

**INTERNATIONAL JOURNAL OF LAW
MANAGEMENT & HUMANITIES**
[ISSN 2581-5369]

Volume 9 | Issue 5

2026

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Behavioural Evidence in Criminal Profiling: Scientific Validity, Cognitive Bias and Its Evidentiary Value

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ABSTRACT

Criminal profiling is a popular investigative technique for creating theories about an unidentified criminal based on behavioural traits linked to a crime. These traits might include victim selection, method of operation, signature behaviour, behaviour at the crime site, and offending tendencies. However, there are several phases of interpretation involved in drawing judgments about an offender's personality, motive, or identity from observable behaviour. In addition to examining how cognitive bias and methodological constraints may impact these behavioural inferences' investigative and evidential usefulness, this study focuses on the scientific validity of such conclusions. Using five previously studied criminal cases (Dennis Rader, Richard Ramirez, Alexander Pichushkin, Michael Gargiulo and Kristen Gilbert) as comparative case studies, the study applies a comparative and analytical approach. The cases were designed to study how behavioural observations were transformed into research hypotheses and psychological interpretations rather than to create psychological diagnoses. The study separates behavioural investigative leads from independently verified forensic data and takes into account confirmation bias, anchoring, contextual bias, and tunnel vision. The Indian evidential framework with regard to expert opinion and scientific evidence is also examined in this article. It makes the case that while criminal profiling may be useful for legitimate investigations, especially when it comes to generating ideas and focusing attention, its findings should not often be regarded as independent evidence of identity, purpose, or guilt. The study suggests a Behavioural Evidence Reliability and Verification Framework that calls on researchers to reveal uncertainty, evaluate scientific support, separate observation from inference, take into account alternative explanations, and look for independent verification.

Keywords: Criminal Profiling, Behavioural Evidence, Forensic Psychology, Cognitive Bias, Expert Evidence, Scientific Validity, Criminal Investigation

I. INTRODUCTION

Criminal investigations often entail situations where investigators must work with inadequate information and the identity of an offender is unclear. In these circumstances, behavioural traits

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of an offence may be analysed to provide theories about the perpetrator. Investigative reasoning may take into account victim characteristics, the manner in which the crime was committed, interactions with the victim, behaviour at the crime scene, efforts at concealment, and recurring patterns across offences.

This need for investigation led to the development of criminal profiling. It makes an effort to formulate theories about an unidentified offender based on behavioural data related to an offence.¹ Various methods of profiling have developed throughout time, such as investigative psychology, criminal profiling, and psychological profiling. The scientific basis of profiling is still debatable, despite its usefulness.²

The contrast between behavioural observation and psychological inference is the main issue. An investigator may see firsthand that a perpetrator has frequently chosen a specific victim type, confined a victim, or returned to a specific place. These are observations. An inference is the conclusion that the criminal has a specific personality trait, psychological need, or motivation.

When behavioural profiling is used in an investigation or in court, the distinction becomes very crucial. The author's previous criminal profiling studies of Dennis Rader, Richard Ramirez, Alexander Pichushkin, Michael Gargiulo, and Kristen Gilbert served as the basis for this investigation. Criminology, victimology, *modus operandi*, signature behaviour, psychological traits, developmental background, crime-scene behaviour, escalation, motive, risk factors, investigation, arrest, and conviction were all covered in those studies. Instead of replicating such profiles, the current study compares them to assess the validity of the logic underlying criminal profiling.

The central research question is:

To what extent can behavioural evidence used in criminal profiling reliably assist criminal investigations, and how do cognitive bias, subjective interpretation and methodological limitations affect its evidentiary value?

II. CONCEPTUAL FRAMEWORK

A. Meaning of Criminal Profiling

In general, criminal profiling is the process of analysing behavioural data connected to an offence in order to formulate theories about an unidentified perpetrator.³

¹ RICHARD N. KOCIS, CRIMINAL PROFILING: PRINCIPLES AND PRACTICE 1–11 (Humana Press 2006).

² *Id.* at 49–64.

³ *Id.* at 1–11.

Analysis of victimology, *modus operandi*, signature behaviour, crime-scene features, and behavioural trends across offences may all be part of the process.

Profiling, however, should not be viewed as a single, standardised scientific method. Various methods, assumptions, and degrees of empirical evidence underpin distinct profiling strategies.⁴ Whether behavioural traits seen at a crime scene may accurately predict stable traits of the perpetrator is a key question in the literature.

Therefore, instead of automatically taking every profile as scientific data, the current research investigates profiling as a thinking process.

B. Behavioural Proof

Information about what an offender seems to have done prior to, during, or following an offence is known as behavioural evidence.⁵

The choice of victims, the strategy used, the application of restrictions, interactions with victims, attempts to hide the crime, and recurring behavioural traits are some examples.

When these findings are given psychological significance, the analytical challenge starts.

Thus, the following difference is crucial: Observation → Interpretation → Conclusion.

The demand for scientific qualification and justification increases with the distance from direct observation in the argument.

C. Victimology

Victimology focuses on the traits and circumstances of the victim and can help detect trends in victim selection.

However, a number of variables, including opportunity, accessibility, location, and situational circumstances, might affect victim selection. As a result, a recurrent victim trait does not always indicate that the perpetrator has a similar psychological trait.

D. Method of Operation

An offender's procedures or behaviours that enable the commission of an offence are referred to as their *modus operandi*.⁶

Over time, an offender's MO may alter as they acquire experience, meet new situations, or adjust to pressure from investigators.

⁴ *Id.* at 13–48.

⁵ *Id.* at 49–64.

⁶ *Id.* at 49–64.

Therefore, the lack of a similar MO does not always rule out a relationship between offences.

E. Signature Conduct

In general, “signature behaviour” refers to actions that are not absolutely required to commit the crime but might be seen as a reflection of the psychological or behavioural demands of the perpetrator.

Signature analysis raises a particularly significant question about scientific validity since it entails more psychological interpretation than merely documenting the mode of offence.⁷

III. SCIENTIFIC VALIDITY OF CRIMINAL PROFILING

A. Development of Profiling

In historical times, attempts to deduce perpetrator traits from crime-scene behaviour have been linked to criminal profiling.⁸ Later, more methodical techniques emerged, such as investigative psychology, which aimed to use scientific psychological concepts in criminal investigations. Because it is an effort to shift profiling from just intuitive judgments to testable behavioural statements, the development of empirical techniques is noteworthy. However, not all profiling methods have the same level of empirical evidence.

B. Offender Typologies’ Dependability

Conventional categorisations like “organized” and “disorganized” criminals have had a significant impact on public and investigative discourse. But classifying criminals according to rigid psychological classifications might oversimplify complicated behaviour. It is possible for an offender to exhibit organised behaviour in one area of an offence and seemingly disorganised behaviour in another.⁹ Situational factors may also have an impact on behaviour. Typologies should thus be used with caution unless they are well validated by empirical data.

C. Scientific Validation

Scientific validity requires more than the fact that a profile appears convincing after an offender has been identified.¹⁰

⁷ *Id.* at 49–64.

⁸ *Id.* at 1–48.

⁹ Richard N. Kocsis, *Validities and Abilities in Criminal Profiling: The Dilemma for David Canter’s Investigative Psychology*, 50 INT’L J. OFFENDER THERAPY & COMPAR. CRIMINOLOGY 458, 458–77 (2006), <https://doi.org/10.1177/0306624X06289179>.

¹⁰ R. N. Kocsis, A. F. Hayes & H. J. Irwin, *Investigative Experience and Accuracy in Psychological Profiling of a Violent Crime*, 17 J. INTERPERSONAL VIOLENCE 811, 811–23 (2002), <https://doi.org/10.1177/0886260502017008001>.

A valid method should have an identifiable theoretical basis, empirical support and an ability to withstand testing against alternative explanations.¹¹

This is especially important because retrospective profiling can create an illusion of accuracy. Once the identity and history of an offender are known, behavioural characteristics can appear more predictive than they actually were before identification.

D. Investigative Utility Versus Evidentiary Reliability

A method may be useful to investigators without being sufficiently reliable to establish guilt.

This distinction is central to the present research.

Profiling may assist investigators in deciding:

Who should be investigated?

But this is fundamentally different from establishing:

Who committed the offence?

The second proposition requires independent evidentiary support.

IV. FORENSIC REASONING AND COGNITIVE BIAS

A. Observation and Interpretation

The reasoning process involved in profiling may be represented as:

Crime-scene information → Observation → Classification → Interpretation → Psychological inference → Investigative conclusion.¹²

Each stage creates an opportunity for error.

For example:

Observation: The offender restrained the victim.

Interpretation: Restraint was an important component of the offence.

Inference: The offender may have sought control.

Psychological conclusion: The offender possesses a strong psychological need for dominance.

The first proposition is directly connected to the evidence. The final proposition requires substantially greater justification.

¹¹ KOC SIS, *supra* note 1, at 27–64.

¹² Itiel E. Dror, *Cognitive and Human Factors in Expert Decision Making: Six Fallacies and the Eight Sources of Bias*, 92 ANALYTICAL CHEMISTRY 7998, 7998–8004 (2020), <https://doi.org/10.1021/acs.analchem.0c00704>.

B. Bias in Confirmation

Confirmation bias can happen when researchers give more weight to data that confirms an established theory while paying less attention to data that contradicts it.¹³ An initial behavioural hypothesis may have an impact on the interpretation of subsequent data in profiling. The significance of protections intended to lessen environmental and cognitive impacts on forensic decision-making has been highlighted by research on cognitive bias in forensic science.

C. Bias in Anchoring

An initial assumption that disproportionately affects later assessments is known as anchoring.¹⁴ Later data may be analysed using the first framework if investigators first create a specific offender profile.

D. Contextual Prejudice

Evidence interpretation by forensic professionals might be influenced by contextual information. For instance, the evaluation of unclear evidence may be unintentionally impacted by the knowledge that investigators suspect a certain person.¹⁵

E. Vision in Tunnels

When detectives get overly fixated on one suspect or explanatory idea while neglecting other possibilities, this is known as tunnel vision.¹⁶ This is especially crucial when a behavioural profile crafts a compelling story about an unnamed criminal.

V. COMPARATIVE CASE STUDIES IN CRIMINAL PROFILING

The cases are more than just five criminal biographies. They are being employed to examine the research question of this study through comparing evidence.

Every case inquires:

What kind of behaviour was seen?

From it, what was deduced?

To what extent was the inference supported by science?

Is there another explanation?

¹³ *Id.* at 7998–8004.

¹⁴ Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124, 1128–30 (1974), <https://doi.org/10.1126/science.185.4157.1124>.

¹⁵ Dror, *supra* note 12, at 7998–8004.

¹⁶ Keith A. Findley & Michael S. Scott, *The Multiple Dimensions of Tunnel Vision in Criminal Cases*, 2006 WIS. L. REV. 291, 292–301.

Was there independent confirmation of the behavioural inference?

A. Dennis Rader (BTK)

Dennis Rader offers a significant case study on offender communication, signature behaviour, and behavioural consistency. Between 1974 and 1991, Rader killed 10 people in Kansas. Additionally, he interacted with the media and law enforcement, developing a unique pattern of behaviour that included attempts to manipulate public perception and the storyline of his crimes. In the end, his communications helped with the inquiry that led to his identification.¹⁷

The instance is helpful for analysing the difference between psychological interpretation and observed behaviour.

It is reasonable to characterise Rader's frequent messages as behavioural evidence. However, more proof would be needed to draw the conclusion that he had a certain personality structure or mental illness based only on this behaviour.

Additionally, the inquiry highlights the significance of corroboration. A psychological profile was not the only basis for his identification. The digital evidence recovered from a floppy disk proved to be a major breakthrough in the investigation.¹⁸

Relevance in comparison

Rader backs the idea that while behavioural traits can lead to insightful research hypotheses, they should be verified by other sources.

B. Richard Ramirez (Night Stalker)

Regarding differences in victimology and *modus operandi*, Richard Ramirez offers a helpful case study.

In California, Ramirez committed several homicides, sexual assaults, and break-ins. His crimes showed a range of victim traits and assault techniques. In the end, he was found guilty of several murders and other crimes and given the death penalty.¹⁹

The instance highlights a serious drawback of strict profiling. Investigators may mistakenly reject potentially related offences if they believe that an offender must always act in accordance with a single, set MO.

¹⁷ FED. BUREAU OF INVESTIGATION, *FBI Kansas City History* (recounting the BTK investigation and the identification of Dennis Rader), <https://www.fbi.gov/history/field-office-histories/kansascity> (last visited Sept. 17, 2026).

¹⁸ U.S. DEP'T OF JUSTICE, *Regional Computer Forensics Laboratory Program Annual Report Fiscal Year 2005*, https://www.rcfl.gov/file-repository/rcfl_nat_annual05.pdf (last visited Sept. 17, 2026).

¹⁹ *People v. Ramirez*, 39 Cal. 4th 398 (2006).

Thus, Ramirez's case highlights the significance of differentiating between:

Consistent behavioural patterns and behaviour that is situational in nature.

Relevance in comparison

The instance bolsters the study claim that behavioural diversity should not be immediately dismissed as evidence against criminal connection, but rather should be integrated into profiling approaches.

C. Alexander Pichushkin (Bitsa Park Maniac)

Alexander Pichushkin offers a case study on motivation inference, victim selection, and recurrence.

Pichushkin was given a life sentence after being found guilty in Moscow in 2007 of 48 murders and three attempted murders.²⁰ His crimes included recurring victim selection and offending tendencies. His repeated actions offer a somewhat solid foundation for recognising behavioural patterns. Nevertheless, the psychological cause of a recurring behavioural pattern is not always established by its presence.

This difference is crucial since profiling often shifts from repeated actions to behavioural patterns and then to psychological motivations.

While the latter step might still be interpretative, the first step might have substantial evidence to back it.

Relevance in comparison

Pichushkin shows how a theory may be strengthened by consistent behaviour, yet this does not eliminate the need for caution when inferring psychological motivation.

D. Michael Gargiulo (Hollywood Ripper)

Because behavioural similarities may be analysed in conjunction with independently verified forensic data, Michael Gargiulo offers a particularly useful comparison scenario. In 2021, Gargiulo received a death sentence after being found guilty of two murders and one attempted murder in California.²¹ In relation to the distinct 1993 murder of Tricia Pacaccio, he was extradited to Illinois in 2024. The story highlights how crucial it is to differentiate between identification and behavioural resemblance. An investigative hypothesis that the offences are related may be supported by similar patterns between the offences. They do not prove that the

²⁰ Judgment of Oct. 24, 2007, Moscow City Court (Russ.) (convicting Alexander Pichushkin of 48 murders and three attempted murders and imposing a life sentence).

²¹ *People v. Gargiulo*, Los Angeles County Super. Ct. (2021).

same individual committed them on their own. Because DNA evidence was alleged to link Gargiulo to materials recovered from the victim, the Pacaccio inquiry is very pertinent.

Relevance in comparison

Gargiulo illustrates how behavioural evidence and independently verifiable forensic evidence complement each other. While DNA or other tangible evidence may offer a different evidential foundation for linking a person to an offence, behavioural analysis may aid in guiding an inquiry.

E. Kristen Gilbert

As her alleged offences took place in a hospital setting with individuals receiving medical attention, Kristen Gilbert offers another type of comparative case study.

Gilbert was found guilty of killing four patients and trying to kill others at a Veterans Affairs hospital.²²

The case is pertinent to the current study since an odd death trend might lead to an inquiry into a specific person. But a suspicious pattern is not proof of causality.

Even while a trend can warrant more research, investigators still need to provide acceptable evidence to link the person, the behaviour, and the subsequent fatality.

Relevance in comparison

Gilbert's instance therefore highlights the need of differentiating between evidence of culpability and pattern identification.

VI. COMPARATIVE ANALYSIS OF THE FIVE CASE STUDIES

The five cases demonstrate different limitations and strengths of behavioural profiling:

Case	Main profiling issue	Contribution to research
Dennis Rader	Signature behaviour and communication	Shows how behavioural patterns can generate investigative leads
Richard Ramirez	MO variation	Demonstrates that offender behaviour may change
Alexander Pichushkin	Repetition and motive	Demonstrates the difference between behavioural consistency and psychological inference
Michael Gargiulo	Behavioural similarity and forensic corroboration	Demonstrates the importance of independent corroboration

²² *United States v. Gilbert*, No. 98-CR-30044-MAP (D. Mass. 2001).

Case	Main profiling issue	Contribution to research
Kristen Gilbert	Pattern recognition	Demonstrates that suspicious patterns do not themselves establish responsibility

The comparative research shows that when investigators find behavioural patterns, the main problem with profiling does not always arise. Instead, the larger danger occurs when researchers interpret those patterns psychologically without adequate factual evidence.²³

For instance, it is reasonable to characterise persistent victim restraint as a behavioural trait. A far stronger argument is that the behaviour indicates a specific psychological need.

Similar to this, similarities between offences may warrant more research to see whether they are related, but similarity by itself does not prove the identity of the criminal.

Thus, the instances validate a key finding of this study: the dependability of the inferential chain linking the observed behaviour to the stated conclusion determines the evidential strength of behavioural profiling.

VII. INDIAN LEGAL AND EVIDENTIARY FRAMEWORK

A. Expert Opinion

The modern Indian framework controlling evidence, including clauses pertaining to expert opinion and electronic and digital evidence, is provided by the Bharatiya Sakshya Adhiniyam, 2023.²⁴

Expert testimony is relevant to profiling since criminal profiling is not automatically accepted by Indian law as evidence of an offender's identification.

Rather, the legal question is whether an expert's specialised expertise can help the court grasp a topic that calls for specialised knowledge and, if so, how much weight to give that view.

B. Weight of the Evidence and Scientific Proof

It is crucial to understand the difference between admissibility and evidentiary weight.

Even in cases where expert testimony is permitted by law, the court must assess the opinion's credibility and persuasiveness.

Therefore a behavioural profile should not automatically be treated as equivalent to DNA evidence, fingerprint evidence or other forms of independently testable forensic evidence.

²³ Kocsis, *supra* note 9, at 458–77.

²⁴ Bharatiya Sakshya Adhiniyam, No. 47 of 2023, § 39, INDIA CODE (2023).

C. Electronic Testimony

Digital evidence may also be used to illustrate the significance of independent corroboration. Regarding the admissibility of electronic records, the Supreme Court has established a significant body of precedent.²⁵ The lesson for behavioural profiling is more general: an investigative hypothesis should ideally direct investigators to data that can be independently verified.

VIII. INVESTIGATIVE LEAD VERSUS EVIDENTIARY PROOF

One of the main points of contention in the study is this difference. An investigative lead helps investigators choose what to look into.²⁶ On the other hand, evidence is information that the court may take into account while deciding contested facts in accordance with relevant evidentiary standards.

Consequently:

“The actions are in line with a need for control.”

is significantly distinct from:

“The offender committed the crime due to a psychological need for control.”

A qualified inference is the first.

In the second, an identification or causal inference is combined with psychological interpretation.

Significantly more support is needed for the second claim.

IX. PROPOSED BEHAVIOURAL EVIDENCE RELIABILITY AND CORROBORATION FRAMEWORK (BERCF)

A. Purpose

This study suggests a Behavioural Evidence Reliability and Corroboration Framework (BERCF) based on the scientific literature, cognitive-bias research, legal analysis, and comparative case studies.²⁷

²⁵ Bharatiya Sakshya Adhiniyam, No. 47 of 2023, §§ 61–63, INDIA CODE (2023); *see also* Arjun Panditrao Khotkar v. Kailash Kushanrao Gorantyal, (2020) 7 SCC 1.

²⁶ Kocsis, *supra* note 9, at 458–77.

²⁷ *See* KOC SIS, *supra* note 1, at 49–64; Dror, *supra* note 12, at 7998–8004.

B. Observation in Stage One

First, without adding any psychological significance, investigators should document what is clearly seen.

C. Behavioural Classification in Stage Two

Recognised terms like MO, victimology, signature behaviour, or offence connection should be used to categorise the behaviour.

D. Interpretation in Stage Three

It is important for investigators to specify exactly what behavioural or psychological interpretation they are giving the observation.

E. Stage Four: Alternative Explanation

At least one credible alternative explanation should be examined.

F. Stage Five: Scientific Support

The inference should be compared with empirical scientific study.

G. Independent Corroboration in Stage Six

Where the profile is being utilised to identify or incriminate a suspect, investigators should seek independent corroboration through DNA, fingerprints, digital evidence, documentary evidence, eyewitness testimony or other admissible material.

The approach consequently does not exclude criminal profiling. It establishes methodological restrictions around its interpretation and evidential usage.

X. LIMITATIONS

This research has significant drawbacks. First, the five criminal cases do not form a statistically representative sample of offenders and are picked for comparative analytical purposes. Second, the research does not seek to independently diagnose any criminal with a psychological illness. Third, the study does not completely assess every forensic specialty. DNA, fingerprints and digital evidence are mentioned largely to highlight the contrast between behavioural inference and independently confirmed evidence. Fourth, past criminal cases varied in the number and quality of publicly available material. Finally, the research studies criminal profiling primarily as an investigative and evidential reasoning process and hence does not claim that every profiling approach holds the same scientific dependability.

XI. CONCLUSION

Between forensic logic, behavioural science, and investigative practice, criminal profiling has a significant yet contentious place. Its capacity to arrange behavioural data and produce research ideas is what makes it potentially valuable. The main problem is when those theories are offered as findings about the identity, psychology, or motivation of offenders that have been proven by science.

Dennis Rader, Richard Ramirez, Alexander Pichushkin, Michael Gargiulo, and Kristen Gilbert are compared to show how behavioural data may be helpful without necessarily being definitive on its own. Rader shows how offender communication and behavioural traits may support an inquiry but ultimately work in tandem with independently verified evidence. Ramirez shows that the behaviour of offenders might differ and that strict presumptions about MO can lead to analytical constraints. Pichushkin illustrates the distinction between identifying recurring behavioural patterns and deriving psychological motivation from them. Gargiulo shows how crucial it is to compare behavioural theories with independent forensic data. Gilbert shows how an odd behavioural or situational pattern might warrant an investigation without proving criminal guilt.

Therefore, the research does not draw the conclusion that criminal profiling is intrinsically faulty. Rather, it contends that the quality of the inferential process linking behavioural observations to the conclusion being made determines a profile's dependability.

Therefore, until a specific behavioural proposition has sufficient empirical validity and is supported by independent data, criminal profiling should be utilised largely as an investigative hypothesis-generating technique. In an effort to operationalise this idea, the proposed Behavioural Evidence Reliability and Corroboration Framework calls on researchers to distinguish between observation and inference, find alternate explanations, assess scientific evidence, acknowledge uncertainty, and look for independent corroboration.

Thus, the main change suggested by this study is from "profile matching" to "evidence-based behavioural inference." If an offender seems to fit a profile, that should not be the only question. Instead, judges and investigators ought to inquire:

What independent evidence supports the specific behavioural conclusion being made, and how well does the existing evidence support it?

This method lowers the possibility that subjective behavioural interpretations may be confused with scientifically proven facts while maintaining the real investigative utility of criminal profiling.
