Operational psychology and cold case investigations in New Zealand

Nathan Brooks*, Shreena Natasha Hira

Behavioural Science Unit, New Zealand Police, Auckland, New Zealand

A R T I C L E   I N F O

Keywords:
Cold case
Psychology
Crime analysis
Personality
Offender profiling
Policing
Investigative practices

A B S T R A C T

Purpose: The purpose of this paper is to examine the application of psychology to the investigation of cold cases. The paper reviews the development of the discipline of operational psychology and reviews the role of the Behavioural Science Unit in assisting with cold case investigations within New Zealand.

Design/methodology/approach: The paper integrates theory, academic principles, and practical investigative experience.

Findings: As a field, operational psychology has a wide application to cold case investigations. The main areas where expertise can be provided, includes, indirect assessment and personality profiles, offender profiling, crime analysis, victimology and equivocal death analysis, and in the interviewing and engagement of offenders.

Operational psychology advice should be based upon sound reasoning, evidenced based conclusion, and within the bounds of practitioner competence. Psychologists should seek to educate investigators on probabilities, likelihoods and error rates, and endeavour to indicate the strength of conclusions and statements provided within a report.

Originality/value: The review aims to provide the necessary and relevant impetus for integrating operational, or forensic psychology expertise into cold case investigations. The application of psychological science to police investigations has been subject to numerous academic commentaries, however, there is a dearth of involvement from practitioners practicing in the field.

In 1998, the Criminal Profiling Unit of the New Zealand Police was established following two major serial rape investigations. Between 1982 and 1996, more than 70 stranger-based sexual assaults occurred, with victims predominately attacked in their homes. These attacks had gradually increased in frequency throughout the years and had included one sexual homicide. Across the cases, police had identified two separate DNA profiles, indicating two offenders were responsible for the series of attacks. In response, Operation Park was implemented to investigate cases linked to one offender, whilst Operation Harvey was established to target the other perpetrator. In 1994, as part of Operation Park, consultation was undertaken with officers from the Federal Bureau of Investigation (FBI), who provided members of the investigation team with information on the utility of offender profiling. After several unsuccessful attempts to detect a suspect, the investigations team decided to devise a profile of the offender, identifying ten characteristics along with areas of geographic priority. To assist with the matching the characteristics to a possible offender, a computer analyst was hired to transpose criminal justice data into a suspect police ‘search’ database. Through these methods, police were able to identify a group of suspects matching the profile description and begin eliminating through DNA swabs. By mid-1995, Joseph Thompson was identified and apprehended by police. Although confessing to 77 sexual assaults dating back to 1982, he was convicted of 50 rapes against 47 females (adults and children).

Following the success of the profiling approach in the apprehension of Thompson, the approach was again trialled in search for the second series of unsolved sexual assaults being investigated by Operation Harvey. This assisted in narrowing the suspect pool from 146,000 to 5000, along with linking unsolved cold cases with active sexual attacks that were still occurring in late 1995. Consequently, through prioritisation and elimination, Malcolm Rewa was apprehended in 1996. Rewa was convicted of sexually assaulting 25 women and murdering another between 1987 and 1996.

After the use of offender profiling across these two cases, the Criminal Profiling Unit was established. In 2014, the unit was renamed the Behavioural Science Unit (BSU) due to the breadth of work extending beyond offender profiling and instead moving towards a broader...
integration of psychology practices to investigations. In its current form, the BSU is a national unit supporting an array of investigations throughout New Zealand. The unit consists of an operational psychology arm and analyst section who identify and connect sex crimes through the Violent Crime Linkage Analysis System (ViCLAS) [1]. Presently, ViCLAS analysts collect data on stranger-based sexual offences and homicides, seeking to link cases and catalogue characteristics of offenders and crimes. At an operational and investigative level, the two psychology roles provide assistance with a broad range of offending, including but not limited to, homicide investigation, serial offending, sexual assaults, national security issues, cold cases, stalking and targeted violence, and arson.

1. Operational psychology

Operational psychologists (OPs) contribute to the investigate process by assisting with suspect prioritisation, crime analysis, equivocal death review, linking of crimes, interviewing approaches, risk assessment of offenders, personality profiles, victimology analysis, and determination of offender motive [3,62]. Operational psychology (OP) has emerged as a qualitatively distinct profession (as opposed to different technique) within policing and intelligence fields, influenced by past approaches such as criminal investigative analysis, diagnostic evaluation, and investigative psychology [2,3]. Historically, “Operational psychology traces its origins back to the profession’s involvement in World Wars I and II” [4]. Within policing, the profession seeks to inform and enhance investigative decision-making, providing a lens through which to understand offender psychology, motivation, and behaviour. As observed by Davis and colleagues [3], “Although all the products and services available offer tactical or strategic solutions in their own right, all are underpinned by a broader philosophy of adding value to the decisions making ... through an enhanced understanding of the offence and offender from a perspective different from that routinely employed within major crime investigation teams” (p. 188).

The cornerstone of OP relies on evidence, reasoning, supported claims, and sound practice. There are primarily three types of logic or reasoning used in OP, with these varying based upon degrees of evidence, probabilities or likelihoods, and veracity of conclusions. These three forms of reasoning are induction, abduction and deduction. However, instead of representing distinct or standalone forms of reasoning, “these are best thought of as different points along the logical continuum, beginning with various hypotheses about what may have occurred or that may be true (induction), and through the scientific method we falsify each conclusion until we are left with the best possible explanation (abduction) or only one that is based on universal laws or principles and cannot be falsified (deduction)” [5].

Abductive reasoning seeks to discover the cause and account for the facts where possible. Advancing further from this approach, deduction is a style of reasoning comprising of a “step by step procedure involving observations and experimentation in problem solving” [16]. This approach to developing a conclusion involves inductive inferences which are then tested against the evidence in the case to determine whether the premise is true. It is the responsibility of the OPs to determine the validity of each and every premise before reaching a conclusion because “if the conclusion is false, then at least one of the premises must be false” [17]. In essence, abductive reasoning seeks to go from truth to truth [6] and according to Alexandra and colleagues [18] the validity of a deductive argument can be confirmed if (p. 65):

- The surprising fact C is observed.
- But if A were true, C would be a matter of course.
- Hence, there is reason to suspect that A is true.

Although a strong inductive argument offers solid support for a conclusion, the argument is still not infallible and remains subject to being inaccurate [5]. At times, inductive reasoning is the only possible approach to a case, however, the onus is on psychologists to stipulate the known limitations of these conclusions to investigation officers. For instance, in providing advice on a series of emails which threaten to carry out a bombing attack, OPs can inform investigators about prior research on this form of offending and conclude possible offender characteristics and motivations. However, the source of information, the lack of evidence, and ambiguity of the offending (threat or planned actions), limit the advice to formulating hypotheses and possibilities, rather than deriving tested conclusions. A similar position can be taken in respect to the use of research in reports and case recommendations, with this informing investigators of high-frequency behaviours, or statically significant relationships or effects. This information can be of valuable investigative relevance, particularly when several co-occurring patterns or characteristics from the research are present in a case, however, the use of research serves as a subject of probability rather than certainty. For example, in research on serial homicide cases, high frequency offender behaviour involves moving the victim (61.1%) and hiding the body (67.8%) [13]. In using this research to inform investigators working on a similar type of case, it is important that that OPs communicate the rate of certainty and error. Rather than stating, ‘most of the time the victim is moved and hidden’, a more effective inductive statement would be, ‘In serial homicide cases, approximately two thirds of victims are moved from the primary crime scene, and their body is hidden’. While the first statement is technically true, this can lead investigators to overestimate the certainty of this position, when instead, a ratio exists (e.g., one third of the time) where this may also be unlikely to occur [5].

Extending upon induction, is a form of reasoning that seeks to identify the most probable or most likely conclusion. Abductive conclusions “as a heuristic method can be found in classical detective stories ... Similarly, the logic of the “deductions” of Sherlock Holmes is typically abductive” [14]. This style of reasoning is formulated from hypothesis testing, with several possible explanations or hypotheses existing, however, a singular hypothesis may best explain the evidence. In certain instances, this may present as scenarios to explain a certain crime scene behaviour, with one scenario, or hypothesis, deemed most probable. Consequently, abductive conclusions are based on feasibility, practicality, likelihood, and probability, rather than a definitive cause [3,5]. A valuable outline of abductive reasoning is provided by Niiniluoto [14] who in consideration of Pierce’s [15] position on an abductive argument, suggests the following (p. S439):

- It is not logically possible for the conclusions to be false if the premises are true.
- The conclusions must be true, if the premises are true.
- It would be contradictory to assert the premises yet deny the conclusions.

The three forms of reasoning serve as the underpinning principles of the scientific method, and OPs regularly practice along the logical continuum when assisting investigations. In practice, premises or theories are developed based on experience, evidence availability, and research (induction) [6]. If the situation permits, these are then tested against case details, with OPs seeking to determine whether these may
or may not be true given the available evidence, aiming to reach a probable conclusion (abduction). In some instances, or when examining specific evidence, OPs are able to test and falsify hypotheses, revising premises and reaching an absolute conclusion (deduction). In a given case, OPs may utilise all forms of logical reasoning, developing an array of conclusions, with some true, others probable, and certain aspects a matter of probability. Often, because of the complexity of human behaviour, evidence availability, or efforts to thwart the investigation by an offender, OPs are faced with deriving the best explanation for the observable evidence and information, this being, abduction.

The current review intends to examine the application of OP to cold cases within New Zealand. The analysis will examine the various approaches and uses of OP, the types reasoning and styles of advice and assistance, the effectiveness of informing investigative decision-making and case prioritisation, and the benefits and challenges of integrating psychology into police investigations. The review will consider how OPs seek to support investigations through the prioritisation of crime scene evidence, integration of relevant research, provision of specialist clinical/forensic opinion and expertise, and the division of strategies and methods to advance the case. The review is not intended to showcase the work of OPs in New Zealand Police, but rather provide a critical analysis of OP and the methods being used in supporting cold case investigation. A central aim is to share the methods and learnings within New Zealand to allow other law enforcement agencies across the globe to understand the scope of OP practice and to consider where this may be used to support cold case investigations.

As a profession, “psychology trades off the norms values and esteem of science and there is a strong agreement that practitioners completing forensic psychological assessments should apply scientific methods and knowledge in their work” [63, p.13]. However, psychology is a social/human science based on probabilities and likelihoods, and “... as a whole remains adrift, divorced from broader spheres of scientific knowledge, isolated from firmly grounded, if not universal principles, leading one to continue building the patchwork quilt of concepts and data domains” [64, p. 289]. Although standards can be established in relation to developing evidence-based practice, psychology is not of the same scientific standards as natural sciences [65–67]. Consequently, given the continuing evolution of psychology as a profession, the review will examine the steps taken by the BSU to improve the practice of operational psychology and implement greater rigor and evidence in assisting police investigations.

2. Application of OP to cold cases

Between 2007 and 2018, there were 820 people killed by homicide in New Zealand [12]. From 2007 through to 2019, police apprehended 894 perpetrators of homicide, with 55 cases remaining unsolved, resulting in a clearance rate of approximately 94%. In addition to homicides, there are approximately 9000 (internal police data) people reported missing in New Zealand each year. Fortunately, most of these cases are resolved and the period missing is short-term and temporary. However, a subset remain unresolved, leading the case to be classified as a ‘long-term missing person’ matter. Presently, there are approximately 500 individuals considered as long-term missing persons in New Zealand (internal police data). For a missing person case to reach a homicide or suspected foul-play classification, typically, a reliable and verifiable witness account is required, or alternatively, a ruling from a Coroner on the matter.

New Zealand currently has 108 unresolved cold cases dating back to 1914 (internal police data). The majority of these cases are unresolved homicides, however, approximately 27 cases pertain to long-term missing person matters where foul play/homicide is suspected. Although a cold case is generally defined as a case that is not being actively investigated, or solved within one year [19–21], unresolved homicides in New Zealand are reviewed every twelve months. Although the review may not result in further investigation of the case due to an absence of new information, the case remains subject to annual analysis and review. Until recently, cold cases in New Zealand were predominately managed by local jurisdictions and districts, however, a National Cold Case Directorate (NCCD) has now been established to oversee these across the country. While no formalised definition is currently utilised by the NCCD to define a cold case, a case is generally classified as ‘cold’ when all investigative avenues have been exhausted and an investigative end point has been reached. It is at this stage, when an end point has been reached, where OP is often utilised to review a case and provide an alternative lens through which to examine the investigation.

The assistance provided by OPs within the BSU primarily relates to homicides or long-term missing person cases. Although there are cases such as unsolved sex crimes or even fire-setting offences where consultation has been provided, most cold case work relates to the aforementioned areas. Although many of the services provided by OPs for cold case investigations are similar to active cases, there are several differences that emerge between active and cold cases. Active cases are often characterised by larger investigative teams, a high frequency of incoming information, modern and current forensic science methods, investigative momentum and pressure, and a developing evidential picture. For OPs the provision of services or advice may evolve as the investigation progresses or new information emerges. Due to this, active investigations may require brief psychological advice because of the rate at which the investigation is progressing. On other occasions where time permits, OPs are able to provide more extensive services or reports. In contrast, cold cases typically have small investigative teams, gaps in forensic testing, historical investigative practices, and reduced time constraints and resources. For OPs cold cases often require a greater investment of time (given the body of information to review), a knowledge of previous social and cultural factors at the time, and the ability to identify suitable features for investigative prioritisation. Many of investigative details are shaped by the extent of the investigation at the time. Alongside this, a multitude of life changes typically occur for witnesses or persons of interest over time. Subsequently, without updated intelligence, past knowledge of a person of interest may have limited utility in informing a personality profile or interview recommendations. Due to this, static information in cold cases requires a more rigorous analysis by OPs, and on occasions a back-and-forth process with investigators can ensue, requiring updated investigative input to progress a product to a suitable standard.

The basis of OP work in cold cases is directed at the victim, person/persons of interest, offence characteristics, offender characteristics, geographical locations, and strategic decision making. The assistance of OPs is largely influenced by the request of the referring officer for a given case, although at times a complete systematic review may be undertaken, often, requests received by the BSU for assistance relate to one of five main areas. This includes, victimology and equivocal death analysis, personality profiling of a person of interest, crime analysis, offender profiling, and engagement, interview strategies and operational support. The following areas will be examined and discussed below; however, an in-depth analysis of the methodologies underpinning each process/area is beyond the scope of the current review. Case examples are integrated into each of these areas (with the exception of the engagement, interview strategies and operational support section) to provide context on case circumstances and the application of methodologies. These case examples are not considered to reflect successes, as some remain ongoing investigations, but instead to provide transparency on the state of practice. The discussion of these aspects is intended to examine the utility of these methodologies, seeking to progress the gaps and disconnects that emerge between practitioners and researchers [5,68,69] in pursuit of developing the field and refining the discipline of OP.

2.1. Victimology and equivocal death analysis

On December 25, 2015, Mr RH answered a phone call from his uncle.
Although it was early in the morning, RH was difficult to engage during the call and at times there was an awkward silence. RH was at home during the call and sounded as though he had just woken. After speaking for around 10 min with his uncle, the pair wished each other a Merry Christmas and said goodbye. RH was not seen again following this phone call and on 10 February 2016, he was reported missing to the police. In the lead up to his disappearance RH had experienced some financial difficulties, was struggling with his wellbeing, suffering stress in life, feeling isolated, experiencing conflict with a neighbour, and unhappy with his living arrangements. Over the coming years, several lines of enquiry were undertaken, from suicide, homicide, through to a deliberate disappearance. Substantial forensic testing was undertaken at the residence of a person of interest, while a thorough analysis was completed of RH’s financial records and accounts in consideration of him commencing a ‘new life’.

Upon the investigation reaching an end point, the BSU was asked to conduct a review of the case and complete an equivocal death analysis. This process, also referred to as a psychological autopsy, has proven to be a valuable investigative tool in cases where “there is some doubt as to whether the death was accidental, self inflicted or malicious, and if the deceased played an active role in his/her own demise” [22]. Although the practices of equivocal death analysis have been subject to criticism [63], it is important to clarify that within the BSU, this form of analysis is not intended to provide a definitive conclusion to investigators. Instead, OPs explore the evidence which supports, or contradicts each possible scenario or outcome. This information is integrated alongside psychological principles and evidence to formulate potential conclusions, with the aim of developing abductive hypotheses and conclusions.

In the absence of RH being discovered, it was not possible to examine a body recovery scene or autopsy information. Instead, the centrepiece of the analysis centred on completing a comprehensive victimology on RH, examining all the known factual details about his life, and considering the psychosocial factors shaping RH’s functioning at the time. To support the analysis, a time of line of life events was developed and charted in the lead up to his disappearance. In addition to this, specific victimology details were examined to determine his likelihood of being generally exposed to harmful events through his everyday lifestyle (lifestyle exposure) and in the immediate hours prior to his disappearance (situational exposure) [23].

As part of determining the various scenarios and situations which potentially explained RH’s disappearance, three primary outcomes were examined, these being suicide, homicide, and death by accident. Case information permitted the conclusion that RH had not disappeared deliberately or inadvertently (such as an episode of mental illness). To examine the possible outcomes explaining RH’s disappearance a formalised report was produced. Conclusions were derived from known and established case details, while areas of inconsistency across witness statements were emphasised and investigative information gaps were highlighted. To support conclusions on the likelihood of suicide, the SAD PERSONS scale [24] was utilised to examine risk indicators for suicide in conjunction with Theory of Interpersonal Suicide [25]. Although the SAD PERSON scale has received criticism due to the limited predictive validity of the instrument [26], the tool was utilised to provide a guide on suicide risk factors, given the absence of other suitable third-party rating instruments. RH’s lifestyle information, witness statements, and prior medical and psychological reports were used to inform conclusions around the likelihood of RH being accidently injured as a result of being in an extreme or second location (e.g., hurt during a bush walk). Finally, in addition to general victimology risk exposure, the forensic evidence collected by police, witness statements, and various situational facts surrounding the case, informed opinion on the likelihood of RH being a victim of homicide. Given the timeline of information, sequence of events and occurrences, and established case facts, a series of abductive conclusions were reached and provided to the investigation team to support the ongoing investigative directions.

### 2.2. Personality profiling of a person of interest

Indirect personality profiling has a long and storied history [27], having been widely used in the military and intelligence agencies for many years prior to adoption by police forces. Famous examples have included the profile of Adolf Hitler developed by Walter Langer and Henry Murray as part of the Office of Strategic Service within the U.S. Army in 1943 [28,29], along with the psychological profile of Saddam Hussein and other world leaders devised by psychiatrist Jerrold Post during his time with the Central Intelligence Agency [30].

Personality profiles are one of the most common cold case requests received by the BSU. Typically, a primary person of interest (POI) has emerged in a case and investigators are seeking to gain greater insight and understanding relating to the personality and behaviour of the POI. Personality profiles can offer a variety of functions within cold case operations, from enhancing investigative knowledge, informing tactical approaches, offering precursory information to an interview or engagement, or assisting with insight into suspect motivations and offending capabilities.

Although there are risks associated with narrowing down on a suspect or POI, OPs seek to support the investigation, rather than question the investigative reasoning behind the prioritisation of a suspect. The primary risks that can emerge relate to tunnel vision, premature judgments, or confirmation bias, where investigators exclude other suspects in favour of another and preference circumstantial evidence that supports a preferred suspect [31,32]. OPs may raise concerns with the officer in charge of an investigation if obvious inconsistencies are evident (e.g., criminal skill, motives, personality capabilities), however, personality profiles are intended to assist the investigation to follow the required course and if sound investigative practice are adhered to, ultimately an incorrect POI will be excluded.

Indirect personality profiles involve the use of collateral and case information to derive a profile of a POI. Although an interview is not conducted with the individual, studies have found that personality traits and conditions such as psychopathy can be determined in the absence of an interview [27], [33–36]. In the absence of an interview, it is critical that supporting documentation is used to develop conclusions about an individual and where suitable, the use of psychological resources or assessments (e.g., DSM-V or various models of personality disorders) to further provide evidence-based structure to opinions. According to Neller [27] to adhere to best practice with indirect assessment, the following is required (pp. 229–230):

- Clearly identify the primary client and reasons(s) for the assessment
- Structure the assessment in accordance with its purpose
- Use relevance and accuracy as guideposts for collecting and reporting information
- When deciding what to report, weigh the probative value of the information against its potentially prejudicial impact
- Separate facts from inferences
- Use both-group based and individual-based data
- Use deductive, inductive, and abductive reasoning
- Consider convergent and divergent validity when testing multiple hypotheses
- Seek peer consultation where possible and appropriate
- Honestly and openly acknowledge limits

The BSU was asked to provide a personality profile on a POI in the disappearance of Mr TP. On 5 December 1994, TP, aged 33 years, was reported missing by his father. Initial investigations into his disappearance revealed that he was last seen alive on 8 November 1994. On the morning of his disappearance, TP left with an associate in his vehicle, placing a shovel in the car boot, as the pair were reportedly intending to visit a cannabis plot. However, according to the associate, shortly into the car trip, TP asked to be dropped off at a nearby location. This was believed to be the last known citing of TP. Investigations into TP’s
lifestyle indicated that he was involved in the selling of drugs, primarily the distribution of the cannabis derivative hashish. In addition to this, he was considered to interact with several criminal associates, and it was rumoured that he had stolen approximately $30,000 worth of hashish from a dealer.

In 2003, nearly 10 years after TP’s disappearance, a Coronial Inquest was conducted. The presiding judge noted, “the evidence does convince me to the required standard that [TP] is dead. He was last seen alive on 8 November 1994 and the circumstances following that, point to his death. In particular the fact that he has not been seen since, that his bank accounts have not been touched, that there has been no contact with NZ work and Income Support Services, Inland Revenue and other agencies satisfied me that he is in fact dead … It seems likely that the death occurred soon after the last time he was seen on 8 November 1994 … A disturbing feature of the evidence, however, is that it points to the probability that the deceased was the victim of foul play”.

In the early stages of the investigation into TP’s disappearance, a clear POI emerged in the case; this being the associate and driver of the vehicle. As the years progressed, this individual continued to remain a primary person of interest. Information gathered by police suggested, that this person had attempted to interfere with witness statements, made comments about the burial location of TP, and on another occasion made remarks about TP digging his own grave. After several years of limited progress in the case, a decision was made to feature the case in a Cold Case television series, which had been developed through a joint venture of New Zealand Police and a national television station. As part of reviewing the case, a psychological profile was sought on the primary POI. The profile was sought to assist with investigative operations and to serve as a platform to assist viewers of the cold case program (especially those with potential information) in understanding the psychology, motives, and behaviour of this individual.

The profile specified a set of characteristics and traits that were evident across the lifespan of this person based upon a range of collateral documentation. Rather than providing a diagnosis or specifying a category of personality disorder or mental illness, the aim of the profile was to construct a psychological picture of the person. Some of the core traits in the profile included, interpersonal dominance, a lack of empathetic concern, cruelty, the tendency to be distrustful and suspicious, antisociality and aggression, disinhibition, and recklessness. Although these traits were provided as the overarching predominant personality features, these characteristics were examined thoroughly in respect to psychological processes, past and future behaviour, motivation, historical offending motives, and criminal skill.

2.3. Crime analysis

Approximately three years ago, a female was found deceased in her dormitory room which she shared with her male partner. She was discovered deceased by the male, with her death occurring a short time after the pair had engaged in an argument. The male reported that he returned to the dormitory room and found his girlfriend slumped on the ground, having committed suicide. The initial police investigation supported the conclusion of suicide, however, several concerns emerged in the case over the coming weeks. This included: various witness reports which indicated a volatile relationship between the pair, the unusual behaviour of the male post death, inconsistent and undetermined autopsy findings, and discrepancies between the male’s account of events and the available crime scene information. Although several investigative avenues were undertaken with the case over the coming years, the enquiry failed to establish whether a criminal offence had occurred, or instead, the death occurred due to suicide. To assist with the enquiry, the BSU sought to review the compiled evidence in the case and to complete a crime analysis based on the available case material.

Analogous to crime scene reconstruction, crime analysis seeks to sequence the information and events into a narrative and structure of occurrence. This entails using the evidence and information as building blocks to establish the known event details, along with identifying the gaps and areas of evidence which provide important investigative directions, or alternatively function as case limitations. As observed by Sunde [37], “prior to establishing, who, how, and why, the investigation must seek to uncover what has happened” (p. 280).

The first stage of crime analysis involves establishing the evidence and determining the known sequence of events and behaviour of the victim [38]. Ultimately, “conclusions cannot be reached without the presence of evidence at the crime scene indicating that a set of behaviour or events has occurred” [5]. For instance, in the above case, this involved examining the scene information (i.e., positioning of victim, objects surrounding body, mechanisms used in death, locking mechanisms and broader access options, and room make-up/construction), autopsy findings and pathology results, the statement provided by the male partner, and the various witness timeline details, to determine the established evidence and facts.

After establishing the evidence and facts, the next step is to discover the cause of death and account for the facts where possible. At a reasoning level, this generally entails moving from deduction to abduction. Typically, this entails the hypothesis testing or scenarios, with one hypothesis or scenario most probable, despite the existence of several possible explanations [31]. The aim is to construct a structure of reasoning whereby the likelihood and probability of one scenario/hypothesis emerges evidentially and logically as the most accurate explanation [3,5,37]. However, given the breadth of behaviour and factors often associated with a crime scene, several best or most accurate conclusions may emerge in each case, particularly when seeking to answer the ‘how’, ‘why’ and ‘who’ questions. For example, in the above case, the crime analysis required an examination of indicators of suicide from the crime scene details (with consideration also given to victimology factors), a determination of the most probable mechanism and method of death, the integration of evidence and theoretical knowledge on crime scene staging and precautionary acts in the commission of a crime, and the establishment of a timeline and sequence of events as part of a reconstruction. This information was subsequently provided to the investigative team with recommendations to support the derived conclusions, along with considerations around motive, offence behaviour, and detection avoidance, under the position that a homicide was ‘what’ most likely had occurred.

2.4. Offender profiling

On the morning of Saturday 16 August 1980, six-year-old AO was found deceased in her bed, in Auckland, New Zealand. The post-mortem identified she had been raped, with the cause of death determined to have been strangulation. In early stages of the investigation, more than 70 staff were tasked with working on the sexual homicide. On Friday night prior to AO’s death there were no noticeable differences to the family routine, and nothing seemed out of the ordinary. AO’s mother had her boyfriend over for dinner, along with two other adults. AO shared a room with her seven-year-old sister who had been sleeping in the bed next to her when she was killed. Her mother was sleeping in the room across the hallway. Based on the reported events that evening and the following morning, the sexual assault and murder occurred within a 10-h window after 9:00pm on the Friday evening. Four adults were present in the house overnight, making the possibility of disturbing the offender high, yet no one in the household was woken during the attack.

Over 650 persons of interest were identified during the original investigation, however, no promising leads emerged, and the crime remained unsolved. Although regularly reviewed over the coming years, a formal review phase prompted a re-investigation after the case remained open for forty years. This resulted in more than 1200 persons

1 Name has been de-identified from the original judgement material to assist with anonymity.
of interest, many of which were identified through re-assessing the original area canvas. The DNA profile that was obtained in the initial investigation failed to match any individual on the National DNA Profile Databank. Subsequently, the new investigation team were tasked with requesting blood samples from the 1200 identified suspects. Given the density of the task, the BSU were asked to provide assistance in prioritising the individuals who were more likely to have committed this type of crime.

Finding the most efficient ways to complete an investigation task allows for resources to be spread further and ultimately provide more investigation options. When faced with a large number of suspects, the ability to prioritise which individuals are best investigated first or in order of relevance, can have a significant impact on investigations. By prioritising suspects, investigation teams are able to focus their immediate resources on suspects that are most likely to fit the ‘profile’ of the perpetrator.

There are a variety of methods that can be utilised in suspect or offender profiling, all with varying strengths and limitations. According to Cole and Brown, ‘Predicting that the offender is likely to be a male, aged between ten and ninety years, may be accurate, but practically is of limited value to the investigation in the narrowing of their potential suspect pool. Predicting the offender is likely to be aged between 20 and 25 years would be far more useful, yet is less likely to be accurate as the potential margin of error is greater. However, to be of practical assistance a balance must be sought, and prediction of the somewhat more specific traits are required if the advice is to be of assistance to investigations, yet this cannot be at the expense of the reliability of the claims’ (p. 201). Although profiles can be derived solely from the crime scene action and sequencing of events, it is also possible to derive broader conclusions about an offender beyond the available case material. However, given that this approach typically involves moving from abductive to inductive reasoning, a greater degree of error and therefore inaccuracy may arise. It is therefore essential that investigators are made aware of the limitations of profiles that extend beyond the crime scene information, and instead preference research and likelihoods as the method of deriving offender traits and characteristics. One method that the BSU has found to be effective is the use of matrix-based reasoning to derive offender characteristics. This approach involves a ‘suspect prioritisation matrix’, developed through evidence-based factors associated with violent and sexual offending [62].

Child sexual homicides are extremely rare [39–41] and subsequently limited research has been conducted on these offenders. Of the studies available, many consist of small sample sizes and cases containing unique features which limit their generalisability. Although child sexual homicides are rare, and there is lack of research on this form of offending, it remains possible to determine some common co-occurring features of perpetrators. A variety of factors relevant to this form of offending, include things such as geographic location, sexual deviancy, and criminal history. These factors can be weighted in terms of their significance to child sexual offending cases. For example, sexual deviancy is a well-established empirically based risk factor for sexual violence recidivism [42] and has been shown as a feature of sexual homicide perpetrator [43]. In the absence of any formal assessment of sexual deviancy, OPs are able to indirectly assess whether features of sexual deviance may exist in the individual’s history based on the crime scene and empirical findings. In addition to socio-emotional information, environmental and situational factors are also relevant. For instance, research has found that unemployment is highly prevalent among sexual homicide perpetrators, with one study reporting over 80% unemployment in the studied sample [44]. Although one in five will be employed, there is a higher likelihood that a perpetrator will not be employed at the time of the offending.

In completing a suspect prioritisation matrix, persons of interest are scored on each of these common evidence-based factors associated with the offending [62]. Consequently, a suspect is considered to be of a higher priority if they are endorsed as having a greater number of factors, and the rating of each of these factors is of a higher severity or weighting. While implementation of a matrix involves analysis of each individual on the list, the outcome enables the investigative team to utilise knowledge of psychological and behavioural features to ensure that resources are directed to efforts most likely to achieve a positive result. Similarly, in cases where evidential interviews are to be conducted for multiple suspects, utilizing a similar method can assist the investigation team in planning which interviews present as priority tasks. The process of assessing known suspects for factors associated with perpetrators of similar crimes, ensures that those displaying histories, current behaviour, or personality characteristics consistent with these factors, can be focussed on more immediately.

2.5. Engagement, interview strategies, and operational support

The engagement, interviewing, and operational aspects of police investigations can be vast and varied, particularly for cold cases. At times there are long-term POIs who may be subject to various operational approaches (i.e., under-cover operations, or surveillance). There are many approaches to engaging a POI, or even a witness, with some of these simple, and others highly complex. For this stage of the investigation, the primary purpose of OP is to assist in providing greater understanding of a particular person. This may incorporate the use of personality profiles, advice on particularly aspects or features within a person’s life, or the development of steps to facilitate a formal interview. Engagement and operational approaches are often strategic components of cold case investigations. Due to this, OPs may provide advice which informs the tactical methods used to achieve an investigative strategy.

Alongside these areas, the BSU receives several requests for guidance and support in the interviewing POIs in cold cases. As interviewing is “an inherently psychological endeavour, and there is nothing unethical in psychological support” being utilised to assist police interviewing approaches and practices [45]. Over recent decades, the involvement of psychologists in interviewing practices has led to the development of rapport-based approaches to interviewing, superseding early coercive styles of practice [45, 46]. While psychologists can offer valuable insights into personality, cognitive functioning, questioning styles, and response consistency, there is an onus of practitioners to ensure that personal vulnerabilities of the interviewee are acknowledged by the interviewer to ensure safe rather than exploitative practice.

There are variety of different techniques and styles used in police interviewing, however, the common method of practice within New Zealand Police is based upon the PEACE principles [47]. This centres on the steps of (P) planning and preparation, (E) engagement and explanation, (A) account, (C) closure, and (E) evaluation. OPs seek to provide input on the POIs likely ways of engagement in an interview and the most suitable approaches to utilise when interviewing that subject. More specifically, requests may involve assistance with the planning and preparation of an interview, the ‘real-time’ support and feedback, or the review and analysis of historical interviews (including witnesses and suspects). There are a myriad of suggestions and recommendations that can be made for a given interview due to case circumstances, presentation of the POI, and interviewing officer. Some of the factors OPs consider about the interviewee and interview include:

- Core personality characteristics
- The presence of impulsivity and self-regulation deficits
- The presence of developmental difficulties and intellectual limitations
- The use of appropriate boundaries
- Methods to manage aggression and threats
- Skills for developing rapport
- Indication of manipulative tendencies
- Awareness of transference and countertransference
- The timing, structure, and pacing of the interview
Ultimately, investigative interviewing advice is intended to provide the
interviewer with greater insight into the psychology, motivations, ca-
pabilities, and behaviour of a POI. Interviewing guidance is typically
derived through abductive reasoning, with an analysis of historical
behaviour and present circumstances informing conclusions about the
POI. This often entails a similar approach to practice as that utilised in
indirect personality assessment as aforementioned. Although occasion-
ally, inductive conclusions are provided based upon prior research, or
occurrences. These statements serve to inform as to the likelihood or
probability of an outcome. For instance, OPs may provide comment on
the value of extensive planning and organisation being utilised in an
investigation by providing evidence of research findings. Statements
may cite research outcomes such as:

- 40–60% of suspects confess during a police interview [48,49].
- 49% of individuals intended to confess before the interview yet
decided not to upon commencing the interview, while 51% intended
not to confess, but subsequently ended up confessing [50].

3. Lessons from cold case investigations

OP has emerged as a specialised practice within policing, assisting
with the prevention, management, and investigation of crimes [2,51].
Although there are a variety of applications and circumstances for the
use of OP in policing, cold case investigations remain one of the most
central subjects. The objective of any investigation is to ultimately
solve the case, apprehending those responsible and seeking justice for
the victim and the community. Unfortunately, cold cases often remain
unsolved for extended periods of time and are characterised by low
clearance rates. These cases consume considerable police resources,
have large volumes of unorganised information and documentation,
may be mis/unclassified for several years, and risk being neglected due
to higher priority active investigations.

Solving any major police investigation is challenging, particularly
once a case extends beyond the first twelve months. In some instances,
cold cases have limited intelligence or evidence to guide the investiga-
tion, whilst in others, investigators may require a small breakthrough or
piece of information to apprehend a suspect. There are many moving
and evolving parts to cold case investigations and OP strives to assist in
narrowing the direction of the investigation and to reduce the investi-
gative gaps. OPs are not responsible for investigative decision-making,
but rather seek to inform and assist these endeavours and decisions.
Although there are several comments and conclusions that could be
made about OP in cold case investigations, the authors consider the
following points to be the pertinent lessons from their involvement in
cases.

3.1. OP is only a piece of the puzzle

The use of psychological advice in investigations is an essential tool,
however, it serves as one of many practices and approaches which
should be incorporated into an enquiry. Like many other forensic tech-
niques in cold cases, OP may not have existed at the time of the initial
investigation. By incorporating the practice, investigators are able to
look at a variety of different perspectives, circumstances, and witnesses
or suspects, through a psychological lens which may not have been
possible at the time of the early investigation. This may serve to provide
new lines of inquiry, different investigative approaches, an alternative
understanding of a POI, or even further investigative hypotheses.

Fundamentally, OPs may compliment, inform, or guide an investi-
gation, however, rarely, if ever, does the practice result in the direct
solving of a crime. As a discipline, there is often misunderstanding about
the effectiveness, usefulness, and expectations of practitioners in cases.
At times investigators believe that OPs will solve the case or find the
‘tell-tale clues to crack an investigation’. Due to this, it is often important
from the outset to establish the expectations and capabilities of OPs. On
some occasions, the conclusions provided in findings may prove essen-
tial to a case, yet, for other matters, the observations may only re-affirm
the established investigative conclusions/directions. In these instances,
it could be seen that OPs are re-hashing the evidence or facts, but
feedback from investigators has indicated the value of integrating
findings into a formal investigative position/s.

Another central challenge in cold cases can relate to the lack of
knowledge pertaining to OP services. Moreover, given that psychology is
based on probabilities and likelihoods, some investigators may perceive
that there are limited benefits to involving a psychologist in case. This
remains a barrier to providing assistance in some cases, however, there
has been a considerable shift in policing to incorporate fields of expertise
into investigations. OP is about providing insight, education, and a
psychological framework to support investigations. The practice of OP is
not intended to function in accordance with expert evidence or court
admissibility standards as the role supports investigations and is not
used a factual expertise to bring about charges [62]. Although OP can be
admissible in court, such uses of the profession are specific in scope, with
defined parameters, and generally relate to the assessment of risk or the
extent and severity of psychopathology.

3.2. The practice remains subject to fallibility

One of the greatest professional hazards is in failing to stay within
the bounds of practice and competence. At times OPs may be asked to
comment on certain aspects of a case that are outside the scope of psy-
chology, or instead, lacking in evidence or empiricism. There may also
be instances where investigators have expectations or a ‘wish list’ of
what an OP should provide to an investigation. However, by over-
reaching, or venturing outside of one’s competence, there is a risk of
the practice being harmed, or a case being misled. As a profession,
psychology is fallible, and this extends to OP [52].

Conclusions are derived from varying types of evidence which in turn
gives rise to various degrees of certainty or probability. In some in-
stances, deductive positions can lead to a conclusion which is true,
however, given the variability of crime scenes, information collection,
and unique features of perpetrators, most conclusions are a matter of
abduction, and therefore, a product of the most probable explanation.
Rarely are statements or conclusions an absolute. Due to this, OPs should
be aware of their limitations, educate investigators on probabilities,
likelihood and error rates, and endeavour to indicate the strength of
conclusions and statements provided within a report [3]. Moreover, as
with the practice of psychological assessment, OPs should seek to
question conclusions and the information in which they may be based
upon, seeking to reduce the risk of biases arising within the practice [31,
32,53].

As OP has evolved within the BSU, approaches to practice have been
continually subject to review. This has included ensuring that founda-
tional validity exists in providing advice with this being built upon
structured reasoning and hypothesis development. This ensures that
conclusions are derived from facts, evidence, and research rather than
experience or intuition. Where possible OPs seek to use validated psy-
chological assessment tools, and where relevant the limitations of these
are noted in furnished reports. Case discussions are often held between
OPs and senior investigators to review opinions and examine potential
biases, or limitations of reports. This is further addressed through
quality assurance methods such as peer review of reports and regular
feedback from investigators. Alongside these practices, when providing
reports to investigators, OPs seek to ensure that simple language is used
that is based on probabilities and likelihoods, rather than providing
absolute conclusions. Efforts are made to ensure that the limitations of
reports are acknowledged and that recommendations are not exagger-
ated or overstated. Importantly, although cold cases have investigative
challenges and limitations, when a comprehensive body of information
has been collected in a case, OPs are able to engage in a thorough case
analysis. This is possible due to reduced time demands of cold cases and
the ability to engage in a more extensive and prolonged consultation with investigators.

3.3. Hypotheses and reasoned scenarios are valuable

OPs are motivated to assist investigations, however, there is a risk that conclusions are made without sufficient information present to support a claim. To avoid this pitfall, there is a benefit to proposing hypotheses, or reasoned scenarios which highlight the information and facts used to reach a conclusion or opinion. Alongside this, alternative hypothesis or scenarios can be proposed which demonstrate where gaps or information are lacking, and therefore, limiting opinion. Interpreting and understanding evidence from a psychological and behavioural perspective, with the incorporation of empirical research findings, can permit for hypotheses and scenarios which serve to account for, or explain unknown aspects of the offence. This is consistent with Petherick and Brooks [3] who suggest that the integration of crime scene and forensic evidence, relevant research, and investigative or clinical expertise, assists in establishing hypotheses based on evidential material and applied reasoning. As observed by Epskamp-Dudink and Winter [31], “It is important that scenario reconstruction as an analytical tool finds its way into the investigative practice” (p. 75). The use of multiple hypothesis, or reasoned scenarios which vary in likelihood, functions to reduce the possibilities or explanations that exist within a case. This allows OPs to avoid the pitfall of having an ‘ultimate’ explanation or solution, and instead to focus on establishing the facts, and the psychological and behavioural features that provide information or evidence in relation to what has happened, and then where permitted, the ‘how’ and ‘why’ queries.

Although research findings and statistical information are valuable to investigators, OP advice is most effective when then rationale supporting derived conclusions is evident and explicit [54,55]. In many ways, a strength of the OP approach emerges through reasoned scenarios which are derived from the established facts, the process of elimination, and likelihoods. This presents OPs with the opportunity to examine those most evidentially supported, whilst also detailing the parameters and bounds of scenarios that are less probable.

3.4. Opinions are only as strong as the original investigation

Police investigations face the classic ‘house of cards’ scenario, where a fragile or poorly collected body of information may collapse an investigation. Policing is about broad information collection which produces facts and evidence. Over time this process should reveal the areas of prioritisation and ultimately the direction to proceed in a given case. As noted in the classic Sherlock Holmes detective novels, “when you have eliminated all which is impossible, then whatever remains, however improbable, must be the truth” [56].

The unfortunate reality of many cold case investigations is that the nature of the evidence and information is often lacking in some capacity and/or form. Although all investigations have gaps and limitations, cold cases are often subject to several issues. This may include, limited forensic testing (due to the age of the case), the death of a key witness or suspect, deterioration of evidence, retirement of an initial investigator, historical investigative standards and practices, and old-fashioned methods of collecting and storing information. Many of these investigative limitations have been overcome through modern policing practices and the advancement of forensic science technique.

Investigative limitations have a flow on effect throughout an investigation, and this can influence the advice and conclusions provided by OPs. In the absence of evidence, or information, OPs may not be able to provide sufficient reasoning to support opinions. This may limit advice to inductive inferences, or instead a summary of known research due to the lack of viable information to derive more comprehensive conclusions. Moreover, OPs may only be able to assist an investigation in a narrow capacity, such as offering victimology advice, or a personality profile, in lieu of a crime analysis or provision of offence scenarios. However, in cases where OPs can liaise with investigators and inform the prioritisation of further information collection, then it is possible to provide an extensive analysis of a case or POI. When information gaps can be addressed, and where time permits, the limitations of historical investigations can be mediated or overcome.

3.5. Missing person cases remain a challenge

A significant challenge for missing person investigations is that there is currently no established method for determining whether the individual is considered a ‘runaway’, if they have met with an accident, are missing as the result of a suicide, or whether they are the victim of foul play [57]. Where foul play is determined as most likely, the absence of a body in these cases also presents as a challenge. Given the lack of known crime indicators or evidence, OP techniques such as personality profiles or crime analysis are unable to be utilised in missing person cases. While assessing victimology can be critical [58,59], it is often limited to analysing a person’s life and considering various probabilities or scenarios that may account for the person going missing. Moreover, limited research exists in the area of missing person investigations, making this task difficult for both investigation teams, as well as the psychologists providing assistance [60].

One of the primary challenges for OPs is in determining relevant pre-disappearance behaviours and situational factors which may indicate a more probable event or occurrences (e.g., missing instead of suicide, or foul-play in lieu of missing). However, these determinations and opinions are often derived from limited information. In addition, the complexity of psychosocial wellbeing makes identifying an individual’s state of mind at the time of disappearance challenging, particularly when there is an absence of investigative information. Despite these limitations, OP provides a significant contribution toward assessing victim factors in the absence of crime factors. The conclusions or recommendations developed can often guide investigation teams in the collection of information from a variety of sources that are likely to provide integral details, such as personality features, relational patterns, and significant life events. Consequently, OP provides valuable assistance in missing person cases, but the extent of advice is restricted due to the nature of these cases.

3.6. Expert collaboration needed

OP developed as a form of practice to provide psychological expertise to police investigations. This was based upon the recognition that police investigations require input from experts across a variety of fields and settings. Investigations are a collective effort, with the whole greater than the sum of its parts [61]. The integration of expertise across various fields has been one of the primary developments in policing over the past few decades. Many cold cases have not benefited from this expertise, and it remains a widely available option for many investigative teams and police departments.

As the incorporation of expertise continues in police practice, cold cases are in a unique position to seek input from a variety of different professionals and fields. Given that cold cases are not bound by time restrictions, or investigative urgency, there is ample opportunity to identify aspects within an investigation where specific expertise may provide more comprehensive insight into an investigation, or specific form of evidence. This may include seeking a broad review of a case, consulting experts in body disposal, or where applicable, liaising with professionals such as criminologists or linguists. OP has benefited from the endeavours of integrating expertise into investigation and this remains an ongoing area for cold case investigations to explore.

4. Conclusion

The article has aimed to share the methods and learnings of OP
within New Zealand to allow other law enforcement agencies across the globe to understand the utility and scope of practice. Although having limitations, OP is a valuable tool for police investigations. There are a variety of techniques and approaches that can be employed to assist cold case investigations, with many of these cases pre-dating the development of the field. As a profession OP is centred on evidence and scientific reasoning, with best practice integrating a combination of deductive, abductive and inductive conclusions. OP is intended to provide insight, education, and psychological framework to support investigations. It is not intended to function as a forensic science technique which is admissible in court, but rather to support and inform police investigation. OP is a piece of the puzzle that assists investigative endeavours and outcomes. Cold cases have commonly reached an investigative end point and the use of OP permits an investigative team to view the case through a psychological lens. This involves examining ‘what’ has occurred, along with considering or proposing answers to the ‘how’, ‘why’, and ‘who’ questions. OP strives to inform and enhance operational decision-making, provide guidance on investigative directions, and assist in the development of strategies and methods within a cold case. OP serves as an example of integrative practice between law enforcement and psychology, with this permitting the application of psychological science to cold case investigations.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

[1] P. Collins, G. Johnson, A. Choy, K. Davidson, R. MacKay, Advances in violent crime analysis and law enforcement: the Canadian violent crime linkage analysis System, J. Govern. Inf. 25 (1998) 277–284, https://doi.org/10.1016/S0373-0257(98) 00008-2.
[2] L. Alison, A. Goodwill, L. Almond, C. van den Heuvel, J. Winter, Pragmatic solutions to offender profiling and behavioural investigative advice, Leg. Criminol. Psychol. 15 (2010) 115–132, https://doi.org/10.1355/1355226984634347, 2010.
[3] M. Davis, L. Rainbow, K. Fritzson, A. West, N. Brooks, Behavioural investigative advice: a contemporary commentary on offender profiling and behavioural investigative advice, in: A. Griffiths, R. Milne (Eds.), The Psychology of Criminal Investigation: from Theory to Practice, Routledge, 2018, pp. 187–206.
[4] S. C. M. Staal, S.C. Harvey, History, goals, and applications of operational psychology, in: M.A. Staal, S.C. Harvey (Eds.), Operational Psychology: A New Field to Support National Security and Public Safety, Praeger, California, 2019, pp. 3–16.
[5] W. Petherick, N. Brooks, Reframing criminal profiling: a guide for integrated practice, Psychiatr. Lawn. 28 (2020) 694–710, https://doi.org/10.1080/13574819.2020.1835702.
[6] W.A. Petherick, Induction and deduction in criminal profiling, in: W.A. Petherick (Ed.), Profiling and Serial Crime: Theoretical and Practical Issues in Behavioural Profiling, third ed., Anderson Publishing, 2000.
[7] J. Thornton, The general assumptions and rationale of forensic identification, in: D.L. Faigman, D.H. Kaye, M.J. Saks, J. Sanders (Eds.), Modern Scientific Evidence: the Law and Expert Testimony, West Publishing, 1997.
[8] R.N. Koets, Serial Arsonist Crime Profiling: an Australian Empirical Study, Firenews, 2001.
[9] J. Navarro, J. R. Schafer, Universal principles of criminal behavior: a tool for analyzing criminal intent, FBI Law Enforcement Bull. 72 (2003) 22–24.
[10] Federal Bureau of Investigation, Uniform Crime Report, 2002. https://ucr.fbi.gov/crime-in-the-u.s/2002, (Accessed 20 March 2019).
[11] M. Mouzos, Homicide in Australia: 2003–2004 National Homicide Monitoring Program (NHMP) Annual Report, Australian Institute of Criminology, 2005.
[12] New Zealand Police, Police Statistics on Homicide Victims in New Zealand 2007–2018, Evidenced Based Policing Centre, 2022. https://www.police.govt.nz/sites/default/files/publications/homicide-victims-report-2019.pdf. (Accessed 20 May 2022).
[13] A.L. Bateman, G.C. Safati, An examination of behavioral consistency using individual behaviors or groups of behaviors in serial homicide, Behav. Sci. Law 25 (2007) 527–544, https://doi.org/10.1002/bsl.749.
[14] I. Nînîluţo, Defending advertising, Philos. Sci. 66 (1999) 436–451. http://www.jstor.org/stable/188790?
[15] C.S. Pierce, in: K.L. Kretner (Ed.), Reasoning and the Logic of Things: the Cambridge Conferences Lectures of 1898, Harvard University Press, 1898.
[16] T. Bevel, R.M. Gardner, Bloodstain Pattern Analysis with an Introduction to Crime Reconstruction, third ed., CRC Press, 2008.
[17] W. Neublett, Sherlock’s Logic: Learn to Reason like a Master Detective, Barnes and Noble Books, 1985.
[50] N. Deslauriers-Varin, E. Beauregard, J. Wong, Changing their mind about confessing to police: the role of contextual factors in crime confession, Police Q. 14 (2011) 5–24. https://journals.sagepub.com/doi/10.1177/10986111110392721.
[51] L. Alison, The Forensic Psychologist’s Casebook: Psychological Profiling and Criminal Investigation, Devon Willan, 2005.
[52] W.A. Petherick, N. Brooks, Where to from here? in: W.A. Petherick (Ed.), Profiling and Serial Crime: Theoretical and Practical Issues in Behavioural Profiling, third ed., Anderson Publishing., 2014, pp. 241–259.
[53] B.C. Marshall, L. Alison, Stereotyping, congruence and presentation order: interpretative biases in utilizing offender profiles, in: L. Alison, L. Rainbow, S. Knabe (Eds.), Professionalising Offender Profiling: Forensic and Investigative Psychology in Practice, Routledge, 2011.
[54] L. Almond, L. Alison, L. Porter, An evaluation and comparison of claims made in behavioural investigate advice reports compiled by the national police improvements agency in the United Kingdom, J. Investigative Psychol. Offender Profiling 4 (2007) 71–83.
[55] T. Cole, J. Brown, What do senior investigative police officers want from behavioural investigative advisers, in: L. Alison, L. Rainbow, S. Knabe (Eds.), Professionalising Offender Profiling: Forensic and Investigative Psychology in Practice, Routledge, 2011.
[56] A. Conan Doyle, The Sign of Four, W.B. Conkey Company, 2013.
[57] S.J. Morzewitz, C. Sturdy Collins, Handbook of Missing Persons, Springer International Publishing Switzerland, 2016.
[58] G. Newiss, L. Fairbrother, Child Abduction: Understanding Police Recorded Crime Statistics, Home Office: United Kingdom, 2004.
[59] G. Newiss, Findings and implications from a study on UK child abduction, Br. J. Sch. Nurs. 8 (2013) 287–289.
[60] S. Foy, Profiling Missing Persons within New South Wales, Unpublished Doctoral thesis, Charles Sturt University, Australia, 2006.
[61] D.R. Hofstadter, Godel, Escher, Bach, An Eternal Golden Braid, Basic Books, 1979.
[62] L. Rainbow, A. Gregory, What behavioural investigative advisers actually do, in: L. Alison, L. Rainbow, S. Knabe (Eds.), Professionalising Offender Profiling: Forensic and Investigative Psychology in Practice, Routledge, 2011, pp. 18–34.
[63] K.A. Matire, T.M.S. Neal, Rigorous Forensic Psychological Assessment Practices Part I, the Joint Federal/provincial Commission into the April 2020 Nova Scotia Mass Casualty, June 2022, p. 15.
[64] T. Milton, What is a personality disorder? J. Pers. Disord. 30 (2016) 289–306.
[65] T. Thomas, Psychology is still a problematic science and the public knows it, Am. Psychol. 67 (2012) 807–808.
[66] K. Danziger, Naming the Mind: How Psychology Found its Language, Sage, 1997.
[67] S.O. Lilienfeld, Public skepticism of psychology: why many people perceive the study of human behavior as unscientific, Am. Psychol. 67 (2012) 111–129.
[68] D. Keatley, S. Cormier, Cold case investigation the doctor and the detective: bridging the gap between police and academics to solve cold cases, J. Crim. Psychol. 10 (2020) 45–46.
[69] B. Fox, L.N. Miley, S. Allen, J. Bone, C. Dodge, N. Khachatryan, M. Lyle, S. McKinley, J. Peake, M. Roos, Law enforcement and academics working together on cold case investigations: lessons learned and paths forward, J. Crim. Psychol. 10 (2020) 93–111.