

Polygraph Testing in the Courtroom: Legal and Ethical Challenges in Southeast Asia

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Abstract

This review offers a thorough examination of the scientific, legal, and ethical aspects of polygraph testing, focusing on the evolving judicial landscape in Southeast Asia from 2016 to 2026. Polygraphy remains a controversial tool in global criminal justice systems, with its widespread use in investigations often contrasted by significant skepticism regarding its scientific and legal validity. While some studies of the Comparison Question Test suggest that it offers a meaningful improvement over traditional methods of detecting deception, the scientific community still raises concerns about its validity and the high risk of false positives. The research reveals considerable variation in legal standards across the region, with countries like Indonesia treating polygraph results as a novel issue in criminal evidence, while Singapore maintains a strict policy of rejecting polygraph results in court. The review also explores how the move toward digital and AI-driven justice systems in nations such as Malaysia and Singapore raises concerns about algorithmic bias and the transparency of decision-making processes. Of particular importance is the constitutional impact of polygraph testing, including issues related to the right against self-incrimination and the emerging concept of "brain privacy." By synthesizing insights from various fields, this study supports the United Nations Sustainable Development Goal 16, which focuses on promoting peace, justice, and strong institutions. It advocates for the creation of unified, evidence-based forensic standards that protect judicial integrity. The paper concludes with a policy framework that calls for region-specific research and the development of ethical guidelines to ensure that advancements in forensic technologies do not infringe upon fundamental human rights.

Keywords: polygraphy, polygraphy testing, forensic science, deception detection, southeast asia

1. Introduction

Polygraph testing is a psychophysiological technique that evaluates autonomic reactions including skin conductivity, heart rate, and respiration to identify potential deception, yet it remains a highly controversial tool within global criminal justice frameworks (Rajan, 2018). Historically a fundamental component of intelligence and law enforcement operations, the method relies on the premise that individuals being deceptive will show distinct physiological stress when responding to relevant questions compared to control stimuli (Honts et al., 2020). However, the shift of these results from investigative settings to formal courtroom evidence is the focus of persistent scientific and legal disagreement (Iacono, 2024). Although supporters point to meta-analyses involving 138 datasets which demonstrate a 0.69 effect size and a notable increase in information over traditional lie detection, the scientific community continues to question the construct validity and the frequency of false-positive outcomes associated with the test (Honts et al., 2020; Iacono, 2024). The current forensic environment is further complicated by the swift incorporation of sophisticated technologies such as machine learning and artificial intelligence into Asian legal systems (Hashmi et al., 2025). In regions like Singapore and Malaysia, the ongoing digitalization of judicial processes which includes automated forensic tools and AI-supported sentencing has forced a re-examination of traditional instruments like the polygraph (Cheong, 2024). While these modern innovations provide potential improvements in the efficiency of investigations, they also introduce significant concerns regarding the lack of transparency in algorithmic decision-making, potential biases, and the possible infringement upon basic human rights (Hossain et al., 2024; Zuwanda et al., 2024). Legal standards for polygraphy across Southeast Asia are notably diverse. For instance, the Indonesian legal framework is currently addressing polygraph use as a novel evidentiary issue (Asiati et al., 2026), while the judiciary in Singapore maintains a consistent policy of absolute non-recognition (Albul et al., 2023). At the same time, regional empirical studies are starting to examine cultural and demographic factors. A 2024 study conducted in Singapore with 118 participants of Malay, Indian, and Chinese descent emphasized the necessity of employing multi-measure physiological markers to account for variations in autonomic reactions across different ethnicities (Rashid et al., 2024). This movement toward localized and evidence-based assessment is essential as the region attempts to reconcile traditional truth-seeking goals with contemporary constitutional safeguards (Lü & Liang, 2022). Even though polygraphy is widely used during field investigations, there remains a notable lack of comprehensive research regarding a standardized ethical and legal framework for its use within the varied socio-legal systems of Southeast Asia. This review seeks to address this deficiency by consolidating current findings on the legal status, ethical implications, and scientific validity of such testing.

The review has three primary goals which include evaluating the reliability and scientific status of polygraph tests in modern forensic psychology while comparing the standard Comparison Question Test with scientifically stronger methods like the Concealed Information Test ([Iacono, 2024; Matsuda et al., 2019](#)). Additionally, it explores the regional differences and legal barriers to courtroom admissibility with a focus on the gatekeeper standards used in Southeast Asian courts relative to international benchmarks like the Daubert standard ([Albul et al., 2023; Saxe & Ben-Shakhar, 1999](#)). Finally, it investigates the constitutional and ethical consequences of polygraph use, particularly concerning the right to brain privacy, the protection against self-incrimination evidenced by major Indian Supreme Court decisions, and the dangers of technological coercion in a digital justice era ([Agarawal et al., 2025; Nemeth, 1983; Tunick, 2017](#)). Through this detailed investigation, the review intends to support academic and policy dialogues by offering a framework for the ethical use of forensic technology that protects judicial integrity while respecting human rights ([Zuwanda et al., 2024](#)).

2. Materials and methods

This review paper employs a multi-disciplinary analysis of academic literature, legal precedents, and governmental reports to evaluate the scientific validity, legal admissibility, and ethical implications of polygraph testing. To capture the most current scientific discourse and technological transitions, the methodology prioritizes research published within the last decade (2016–2026). This approach specifically includes recent assessments of "novel" legal applications in Southeast Asian jurisdictions such as Indonesia ([Asiati et al., 2026](#)). Geographically, while the review maintains a global perspective drawing on international standards from the United States, Japan, and India that places a particular emphasis on the Southeast Asian context, specifically examining the evolving legal standards and academic discourse in Indonesia, Singapore, and Malaysia ([Albul et al., 2023; Asiati et al., 2026; Mallow, 2020](#)).

2.1 Polygraph Techniques

The review distinguishes between two primary psychophysiological methodologies commonly discussed in forensic literature: the Comparison Question Test and the Concealed Information Test.

- **Comparison Question Test:** This remains the most frequently applied forensic polygraph technique globally ([Honts et al., 2020](#)). The CQT monitors autonomic responses—specifically heart rate, blood pressure, respiration, and sweat production—based on the premise that deceptive individuals will exhibit significantly stronger physiological reactions to "relevant" questions (e.g., crime-specific) compared to "comparison" questions intended to provoke a reaction from truthful subjects ([Kumar, 2025; Rajan, 2018](#)). A 2020 meta-analysis of 138 CQT datasets reported a meta-analytic effect size of 0.69 (including inconclusive results), suggesting that while the test provides a significant information increase over interpersonal deception detection, its accuracy is moderated by the examinee's level of motivation ([Honts et al., 2020](#)). However, the technique remains controversial; critics argue that fifty years of research has not significantly improved practice, and concerns persist regarding its high false-positive rate ([Iacono, 2024](#)).
- **Concealed Information Test:** Also known as the Guilty Knowledge Test, the CIT assesses recognition rather than deception ([Matsuda et al., 2019](#)). Examinees are presented with multiple-choice questions where only one option contains specific, undisclosed crime details known only to the perpetrator and investigators ([Rajan, 2018](#)). A heightened physiological response to the correct option suggests the presence of concealed knowledge ([Matsuda et al., 2019](#)). While psychophysiologicalists often regard the CIT as a more scientifically defensible method, its field application remains negligible globally, with the notable exception of Japan, where it is extensively integrated into criminal investigations ([Iacono, 2024; Matsuda et al., 2019](#)).
- **The Human Factor and Subjectivity:** It is critical to recognize that the polygraph is an instrument for recording physiological data, not a direct measure of truth ([Kumar, 2025](#)). The inferential step—attributing physiological arousal to deception—is performed by a human examiner ([Iacono, 2024](#)). This reliance on human interpretation has led to ongoing criticism that polygraph practice remains on "shaky ground" compared to more objective forensic sciences, often insulated from rigor by unwavering government support for the lie detector industry ([Iacono, 2024](#)).

2.2 Literature Search and Selection

A systematic search strategy was implemented across major academic databases, including PubMed, Web of Science, and HeinOnline, to identify relevant studies published between 2016 and 2026. The search utilized keywords such as "polygraph," "lie detection," "forensic science," "admissibility," "self-incrimination," and "Southeast Asia." Inclusion criteria focused on empirical studies, meta-analyses, and legal evaluations directly addressing the scientific or courtroom application of polygraph tests.

Special emphasis was placed on identifying regional legal transitions. For example:

- **Indonesia:** Recent scholarship highlights that the use of polygraph as criminal evidence remains a "novel matter," raising critical questions about its position within the Indonesian justice system ([Asiati et al., 2026](#)).
- **Singapore:** Comparative jurisprudence indicates a "categorical non-recognition" of polygraph results as evidence in court ([Albul et al., 2023](#)).

- **Malaysia:** Academic discourse has evaluated the need to re-examine polygraph admissibility within the context of evolving forensic evidence standards ([Mallow, 2020](#)).

Additionally, the review incorporates findings on constitutional protections, such as India's rejection of polygraph tests based on the right against self-incrimination under Article 20 ([Agarawal et al., 2025; Kumar, 2025](#)). Pre-2016 publications were selectively included only for foundational scientific theories or landmark historical legal context ([Council, 2003](#)).

2.3 Ethical Evaluation Framework

The methodology also includes a qualitative assessment of ethical challenges, focusing on the potential erosion of the "right to privacy" and the invasion of the "private regions" of the human mind ([Nemeth, 1983; Tunick, 2017](#)). The review evaluates whether the use of such intrusive technology is sufficient to outweigh potential barriers to therapeutic alliance or the risk of coerced self-incrimination in forensic settings ([Agarawal et al., 2025; Elliott & Völlm, 2016](#)).

3. Results and Discussions

The synthesis of contemporary literature reveals a persistent divide between investigative utility and judicial evidentiary standards. While polygraphy remains a staple in preliminary investigations, its scientific credibility continues to face rigorous academic and legal scrutiny, particularly as jurisdictions navigate the transition toward digitalized forensic frameworks.

3.1 Scientific Validity and Reliability

The scientific status of the Comparison Question Test remains the most contentious aspect of polygraphy. A 2020 meta-analysis of 138 CQT datasets reported a meta-analytic effect size of 0.69, suggesting that the technique provides a statistically significant "information increase" compared to interpersonal deception detection ([Honts et al., 2020](#)). However, this accuracy is not uniform; proponents claim rates exceeding 90%, yet independent reviewers highlight unquantified error rates and a weak theoretical foundation ([Iacono, 2024; Kumar, 2025](#)).

- **Construct Validity:** Critics argue that the CQT lacks a distinct physiological "signature" for deception ([Kumar, 2025](#)). The test measures autonomic arousal (heart rate, respiration, galvanic skin response), which can be triggered by anxiety, fear, or anger, leading to high false-positive rates where innocent individuals are labeled deceptive ([Iacono, 2024; Rajan, 2018](#)).
- **The Japan Model:** In contrast to the CQT, the Concealed Information Test is widely regarded as more scientifically robust because it assesses recognition rather than arousal ([Matsuda et al., 2019](#)). In Japan, the CIT is extensively integrated into the criminal justice system, supported by decades of field-validated research ([Iacono, 2024; Matsuda et al., 2019](#)).
- **Technological Evolution:** Recent research in Singapore has attempted to modernize these indicators by evaluating pupil response and facial temperature changes alongside traditional measures ([Rashid et al., 2024](#)). This study, involving 118 participants across Chinese, Indian, and Malay ethnicities, found that combining multiple physiological indicators offers more robust predictions than single-measure approaches ([Rashid et al., 2024](#)).

3.2 Global Legal Admissibility

The legal landscape for polygraph evidence is characterized by three distinct judicial approaches:

1. **Categorical Non-Recognition:** Jurisdictions like Singapore, Estonia, Slovakia, and Moldova strictly exclude polygraph results from courtroom evidence, prioritizing the protection of judicial integrity against unreliable methodologies ([Albul et al., 2023](#)).
2. **Investigative and Auxiliary Use:** Many nations—including India, Canada, Lithuania, and Poland—utilize the polygraph as a "clue" or investigative tool during preparatory proceedings but bar its use as substantive evidence ([Albul et al., 2023](#)). In India, while the Supreme Court has restricted its use based on constitutional protections, results from non-police examiners are occasionally discussed in auxiliary contexts ([Agarawal et al., 2025; Kumar, 2025](#)).
3. **Conditional Admissibility:** A minority of states, such as Latvia, Russia, and Japan, recognize polygraph results as formal evidence ([Albul et al., 2023](#)). In the United States, admissibility often depends on "stipulation" between parties or meeting stringent *Daubert* or *Frye* standards for scientific relevance ([Honts et al., 2020](#)).

3.3 The Southeast Asian Landscape: A Regional Perspective

The application of polygraphs in Southeast Asia is deeply influenced by regional legal traditions that often prioritize public safety and truth-seeking over individual procedural rights ([Lü & Liang, 2022](#)).

- **Indonesia:** Recent scholarship identifies the use of polygraph as a "novel matter" in the Indonesian criminal justice system ([Asiati et al., 2026](#)). While it is increasingly used in high-profile cases, its position as formal evidence remains legally ambiguous, prompting calls for clearer statutory guidance ([Asiati et al., 2026](#)).
- **Singapore:** Despite rigorous empirical research conducted within the country ([Rashid et al., 2024](#)), the judiciary maintains a policy of non-recognition ([Albul et al., 2023](#)). This reflects a broader regional tension between the push for digitalization and the safeguarding of due process ([Cheong, 2024](#)).
- **Malaysia:** The Malaysian judiciary has begun incorporating AI into sentencing processes for offenses such as drug possession and theft ([Sanghvi et al., 2022](#)). This digitalization sets a precedent for how forensic technologies, including polygraphy, might eventually be integrated into broader algorithmic decision-making frameworks ([Mallow, 2020; Sanghvi et al., 2022](#)).

3.4 Legal and Scientific Challenges

The primary barrier to widespread admissibility remains the "gatekeeper" role of the judiciary. Courts are frequently tasked with evaluating complex psychophysiological data that the scientific community itself has not fully validated ([Honts et al., 2020; Iacono, 2024](#)). This creates a "disconnect" where investigators rely on the tool to extract confessions, even when the resulting data is insufficient for judicial proof ([Lü & Liang, 2022](#)). In Asian contexts, where "authoritarian legality" may emphasize the "truth" over the method of its discovery, the risk of "making a crime" through investigative pressure remains a critical concern ([Le et al., 2022; Shuai, 2023](#)).

3.5 Ethical and Constitutional Implications

The ethical discourse surrounding polygraphy has expanded to include "brain privacy" and the right against self-incrimination.

- **Self-Incrimination:** The involuntary administration of polygraph tests has been declared unconstitutional in India (Article 20), as it constitutes an invasive "mental search" that violates the privilege against self-incrimination ([Agarawal et al., 2025; Kumar, 2025](#)).
- **The "Black Box" Problem:** As polygraphy intersects with AI and machine learning, concerns regarding "algorithmic accountability" have emerged ([Cheong, 2024](#)). In Indonesia and Malaysia, the lack of transparency in automated systems—where the reasoning behind a "deception" label is inscrutable—poses significant threats to human rights and due process ([Hashmi et al., 2025; Hossain et al., 2024; Zuwanda et al., 2024](#)).
- **Privacy Erosion:** The extraction of physiological data is increasingly viewed as an erosion of the "private regions" of the human mind, raising questions about whether the state's interest in crime-solving justifies such intrusive measures ([Nemeth, 1983; Tunick, 2017](#)).

3.6 Future Directions

To achieve international standards of forensic reliability, the following pathways are proposed:

1. **Cultural and Demographic Adaptation:** Future research must continue the work of the 2024 Singapore study to ensure that physiological benchmarks are culturally and demographically inclusive, accounting for ethnic variations in autonomic response ([Rashid et al., 2024](#)).
2. **Harmonization and Transparency:** There is a critical need for standardized ethical guidelines for all forensic technologies in Southeast Asia ([Habibulloh, 2025](#)). Mechanisms for "procedural transparency" and "legal accountability" are essential to ensure that deception detection tools do not operate as "black boxes" ([Fraidan, 2025; Zuwanda et al., 2024](#)).
3. **Evidence-Based Policy:** Jurisdictions currently grappling with the "novelty" of polygraphs, such as Indonesia, should look toward the "Japan Model" of CIT for a more scientifically defensible investigative framework ([Asiati et al., 2026; Matsuda et al., 2019](#)).

4. Conclusion & Recommendations

Polygraph testing in Southeast Asian courtrooms faces substantial legal and ethical challenges primarily stemming from ongoing debates about its scientific validity and reliability. While utilized for investigative purposes in many jurisdictions, its role as admissible evidence is contentious and often limited. Ethical concerns regarding self-incrimination, privacy, and the potential for bias underscore the need for cautious integration of such technology into legal processes. Moving forward, the region requires a concerted effort to conduct localized research, develop clear legal standards, and establish robust ethical guidelines to ensure that forensic science serves justice effectively and equitably, without infringing upon fundamental human rights.

Based on the synthesis of the legal and ethical challenges, we propose the following five recommendations to guide the future integration and regulation of polygraph testing and similar forensic technologies within Southeast Asian judicial systems:

Recommendations

1. **Foster Region-Specific Empirical Research on Deception Detection Technologies:** There is a critical need for more localized and independent empirical studies across Southeast Asia to evaluate the validity, reliability, accuracy, and cultural applicability of polygraph tests and other emerging deception detection technologies. This research should adhere to rigorous scientific standards, focusing on diverse populations within the region to provide nuanced insights into physiological responses and cultural factors influencing test outcomes (Rashid et al., 2024). Such efforts are essential to inform evidence-based policy decisions.
2. **Develop Harmonized and Scientifically-Informed Admissibility Standards:** Legal frameworks across Southeast Asia should strive for greater clarity and consistency regarding the admissibility of polygraph evidence. This requires establishing uniform, scientifically grounded standards for expert testimony, potentially adapting international best practices like the Daubert standard while accounting for local legal traditions and judicial systems (Olivier, 2014; Saxe & Ben-Shakhar, 1999). The goal should be to ensure that only scientifically validated and reliable evidence is presented in court, preventing inconsistent rulings and upholding the integrity of the judicial process (Albul et al., 2023; Honts et al., 2020).
3. **Implement Robust Ethical Frameworks and Human Rights Safeguards for Forensic Technologies:** Comprehensive ethical guidelines are essential for the deployment of all forensic technologies, including polygraphs, within the region's justice systems. These guidelines must prioritize fundamental human rights, explicitly safeguarding against self-incrimination, protecting individual privacy, preventing coercion, and addressing potential biases in data interpretation (Agarawal et al., 2025; Elliott & Völlm, 2016). Insights from the ethical governance of forensic DNA databases in Southeast Asia can serve as a valuable reference for developing these broader ethical frameworks (Ungria & Jimenez, 2022).
4. **Enhance Judicial and Law Enforcement Training and Education:** Significant investment is needed to provide specialized training and continuous education for judges, prosecutors, defense lawyers, and law enforcement personnel on the scientific principles, limitations, and ethical implications of forensic technologies, including polygraphs. This would improve the legal community's capacity to critically evaluate scientific evidence, address technical complexities, and apply legal standards effectively, thereby reducing judicial inconsistency and fostering public confidence (Nazir et al., 2025; Saleem et al., 2025).
5. **Promote Transparency and Accountability in Algorithmic Justice Systems:** Given the increasing integration of AI and other advanced digital tools into criminal justice, robust mechanisms for transparency and accountability must be established. This includes addressing "black box" concerns by ensuring that the reasoning behind algorithmic decisions is clear, auditable, and subject to scrutiny. Such measures are crucial to prevent the erosion of constitutional protections and fundamental due process rights in an era of technologically-driven governance (Firdous et al., 2025; Shaheen et al., n.d.; Shamov, 2025).

Compliance with ethical standards

This study followed accepted academic and ethical standards for systematic literature reviews. As it relied solely on published sources, no human participants or primary data were involved.

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Conflict of interest statement

The authors declare no financial or personal conflicts of interest.

Statement of ethical approval

Ethical approval was not required, as the study involved only secondary data from publicly available literature.

Statement of informed consent.

Informed consent was not applicable, as no human participants were involved in the study.

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