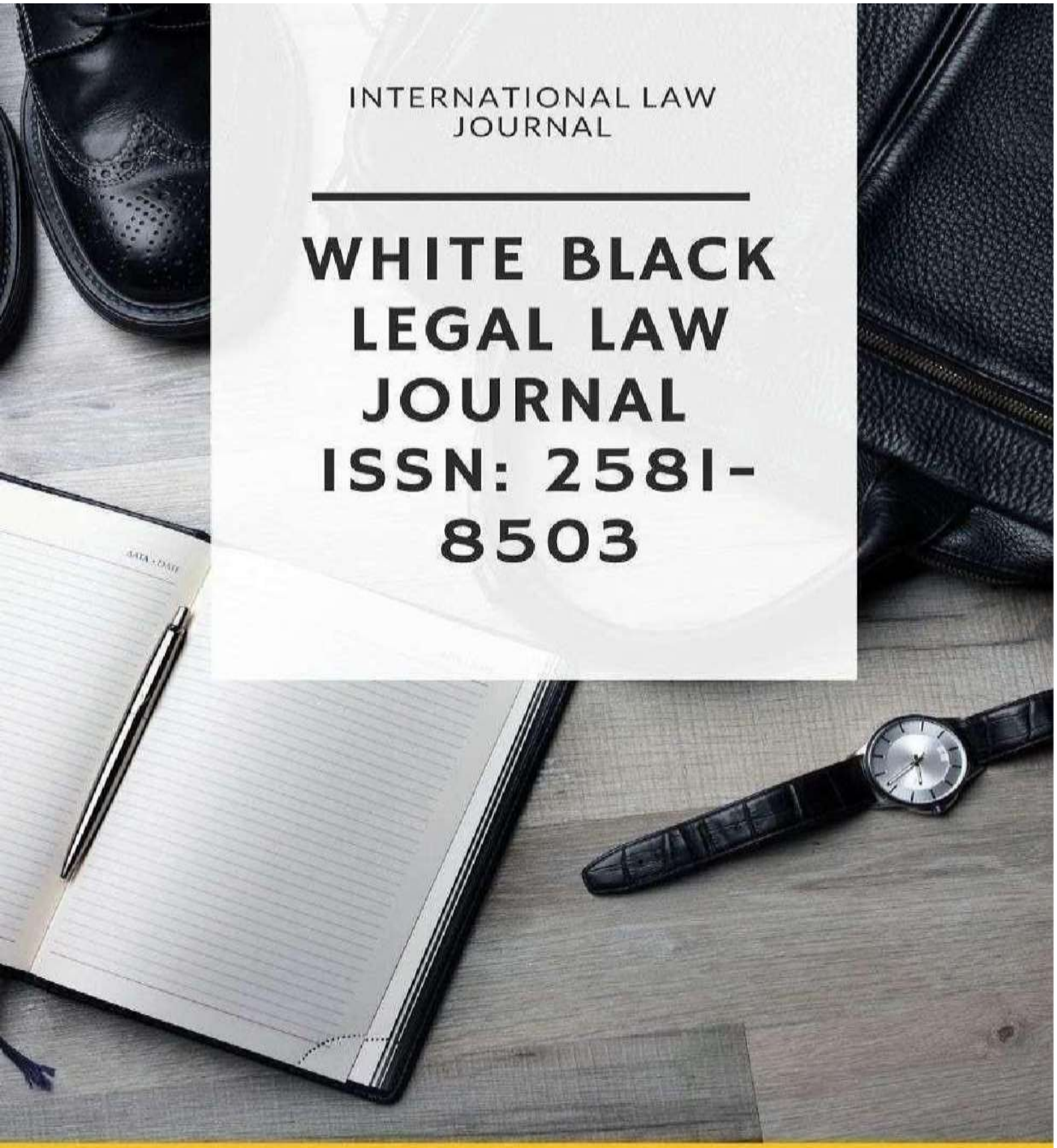

INTERNATIONAL LAW JOURNAL

WHITE BLACK LEGAL LAW JOURNAL

ISSN: 2581-8503

Peer - Reviewed & Refereed Journal

The Law Journal strives to provide a platform for discussion of International as well as National Developments in the Field of Law.

WWW.WHITEBLACKLEGAL.CO.IN

DISCLAIMER

The views, opinions, interpretations, and conclusions expressed in the articles are exclusively those of the respective authors. They do not represent or reflect the views of the Editorial Board, Editors, Reviewers, Advisors, Publisher, or Management of *White Black Legal*.

While reasonable efforts are made to ensure academic quality and accuracy through editorial and peer-review processes, *White Black Legal* makes no representations or warranties, express or implied, regarding the completeness, accuracy, reliability, or suitability of the content published. The journal shall not be liable for any errors, omissions, inaccuracies, or consequences arising from the use, interpretation, or reliance upon the information contained in this publication.

The content published in this journal is intended solely for academic and informational purposes and shall not be construed as legal advice, professional advice, or legal opinion. *White Black Legal* expressly disclaims all liability for any loss, damage, claim, or legal consequence arising directly or indirectly from the use of any material published herein.

ABOUT WHITE BLACK LEGAL

White Black Legal – The Law Journal is an open-access, peer-reviewed, and refereed legal journal established to provide a scholarly platform for the examination and discussion of contemporary legal issues. The journal is dedicated to encouraging rigorous legal research, critical analysis, and informed academic discourse across diverse fields of law.

The journal invites contributions from law students, researchers, academicians, legal practitioners, and policy scholars. By facilitating engagement between emerging scholars and experienced legal professionals, *White Black Legal* seeks to bridge theoretical legal research with practical, institutional, and societal perspectives.

In a rapidly evolving social, economic, and technological environment, the journal endeavours to examine the changing role of law and its impact on governance, justice systems, and society. *White Black Legal* remains committed to academic integrity, ethical research practices, and the dissemination of accessible legal scholarship to a global readership.

AIM & SCOPE

The aim of *White Black Legal – The Law Journal* is to promote excellence in legal research and to provide a credible academic forum for the analysis, discussion, and advancement of contemporary legal issues. The journal encourages original, analytical, and well-researched contributions that add substantive value to legal scholarship.

The journal publishes scholarly works examining doctrinal, theoretical, empirical, and interdisciplinary perspectives of law. Submissions are welcomed from academicians, legal professionals, researchers, scholars, and students who demonstrate intellectual rigour, analytical clarity, and relevance to current legal and policy developments.

The scope of the journal includes, but is not limited to:

- Constitutional and Administrative Law
- Criminal Law and Criminal Justice
- Corporate, Commercial, and Business Laws
- Intellectual Property and Technology Law
- International Law and Human Rights
- Environmental and Sustainable Development Law
- Cyber Law, Artificial Intelligence, and Emerging Technologies
- Family Law, Labour Law, and Social Justice Studies

The journal accepts original research articles, case comments, legislative and policy analyses, book reviews, and interdisciplinary studies addressing legal issues at national and international levels. All submissions are subject to a rigorous double-blind peer-review process to ensure academic quality, originality, and relevance.

Through its publications, *White Black Legal – The Law Journal* seeks to foster critical legal thinking and contribute to the development of law as an instrument of justice, governance, and social progress, while expressly disclaiming responsibility for the application or misuse of published content.

"FORENSIC INPUT IN CUSTODIAL INTERROGATIONS AND LIE DETECTION: A CRIMINOLOGICAL PERSPECTIVE"

AUTHORED BY	---	BISWARUP MUKHERJEE
Designation	---	Student [10th Semester]
Course	---	B.A. LLB (H)
Institution	---	Department of Law, University of North Bengal
CO-AUTHOR	---	SUDIKSHA GHATAK
Designation	---	Assistant Professor
Institute/Affiliation	---	Indian Institute of Legal Studies, Siliguri

ABSTRACT

Custodial interrogation has long been a critical stage in the criminal justice process, balancing the need for effective crime investigation with the protection of constitutional safeguards. This paper illustrates the brief ideas about criminological theory, forensic techniques and constitutional principles to understand the role and limitations of interrogation practices. Commencing with an overview of criminological theories of crime, the paper describes the incentives behind criminal behaviour and the rationale for custodial interrogation as an instrument of truth seeking. It further examines the forensic inputs that magnify interrogation processes, including all scientific methods, psychological profiling and technological advancements such as polygraph tests, brain mapping and narco-analysis. These lie detection techniques, while observed through the lens of criminology, it raises important questions about reliability, admissibility and ethical use. A key focus of this study is the conflict between the investigative efficiency and the constitutional rights of the accused. It discusses how constitutional safeguards, particularly those ensuring protection against self-incrimination and custodial torture, act as necessary checks against misuse. At the same time, it depicts the criminological role in assessing the risk of abuse, coercion and the potential for miscarriage of justice if forensic tools are not properly applied. The paper provides few recommendations aimed at balancing effective investigations with human right protection. These includes abiding regulatory frameworks, judicial precedents, improved training for law enforcement and greater reliance on corroborative evidence rather that coercive evidence.

KEYWORDS:

Custodial Interrogation, Criminology. Constitutional Safeguards, Lie Detection, Investigation

1. INTRODUCTION:

The interrogation room occupies a peculiar and contested space in the architecture of modern criminal justice. It is a place where the machinery of state power, embodied in the trained detective, the fluorescent light, and the carefully calibrated silence, meets the frailty of individual psychology. What happens in that room has consequences that ripple outward through the entire criminal process: the statements obtained there can condemn the guilty, but they can, and too often do, condemn the innocent as well[1]. Understanding that process, and subjecting it to rigorous scientific scrutiny, is not merely an academic exercise. It is a matter of foundational importance to the integrity of the justice system itself.

The law's principal response to the dangers of custodial interrogation has, for most of the twentieth century, been procedural and rights-based. The landmark decision in Miranda v. Arizona recognized that the enclosed, psychologically pressurized environment of police questioning is, by its very nature, inherently coercive, and it mandated prophylactic warnings as the minimum constitutional safeguard[2]. Yet the decades of scholarship and exoneration data that followed have exposed a persistent and troubling gap between the aspirations of Miranda and the realities of interrogation practice. Suspects waive their rights. Interrogators deploy sophisticated psychological techniques. And confessions, even demonstrably false ones, continue to carry extraordinary weight with judges and juries alike. The procedural architecture built around the Fifth and Sixth Amendments, however important, has proven insufficient on its own to guarantee that what emerges from the interrogation room is the truth.

The history of interrogation is, in large part, a history of attempts to substitute scientific certainty for the unreliable intuitions of individual interrogators. From the brutal "third degree" methods that dominated early twentieth-century American policing, through the behaviourally sophisticated Reid Technique that displaced them, and into the neuroimaging and algorithmic tools that crowd the horizon today, the promise has remained remarkably constant: that science can peel away deception and reveal the truth hidden beneath[3]. That promise has always been partially fulfilled and always somewhat illusory. Each new generation of deception detection

[1] Saul M. Kassin & Gisli H. Gudjonsson, *The Psychology of Confessions: A Review of the Literature and Issues, 5 Psychol.* Sci. Pub. Int. 33, 35–38 (2004).
[2] Miranda v. Arizona, 384 U.S. 436, 455 (1966).
[3] Richard A. Leo, *Police Interrogation and American Justice* 8–12 (2008).

technology has been embraced with enthusiasm, deployed widely, and then subjected to empirical scrutiny that revealed, with uncomfortable regularity, that human beings, whether equipped with polygraphs, brain scanners, or their own trained intuitions, perform only modestly better than chance when asked to distinguish truth from falsehood[4].

The polygraph illustrates the problem with particular clarity. For decades, it served as the forensic community's primary instrument of lie detection, its ink tracings treated in some quarters as a kind of physiological window onto guilty knowledge. But successive waves of empirical evaluation, culminating in the comprehensive review conducted by the National Research Council, established that the polygraph's theoretical foundations are weak and its error rates unacceptably high[5]. Innocent people fail polygraph examinations; guilty people pass them. The instrument measures stress and arousal, not deception itself, and its results are susceptible to both conscious countermeasures and the distortions introduced by the examiner's own expectations. Courts in most jurisdictions have been appropriately sceptical of polygraph evidence, though the test remains widely used in investigative contexts where its limitations are too easily forgotten.

The false confession problem has done perhaps more than any other single phenomenon to force a reckoning with the assumptions underlying standard interrogation practice. The DNA exoneration cases documented by Brandon Garrett and the Innocence Project revealed, with the kind of clinical precision that only genetic evidence can provide, that a significant proportion of wrongful convictions rested in part on confessions that were, by every subsequent indicator, entirely fabricated[6]. These were not confessions extracted by outright physical violence or obvious duress. They were obtained through interrogation techniques that the courts had approved and that trained professionals considered sound. The conclusion that follows is uncomfortable but inescapable: the techniques themselves, prolonged questioning, strategic deception, the relentless minimization of moral consequences, are capable of inducing innocent people to confess to crimes they did not commit.

These empirical realities create a normative challenge that cuts across the boundary between social science and law. If interrogation techniques that are currently lawful and widely practiced carry a measurable risk of producing false confessions, and if lie detection instruments that are regularly deployed have error rates inconsistent with the weight placed on

[4] Aldert Vrij, *Detecting Lies and Deceit: Pitfalls and Opportunities* 1–5 (2d ed. 2008).
[5] Charles R. Honts, David C. Raskin & John C. Kircher, *Mental and Physical Countermeasures Reduce the Accuracy of Polygraph Tests*, 79 J. Applied Psych. 252, 254–56 (1994).
[6] Brandon L. Garrett, *Convicting the Innocent: Where Criminal Prosecutions Go Wrong* 18–27 (2011).

their results, then the criminal justice system faces an obligation to reform its practices[7]. That obligation does not resolve itself simply by calling for better training or more procedural safeguards, though both have their place. It requires a deeper engagement with the science of cognition, memory, deception, and stress and a willingness to restructure interrogation practice around what that science actually supports, rather than what investigators and policymakers wish it supported.

It is against this backdrop that the present article examines the role of forensic science in custodial interrogation and lie detection from a criminological perspective. The term "forensic input" as used here encompasses a broad range of scientific contributions: the psychological research on deception cues and their reliability; the physiological instruments, from the polygraph to functional magnetic resonance imaging, designed to detect concealed knowledge; the structured interviewing protocols developed to maximize information yield while minimizing coercive pressure; and the statement analysis techniques that purport to identify linguistic markers of deception in verbal and written accounts[8]. Each of these constitutes a distinct domain of inquiry, with its own evidentiary base, its own institutional champions, and its own record of success and failure in the field.

The central argument advanced in this article is that the integration of forensic science into custodial interrogation practice has been, at best, uneven, and that the gap between what the science demonstrates and what the practice embodies remains wide and consequential. Investigators have been too quick to adopt the trappings of scientific authority, the polygraph's oscillating pens, the analyst's behavioural checklist, the algorithm's confident output, without attending sufficiently to the underlying evidentiary questions those instruments actually answer. At the same time, the legal system has been slow to impose the kind of rigorous gatekeeping that would hold forensic claims about deception to the same standard of scientific validity demanded of other forms of expert testimony[9]. The result is a system in which the language of science is deployed to lend authority to practices that, examined closely, often lack the scientific foundation that language implies.

What follows is not a counsel of nihilism about the possibility of honest and effective criminal investigation. The interrogation room, for all its dangers, serves legitimate and important functions in the criminal justice system, and the scientific disciplines brought to bear on it

[7] Paul G. Cassell, *Protecting the Innocent from False Confessions and Lost Confessions*—and from Miranda, 88 J. Crim. L. & Criminology 497, 500–02 (1998).
[8] Pär Anders Granhag & Leif A. Strömwall, *The Detection of Deception in Forensic Contexts* 3–6 (2004).
[9] Saul M. Kassin, Steven A. Drizin, Thomas Grisso, Gisli H. Gudjonsson, Richard A. Leo & Allison D. Redlich, *Police-Induced Confessions: Risk Factors and Recommendations*, 34 Law & Hum. Behav. 3, 3–5 (2010).

contain genuine insights that can improve both the reliability and the fairness of investigative practice. The goal of this article is to distinguish those insights from the scientism that has too often accompanied them, to ask, with precision and rigor, what forensic science actually knows about deception and confession, and to propose, on that basis, a more honest and defensible account of what it can and cannot contribute to the search for truth in the room where so much, for so many, ultimately turns.

2. CRIMINOLOGICAL PERSPECTIVE:

Criminology, in its broadest sense, is the scientific study of crime, criminal behaviour, its causes, and societal responses to it. It examines not only why individuals engage in criminal conduct but also how institutions particularly the criminal justice system responds to, construct, and sometimes influence such behaviour[10].

It is a scientific study of the nonlegal aspects of crime and delinquency, including its causes, correction, and prevention, from the viewpoints of such diverse disciplines as anthropology, biology, psychology and psychiatry, economics, sociology, and statistics.

Viewed from a legal perspective, the term crime refers to individual criminal actions (e.g., a burglary) and the societal response to those actions (e.g., a sentence of three years in prison). By comparison, the field of criminology incorporates and examines broader knowledge about crime and criminals. For example, criminologists have attempted to understand why some people are more or less likely to engage in criminal or delinquent behaviour. Criminologists have also examined and attempted to explain differences in crime rates and the criminal code between societies and changes in rates and laws over time[11].

Within this framework, custodial interrogation and lie detection are not viewed merely as technical or legal processes, but as complex social interactions shaped by power dynamics, psychological pressures, and institutional objectives.

From a criminological standpoint, suspect behaviour during custodial interrogation cannot be reduced to a simple dichotomy of truth versus deception. Instead, it is influenced by a range of factors including fear, stress, authority pressure, and individual psychological vulnerabilities. The custodial environment itself makes a significant imbalance of power, often placing the suspect in a position of dependency and compliance. This aligns with criminological theories such as control theory, which suggests that individuals may conform to authority to avoid

[10] Edwin H. Sutherland, Principles of Criminology 3 (4th ed. 1947).
[11] Criminology, Encyclopaedia Britannica, https://www.britannica.com/science/criminology (last visited Apr. 30, 2026).

negative consequences, and labelling theory, which highlights how institutional processes can shape an individual's identity and responses[12].

One of the most significant contributions of criminology to this field is its analysis of false confessions. Empirical studies have consistently demonstrated that certain interrogation techniques especially those involving psychological manipulation, prolonged questioning, or the presentation of false evidence can lead innocent individuals to confess to crimes they did not commit[13]. This challenges the traditional evidentiary value placed on confessions within the legal system. Rather than being treated as definitive proof of guilt, criminological research suggests that confessions must be evaluated in light of the conditions under which they are obtained.

In the context of lie detection, criminology adopts a critical approach toward the assumption that deception can be scientifically and objectively measured. Techniques such as polygraph testing rely on physiological indicators like heart rate, respiration, and skin conductivity, based on the premise that deception triggers measurable stress responses. However, research has shown that these indicators are not exclusive to lying and may also arise from anxiety, fear, or confusion conditions commonly experienced during custodial interrogation[14]. The National Research Council has also questioned the reliability and validity of polygraph testing, particularly in high-stakes criminal investigations[15].

Criminology further emphasizes the contextual and situational nature of deception. Lying is not a uniform or easily detectable behaviour; it varies across individuals and circumstances[16]. A suspect may provide false statements not only to evade liability but also as a response to coercion, perceived threats, or a desire to appease authority figures. This perspective challenges the simplistic reliance on forensic tools as definitive indicators of truth and instead calls for a more nuanced understanding of human behaviour.

Another critical concern is the issue of suggestibility, particularly among vulnerable groups such as juveniles, individuals with cognitive impairments, or those under significant psychological stress. Studies indicate that such individuals are more susceptible to suggestion and may provide inaccurate or coerced statements during interrogation[17]. When combined with

[12] Travis Hirschi, Causes of Delinquency (1969); Howard S. Becker, Outsiders: Studies in the Sociology of Deviance (1963).
[13] Saul M. Kassin et al., Police-Induced Confessions: Risk Factors and Recommendations, 34 L. & Hum. Behav. 3 (2010).
[14] Aldert Vrij, Detecting Lies and Deceit: Pitfalls and Opportunities (2d ed. 2008).
[15] Nat'l Rsch. Council of the Nat'l Acads., The Polygraph and Lie Detection (2003).
[16] Bella M. DePaulo et al., Cues to Deception, 129 Psychol. Bull. 74 (2003).
[17] Gisli H. Gudjonsson, The Psychology of Interrogations and Confessions: A Handbook (2003).

forensic techniques that claim scientific certainty, this creates a heightened risk of misinterpretation and wrongful conviction.

Moreover, criminology critiques the illusion of objectivity often associated with forensic technologies. While lie detection tools are presented as neutral and scientific, their application is influenced by human factors such as examiner bias, procedural inconsistencies, and susceptibility to countermeasures[18]. As a result, these techniques cannot be regarded as infallible and must be treated with caution within the evidentiary framework.

In response to these concerns, contemporary criminological research advocates for the adoption of ethical and evidence-based interrogation practices, such as investigative interviewing. Unlike traditional accusatory models, these approaches prioritize information gathering over confession extraction, thereby reducing the risk of coercion and false admissions[19]. This shift reflects a broader commitment to aligning forensic practices with principles of fairness, accuracy, and human rights.

In conclusion, the criminological perspective provides a critical and multidimensional understanding of custodial interrogation and lie detection. It highlights the interplay between psychological vulnerability, institutional power, and forensic practices, while cautioning against overreliance on technological tools as definitive measures of truth. By integrating criminological insights, the criminal justice system can move toward more balanced, reliable, and just investigative processes.

3. FORENSIC INPUTS IN CUSTODIAL INTERROGATION:

The incorporation of forensic techniques into custodial interrogation reflects an evolving attempt within criminal justice systems to enhance the accuracy of investigations through scientific means. Techniques such as polygraph examinations, narco-analysis, and brain-mapping (BEOS) are often employed to evaluate the credibility of suspects and extract information. However, their use must be examined not only through a scientific lens but also in light of constitutional guarantees and statutory provisions governing criminal procedure and evidence.

Polygraph tests measure physiological indicators such as heart rate, blood pressure, respiration, and galvanic skin response based on the premise that deceptive answers trigger measurable

[18] Christopher J. Patrick & William G. Iacono, Validity of the Control Question Polygraph Test: The Problem of False Positives, 7 J. Applied Psychol. 96 (1991).
[19] P.E. Shepherd, Ethical Interviewing, 1 Policing 1 (2007).

stress responses[20]. Narco-analysis involves the administration of psychoactive substances to induce a semi-conscious state, ostensibly reducing the subject's ability to fabricate responses[21]. Brain-mapping techniques attempt to detect recognition of stimuli by measuring neural activity[22]. While these methods are often presented as objective and scientific, their legal admissibility and reliability remain deeply contested.

In the Indian constitutional framework, the use of such techniques directly engages Article 20(3) of the Constitution of India, which guarantees the right against self-incrimination, and Article 21, which protects the right to life and personal liberty, including the right to privacy and mental autonomy[23]. The Supreme Court's landmark judgment in Selvi v. State of Karnataka unequivocally held that the involuntary administration of polygraph tests, narco-analysis, and brain-mapping violates these constitutional protections[24]. The Court reasoned that these techniques involve the extraction of personal knowledge from the mind, thereby amounting to testimonial compulsion, which is impermissible under Article 20(3). It further emphasized that such practices infringe upon substantive due process under Article 21 by compromising individual dignity and autonomy.

The Court in Selvi also clarified that even when these tests are conducted with the consent of the individual, the results cannot be admitted as substantive evidence in court. At best, they may serve as investigative leads, subject to independent corroboration[25]. This position aligns with the broader evidentiary framework under the Indian Evidence Act, 1872, particularly Sections 24–27, which regulate the admissibility of confessions and emphasize voluntariness as a key requirement[26]. Any information obtained through coercive or involuntary means risks being excluded as unreliable and violative of due process.

The distinction between physical evidence and testimonial evidence, as laid down in State of Bombay v. Kathi Kalu Oghad, remains central to this analysis[27]. The Supreme Court in that case held that compelling an accused to provide physical evidence such as fingerprints or handwriting samples does not violate Article 20(3), as it does not involve the communication of personal knowledge. However, forensic techniques like narco-analysis and brain-mapping blur this distinction by directly accessing cognitive responses, thereby falling within the scope

[20] Nat'l Rsch. Council of the Nat'l Acads., The Polygraph and Lie Detection 2–3 (2003).
[21] K. S. Narayan Reddy & O. P. Murty, The Essentials of Forensic Medicine and Toxicology 608–10 (33d ed. 2014).
[22] Farwell Brain Fingerprinting, in Encyclopaedia of Forensic Sciences (2d ed. 2013).
[23] India Const. arts. 20(3), 21.
[24] Selvi v. State of Karnataka, (2010) 7 S.C.C. 263, 221–223 (India).
[25] Indian Evidence Act, 1872, §§ 24–27.
[26] State of Bombay v. Kathi Kalu Oghad, A.I.R. 1961 S.C. 1808, 13 (India).
[27] Code of Criminal Procedure, 1973, §§ 161–162.

of testimonial compulsion.

From a procedural standpoint, the Code of Criminal Procedure, 1973 (CrPC) provides safeguards against coercive interrogation practices. Sections 161 and 162 CrPC regulate the examination of witnesses by police and prohibit the use of statements made to police officers as substantive evidence, except under limited circumstances[28]. Additionally, Section 164 CrPC ensures that confessions are recorded before a magistrate and must be made voluntarily, free from any inducement, threat, or coercion[29]. The use of forensic techniques that undermine voluntariness is therefore inconsistent with these procedural safeguards.

Judicial scepticism toward lie detection techniques is also reflected in comparative jurisprudence. In United States v. Scheffer, the United States Supreme Court upheld restrictions on the admissibility of polygraph evidence, citing the lack of scientific consensus regarding its reliability and the risk of undue influence on fact-finders[30]. This reinforces the principle that forensic tools claiming to detect truth must meet stringent standards of scientific validity before being accepted in legal proceedings.

Scientific studies further highlight the limitations of these techniques. The National Research Council has concluded that polygraph testing lacks sufficient accuracy to justify its use as a definitive measure of deception[31]. Similarly, research indicates that narco-analysis does not guarantee truthful responses, as subjects may remain susceptible to suggestion or provide inaccurate information. Brain-mapping techniques also face challenges relating to standardization and interpretation, limiting their evidentiary value[32].

In addition to concerns of reliability, the use of forensic techniques in custodial interrogation raises issues of custodial violence and coercion, which have been addressed by the Supreme Court in D.K. Basu v. State of West Bengal[33]. The Court laid down detailed guidelines to prevent abuse of power during arrest and interrogation, emphasizing the need to protect the dignity and rights of individuals in custody. The use of intrusive forensic methods must therefore be evaluated against these safeguards to ensure that investigative efficiency does not override fundamental rights.

At the same time, it is important to distinguish between intrusive lie detection techniques and other forms of forensic evidence such as DNA profiling, fingerprint analysis, and digital

[28] Code of Criminal Procedure, 1973, § 164.
[29] United States v. Scheffer, 523 U.S. 303, 309–12 (1998).
[30] Nat'l Rsch. Council of the Nat'l Acads., supra note 1, at 214–16.
[31] Gisli H. Gudjonsson, The Psychology of Interrogations and Confessions 340–45 (2003).
[32] A. K. Jain, Textbook of Forensic Medicine and Toxicology 95–97 (6th ed. 2014).
[33] D.K. Basu v. State of West Bengal, (1997) 1 S.C.C. 416, 35–36 (India).

forensics which are generally admissible and do not involve testimonial compulsion. Their use is regulated by statutory provisions and is widely accepted due to their scientific reliability when properly conducted.

In conclusion, while forensic inputs can enhance the investigative process, their use in custodial interrogation particularly in the context of lie detection must be carefully regulated within the framework of constitutional rights and evidentiary principles. Judicial precedents, statutory safeguards, and scientific research collectively caution against treating such techniques as conclusive proof of truth. A balanced approach that integrates legal safeguards with scientific rigor is essential to ensure that the pursuit of justice remains both effective and fair.

Chart: Forensic Inputs in Custodial Interrogation – Criminological & Legal Analysis

Forensic Technique	**Method Used**	**Criminological Concern**	**Legal Position (India)**	**Reliability**
Polygraph Test	Measures physiological responses (heart rate, BP, respiration)	Susceptible to stress, fear and anxiety; may not indicate deception	Involuntary use barred (Selvi v. State of Karnataka)	Not scientifically conclusive high false positive
Narco-Analysis	Use of drugs (e.g. sodium pentothal) to reduce inhibition	Violates mental autonomy; risk of suggestibility and false statement	Declared unconstitutional if involuntary	Responses may be imaginary or influenced
Brain Mapping (BEOS)	Measures brain responses to stimuli	Assumes memory = guilt, ignores psychological context	Restricted; requires consent	Interpretation is complex and disputed
Voice Stress Analysis	Detects stress in voice patterns	Stress = Deception; cultural and emotional variation	Not widely accepted as evidence	Low accuracy; lacks scientific consensus

DNA & Fingerprinting	Physical evidence collection	Minimal criminological concern; objective evidence	Fully admissible (subject to procedure)	Highly reliable if properly handled
Digital Forensics	Analysis of electronic data	Raises privacy concerns but less coercive	Admissible under Evidence Act (hereinafter BSA)	Depends on data integrity

4. LIE DETECTION AND CRIMINOLOGY:

Lie detection, as a concept within criminal investigation, occupies a complex and often contested space at the intersection of criminology, forensic science, and law. While traditionally regarded as a mechanism to distinguish truth from deception, criminology challenges the reductionist assumption that lying is a uniform or easily detectable behaviour. Instead, it conceptualizes deception as a multifaceted phenomenon shaped by psychological processes, social contexts, and institutional pressures particularly within custodial interrogation settings.

At its core, criminology recognizes that deception is context-dependent rather than inherently pathological. Individuals subjected to custodial interrogation often operate under intense psychological stress, fear of authority, and uncertainty regarding consequences. In such circumstances, lying may function as a coping mechanism rather than a deliberate attempt to obstruct justice. This aligns with broader criminological and psychological theories that emphasize compliance, suggestibility, and authority-induced behaviour, where individuals may conform to perceived expectations to alleviate immediate distress[34]. The custodial environment, characterized by isolation and power asymmetry, amplifies these tendencies and complicates the interpretation of suspect responses.

A significant criminological concern in this domain is the phenomenon of false confessions, which directly challenges the reliability of lie detection frameworks. Research categorizes false confessions into three types voluntary, compliant, and internalized each reflecting different

[34] Saul M. Kassin et al., Police-Induced Confessions: Risk Factors and Recommendations, 34 L. & Hum. Behav. 3 (2010).

psychological dynamics[35]. Compliant confessions, for instance, arise when individuals knowingly provide false admissions to escape coercive interrogation, while internalized confessions occur when suspects come to believe in their own guilt due to persistent suggestion or manipulation. These findings highlight that confession-based truth verification, often reinforced by lie detection techniques, is inherently vulnerable to error.

Forensic lie detection methods, such as polygraph tests and voice stress analysis, are premised on the assumption that deception produces identifiable physiological markers. However, criminological research has consistently demonstrated that such markers elevated heart rate, perspiration, or vocal stress are not exclusive to lying[36]. They may equally result from anxiety, fear, confusion, or trauma, all of which are prevalent in custodial settings. This creates a fundamental epistemological problem: the inability to distinguish between stress-induced responses and deception-induced responses. Consequently, the scientific validity of these techniques as definitive indicators of truth remains highly questionable.

The judiciary has acknowledged these limitations. In Selvi v. State of Karnataka, the Supreme Court of India explicitly recognized that techniques such as polygraph examinations and narco-analysis lack sufficient scientific reliability and are prone to error[37]. The Court held that even when administered with consent, the results of such tests cannot be treated as substantive evidence and must be corroborated independently. This judicial position reflects a broader criminological critique that lie detection technologies risk being accorded undue evidentiary weight, thereby distorting the fact-finding process.

Criminology also interrogates the myth of technological objectivity. While forensic lie detection tools are often portrayed as neutral and scientific, their application is deeply embedded in human judgment. Examiner bias, methodological inconsistencies, and interpretative subjectivity all influence outcomes[38]. Moreover, the existence of countermeasures techniques through which individuals can manipulate physiological responses further undermines the credibility of such tools. This challenges the perception of lie detection as an infallible scientific process and underscores its vulnerability to both intentional and unintentional distortions.

Another critical dimension is the role of vulnerability and differential susceptibility. Criminological studies emphasize that certain individuals such as juveniles, persons with

[35] Saul M. Kassin & Lawrence S. Wrightsman, Confession Evidence, in The Psychology of Evidence and Trial Procedure 67 (Saul M. Kassin & Lawrence S. Wrightsman eds., 1985).
[36] Aldert Vrij, Detecting Lies and Deceit: Pitfalls and Opportunities (2d ed. 2008).
[37] Selvi v. State of Karnataka, (2010) 7 S.C.C. 263, 221–223 (India).
[38] Nat'l Rsch. Council of the Nat'l Acads., The Polygraph and Lie Detection 214–16 (2003).

cognitive impairments, and those experiencing psychological distress are disproportionately affected by interrogation pressures[39]. These individuals are more likely to exhibit heightened suggestibility and compliance, increasing the risk of false or misleading statements. When subjected to lie detection techniques, their responses may be misinterpreted as indicators of deception, thereby compounding the risk of wrongful conviction. This raises important concerns regarding the equitable application of forensic tools within the justice system.

Further, criminology situates lie detection within the broader discourse of power, control, and institutional legitimacy. The use of such techniques in custodial interrogation can reinforce existing power imbalances by creating an aura of scientific certainty that pressures suspect to conform. This dynamic is particularly problematic in light of judicial concerns regarding custodial abuse, as highlighted in D.K. Basu v. State of West Bengal, where the Supreme Court emphasized the need to protect individuals from coercive practices during interrogation[40]. The incorporation of forensic lie detection tools, if not carefully regulated, may inadvertently legitimize coercive practices under the guise of scientific investigation.

In response to these challenges, contemporary criminological thought advocates a shift toward ethical and evidence-based interrogation models, such as investigative interviewing. These approaches prioritize the collection of accurate information through rapport-building, open-ended questioning, and cognitive interviewing techniques, rather than relying on confession extraction or technological verification[41].

Empirical studies suggest that such methods not only enhance the reliability of information obtained but also align more closely with principles of procedural fairness and human rights.

Moreover, the emergence of advanced technologies such as artificial intelligence and neuro-forensics necessitates a cautious and critical approach. While these innovations hold potential for improving investigative processes, criminology warns against uncritical adoption without rigorous validation and ethical oversight. The risk of over-reliance on technological solutions, at the expense of human judgment and contextual understanding, remains a persistent concern.

In conclusion, the criminological analysis of lie detection reveals that deception is a complex and context-sensitive phenomenon that cannot be accurately captured through simplistic or purely technological means. It underscores the limitations of forensic lie detection techniques and highlights the risks of coercion, bias, and misinterpretation inherent in their use. By integrating criminological insights with legal safeguards and scientific rigor, the criminal

[39] Gisli H. Gudjonsson, The Psychology of Interrogations and Confessions (2003).
[40] D.K. Basu v. State of West Bengal, (1997) 1 S.C.C. 416, 35–36 (India).
[41] P.E. Shepherd, Ethical Interviewing, 1 Policing 1 (2007).

justice system can move toward more reliable, ethical, and rights-oriented approaches to truth-finding.

5. LEGAL AND HUMAN RIGHTS CONCERNS:

The use of forensic techniques in custodial interrogation, particularly those aimed at lie detection, raises profound legal and human rights concerns. While such methods are often justified on the grounds of investigative efficiency and scientific advancement, their application must be carefully evaluated within the framework of constitutional guarantees, statutory safeguards, and international human rights standards. At the heart of this debate lies the fundamental tension between the state's interest in effective law enforcement and the individual's right to dignity, autonomy, and fair trial.

Within the Indian constitutional framework, the most significant protection is embodied in Article 20(3) of the Constitution, which guarantees that no person accused of an offence shall be compelled to be a witness against himself[42]. This right against self-incrimination forms a cornerstone of criminal jurisprudence and is closely linked to the presumption of innocence. The Supreme Court has interpreted this provision expansively to include not only direct testimony but also any form of compelled extraction of personal knowledge. In Selvi v. State of Karnataka, the Court held that the involuntary administration of polygraph tests, narco-analysis, and brain-mapping techniques violates Article 20(3), as these methods intrude into the mental processes of the individual and amount to testimonial compulsion[43].

Closely related is Article 21, which guarantees the right to life and personal liberty. Over time, judicial interpretation has expanded this provision to include the rights to privacy, dignity, and bodily integrity[44]. The use of invasive forensic techniques particularly those that alter cognitive states or extract information without consent has been held to violate these principles. In Selvi, the Court emphasized that such practices infringe upon mental privacy, a crucial aspect of personal liberty, and cannot be justified merely on the basis of their potential utility in investigation. This reasoning aligns with the broader constitutional commitment to substantive due process and human dignity.

Statutory safeguards further reinforce these constitutional protections. The Indian Evidence Act, 1872, particularly Sections 24 to 27, governs the admissibility of confessions and

[42] India Const. art. 20(3).
[43] Selvi v. State of Karnataka, (2010) 7 S.C.C. 263, 221–223 (India).
[44] Justice K.S. Puttaswamy (Retd.) v. Union of India, (2017) 10 S.C.C. 1 (India).

mandates that they must be voluntary to be legally valid[45]. Any confession obtained through inducement, threat, or coercion is inadmissible. The use of forensic techniques that compromise voluntariness therefore directly conflicts with these provisions. Similarly, the Code of Criminal Procedure, 1973 (CrPC) provides procedural safeguards to ensure fairness during investigation. Section 164 CrPC, for instance, requires that confessions be recorded before a magistrate and be made voluntarily, free from any external pressure[46]. These provisions collectively underscore the legal system's emphasis on protecting individuals from coercive interrogation practices.

The judiciary has also addressed the broader issue of custodial abuse and the need for procedural safeguards. In D.K. Basu v. State of West Bengal, the Supreme Court laid down detailed guidelines to prevent custodial violence and ensure transparency in arrest and interrogation procedures[47]. These guidelines emphasize the importance of accountability, legal representation, and protection of detainees' rights. The use of forensic lie detection techniques, particularly when conducted without adequate safeguards, risks undermining these protections by introducing new forms of coercion under the guise of scientific investigation.

From an international perspective, the use of intrusive interrogation techniques raises concerns under various human rights instruments. Article 14(3)(g) of the International Covenant on Civil and Political Rights (ICCPR) guarantees the right against self-incrimination, while Article 7 prohibits torture and cruel, inhuman, or degrading treatment[48]. The United Nations Convention Against Torture (UNCAT) further reinforces the absolute prohibition of torture and coercive practices[49]. Although forensic techniques such as narco-analysis or polygraph testing may not always involve physical violence, their coercive and intrusive nature can amount to psychological pressure, thereby falling within the ambit of prohibited treatment.

Criminological analysis complements these legal concerns by highlighting the risk of misuse and systemic bias. The deployment of lie detection techniques in custodial settings often disproportionately affects vulnerable populations, including economically disadvantaged individuals, minorities, and those with limited access to legal representation[50]. The perception of these techniques as scientifically infallible may also lead to their overuse or misuse, resulting

[45] Indian Evidence Act, 1872, §§ 24–27
[46] Code of Criminal Procedure, 1973, § 164.
[47] D.K. Basu v. State of West Bengal, (1997) 1 S.C.C. 416 (India).
[48] International Covenant on Civil and Political Rights arts. 7, 14(3)(g), Dec. 16, 1966, 999 U.N.T.S. 171.
[49] Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, Dec. 10, 1984, 1465 U.N.T.S. 85.
[50] Saul M. Kassin et al., Police-Induced Confessions: Risk Factors and Recommendations, 34 L. & Hum. Behav. 3 (2010).

in wrongful convictions and erosion of public trust in the justice system.

Another critical issue is the lack of informed consent and procedural clarity. Even where consent is formally obtained, questions remain regarding its validity in a custodial environment characterized by power imbalance and implicit coercion. The Supreme Court in Selvi acknowledged this concern and emphasized that consent must be genuine, informed, and voluntary, accompanied by adequate legal safeguards. This highlights the need for clear regulatory frameworks governing the use of forensic techniques, including guidelines on consent, administration, and evidentiary use.

Furthermore, the admissibility and evidentiary value of such techniques remain uncertain. Courts have generally been reluctant to accept the results of lie detection tests as conclusive evidence, recognizing their limited reliability and potential for misuse. This cautious approach reflects a broader commitment to ensuring that scientific advancements do not undermine fundamental legal principles.

In conclusion, the use of forensic lie detection techniques in custodial interrogation raises serious legal and human rights concerns that cannot be overlooked. Constitutional protections, statutory safeguards, and international human rights norms collectively emphasize the need to preserve individual autonomy, dignity, and fairness in criminal proceedings. While forensic science can undoubtedly contribute to effective investigation, its application must be carefully regulated to prevent abuse and ensure compliance with fundamental rights. A rights-based approach grounded in legality, necessity, and proportionality is essential to reconcile the demands of justice with the imperatives of human dignity.

6. TECHNOLOGICAL AND FUTURE TRENDS IN FORENSIC INTERROGATION AND LIE DETECTION:

A. The Allure and the Architecture of the Next Generation

There is something persistently seductive about the idea that technology will finally solve the problem that has defeated every prior generation of investigators: the problem of knowing, with certainty, when another human being is lying. Each technological wave arrives bearing the same promise, dressed in the vocabulary of the era, the physiograph, the polygraph, the voice stress analyzer, and now, the functional magnetic resonance imaging scanner, the algorithmic behavioral classifier, and the artificial intelligence deception detection system. The persistence of the promise is itself informative. It tells us not only about the genuine complexity of deception as a cognitive

and neurological phenomenon, but also about the institutional pressures that drive law enforcement and intelligence agencies toward tools that appear to resolve that complexity, regardless of whether they actually do[51]. The task of this Part is to examine, with the precision that the stakes demand, what the current generation of forensic technologies actually offers, and where the gap between promise and performance remains dangerously wide.

B. Functional Neuroimaging and the Brain-Based Lie Detector

The development of functional magnetic resonance imaging as a tool for deception detection represents, at least in theoretical terms, a genuine conceptual advance over the polygraph. Where the polygraph measures peripheral physiological responses, changes in blood pressure, galvanic skin conductance, respiration, that are only indirectly related to deception, fMRI purports to image the neural architecture of the lie itself. Research conducted in the early decades of the twenty-first century identified activation in the anterior cingulate cortex and the superior frontal gyrus as correlates of deceptive responses, giving rise to the claim that fMRI could detect deception by reading the brain's own functional signature rather than its downstream somatic effects[52]. The attractiveness of this claim to law enforcement agencies, intelligence services, and, eventually, commercial enterprises offering fMRI-based lie detection services was immediate and understandable, even if the underlying science warranted considerably more caution than its promoters supplied.

The difficulties that have accumulated around forensic fMRI lie detection fall into four broad categories, each of which independently would be sufficient to disqualify the technique from courtroom use, and which together present what one group of scholars has described as a range of scientific, legal, ethical, and operational obstacles suggesting that fMRI is unlikely to constitute a viable lie detector for criminal courts[53].

The first and most fundamental problem is the ecological validity gap. Laboratory studies of fMRI-based deception detection involve participants who are instructed to lie under controlled experimental conditions, typically about low-stakes matters with

[51] Pär Anders Granhag & Leif A. Strömwall, The Detection of Deception in Forensic Contexts 3–6 (2004).
[52] Saul M. Kassin, Steven A. Drizin, Thomas Grisso, Gisli H. Gudjonsson, Richard A. Leo & Allison D. Redlich, Police-Induced Confessions: Risk Factors and Recommendations, 34 Law & Hum. Behav. 3, 3–5 (2010).
[53] Christian A. Meissner, Sena Garven, J. D. Memory & Intelligence Svc., Investigative Interviewing: A Review of the Literature and a Model of Science-Based Practice, in Oxford Handbook of Psychology and Law 582, 583–85 (David DeMatteo & Kyle C. Scherr eds., 2023).

no personal consequences for either truthful or deceptive responding. The neural signatures identified under those conditions may or may not correspond to the neural states of a suspect lying to investigators about a serious crime under conditions of genuine fear, stress, and moral weight. The extent to which experimentally induced lies are neurologically equivalent to lies told in real-world high-stakes contexts remains an open and deeply contested empirical question[54].

The second problem is the individual inference problem. Laboratory fMRI studies typically generate results that are averages across many participants making many responses. The relevant forensic question, however, is never whether deceptive people as a group show different average neural activation patterns than truthful people as a group. It is whether this particular person is lying about this particular thing right now. The statistical machinery of group-level neuroimaging research is poorly suited to generating the individual-level inferences that courtroom fact-finding requires, and the accuracy rates reported in laboratory studies, even the most optimistic of which fall well short of the standards that would be required for evidence bearing on guilt or innocence beyond a reasonable doubt, reflect this fundamental mismatch[55]. A 2024 study published in the Proceedings of the National Academy of Sciences represented a genuine methodological advance in fMRI lie detection by developing algorithms capable of distinguishing deceptive neural signatures from confounds such as selfish but truthful responses, achieving accuracy rates of approximately 79% in controlled experimental conditions[56]. That figure, while meaningful as a research result, falls well short of the evidentiary standards that the criminal justice system demands, and the study's own authors were careful to note the distance between laboratory performance and forensic application.

The third and fourth problems susceptibility to countermeasures and ethical concerns regarding mental privacy and compelled neurological self-incrimination compound the purely scientific limitations. Research has demonstrated that individuals can systematically corrupt fMRI deception detection results through physical movements and deliberate cognitive strategies, raising the uncomfortable possibility that a

[54] Tanjila Islam Chowdhury, Branka Bilić, & Tomislav Mašić, Advanced Neuroimaging and Criminal Interrogation in Lie Detection, 19 Open Med. 1, 3–4 (2024).
[55] Daniel D. Langleben & Jane Campbell Moriarty, Using Brain Imaging for Lie Detection: Where Science, Law, and Policy Collide, 19 Psych. Pub. Pol'y & L. 222, 223–24 (2013).
[56] Tim Brennen & Svein Magnussen, Lie Detection: What Works?, 32 Current Directions Psychol. Sci. 267, 271–72 (2023).

sufficiently motivated and sophisticated suspect could defeat the technology while an innocent and anxious one could not[57]. The ethical dimensions are equally serious: compelling a suspect to submit to neuroimaging as a condition of interrogation raises Fifth Amendment concerns that go beyond the existing doctrine surrounding physical evidence, touching questions about the boundary between the body as evidence and the mind as a constitutionally protected refuge.

C. *Artificial Intelligence and Automated Behavioural Analysis*

The deployment of artificial intelligence in deception detection has proceeded along two distinct but related pathways. The first involves the automated analysis of behavioural and physiological cues, micro expressions, vocal stress patterns, eye movement, postural changes, using machine learning classifiers trained on databases of truthful and deceptive responses. The second involves the integration of AI into broader investigative processes: the analysis of communication records, social media behavior, financial transactions, and other digital traces that, in combination, are claimed to reveal deceptive or criminally relevant patterns. Both pathways raise profound questions about evidentiary validity, constitutional rights, and the particular dangers that attend the deployment of probabilistic algorithmic outputs in binary contexts of guilt and innocence.

The automated behavioural analysis systems that have attracted the most attention in law enforcement contexts share a common theoretical ancestry with the polygraph: they rest on the assumption that deception produces characteristic and detectable outputs in human behavior, and that trained algorithms can identify those outputs more reliably than trained human observers. The empirical record, however, is not encouraging. The same meta-analytic research that has established the near-chance performance of trained human lie detectors has generally found that algorithmic systems performing unaided behavioral analysis do not achieve meaningfully superior accuracy, and that the specific behavioural cues on which many commercial systems rely, including micro expression classifiers and vocal biomarker analyzers, lack the empirical validation that responsible forensic use would require[58]. The fundamental problem is not with the sophistication of the algorithms but with the poverty of their theoretical foundations: if

[57] Id. at 270–71.
[58] Sangil Lee, Runxuan Niu, Lusha Zhu, Andrew S. Kayser & Ming Hsu, Distinguishing Deception from Its Confounds by Improving the Validity of fMRI-Based Neural Prediction, 121 Proc. Nat'l Acad. Sci. 1, 3–5 (2024).

there is no reliable, consistent behavioral signature of deception in the human organism, and the weight of the scientific literature suggests there is not, then no algorithm, however well-trained, can reliably detect what does not reliably exist.

The evidentiary admissibility of AI-generated forensic outputs presents a distinct but related set of challenges. Under the Daubert framework established by the United States Supreme Court, scientific expert testimony is admissible only if it rests on a reliable foundation, has been subjected to peer review and testing, carries a known and acceptable error rate, and enjoys general acceptance in the relevant scientific community[59]. The application of these criteria to AI-based deception detection systems exposes a landscape of uncertainty that the legal system has only begun to map. Most commercial AI lie detection products operate as "black box" systems whose internal logic is proprietary and thus unavailable for adversarial testing or judicial scrutiny. The error rates of such systems in real-world forensic conditions, as opposed to the curated laboratory or corporate testing environments in which they are typically evaluated, are largely unknown. A proposed Federal Rule 707, circulated for public comment in 2025, would require AI systems offered as evidence in criminal proceedings to meet Daubert-equivalent standards of reliability and transparency even in the absence of a sponsoring human expert, signaling a legislative recognition that existing evidentiary frameworks were not designed to accommodate AI-generated proof[60]. Whether that recognition will translate into meaningful gatekeeping before these systems become institutionally embedded in investigative practice remains to be seen.

D. Structured Interviewing, the PEACE Model, and the Science-Based Alternative

Against the backdrop of technologically ambitious but empirically fragile deception detection tools, a quieter and more durable transformation has been underway in the architecture of custodial interrogation itself. The PEACE model of investigative interviewing, an acronym for Preparation and Planning, Engage and Explain, Account, Closure, and Evaluation, emerged from the United Kingdom in the early 1990s as a direct institutional response to the miscarriages of justice that had been produced by coercive, confession-oriented interrogation practices, and has since been adopted or adapted by law enforcement agencies across Europe, Australasia, and increasingly

[59] Pär Anders Granhag & Leif A. Strömwall, The Detection of Deception in Forensic Contexts 91–94 (2004).
[60] Maria Hartwig & Charles F. Bond Jr., Why Do Lie-Catchers Fail? A Lens Model Meta-Analysis of Human Lie Judgments, 137 Psychol. Bull. 643, 644–46 (2011).

North America. The model's central commitment is to information-gathering rather than confession-elicitation: where the Reid Technique orients the interrogator toward breaking down denial and producing admission, PEACE orients the investigative interviewer toward building a complete, verifiable account of events that can be tested against the available evidence.

The empirical support for information-gathering approaches over accusatorial ones has accumulated substantially in recent years. A systematic review and network meta-analysis published in 2024, synthesizing twenty-nine laboratory studies conducted between 1996 and 2023, found that information-gathering approaches produced significantly higher rates of truthful disclosure and substantially lower rates of false confession than accusatorial methods. The United Nations Special Rapporteur on torture has specifically advocated for the development of a universal protocol mandating non-coercive interviewing standards for all law enforcement, military, and intelligence personnel, a development that situates the PEACE model not merely as a matter of investigative best practice but as an emerging norm of international human rights law. The High-Value Detainee Interrogation Group, established by the Federal Bureau of Investigation to develop science-based alternatives to coercive interrogation, has produced a body of research endorsing information-gathering principles as both more reliable and more ethically defensible than their accusatorial counterparts.

The significance of this shift for the question of forensic input in custodial interrogation cannot be overstated. The PEACE model and its cognate frameworks, the Cognitive Interview, the Strategic Use of Evidence protocol, and related structured approaches, represent the integration of scientific knowledge about memory, cognition, and suggestibility directly into interrogation practice, not as an adjunct to traditional methods but as a replacement for them. They constitute, in other words, a form of forensic input that operates at the level of the interrogation's design rather than at the level of post-hoc technological overlay. Their track record, while not perfect and their training demands considerable, is substantially better than that of the technological alternatives that have commanded far more institutional and popular attention.

E. The Horizon: Emerging Technologies and Their Legal Implications

The coming decades are likely to bring further waves of forensic technology to bear on the problem of deception detection in custodial interrogation. Functional near-infrared spectroscopy, a portable and less invasive alternative to fMRI that measures cortical

hemodynamic responses associated with deception-related cognitive processes, has attracted research interest as a potential field-deployable neuroimaging tool, with some laboratory studies reporting classification accuracies exceeding 88% in controlled settings. EEG-based concealed information tests, which exploit the well-documented P300 event-related potential response as a marker of guilty knowledge, continue to be refined in laboratory settings. And the integration of large language model analysis into statement validity assessment, using AI to identify statistical anomalies in the structure of verbal and written accounts that may be indicative of fabrication represents a frontier whose empirical validation has barely begun but whose potential forensic deployment is already commercially advanced.

Each of these technologies will arrive bearing the same evidentiary questions that have attended every prior generation of lie detection tools: Has it been tested under conditions that approximate forensic reality? Is its error rate known and acceptable? Can it be defeated by countermeasures? Does its deployment raise constitutional concerns about compelled self-incrimination or the right to mental privacy? And, perhaps most importantly, will the institutional and cultural pressures that have historically caused courts and agencies to embrace the trappings of scientific authority before waiting for scientific validity to be established assert themselves again, embedding these tools in practice before the empirical record has been given time to mature? The lessons of the polygraph, of the voiceprint, of the forensic hair analyst, and of the bite mark examiner are clear enough. Whether they will be heeded when the next wave of technology arrives is a question that the criminal justice system has not yet demonstrated the institutional resolve to answer correctly.

7. RECOMMENDATIONS: TOWARD A FORENSICALLY GROUNDED AND RIGHTS-RESPECTING FRAMEWORK FOR CUSTODIAL INTERROGATION:

A. Universal Mandatory Electronic Recording of Custodial Interrogations

The single most widely supported, empirically validated, and institutionally feasible reform available to the American criminal justice system is the universal mandatory electronic recording of custodial interrogations, from the moment of detention and the administration of Miranda warnings through the conclusion of questioning. The case for this reform rests on a convergence of interests that ought, in principle, to make it politically tractable: it protects suspects from coercion and false confession; it protects

investigators from false allegations of misconduct; it creates a contemporaneous record of the conditions under which any statement was obtained; and it gives courts the factual basis they need to make informed suppression decisions rather than resolving disputed credibility contests between officers and defendants.

The empirical record is clear and consistent. Jurisdictions that have implemented mandatory recording, including the federal law enforcement agencies that adopted recording requirements following Department of Justice policy changes in 2014, have reported that investigators adjusted their practices with minimal disruption and that the resulting records improved the quality and credibility of confessions that were genuine. As of the most recent comprehensive survey, twenty-four states and all federal law enforcement agencies require recording of custodial interrogations in at least some categories of serious felony cases; the remaining twenty-six states permit recording to remain at the discretion of individual agencies, producing the kind of uneven and jurisdiction-dependent protection that the empirical problem of false confessions demands a systematic remedy for. This article recommends universal federal legislation mandating electronic recording of all custodial interrogations in felony matters, enforceable through an exclusionary rule applicable to unrecorded statements, with narrow exceptions for genuine operational emergencies subject to judicial scrutiny.

B. Prohibition of Deceptive Interrogation Tactics, Beginning with Vulnerable Populations

The legal authorization, under Frazier v. Cupp and its progeny, for law enforcement officers to deliberately lie to suspects during custodial interrogation, including by fabricating evidence, falsely claiming that accomplices have implicated the suspect, and misrepresenting the legal consequences of confession, is among the most anomalous features of American criminal procedure, and one whose empirical costs are now too well-documented to be defended with intellectual seriousness.[5] The research literature on false confessions has established beyond reasonable dispute that deceptive interrogation tactics are a significant risk factor for false confession, particularly when applied to individuals who are young, cognitively vulnerable, mentally ill, or in a state of sleep deprivation or acute psychological distress.

A growing number of state legislatures have begun to act on this evidence. Illinois became the first state, in 2021, to ban the use of deceptive tactics in interrogations of juveniles; California followed in 2022 with Assembly Bill 2644, which extended protections to all persons under the age of twenty-five; Indiana, Utah, Oregon, and

several other states have enacted comparable restrictions; and as of 2024, ten states have passed legislation effectively prohibiting law enforcement from lying to juvenile suspects. These legislative developments represent a meaningful shift in the political feasibility of deception reform and should be understood as the leading edge of a more comprehensive change. This article recommends the extension of anti-deception prohibitions to all custodial interrogations regardless of the suspect's age, accompanied by a prophylactic exclusionary rule rendering involuntary any statement obtained through the knowing use of false factual claims or misrepresentations about the legal consequences of confession. Where an adult suspect knowingly and voluntarily waives the protection after full advisement, a narrowly defined exception may be defensible; but the default presumption should be against deception, not in its favor.

C. Adoption of Information-Gathering Interrogation Frameworks as the Mandatory Standard of Practice

The empirical case for replacing accusatorial interrogation methods including the Reid Technique and its derivatives with information-gathering frameworks modeled on the PEACE protocol or comparable science-based approaches is now sufficiently robust to support not merely a preference but a professional standard. A 2024 systematic network meta-analysis, synthesizing twenty-nine experimental studies spanning nearly three decades of research, found that information-gathering approaches produced significantly higher rates of truthful disclosure and dramatically lower rates of false confession than accusatorial alternatives, while matching or exceeding accusatorial methods in obtaining genuine admissions from actually guilty suspects. The argument that deceptive and confrontational methods are necessary to effective criminal investigation is not supported by the best available evidence and should no longer be treated as a legitimate empirical claim.

This article recommends that federal funding for state and local law enforcement training be conditioned on the adoption of information-gathering interviewing frameworks meeting published empirical standards; that the Federal Bureau of Investigation's existing commitment to rapport-based, science-informed interrogation protocols developed through the High-Value Detainee Interrogation Group's research program be formalized into mandatory agency-wide training requirements; and that accreditation standards for law enforcement agencies be revised to require demonstrated competency in science-based interrogation practice as a condition of

continued certification. The resistance to these changes in many American law enforcement agencies is real and should not be understated, but it is not a principled objection grounded in evidence. It is an institutional inertia that legislative and accreditation mandates are well-positioned to overcome.

D. Rigorous Pre-Admission Evidentiary Gatekeeping for Forensic Deception Detection Technologies

The history of forensic science in American courts is substantially a history of judicial failures to perform the gatekeeping function that Daubert v. Merrell Dow Pharmaceuticals, Inc. and its successors placed on trial judges. Forensic techniques that lacked validated scientific foundations hair microscopy, bite mark analysis, blood spatter pattern analysis as commonly practiced, and the polygraph in jurisdictions that permitted its admission were accepted into evidence on the basis of claimed expertise and institutional authority rather than demonstrated empirical validity. The result, documented exhaustively in the 2009 National Research Council report and the 2016 President's Council of Advisors on Science and Technology report on forensic science, was a systemic contribution to wrongful conviction that the adversarial process proved incapable of correcting after the fact.

This history must not be repeated with the next generation of deception detection technologies. This article recommends that courts apply Daubert gatekeeping to all claims of deception detection expertise with genuine rigor, requiring as a condition of admission not merely that the technique is used professionally or that its proponents believe in its validity, but that it has been independently validated under conditions approximating forensic use, carries a known and documented error rate that is acceptable for the evidentiary purpose at issue, and is generally accepted in a relevant scientific community that is not itself constituted primarily of the technique's commercial or institutional advocates. Under this standard, fMRI-based lie detection, automated behavioral analysis systems, algorithmic voice stress analysis, and comparable technologies should currently be excluded from criminal proceedings. Their proponents should be encouraged to conduct the kind of rigorous, multi-site, peer-reviewed clinical validation that would eventually justify reconsideration; but the courthouse door should remain closed until that validation has been achieved, not opened in advance of it on the basis of hope.

E. Special Procedural Protections for Cognitively Vulnerable Suspects

The risk of false confession is not evenly distributed across the population of criminal suspects. It is concentrated, with a consistency that the empirical literature has now documented across dozens of studies and hundreds of exoneration cases, among individuals who are young, who have intellectual disabilities, who are experiencing active mental illness, or who present with the personality traits, high suggestibility, high compliance, weak resistance to authority, that Gisli Gudjonsson's foundational research on interrogative suggestibility identified as the primary individual-level risk factors for false confession. The current legal framework, which treats competence to waive Miranda rights as a binary determination based on a brief judicial or clinical assessment, is poorly calibrated to detect and correct for these vulnerabilities in real time.

This article recommends a graduated framework of procedural protections keyed to demonstrated vulnerability. For all suspects under the age of eighteen, the mandatory presence of an independent legal advocate before and during custodial interrogation should be required as a matter of statutory right, non-waivable by either the suspect or the suspect's parents. For suspects with identified intellectual disabilities or active psychiatric conditions, similarly non-waivable requirements for the presence of an appropriate adult or legal representative should be enacted at the federal and state levels, drawing on the model provided by England and Wales under the Police and Criminal Evidence Act 1984 and its associated codes of practice. For all suspects, the duration and conditions of custodial interrogation should be subject to mandatory limits, including restrictions on sleep deprivation and continuous questioning, enforceable through exclusion of statements obtained in violation of those limits.

8. CONCLUSION:

The recommendations advanced in this Part share a common premise: that the integration of forensic science into custodial interrogation and lie detection should be governed by the same standards of empirical rigor, transparent methodology, and adversarial accountability that the legal system professes to apply to scientific evidence generally, and that the persistent failure to apply those standards in this domain has had real costs, measured in wrongful convictions, in miscarried prosecutions, and in the gradual erosion of public confidence in the integrity of criminal justice processes. None of these recommendations asks the criminal justice system to abandon its legitimate interest in obtaining accurate, reliable information from suspects.

They ask it, rather, to pursue that interest through methods that the science actually supports, and to stop lending the authority of law to methods that the science has, in many instances, decisively refuted. The interrogation room will always be a place of tension between competing institutional and individual interests. What forensic science offers, at its best, is not the elimination of that tension but a more honest and more defensible way of navigating it.

The interrogation room has always been, in the deepest sense, a room about truth — about who has it, who wants it, and what may legitimately be done to obtain it. The forensic sciences entered that room with a promise: that the instruments of scientific inquiry could cut through the noise of human deception and deliver, with a reliability that unaided human judgment could never match, something approaching certainty about guilt and innocence. That promise, examined honestly and in full, has not been kept. Not by the polygraph. Not by the voiceprint analyst. Not by the behavioral profiler trained to read deception in the flicker of a microexpression. And not, at least not yet, by the neuroimaging technologist or the algorithmic behavioral classifier who have arrived carrying the same promise dressed in the vocabulary of a new century.

This is not a conclusion that should inspire nihilism about the role of science in criminal justice. It should inspire precision. The record examined in this article is not a record of science failing. It is a record of science being misused adopted prematurely, deployed without adequate validation, and insulated from the kind of rigorous adversarial scrutiny that distinguishes genuine scientific knowledge from the performance of scientific authority. The polygraph was not rejected by the scientific community because science failed to understand deception. It was rejected because honest scientific inquiry, applied to the polygraph's own claims, found those claims wanting. The same process of honest inquiry has produced the most valuable contributions that forensic science has actually made to interrogation practice: the structured interviewing protocols, the cognitive interview, the information-gathering frameworks that have, in jurisdiction after jurisdiction, produced more reliable information with fewer false confessions and less institutional injustice than the accusatorial methods they replaced.

The central argument of this article has been that the gap between what forensic science knows and what interrogation practice embodies is not an accident and not simply a product of ignorance. It is the product of institutional incentives that reward the appearance of scientific

rigor over its substance, that measure investigative success by confession rates rather than accuracy rates, and that have consistently allowed the prestige of technology to substitute for the harder work of empirical validation. Closing that gap requires more than the production of better science, though better science is certainly needed. It requires the kinds of structural reforms recommended in Part VI, mandatory recording, prohibition of deception, adoption of information-gathering frameworks, rigorous judicial gatekeeping, protection of vulnerable suspects, and independent institutional governance of forensic standards, that would realign those incentives with the values that criminal justice is supposed to serve.

What is at stake in the interrogation room is not abstract. It is the liberty, and sometimes the life, of individual human beings who face the full weight of state power in a confined space, under conditions of stress and uncertainty that most citizens will never experience and that most jurors will struggle to fully comprehend. Every false confession that was produced by a technique the scientific community had already found wanting, every wrongful conviction that rested in part on forensic evidence that lacked the validation its proponents claimed, represents a failure not just of science or of law but of the institutional will to hold both accountable to the standards they profess. The criminal justice system has the knowledge it needs to do better. The question is whether it has the institutional resolve to act on what it knows.

That resolve, this article has argued, must begin with honesty: honesty about what lie detection can and cannot do, honesty about the risks that interrogation methods carry for innocent as well as guilty suspects, and honesty about the distance between the scientific foundations of forensic claims and the authority with which those claims are typically presented. It must proceed through the unglamorous but essential work of institutional reform, the legislation, the training mandates, the evidentiary standards, the independent oversight, that translates honest knowledge into reliable practice. And it must be sustained by a commitment to the values that give the entire enterprise its justification: the commitment to accuracy in fact-finding, to fairness in procedure, and to the dignity of every person who passes through the interrogation room, wherever that journey ultimately takes them.

The science of interrogation and deception detection is, in the end, only as good as the institutional framework that governs its use. Build that framework badly, and the science becomes a tool of confirmation bias, institutional convenience, and injustice dressed in the

language of expertise. Build it well, with genuine rigor, genuine accountability, and genuine fidelity to the values the law professes, and it becomes something rarer and more valuable: a meaningful contribution to the possibility of getting the truth right. That possibility is what makes the enterprise worth pursuing. And it is what makes the reforms recommended here not merely desirable but, in any system that takes its own commitments seriously, genuinely necessary.