. The integration of NCRA in both areas and the requisite ethical considerations will be examined in the following discussion.

Potential of NCRA in Rehabilitation Programs:

### 1) Identification of Individual Needs

The potential of NCRA (Neuro-Cognitive Rehabilitation Approach) in criminal rehabilitation programs is significant. A key aspect of this approach is the ability to identify specific individual needs, especially in detecting cognitive deficits that contribute to criminal behavior. For example, NCRA can highlight issues such as impulsivity or decision-making difficulties that are often seen in offenders. By recognizing these cognitive aspects, rehabilitation programs can be further tailored to each individual. This leads to the development of more focused and personalized interventions, with particular attention to strengthening these areas of deficit. Thus, the NCRA paves the way towards a rehabilitation strategy that focuses not only on punishment but also on improving and developing the cognitive abilities of the offender, which may ultimately reduce the risk of future criminal behavior.

### 2) Improved Prediction of Success Rates

The use of NCRA (Neuro-Cognitive Rehabilitation Approach) has an important role in improving the predictability of criminal rehabilitation program success rates. One of the most important aspects of NCRA is its ability to predict recidivism risk with higher accuracy compared to traditional assessment methods. This means

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<sup>28</sup> Haarsma et al., "Assessing Risk Among Correctional Community Probation Populations: Predicting Reoffense With Mobile Neurocognitive Assessment Software."

that NCRA can provide deeper insight into the likelihood of an individual re-offending after serving a sentence or undergoing rehabilitation. With this information, correctional officers can make more informed decisions when prioritizing who should receive intensive rehabilitation programs. Individuals with a high risk of recidivism can be targeted to receive more comprehensive and in-depth interventions. This approach not only increases the effectiveness of the rehabilitation program for such individuals but also contributes to the overall improvement of rehabilitation success rates. Thus, NCRA offers a more targeted and efficient strategy for addressing the issue of recidivism in the correctional system.

### 3) Increased Motivation and Engagement

NCRA (Neuro-Cognitive Rehabilitation Approach) plays a crucial role in increasing inmates' motivation and engagement in rehabilitation programs. A fundamental aspect of NCRA is its ability to provide an objective assessment of the cognitive deficits faced by the individual. This assessment not only identifies specific areas in need of development, but it also emphasizes the potential improvements that may be made with appropriate interventions. Prisoners' motivation to engage in the rehabilitation program may naturally rise when they are provided with a clear understanding of the cognitive aspects of their obstacles and practical strategies to overcome them. They have a greater understanding of the tangible benefits that come with actively engaging in the program. Thus, NCRA not only focuses on the cognitive aspect but also triggers self-awareness and the desire to change in prisoners, which are important steps in the rehabilitation process. This approach also helps in creating a more supportive and positive environment where inmates feel that they have agency and an active role in their rehabilitation journey. The result is increased engagement and adherence to the rehabilitation program, which in turn can increase the overall effectiveness of the rehabilitation process.

The integration of the Neuro-Cognitive Rehabilitation Approach (NCRA) into public policy is a promising strategic step in redefining the way we address crime and rehabilitation issues. This approach marks a shift from traditional methods that often focus on punishment towards a

paradigm that is more oriented towards recovery and improvement. By applying NCRA principles to public policy, the government and correctional institutions have the opportunity to develop more effective, efficient, and humane strategies for dealing with crime problems. This has the potential to reduce recidivism rates while also giving inmates an opportunity to improve themselves and become more responsible and productive members of society when they are released from prison. By integrating NCRA into public policy, communities may be made safer and more inclusive while also enhancing the quality of rehabilitation programs.

#### 1) Effective Resource Allocation

It means one of the main advantages of implementing the Neuro-Cognitive Rehabilitation Approach (NCRA) in the criminal rehabilitation system. By using the NCRA, governments and correctional institutions can obtain accurate information regarding each individual's risk of recidivism. This information is very important as it allows for a more targeted and efficient allocation of resources. When recidivism risk information indicates that an individual is at high risk of reoffending, the government can prioritize the individual for a more intensive and comprehensive rehabilitation program. These programs may require more resources, such as specialized professionals, ongoing therapy, and closer monitoring, but the investment is justified given the high level of risk. Conversely, for individuals with a low risk of recidivism, a milder, more cost-effective approach can be adopted. These programs may not be as intensive or detailed as those for high-risk individuals, but they still provide the support and supervision necessary to ensure that the individual stays on track. This approach not only saves costs but also avoids placing an unnecessary burden on low-risk individuals.

#### 2) Determination of Conditions for Parole

Application of the Neuro-Cognitive Rehabilitation Approach (NCRA) can play a crucial role in determining parole eligibility. NCRA, with its focus on cognitive assessment and recidivism risk, provides objective data that can be used to make more informed decisions about an inmate's readiness for reintegration into society. In the context of parole, an NCRA assessment indicating a low risk score may be interpreted as an indicator that the individual has a lower

likelihood of reoffending. This indicates that the individual may have developed the skills and mindset necessary to live productively and responsibly in society. As a result, they may be considered good candidates for parole with appropriate conditions. The decision to grant parole based on NCRA assessments could also help reduce prison overcrowding. By releasing low-risk inmates, correctional institutions can focus more on rehabilitating high-risk individuals, who may require more intensive resources and attention. This approach also supports restorative justice. Rather than relying solely on punishment, the focus is on successful rehabilitation and reintegration, thereby helping prisoners return to society in a safer and more responsible manner. In addition to helping the individual in question, this also benefits society as a whole by reducing crime rates while improving public safety.

### 3) Development of More Targeted Policy Instruments

The application of the Neuro-Cognitive Rehabilitation Approach (NCRA) in public policy development has the potential to create more targeted policy instruments, especially in the context of crime prevention. Data and insights gained from NCRA enable a deeper understanding of the cognitive factors that contribute to criminal behavior, which is critical information in designing prevention strategies. By understanding how specific cognitive deficits, such as problems in decision-making or impulse control, it can increase the risk of criminal conduct, policymakers can develop programs and policies that better focus on addressing these cognitive problems. Such an approach could involve early intervention, aimed at individuals or groups considered vulnerable, with the aim of strengthening their cognitive skills before criminal behavior develops. Programs that might be developed based on NCRA insights could include education and training designed to improve executive function, teach better decision-making strategies, and strengthen impulse control. Such an approach cannot only help prevent the development of future criminal behavior but also provide additional benefits, such as improved academic and social performance. Additionally, insights from the NCRA can be used to inform and refine existing rehabilitation programs, ensuring that they include components designed to address

underlying cognitive deficits and thereby reduce the likelihood of recidivism. Overall, the application of NCRA in public policymaking opens up opportunities to develop more holistic and evidence-based crime prevention strategies that not only reduce crime rates but also support the well-being and development of society more broadly.

## Conclusion

This study concluded and highlighted that the role of journalists in providing reliable news remains indispensable for staying informed about current events and societal developments. Access to accurate information is crucial for fostering vibrant societies and informed citizenry. However, the research highlights persistent incidents of violence against journalists both in Indonesia and globally. Such acts not only obstruct the progress of democracy but also infringe upon citizens' rights to access objective and credible information.

Indonesia's constitution guarantees the right to information, and several laws safeguard everyone's right to seek, acquire, possess, and convey information. Despite these legal protections, journalists frequently face violence in various forms such as physical assaults, intimidation, and even threats of imprisonment or worse. Previously, arrests and imprisonments often relied on provisions under Law Number 11 of 2008 and Law Number 19 of 2016 on Information and Electronic Transactions (ITE), particularly concerning defamation and hate speech.

Looking forward, potential criminalization and imprisonment of journalists may stem from sections 65–68 of Law Number 27 of 2022 on Personal Data Protection and provisions in Law Number 1 of 2023, the Indonesian New Penal Code. The challenges and violence journalists encounter, particularly in recent years, underscore the critical importance of respecting their societal role. Press freedom violations not only undermine democracy but also threaten the fundamental right to information for all. It is imperative to recognize that violence against journalists represents an attack on freedom itself. Promoting media literacy and supporting journalist organizations are vital steps toward preventing and addressing such violence, ensuring a free and democratic society for all.

## References

- Akhmad, Akhmad, Zico Junius Fernando, and Papontee Teeraphan. "Unmasking Illicit Enrichment: A Comparative Analysis of Wealth Acquisition Under Indonesian, Thailand and Islamic Law." *Journal of Indonesian Legal Studies* 8, no. 2 (2023): 899–934.
- Asscher, Jessica J, Maja Deković, Peter H van der Laan, Pier J M Prins, and Sander van Arum. "Implementing Randomized Experiments in Criminal Justice Settings: An Evaluation of Multi-Systemic Therapy in the Netherlands." *Journal of Experimental Criminology* 3, no. 2 (2007): 113–29.
- Baraza, Samson. "Criminal Justice Should Focus More on Rehabilitation than Punishment." *SSRN Electronic Journal*, November 2020, 1–7.
- Ben-Haim, Moshe Shay, Paul Williams, Zachary Howard, Yaniv Mama, Ami Eidels, and Daniel Algom. "The Emotional Stroop Task: Assessing Cognitive Performance under Exposure to Emotional Content." *Journal of Visualized Experiments: JoVE* 2016, no. 112 (June 2016): 1–10.
- "Center for Science & Law," n.d.
- Chandler, Chelsea, Peter W Foltz, Alex S Cohen, Terje B Holmlund, Jian Cheng, Jared C Bernstein, Elizabeth P Rosenfeld, and Brita Elvevåg. "Machine Learning for Ambulatory Applications of Neuropsychological Testing." *Intelligence-Based Medicine* 1–2 (2020): 1–11.
- Dean, Geoff. *Neurocognitive Risk Assessment for the Early Detection of Violent Extremists*. Springer, 2014.
- Divisi HUMAS POLRI. "BNPT: 116 Eks Napiter Kembali Jadi Residivis Terorisme." [humas.polri.go.id](https://humas.polri.go.id), 2023.
- Fernando, Zico Junius, Kiki Kristanto, Ariesta Wibisono Anditya, Sawitri Yuli Hartati, and Agri Baskara. "Robot Lawyer in Indonesian Criminal Justice System: Problems and Challenges for Future Law Enforcement." *Lex Scientia Law Review* 7, no. 2 (November 2023): 1–24.
- Geest, C.C.C. van, and H.J. Engelbregt. "The Use of the Eriksen Flanker Task as Training Instrument for Cognitive Control in Inhibition Disorder." *Applied Neuroscience And Mental Health* 2, no. 1



- (December 2022): 2–7.
- Glenn, Andrea L., and Adrian Raine. “Neurocriminology: Implications for the Punishment, Prediction and Prevention of Criminal Behaviour.” *Nature Reviews Neuroscience* 2013 15:1 15, no. 1 (December 2013): 54–63.
- Golomb, Beatrice A., Myrna Cortez-Perez, Beth A. Jaworski, Sarnoff Mednick, and Joel Dimsdale. “Point Subtraction Aggression Paradigm: Validity of a Brief Schedule of Use.” *Violence and Victims* 22, no. 1 (February 2007): 95–103.
- Haarsma, Gabe, Sasha Davenport, Devonte C. White, Pablo A. Ormachea, Erin Sheena, and David M. Eagleman. “Assessing Risk Among Correctional Community Probation Populations: Predicting Reoffense With Mobile Neurocognitive Assessment Software.” *Frontiers in Psychology* 10, no. January (2020): 1–13.
- Kumparan.com kumparanNEWS. “Dirjen PAS: Selama 2019, Residivis Narkoba Dekati Angka 9 Ribu Orang.” Kumparan.com, 2019.
- Lejuez, C. W., Will M. Aklin, Michael J. Zvolensky, and Christina M. Pedulla. “Evaluation of the Balloon Analogue Risk Task (BART) as a Predictor of Adolescent Real-World Risk-Taking Behaviours.” *Journal of Adolescence* 26, no. 4 (August 2003): 475–79.
- Levack, William M M. “Ethics in Goal Planning for Rehabilitation: A Utilitarian Perspective.” *Clinical Rehabilitation* 23, no. 4 (2009): 345–51.
- Pettanase, Ismail. “Pembinaan Narapidana Dalam Sistem Pemasyarakatan.” *Solusi* 17, no. 1 (January 2019): 57–63.
- Ross, Erin H, and Peter N S Hoaken. “Correctional Remediation Meets Neuropsychological Rehabilitation: How Brain Injury and Schizophrenia Research Can Improve Offender Programming.” *Criminal Justice and Behavior* 37, no. 6 (April 2010): 656–77.
- Sánchez-Kuhn, Ana, José Juan León, Karinna Gôngora, Cristian Pérez-Fernández, Fernando Sánchez-Santed, Margarita Moreno, and Pilar Flores. “Go/No-Go Task Performance Predicts Differences in Compulsivity but Not in Impulsivity Personality Traits.” *Psychiatry Research* 257 (2017): 270–75.
- Schulenberg, Stefan E, and Barbara A Yutrzenka. “Ethical Issues in the Use of Computerized Assessment.” *Computers in Human Behavior* 20,

no. 4 (2004): 477–90.

Setyawan, Arif Budi. “IPAC: Ada 94 Residivis Kasus Terorisme Sejak 2002 Hingga Mei 2020 - Dare to Share.” Ruangobrol.id, 2020.

Shirtcliff, Elizabeth A., Michael J. Vitacco, Alexander R. Graf, Andrew J. Gostisha, Jenna L. Merz, and Carolyn Zahn-Waxler. “Neurobiology of Empathy and Callousness: Implications for the Development of Antisocial Behavior.” *Behavioral Sciences & the Law* 27, no. 2 (March 2009): 137–71.

Zico Junius Fernando et al. “Preventing Bribery in the Private Sector Through Legal Reform Based on Pancasila.” *Cogent Social Sciences* 8, no. 1 (2022): 1–14.

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