



Review Of Psychological Profiling Techniques In Criminal Investigation

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Abstract: Psychological profiling has developed as a needful tool in modern criminal investigations, enabling law enforcement to comprehend the personality traits and behavioural patterns of suspects. This review looks into the importance and various psychological profiling techniques, cantering on their application in solving complicated criminal cases. The paper examines the efficacy of psychological profiling justifying its success rate in solving criminal cases and its impact in its investigation. Additionally, the ethical considerations and privacy issues that rise during the recording, processing, and storing of biographical and biometric data are discussed. By amalgamating the insights from psychology with conventional investigative methods, profiling aids in creating more accurate investigative leads. This review also addresses the limitations, challenges, and legal implications that is raised during the usage of psychological profiles in criminal justice, stressing the importance of thorough training and scientific credibility. The paper winds up with a discussion on the future perspective of psychological profiling, highlighting advancements in the technology and its integration with other forensic techniques.

Objectives: After a systematic review of psychological contributions to cold case investigations, we felt the need to share knowledge on cold case investigative activities as perceived by an operational police psychologist partnered with the New Zealand Police.

Methods: To gather information, descriptive phenomenology was selected as the method, which allowed the investigators to elucidate the participant's responses and then transcribe and analyse the data based on emergent themes. The small but focused sample of two operational police psychologists, with combined experiences of over 30 years, provided in-depth descriptions of their experiences. **Results:** Both operational psychologists had unique experiences, having been involved in some cold case investigations with the New Zealand Police. They offered their opinion on psychological techniques used in cold case investigations, focusing on eliciting and properly evaluating information and encouraging the value of cold case reviews over forensic strategies that are currently designed to place targets on defendants. **Conclusions:** Clear problems accompanied the application of profiling. Firstly, insufficient experience has caused academic-based programmes negatively affecting police practice. profiling and crime linkage are poorly regarded by law enforcement due to inaccurate claims made, failing to produce harmful outcomes, and inadequate knowledge of police culture (Brooks & Natasha Hira, 2022). Secondly, misunderstandings that arise when disseminating commentary on how profiling processes and

products are constructed. Conduct and results are usually published within the same document, suggesting disparate stakeholder involvement (Toolin et al., 2022).

Keywords: operational psychology, New Zealand Police, cold case investigations, investigative psychology

I. INTRODUCTION

By Nodaway's, subjects, especially on the Internet, are particularly careful about sharing their personal information. With the realization that the curiosity about the people is independent of the technological invasion, and the fact that it does not have much relation with the social media, is to be made on some of the research projects by stepping to the field work, according to people's perceptions and expectations about their own privacy and the study people of each other, So, such a study would also contribute to the establishment of a sharing or comparison that reflects the difference between an auditory-mediated and indirect dimension, a company-wide apparent, and a native withdrawal of behavioural dimensions and Rain of Economic Crimes.

Profiles with a minimum of characteristics are only generally formed in the Computer and Information Technology Crimes or they are selected and implemented from the certain kind of activities in the criminology. (Brooks & Natasha Hira, 2022). They had been often determined by the empirical way. In this case, these profiles would be less descriptives. For this reason, to be more effective in terms of crime prevention and deterrence and increase the probability of capturing the criminal profile, profiles must have been configured dimensioned the social behaviours, life styles, thinking, feeling emotional structure, adapting and disturbance to the technology.

Criminal Investigation that presents the profiles of the criminal activities, provides advantages in terms of taking precautions and implementing preventive measures, supplies an important time for the concerned institutions to take required precautions, helps authorities find the person responsible for the criminal activities. (del Mar Pecino-Latorre et al., 2019).

Today every law enforcement and detective authority have to deal with vast portion of different criminal activities of criminals, now a days with help of digital media especially in social websites, they did no need any introduction of technical security bar like firewalls, intrusion detection and prevention systems, data encryption or whatever at all. They did not trust on their profiles. (Bada & R. C. Nurse, 2021).

1.1. OVERVIEW OF PSYCHOLOGICAL PROFILING

Notwithstanding the different methods described in literature, it is primarily five broad categories of profiling: crime scene profiling, inductive/deductive/streaming method, classical and discrete profiling, criminological profiling and geographical profiling (Bada & R. C. Nurse, 2021). In practice, hybrid methods are often used as a combination of Crime scene profiling and the geographical profiling in the well-known profiling cases [9]. But despite wide ranged methods of profiling and their unique individuality, the most prominent aspect, applicable to each technique are variety of types of profiling which can be divided into three main types: the offender/violent (committed by criminal) crime which relating to the profile of suspected perpetrator, the geographical which focusing on the location of the crime itself and community which emphasis on victimological and criminological profiles/endangering factors that increasing the number of the victims of crime.

Psychological profiling is an investigative practice comprised of procedures for the analysis of evidence from crime scenes that are preventive investigation or solving cases of crimes (del Mar Pecino-Latorre et al., 2019). In terms of its procedural characteristics, profiling does not match the ideal standards of research (e.g. standardization of instruments, technique and procedures to control the environmental variables). Still, profiling remains interesting due to some advantageous characteristics, including applied and preventive use, every real-life information and data while simulating the real-life conditions of examination and application (Brooks & Natasha Hira, 2022). These characteristics differentiate profiling from theoretical experimental research from the wider field of psychology as well. Surveys among law enforcement officers point out that despite the increasing globalization, the work on profiling is still mainly conflicting which is exemplified by the numerous definitions of profiling which influences productivity of the field. However, terms such as

psychological, offender, criminal forensic profiling, and actions profiles-related term is most widely used by practitioners shows its interdisciplinary nature.

1.2. Importance of Psychological Profiling in Criminal Investigations

The importance of psychological profiling in criminal investigations has gained credibility over time. Profiling aged significantly and become a widely used term. Together with the increase in literature on profiling, this growing popularity of psychological profiling emerged as signing the general acceptance in the forensic world, broadened audiences with practitioners and the public, enhanced collaboration with different disciplines and many new responsibilities evolved from scientific disciplines to contribute to justice. These responsibilities include the assessment of pre-sentence reports, setting release conditions, providing support in staff services for murderers, collaborating with the police regarding sex- and violent assaults, methods to investigate acts of terrorism, supporting genocide tribunals in documenting mass-homicides, recognizing signs of child sexual exploitation and more (H.D. de Roo et al., 2022).

Psychological profiling is crucial for solving criminal cases, and especially necessary in early stages of case analysis, such as in cold as well as ongoing cases. The latter is in line with typologies distinguished by Rossmo (2000). Psychological profiling falls under investigative psychology. Investigative psychology is characterised by the construction of a personality profile often known as a *modus operandi*-derived profile (MOP). The FBI originally referred to this as criminal profiling in the context of violent crime analysis. Offender profiling is an older description referring to the psycho-dynamic understanding of a crime by looking at its crime scene aspects (Kumar Gopala Pillai & Ramakanth Kumar. P, 2010).

It is important to recognize the significant leap that is made from identifying behavioural evidence to apprehending the perpetrator of a crime. This is due to the complexity of influence known as the 'post hoc ergo propter hoc' (Kocsis, 2004). This phrase is attributed to Aristotle, and when translated, it means 'after this, therefore because of this'. This logical fallacy is the basis of an inaccurate argument or belief if there is not a coincidence between the antecedent and the following event. It is relevant here because when two tend to occur together, particularly in the context of a crime, they are often perceived to be related. In the context of a crime, these decision cascades could lead to individuals concluding that a particular offender profiles, despite some evidence suggesting that some profiles should be taken with a grain of salt (Bada & R. C. Nurse, 2021).

II. TYPES OF PSYCHOLOGICAL PROFILING TECHNIQUES

There are only a small number of case studies to support the concept of a typology of offenders that integrates psychopathy, dangerous co-occurring, and paraphilia at one extreme and schizoid personality disorder and Asperger's disorder at the other extreme. Although a weak correlation has been established between the big five personality traits and dangerous co-occurring, which share meaningful variance, this may be more reflective of shared variance among negative emotionality (narcissistic, antisocial, dissocial, or unstable) and traits of addiction proneness and impulsivity regardless of any shared influence of dangerous co-occurring, psychopathy, and antisocial personality disorder and not a meaningful meaning derived from shared variance among different threats across different domains of personality functioning.

The foremost active categories of Criminal Profiling include Interactive Profiling, Geographical Profiling, Investigative Psychology Profiling, Clinical Approach Profiling, Music Profiling, and Criminal Investigative Analysis (Esplere and Cosio, 2020). Since there is a wide range of profiling techniques, Dangerous Co-occurring and psychopathy, the two most widely studied personality constructs, have received extra emphasis in criminal studies. Over the last 100 years, there have been a plethora of attempts to explain the associations among these categories and between these categories and concurrent abnormality more generally. Although some researchers have argued for a meaningful difference, proponents of the three-construct model have appealed to the concept of the "dark triad," which states that dangerous co-occurring, psychopathy, and various forms of personality disorder marked by personality and behavioral instability belong to a larger, overarching category such as one of the personality disorder spectrum clusters.

Profiling is a significant component of forensic science and is an essential process for police ground actions (Kumar Gopala Pillai & Ramakanth Kumar. P, 2010). Psychological Profiling (also referred to as Criminal Profiling) is important in police investigations as it is done to provide a detailed picture of the offender including his personality, lifestyle, physical traits, habits, etc. to narrow down the list of suspects (Bada & R. C. Nurse, 2021). It aids in aerially searching or focusing on certain areas of the haystack where the needle is found (Monaro et al., 2021).

2.1. Offender Profiling

In early studies it is stressed that a diversified range of proof including the MO and methods utilized to perpetrate the homicide might assist the detectives realise the identity of the murderer (Canter et al., 2004).. The indicators to comprehend the cause of the act focus specifically on the data concerning the criminal's behaviour when an offense is carried out, frequently referred to as crime scene behaviour (De Keersmaecker & Legrand, 2004). Currently in police practice and in the media one frequently refers to offences being committed immutably or at random, meaning that conditions resulting in persistent cases guarantee that the structure of the crime scenes is comparable and that offenders act without any respect for the identities and characteristics of the victims (Lauritsen & Schaum, 2004). Holmes (1996) and others stress however that therein and the offender leaves his or her private directories of motive, personality, etc. especially in the structure, location and other features of the crime scene: keeping the files of his or her rule, history and readiness.

Offender profiling is a forensic investigative process to assist law enforcement investigation agencies to identify the most likely suspects based on scientific analysis of the crime scene behaviour and crime related elements. It is a blend of psychological and empirical techniques to profile the plausible suspect (Holmes & Holmes, 2013)(del Mar Pecino-Latorre et al., 2019). Profiling is significant for the criminal investigation because sex offence scenes furnish a fairly extensive quantity of material likely to assist in the arrest of a suspect (Canter, 2004; Lloyd & Dürsteler, 1987)(H.D. de Roo et al., 2022). It relies on the idea that behavioural evidence left behind at a crime scene can provide an image of the mental characteristics of the person liable for that behaviour (Holmes & Holmes, 2009a) (del Mar Pecino-Latorre et al., 2019). Offender profiling is based on the supposed assumption that certain kinds of crimes are more likely to be perpetrated by individuals with certain types of personality or other characteristics than by individuals who do not have those characteristics or personality features (Woodhams & Roulstone, 2009).

2.2. Geographic Profiling

Probabilistic approaches to modelling crime have shifted non-linearly in recent years to include an acknowledgment of serial crime, which is no longer simply an anomaly. There are non-exclusionary opportunities within this shift to begin examining conjecture within theories of crime to conceptualize behaviour with more regard and precision. Family of permutation tests, nearest neighbour lookup tables, pattern validation through behavioural consistency, and neural network models to interpret spatial behaviour will all drastically improve the performance of geographic profiling. Research is now greatly needed to improve such models of criminal behaviour; however, due to pervasive sheath-to-summit, and the consequent propensity for decaying support, any comprehensive theoretical review will fall victim to underreporting if limited to a focus on conventional linear unimodal distributions.

An effective investigative strategy grounded in theories which recognize behavioural consistency serves as the main governing body behind psychological profiling, due to the assertions of which Kubus et al. (Svobodová, 2018). Geographic profiling is a spatial method born from a set of predictive algorithms that, when given a set of control points, will estimate the unknown location, or the 'centre of gravity' of any set of points (Brooks & Natasha Hira, 2022). It is a three-step methodology in the profiling of any series of geographically clustered crimes. This approach has been considered since the 1980s as a means to circumnavigate the operator/crime linkage factors (Berezowski et al., 2022).

2.3. Investigative Psychology

This area of expertise is being created for police work in 1980 by FBI agents. Until then, the FBI and other US police agencies had relied substantially on criminal crime scenes, corpses, informants, and shoe-leather accident studies, but looks were constantly examining technological advances in the sciences related to criminal investigation (del Mar Pecino-Latorre et al., 2019). The FBI has reached out to a number of academic researchers in psychology, sociology and other related areas, and with their financial, moral and social assistance, a new investigative area was developed by researchers and students over time to support the police investigation process which later became famous as psychological investigation. The FBI's National Criminal Profile School has trained dozens of police officers from the United States, Canada, the United Kingdom, Europe, Australia and Asia. They then delivered training and educational programs for others who wanted to develop their psychological investigative experiences and understanding to impossible limits. Owing to this crime protection lectures based on universities and faculties, researchers have begun conducting dynamic studies and, as a result, have produced numerous reports, organs, and learning academicians and students in the field.

Investigative Psychology, a branch of the psychological discipline devoted to the study and application of psychological principles and research methods to understand and solve crimes, especially those of violence or serious indication. It has also been defined as the scientific study of criminal behaviour in a way that could help to solve crime (Brooks & Natasha Hira, 2022). Investigators use the principles and methods of psychology to bring criminals to justice. It involves two main areas of study: the theories of criminal behaviour (i.e., detection, prediction, and explanation) and the ways in which the investigative tools with predictive, explanatory, legal, and psychological material can be used to advance criminal investigations. This multi-dimensional area of expertise is sometimes named offender profiling for law enforcement; investigative action analysis for organ vigilance; and conversation identification, language analysis, and disaster recognition for intelligence agents (Bada & R. C. Nurse, 2021).

2.4. Psychological Autopsies

The economic implications of the very existence of psychological autopsies as a forensic tool are also worthy of the reader's consideration. The cost-across-time differential of psychological autopsies might be reasonably approximated as force-multipliers of the original expenditure. The "front end" expenses of psychological autopsy comprise of the salary of staff so trained to conduct one plus the "opportunity cost" of time expended in doing other things while working on them. Providently, conducting a psychological autopsy requires that (a) access be readily obtained to the full, unabridged, unredacted medical file and (b) personnel costs and associated office expenses) are generously covered (Ahmed Khan et al., 2005). Finally, to offer a survey of some techniques and measures that the reader might temporarily employ for this purpose includes filling in so-called "time 1" and "time 2" measurements or measures by confidantes, friend, relatives, the deceased's manager, and significant others. All of this can facilitate what is known as the indirect, or "impressionistic" application of methods and utilities only validated for measurement and assessment that this study, review, and survey have directly contemplated, offered, and examined (Menon et al., 2020).

Psychological autopsies are compelling forensic tools that may be used in various ways to achieve vastly different ends in a wide range of circumstances. From a practical point of view, psychological autopsies can be employed to bring closure to family members and to friends who have survived bereaved a death which is puzzling, enigmatic, or else, troubling. They stand as the last-best effort to study the life and death of a person who is no longer within reach in the same way as when living. These posthumous examinations can provide vital insights into the psychosexual, psychosocial, socio-historical, economic, and situational milieu within which lives were lived and then, ended. The judicial implications they may have been noteworthy as well as the repercussions they may have in public health policy or clinical matters (del Mar Pecino-Latorre et al., 2019).

III. EFFECTIVENESS OF PSYCHOLOGICAL PROFILING TECHNIQUES

Profiling has acquired a reputation for effectiveness based on popular media accounts, yet the publicly accessible scientific evidence supporting its efficacy is less compelling. Profiling's ongoing popularity is due to its appealing nature rather than proximity to science. Despite the absence of a comprehensive foundation, most police and law enforcement officials agree that profiling is a practical and efficient procedure. Nonetheless, demands for credible proof of the profiling's corresponding outcomes on actual cases continue to emerge. Additionally, empirical literature on the substance of profiling appears to be oversaturated relative to its practicality. Researchers must now provide stepped-up emphases on actual case outcomes, particularly with respect to criminal identification (H.D. de Roo et al., 2022). Analysis has confirmed that profiling can help sort or differentiate suspects, enabling authorities to classify and devote special attention to certain suspects. That feature will ultimately facilitate solving complex instances.

Criminal investigations are of paramount importance and psychological profiling has also been widely used in solving crimes (del Mar Pecino-Latorre et al., 2019). The limited information available and the fact that it cannot be verified or falsified make it an acceptable tool in providing investigative leads in hard cases (Kern et al., 2021). When deciding whether or not to use psychological profiling as part of an investigation, police forces should be aware of a variety of advantages and disadvantages. One of the perceived advantages is that profiling is believed to suggest which offenders are unlikely to be responsible for the crime.

3.1. Success Rates in Solving Cases

There are no studies at present providing the most reliable answer or at least an answer derived competently from empirical studies (H.D. de Roo et al., 2022). The considerable variability in the methodical procedure by different research teams (cf. Kocsis et al., 2015; Reinartz & Kostadinova, 2015), which directly leads to contradictions in the interpretation of the empirical results, seems especially significant. Furthermore, in many cases, the conflicting nature of the studies can be explained by other factors affecting the results, such as the inner psychometric properties of original tools, such as the predictability, reliability, and validity of number of the basic types of profilers as well as the fact that the tool was used by profilers with significantly differing levels of practice and commitment, subject matter experts, who were novices, or students. Finally, it seems important to methodically question the differences in functionality of the profilers compared with a control condition and to the effect of merely receiving a psychological profile. Case after case, a profiler could take significant steps that may influence the case. If the profilers have additive effects in the thinking process of the CS examiners, if the need for less frequent interaction with them in the nuclear phase leads to a quicker identification of the cell, if the increased workload caused by the massive of conduct received from the profilers has a direct effect on the deviant amount of conducted, and the conclusion of a homicide scenario are all important investigative parameters.

Success rates in solving cases Often when new techniques are developed and debated, the first and most important question seems to be missed: "Do new techniques work and under what conditions?" This is certainly the case with psychological profiling (del Mar Pecino-Latorre et al., 2019). Does psychological profiling, in fact, entail a positive addition to the investigation of unresolved cases - as many criminological authors and the American FBI and British police claim, or is it in conflict with established protocols of police investigations and does not consistently produce positive effects (e.g. Jackson & Bekerian, 1997; Wood, 2015).

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3.2. Impact on Criminal Investigations

In the field of criminal investigations, recent advancements do not always get utilized fully, even when they have been analysed to verify the highest likelihood of their success. Thus, it is essential for advances in experimental psychological research to reach broad audiences, especially to first responders and others involved in emergency planning and responses to terrorist acts. Sound experimental enquiries ensure they are observed and facilities are implemented with substantial utilization to back up their applications effectively. Given the right professional preparation, it very well may be as important to concentrate on realizing emergency psychological profiling, and including computerized tasks to upgrade the ability to perform imaginative analytical and prediction activities that support practice during emotional episodes along these lines.

Criminal profiling has been demonstrated to accurately identify certain psychological features of an offender (del Mar Pecino-Latorre et al., 2019). Even though much skepticism about its practical utility exists, psychological profiling has been reported to facilitate criminal investigations, reduce the time taken to resolve them, and aid in catching the criminal. Evidence is available to confirm that psychological profiling facilitated intelligence sharing and validation, even when conducted in descriptive and experience-based forms by professionals (Y. Chén, 2022). Psychological profiling has been used as tools for suggesting likely unwanted effects of treatment, understanding the features or behaviour of those who are most likely to be the greatest threat to others, yet never undertake a crime, or describe the different psychological processes which are likely to indicate that offenders are at risk of committing a violent crime. Most solid evidence for the use of profiling emanates from small-scale psychological studies and much comes from arguments put forward by practitioners (Novikov et al., 2021).

IV. ETHICAL CONSIDERATIONS IN PSYCHOLOGICAL PROFILING

A police report is required to be objective and the findings of psychological profiling can often offer a subjective insight into crime scene analysis and suspect research. Researchers argue that ethical duty should therefore apply to reduce any chances of future miscarriages of justice arising from the unreasonable reliance on psychological profiling. Ethical duty therefore extends to the valuable support that is provided by psychological insight democratising the criminal investigation process to those whom are most vulnerable, such as the homeless. What may be considered unethical by members of this subset of society may be prolonged by what is deemed 'rational' profiling action of police officers. Ethical codes regulate how an individual should behave in human behaviour research; in criminal profiling however, these principles are perceived as voluntary. Courteille suggest that it is essential that standardised objective practice is pursued to possibly support these individuals in the future with no link to a legal obligation, else the potential for miscarriages of justice will remain or increase.

Ethical considerations in forensic psychological profiling are paramount in such a sensitive profession (Areh et al., 2021). Conversely, there is a lack of uniform standardisation across police forces when it comes to the application of psychological profiling. Indeed, historically, arguably the most famous psychological profile was produced by a police officer without access to psychological insight—the sexual sadistic serial killer letter authored by an unidentified suspect whom has become known as Jack the Ripper. This indicates how societal attitudes to police methods and technological developments have shaped crime investigation, rather than there being clear reliance on psychological construct. The application of psychological profiling internationally within European police forces is disparate and acute, with opportunities to develop standardised procedures observed within other areas of forensic psychology (Kumar Yadav, 2017).

4.1. Privacy Concerns

The use of profiling equipment could raise privacy concerns. The recording, processing and storage of biometric and biographical data require a set of preconditions under every European fundamental rights regime and under procedural requirements of European Union criminal justice measures. Cultural, social and criminal justice conditions, including advancements in technology and privacy issues introduced by biometric installations in the criminal justice and private security sectors, could have a direct influence on the acceptability of particular surveillance approaches and legal cultures in European states. There are material privacy risks in using facial recognition for the purpose of locating individuals on the basis of security data

and to a general database viewed from a data protection standpoint. There are claims of profound negative implications for the privacy of individuals.

As with DNA profiling, the forensic use of behavioural and biological data that are commonly collected for health and human services causes serious privacy, civil and human rights concerns (M. Butler & Willis, 2020). The legality of access to these data is also a matter of concern. Whilst the standard for access to health and human services data is that data should not be accessed without individual consent, access to data for criminal investigation is provided for under the European Union's Police and Criminal Justice Data Protection Regime, as provided under Directive 2016/680. There is specific concern regarding the investigation of alleged historical offences and the legality of using this data. Systems in place may have been especially built to allow information to be accessible to the police. The General Data Protection Regulation (GDPR) – Regulation (EU) 2016/679 – permits health- and human-services data to be used for purposes of criminal investigation where that data is 'necessary' (Chen et al., 2024). In addition, it comes with new offences for companies, their responsible directors and data protection officers for failure to provide necessary security for these as well as other types of personal data, including in the context of criminal investigations. To obtain biometric samples or their profiles necessary for criminal investigation, searches of low-sensitivity databases are made to find individuals who are not directly 'searchable' on the factual basis of the case (Harrigian & Dredze, 2022).

4.2. Potential for Bias

Analysing the sequential steps involved in the profiling process, we can identify presents ample opportunities for forecasters to engage in motivated reasoning during profiling assessments (see Table 1). Consequently, proof this kind of thinking is that instead of predicting the behaviour that is under investigation (e.g. offending) the focus of these tools is predicting being detected for this behaviour (e.g. police detection, conviction), which has been extensively researched in criminology as an entirely different focus (i.e. crime event versus crime record generation). Concluding, one can see that criminal behaviour profiling rests upon flawed assumptions of stability of human character over time and unrestricted stability in behaviour derived from it. This is variously debated by psycho-legal scholars but ultimately joint in their acknowledgement there is at present simply insufficient scientifically robust evidence in support of psychological profiling instead of predominantly heuristics underpinning it. There are also many opportunities for the assessment of the individual and assigning of the label of a likely criminal to become biased. Bias of one kind, in attributing criminal intention to a person adverse to attributing criminal intention in another person is in infinitely demand; it has overtaken selection bias. Bias on the basis of sex, race, nationality, social class is easily available. Bias, therefore, in ying criminal intention can be much abused and, is argued here, because it is formed on the context of conclusions reached in the First Crime or act of criminal misconduct, of the types on which that individual can move towards a career in crime, surprising circumstances warrant empirical investigation (M. S. Neal, 2016).

Psychological profiling is an investigative tool that generates hypotheses and informs major investigation decisions (Bada & R. C. Nurse, 2021). It is based on psychological theory that what people do is a function of who they are, which ultimately makes the technique depend on stability of behaviours over time. This raises deceptive intention as a potential for the profiling technique to become inaccurate (Laufer, 2020). Social ties, school or job involvement and even religion can suppress non-criminal behaviours, range of offending, endorsing legitimate means of attaining socio-economic independence and at its extreme, even entirely desist offending based on religious convictions as a way to negate a criminal identity. At the same time, young adults are still establishing their adult identity, which alone is a poor basis for the reliability of profiling assessments.

4.3. Legal Implications

Profiling occurred in the test of McNaughten rule case. McNaughten, inflict a fatal gunshot wound toward the Prime Minister. Medical history of one of the experts profiled, Dr. Beasant, and profile M. But McNaughten, in advance of trial, explained that his motivation for murdering the Prime Minister. The McNaughten rule occurred the first organized psychological profiling effort in a case to trial. Therefore, began the history of legal ramifications for profiling. Attorneys and scholars later wrote frequently about numerous ways that profiling and the law intersect. This occurs when investigators make a crime psychiatric evaluation to decisions in psychology and make different outcomes. The question those legal scholars put forth leads toward the possibly various factors that the profiling impacting on legal change made for the justice a mechanism for

inquiry. W.K. v. C.D. is an unusually high stake in the presentation of profiling of the child custody decision because of this kind of parents who may profiled at the bias and must careful to make a profile.

For a long time, legal trials utilized profiling mainly to make a psychological evaluation engaging in a criminal trial with expert psychological evidence (Laufer, 2020). It would be more difficult for an expert to serve as a fact witness in some sort of the criminal proceedings. Recently, some used profiling at the pre-trial stage for the screening psychological evaluation completed to screen for the “suicide watch” in to jails (H.D. de Roo et al., 2022). Additionally, many forensic mental health professionals have been appointed recently to provide psycho risk evaluations of assailants to help determine a criminal sentence and to led different the version of an actus reas of a crime defined as a “guilty mind” (Veale, 2023).

V. CHALLENGES FACED BY FORENSIC PSYCHOLOGISTS

The testifying practitioner can become entangled in the context of the adversarial process, with advocacy bias leading to evidence inflation and adversarial allegiance bias threatening the objectivity of the expert (Brooks & Natasha Hira, 2022). The emphasis on forensic psychologists as advocacy witnesses is unwarranted – they can provide neutral expertise with clarity, simplicity and restraint. Biases can be managed through clinician training in interview and test administration, augmented decision rules, formal structured diagnostic systems, manualised risk assessment tools, evidence-based decision-making and systematic error-correction. Case examination and feedback, consultation, peer review, error bars, opponent expert opinions, the use of an independent lawyer, and guiding jury directions have all been proposed as possible methods for identifying or mitigating bias.

Forensic psychology is the application of psychology to criminal justice. Forensic psychologists are commonly called upon to conduct assessments, but they face a number of challenges in providing expert opinions to the court (I. James & Gladyshev, 2013). One of the main challenges faced by forensic psychologists is the need to manage practitioner bias. Forensic psychologists are often asked to provide expert evidence based on a single interview with the offender, which is conducted in a highly constrained and artificial setting, typically with very little data available to triangulate the findings, such as collateral sources of information (Casu et al., 2023). In these circumstances, forensic psychologists have been found to be more confluent (i.e. they suggest a range of possibilities rather than a single correct conclusion) in their opinions compared to other forensic experts, but this could also be a marker of overall judgment quality rather than a legitimate method of conveying the expertise of forensic psychologists.

5.1. Limited Data Availability

Indeed, some forensic psychologists and other social science practitioners work with police to develop and apply “professional judgments” to surprisingly great effect, including during a secondment (Jin & Salehi, 2024). However, without the prospective benefits of guiding evidence-based decision making, and the mere possibility might lower social welfare – or so the argument goes. There is some truth to this. But which is best, an improved instrument and less truly guilty people escaping detection, or a beaten instrument and more innocent people being wrongfully convicted? Other social scientists argue that psychological profiling techniques not supported by evidence could deter police from continuing to pursue other, more reliable lines of enquiry. Meanwhile, this uncertainty also might incentivise wrongful perpetrators to undertake counter measures after taking stock of the police’s activities, such as changing appearance, weapon, modus operandi, and possibly locale, which would make subsequent apprehension more difficult.

Limited data availability hinders forensic psychological techniques’ testing and repeatability across various criminal investigations and population groups, which raises their admissibility in courts (Wienroth et al., 2021). Given the absence of evidence to inform practice, psychological profiling techniques seldom play a major role in criminal investigations in Australasia, Europe, and North America (Brooks & Natasha Hira, 2022). Additionally, while police authorities increasingly seek forensic psychologists’ assistance, there is limited evidence as to the nature, extent, and outcomes of integration. Notwithstanding, some police officers build conviction over time to prefer certain forensic psychological techniques after observing repeated confirmatory results. Researchers have been addressing the empirical challenge by collecting a broader range of data prior to attempting to develop, refine, and validate psychological profiling techniques further.

Methodological advances—such as theory and logic models, and increased replication—also can help enhance the quality of evidence in the field.

5.2. Public Perception of Profiling

In general, profiles do not seem to hold up under lay people's scrutiny, and indeed, some research suggests that the general public is strongly dismissive of psychological profiling techniques. When profile reports are experimental, rather than actual, (Munnelly et al., 1997) provide evidence that mock jurors made varying responses to controlled data and subjective outline reports (Kumar Yadav, 2017). These findings force researchers and practitioners to acknowledge that faith in the reliability and utility of psychological profiling is low, and there is a need to improve and increase the spread of information on evidence-based practice in the field. The lack of awareness and, more importantly, misunderstanding of certain important elements of psychological profiling lay at the heart of views that currently run contrary to the perspective care and adherence to the protocol. If psychology is to continue to have visibility and utility, active dissemination strategies must amount to practical experiences of practitioners; participants who achieve effective compliance with required elements of best assessment practice are more likely to hold positive attitudes toward assessment, and probably the same is true for criminal profiling.

By the nature of the application and the many legal and ethical implications, it is unsurprising that the main concern relating to forensic psychology is the lack of public understanding. However, Keast et al. (2006) found that the degree of public understanding largely depended on the extent to which the profile was case-specific, which may reflect an implicit concern in Profiling discourse that case specificity is not made explicit to non-professionals (Laufer, 2020). The concern for information dissemination and research differs between academic and law enforcement communities, often leaving profiles for a case unchecked in terms of inter-rater agreement, validity and utility. Furthermore, research indicates that jurors, police officers and the general public evaluate the admissibility and weight of scientific evidence (like profiles) on the basis of partial and informal information. This places professionals in a position of responsibility, as the correct interpretation of psychological profiling techniques rests largely on the shoulders of judges and jury members (Iudici et al., 2015). According to academic research (Rassin, 2006), general public perceptions tend to be more negative than legal judgments. Psychological profiles present a paradox to lay people: they are themselves perceived as unreliable, but the person producing the profile may also be considered to lack reliability.

VI. FUTURE OF PSYCHOLOGICAL PROFILING

Criminal profiling, as it is known today, was launched by the US FBI at their Behavioural Science Unit in the late 1970s and largely known to the general public with documentaries, TV series and books on the profiling of celebrity serial killers. The specifics of it are still a well-kept secret that most law enforcement agencies around the world only use it in high-profile criminal cases after running into a dead-end in their investigation. Profiling is considered to be an experience-based skill acquired over the years from dealing with hundreds of criminals every day. People have tried to model profiling matching the intuitions of profiling but it is extremely difficult to obtain data that is needed to construct profiles. Criminals are believed to have qualitative distinctions in their personality similar to the general population. We will address criminal profiling based on quantitative distinctions. We will show that modelling criminal behaviours matching the intuitions of profiling has been suggested and the best of it is evidence-based crime scene behaviours modelling using Bayesian networks under the Markov assumption. Splitting crime scene variables into *modus operandi* and personality variables is very important. A method that treats them separately can be called variable typing forcefully externalizing the adversarial tasks. Externalization ensures reliability which is extremely important, especially in the research and development stage of profiling. The presented framework is human-centric, meaning that profiles are intended for human use but all three measures of uncertainty, predictive accuracy, and relevance of a profile have been implemented in the evaluator.

Offender profiling, also known as psychological profiling, criminal profiling, and criminal personality profiling, refers to deductive and inductive methods in addressing crime, particularly violent crime and serial killings. This article proposes classification problems, profiling intuition, typing methods, and machine learning techniques for the future of psychological profiling. Predictive knowledge is the ultimate intelligence of the criminal investigation process. The common typological methods in offender profiling include the geoprofiling, child sexual abuse, abuse in heterosexual relationships, animal cruelty, targeting property, hate

crimes, and drug trafficking (del Mar Pecino-Latorre et al., 2019). Machine learning has been used to address crime in general and in particular violence. The ensemble learning method has been used to address the profiling problem. Investigators are presumed to access psychological files in cases of homicide investigations in order to make the practical predictions of the psychological profiling of the offender (Kumar Gopala Pillai & Ramakanth Kumar. P, 2010).

6.1. Advancements in Technology

OP's empirical aspects could also borrow the working models used in computational science. Three global biotypes are defined and integrated in global crime scene inference algorithms (CSIAs): the offending processes (e.g. the sequence of steps used at the crime scene to avoid detection), cognitive style (organized or disorganized), and geographical propensity (Caponnetto & Milazzo, 2019). Each of these three global biotypes is divided into several local derivatives, which reach a total of 18 Likelihood Ratios (LRs). Each derivative received a systematic literature review, and corresponding large datasets were built to calibrate CTSIs through the mean value of successive derivatives.

Technology and artificial intelligence (AI) have been developed. These developments are vastly open-question prediction improvements (H.D. de Roo et al., 2022). For instance, technology such as computer vision, a digital technology for the automated recognition and classification of individuals, can transform contiguous spatiotemporal data such as individual interactions with places or objects (i.e. behaviour) into a set of trait measurements (e.g. is this individual aggressive) (Goldenfein, 2019)? The predictive quest in offender profiling (OP) should leverage the profusion of trait measurements derived from technological innovations. In everyday practice, however, the uncertainty about the very link between human behaviours, evidence, and (real) world crimes can convert technological products into digital crystals balls. Using unbiased data to revisit mainstream constructs and methodologies may be a good start. Scholars from criminology, forensic psychology, and behavioural science could progressively combine their data resources and data processing to develop empirically informed crime scene inferences. OP would benefit from their knowledge as it becomes more computationally empirical and less theoretically driven.

6.2. Integration with Other Forensic Techniques

Currently the data show what is known, that the multiple methods of official recording and investigating provide complementary converging information about homicides to the benefit of justice in the small national percentage of homicides that are not immediately possibly clear to police. The ranking of the associations from this review of empirical subtypes is a guide to most reliable significant crime scene and victimological information that will be found at Homicide Characteristics Coded crime scenes. Strangers, drugs, different weapons can complicate the use of other forensic techniques. Constrained modus operandi suggests use of other forensic DNA and FARC models and databases to the relative exclusion of hypothesis-based isotope and serology. Allegoresis suggests use of other forensic isotope and entomology models, databases and forms of forensic intelligence, diatom and fungi. Schemas also suggest use of those most helpful forensic techniques before he faces arrest and official identity record.

Homicides carry a high risk to both the community and law enforcement investigating such events. It is essential that valid and reliable knowledge across criminology and forensic psychology is used to guide criminal profiling investigations (del Mar Pecino-Latorre et al., 2019). Additional techniques used in criminal investigations include crime scene analyses like geographic profiling, and offender and victim profiling, as well as other offender signature behaviours. Officers and psychologists rely on the combined evaluation of these sources of information to determine the most likely characteristics of the person who committed the crime, for intelligence-led suggestions for the rest of the investigation. A powerful additional forensic technique in criminal investigations is DNA analyses on physical evidence (George Cowell, 2018) and forensic databases.

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