

The Anatomy of a Criminal Investigation

Anatomie d'une enquête criminelle

Anatomía de una investigación penal

Kim Rossmo

Numéro hors-série, 2022

Prize winning articles from *Criminologie*

URI : <https://id.erudit.org/iderudit/1092596ar>

DOI : <https://doi.org/10.7202/1092596ar>

[Aller au sommaire du numéro](#)

Éditeur(s)

Les Presses de l'Université de Montréal

ISSN

0316-0041 (imprimé)

1492-1367 (numérique)

[Découvrir la revue](#)

Citer cet article

Rossmo, K. (2022). The Anatomy of a Criminal Investigation. *Criminologie*, 1–26.
<https://doi.org/10.7202/1092596ar>

Résumé de l'article

Malgré l'attention considérable portée à l'étude du maintien de l'ordre, les criminologues omettent l'une de ses principales fonctions. Les enquêtes criminelles impliquent environ 16 % du personnel d'application de la loi et jouent un rôle majeur, en fonction de leurs succès et de leurs échecs, dans la manière dont les forces de l'ordre sont perçues par le public. Cette lacune scientifique est d'autant plus surprenante compte tenu du rôle primordial que jouent les détectives et les enquêteurs policiers quant à la suite des choses. Sans la résolution du crime et l'arrestation de l'individu fautif, aucune autre instance du système de justice – procureur, avocat de la défense, juge, juré, probation, maison de détention, prison, libération conditionnelle, réinsertion sociale – n'entre en jeu. Les quelques recherches menées sur le sujet se sont surtout intéressées à l'aspect organisationnel et technique du travail de détective. J'opterai ici pour une approche différente et analyserai l'anatomie d'une enquête criminelle : sa structure sous-jacente, ce que cette démarche implique et exige, comment atteindre ces exigences, quelles en sont les failles, et où est la place à l'amélioration. Les points plus spécifiques que sont la phase opérationnelle de l'enquête, la définition et la nature de la preuve et la structure systémique derrière l'échec d'enquêtes seront aussi abordés. L'enquête dans l'affaire Gail Miller-David Milgaard servira d'exemple à l'étude.

The Anatomy of a Criminal Investigation

Kim Rossmo

Abstract Despite the considerable attention devoted to the study of policing, criminologists tend to ignore one of its most important functions. Criminal investigations involve approximately 16% of law enforcement personnel, and play a major role in the public's image of the police through their successes or failures. This scholarly lacuna is even more surprising given the gateway position held by detectives and police investigators. Unless a crime is solved and an individual arrested, the entire remainder of the criminal justice system – prosecutors, defense attorneys, judges, juries, probation, jails, prisons, parole, rehabilitation – fails to come into play. What research that has explored this function has been primarily interested in organizational and technical aspects of detective work. Here, I take a different approach by exploring the anatomy of a criminal investigation – the underlying structure of what is required, what is done, how it fails, and how it can be improved. Specific areas of interest include the functional phases of an investigation, the definition and nature of evidence, and the systemic structure of criminal investigative failures. The Gail Miller-David Milgaard murder investigation is used as a case study.

Keywords: Criminal investigations, detectives, policing, criminal investigative failures, wrongful convictions.

Introduction¹

In the popular conception of a criminal investigation, an intrepid detective discovers a number of puzzling clues, logically analyzes the evidence, and brilliantly exposes the murderer. The iconic

¹ French version published in *Criminologie. Enquête policière et techniques d'enquête*, vol. 53, no 2, Fall 2020. Rossmo, K. (2020). Anatomie d'une enquête criminelle. *Criminologie*, 53(2), 17-42. <https://doi.org/10.7202/1074187ar>

image is that of Sherlock Holmes, with his magnifying glass, following a series of footsteps to the dénouement of the mystery;² or C. Auguste Dupin, in *The Murders in the Rue Morgue*, reading his associate's mind by rationally tracing his line of thought over the previous fifteen minutes.

While real-world investigations are typically less dramatic and more chaotic than fictional detective stories, both require a framework centered on information (Willmer, 1970). The clues methodically uncovered by Holmes, Dupin, and their colleagues possess an information content. Investigators are particularly interested in a special type of information known as evidence. Flowing from the crime scene to the arrest to the trial, evidence is the lifeblood of any investigation.

Previous research found that many police managers, along with many academics, did not properly understand the nature of the investigative function (Eck & Rossmo, 2019; Horvath, Meesig, & Lee, 2003). In response, this article seeks to develop novel and useful insights into detective work by exploring the anatomy of a criminal investigation – its structure, operations, and failures.

Functional Phases of an Investigation

If evidence is the lifeblood of an investigation, the body it flows through consists of three different functional phases – obtaining evidence, processing suspects, and convicting the offender (see Table 1). The first phase includes evidence collection, evaluation, and analysis. The second phase can be divided into subparts involving suspect generation, prioritization, and assessment.³ The third phase requires using the case evidence to identify the offender and prove his or her guilt – a goal that can only be accomplished through a witness, a confession, or physical evidence.

Tableau 1 Criminal Investigative Phases

² As Sherlock Holmes explained to Dr. Watson in *A Study in Scarlet*, “There is no branch of detective science which is so important and so much neglected as the art of tracing footsteps.” This novel also fictionally debuted the magnifying glass as an investigative tool. In later stories, in addition to human footsteps the famous detective followed horse, cow, hound, carriage, and bicycle tracks.

³ Many criminal investigations are short and perfunctory; the offender is identified by the victim, a suspect is arrested by patrol officers, or an administrative decision is made to stop pursuing the case because of a lack of leads (Chaiken, Greenwood, & Petersilia, 1976). The focus in this article is on investigations of substance and complexity, often involving true mysteries and “whodunnits.”

Evidence	Suspects			Offender
	Generate	Prioritize	Assess	
Collection	Records Public	Description	Motive	Witness
Evaluation		Behavior	Means	Confession
Analysis		Geography	Opportunity	Physical Evidence

While Table 1 presents these phases in chronological order, in reality they overlap and may even operate independently of each other. Ideally, detectives would first find and process all the available evidence connected to a crime and carefully analyze its implications before moving on to suspects. However, the chaos and attention surrounding major crimes often result in a torrent of information and tips flowing into the police long before all the witnesses have been interviewed, the neighborhood canvassed, and the lab results returned. Detectives may also suffer from tunnel vision and premature judgment, concluding a particular suspect is guilty prior to considering all the evidence in a case. The premature shift from an evidence-based to a suspect-based investigation has led to a number of wrongful convictions.

Suspect and offender phases are sometimes temporally reversed. For example, detectives might have a good idea of who the offender is but lack the evidence necessary for an arrest. Alternatively, they may have the ability to legally establish guilt but not know who the offender is. This last scenario occurs when there is forensic evidence that definitely links to an individual (e.g., DNA), but that person is unknown and therefore must first be found before a comparison is possible. Collecting, prioritizing, and assessing suspects then becomes the investigative focus.

Research has shown that most crimes are solved by information obtained from the public (Chaiken et al., 1976). Police interview witnesses, informants, family and friends of the victim, neighbors in the area of the crime scene, ask for tips, and question informants in an effort to generate suspects. Sex offender registries, parolee lists, and other police and criminal databases are searched, along with motor vehicle department and various government record systems.

For serious stranger crimes, it is not uncommon for investigations to suffer from information overload problems after amassing hundreds or even thousands of suspects; prioritizing suspects then becomes necessary (Rossmo, 2000). However, there are only a limited number of methods for doing so. A generic physical description (race, sex, height, weight, hair color) is one option, though this requires a witness to the crime. Offender behavior may provide another approach. Finally, the ubiquity of addresses in various databases makes geography a useful method. A behavioral or geographic profile specific to the crimes under investigation can increase the precision of these last two techniques.

After suspects have been generated and prioritized, investigators have to assess them – or at least those most highly prioritized. This task is significantly more time-intensive than prioritization. Suspects have to be interviewed, along with their families, friends, and neighbors, alibis checked out, *modus operandi* compared, and so on. A suspect can also be assessed on the basis of motive, means, and opportunity. These three classic crime requirements directly relate to the basic 5Ws + 1 H of investigations: suspects (who) can be assessed by considering motive (why), means (what, how), and opportunity (where, when).

Proving guilt in a criminal trial can be only be accomplished through a witness, a confession, or physical evidence (Klockars & Mastrofski, 1991). This requirement connects back to the first, evidence-centric stage at the beginning of an investigation. The dynamics of the interconnected phases depicted in Table 1 are outlined in the crime-evidence-suspects-offender (cESO) schema shown in Figure 1.

- A crime is discovered.
- Police search for and collect evidence from the crime scene, which may lead to new investigative avenues and additional evidence. All evidence needs to be evaluated and analyzed.
- Guided by this evidence, investigators generate suspects, prioritize them, and then conduct assessments of the most likely possibilities.
- Legally establishing who the offender is requires “proof beyond a reasonable doubt” (Boyd, 2019). Such proof is derived from evidence in the form of a witness, a confession, and/or physical evidence.
- This process of identifying the offender and establishing guilt operates in both directions. Evidence found at the crime scene (e.g., fingerprints) or from follow-on investigative

efforts may lead to a suspect; alternatively, evidence obtained from investigating a suspect (e.g., a confession) may establish a connection back to the crime.

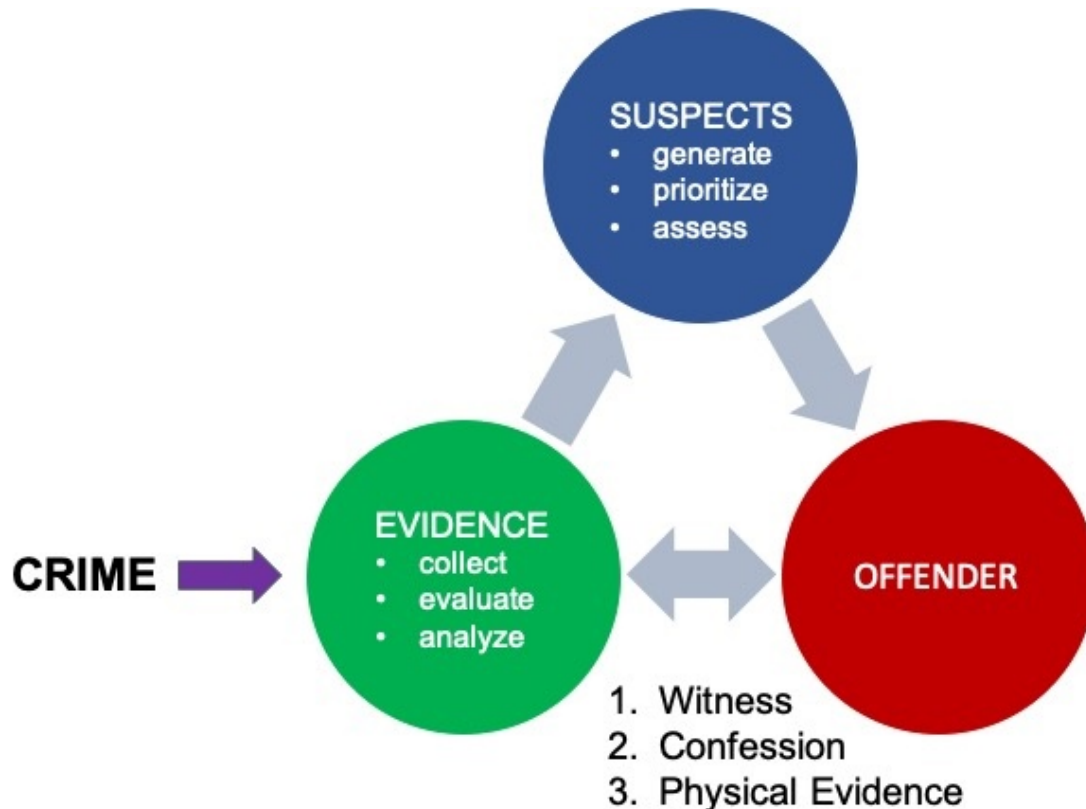


Figure 1. Crime-Evidence-Suspects-Offender (cESO) Schema

Evidence

Information – intelligence and evidence – is needed to strategically guide the collection, prioritization, and evaluation of suspects. It is important to understand what distinguishes evidence from intelligence. Evidence is a recorded fact relevant to the crime, the origin of which can be identified (e.g., witness statement, crime scene photograph, laboratory report, etc.). Theories, assumptions, and intuition are not evidence. Intelligence is a broader category of information that may not rise to the standard of evidence or be admissible in court. While criminal intel is often

useful in the early stages of an investigation to help guide police decision-making, evidence is required to legally solve a crime.

Evidence has two characteristics that determine its importance in an investigation – significance and reliability. Significance is the strength of the evidence, how strongly it supports the guilt of a suspect or points towards a particular theory of the crime in comparison to other suspects and theories. Reliability is the accuracy or truthfulness of the evidence. Even highly significant evidence has little probative value if it is wrong.

Significance

Significance can be formally measured by the likelihood ratio of the probability of the evidence given the hypothesis (e.g., a suspect is guilty) to the probability of the evidence given the complement of the hypothesis (e.g., a suspect is innocent):

$$LR = \frac{P(E|H_1)}{P(E|H_2)}$$

where:

LR = likelihood ratio

$P(E|H_1)$ = probability of the evidence given hypothesis H_1

$P(E|H_2)$ = probability of the evidence given hypothesis H_2 (the complement of hypothesis H_1).

A likelihood ratio greater than 1 means the evidence contributes to a conclusion of guilt, while a likelihood ratio less than 1 means the evidence contributes to a conclusion of innocence; the larger or smaller the likelihood ratio, the greater that contribution (Robertson & Vignaux, 1995). A likelihood ratio of 1 supports neither guilt or innocence (in other words, it is neutral and has no impact on either hypothesis).⁴ The numerator, which varies between 0 and 1, can only reduce the

⁴ The likelihood ratio is a measure of evidence diagnosticity. During the trial of Guy Paul Morin for the murder of his neighbor, Christine Jessop (see below), Crown counsel argued that Morin's failure to attend Jessop's funeral was evidence of consciousness of guilt. However, his attendance could have equally been regarded as *indicative* of guilt; police commonly monitor – as they did in the Jessop case – those who attend a murder victim's funeral in case the

probability of guilt, while the inverse of the denominator, which varies between 1 and ∞ , can only increase the probability of guilt. It is therefore not how well the evidence (e.g., DNA) matches the suspect that determines guilt – though a low match can establish innocence – but rather how unlikely it matches anyone else.

The likelihood ratios for all the evidence can be combined with the prior probability of a suspect's guilt to produce the posterior probability of guilt, following Bayes' theorem (Eddy, 2004; Iversen, 1984). Bayesian analysis provides a means of updating beliefs (e.g., probability of a suspect's guilt) when new evidence emerges. Bayes' theorem is:

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

where:

$P(A|B)$ = probability of event A given event B

$P(B|A)$ = probability of event B given event A

$P(A)$ = probability of event A

$P(B)$ = probability of event B .

With a few exceptions, such as DNA, it is not possible to precisely determine evidence probabilities. However, it is still important to understand the different contributions made by the numerator and the denominator in this equation. For example, suppose a witness describes a burglar as a white male wearing a black T-shirt and jeans. Police then see someone who fits this description. The description match is evidence, but how strong (significant) is it?

The first thing that needs to be determined is the probability of the evidence (description) given that the suspect is guilty. All parts of the description match; however, unlike sex and race,

killer shows up. A provincial inquiry later noted, "Mr. Morin's failure to attend the funeral or funeral home was worthless evidence and ought not to have been admitted" (Kaufman, 1998, p. 34). As the numerator and denominator probabilities for the significance of this evidence were similar, it had no diagnosticity.

people may change their clothing. The value of the numerator is therefore probably somewhat less than 1 (its maximum potential value).

The second part that needs to be determined is the probability of the evidence (description) given that the suspect is innocent; in other words, how likely is it that police might come across a white male in a black T-shirt who had nothing to do with the robbery? The answer is very probable given the demographic frequency of white males, the prevalence of black T-shirts and jeans, and the many individuals police encounter on a daily basis. Consequently, the denominator is reasonably high. Overall, the likelihood ratio in this scenario would be slightly over 1 (i.e., not very significant). While the police may want to question the individual, the reasonable and probable grounds for an arrest are lacking.

Now suppose the burglar was described as a white male wearing a purple Berlin Philharmonic T-shirt and jeans, with a Sasquatch tattoo on his right forearm. The police stop a similar suspect. In this case, the denominator probability is small because Berlin Philharmonic T-shirts are not common (at least in North America) and arm tattoos of Sasquatches even less so. The low denominator results in a high likelihood ratio, meaning the evidence is much more significant than in the first scenario, and justifies a detention.

It is important to remember that both the numerator and the denominator influence the significance of the evidence. In some wrongful conviction cases, detectives made the mistake of focusing only on suspect-offender similarities, while failing to consider how common the evidence was overall. A perfect match of a suspect to the evidence is only meaningful if the evidence is rare in the general population. This is the reason DNA is powerful evidence; it typically involves extremely low random match probabilities that establish guilt beyond any reasonable doubt.

Reliability

The strength of even the most significant evidence is eroded if it is not reliable. A number of factors can undermine reliability; for example, a witness might have something to gain, hold an animosity towards the accused person, been drunk or under the influence of drugs, and so forth. Following Thomas Sophonow's arrest for the murder of a teenage girl in Winnipeg, 11 different jailhouse informants rushed to volunteer their services to police in the hopes of having their current charges

dismissed. Crown counsel chose to call the three “best” of these to testify at trial. One, who had a conviction for perjury, had testified as a jailhouse informant in nine cases. A provincial inquiry later drily noted: “He seems to have heard more confessions than many dedicated priests” (Cory, 2001).

The notorious reputations of jailhouse informants made these claims highly suspect and detectives and prosecutors should have known their proffered evidence had little reliability. Unfortunately that did not happen and the significance of the evidence improperly overrode its unreliability. Sophonow was wrongfully convicted and spent four years in prison until his eventual exoneration and release.

Confessions can also suffer from reliability problems. Detectives coerced a confession from 14-year-old Michael Crowe for the murder of his sister, Stephanie, in Escondido, California. He was grilled for hours, promised leniency if he confessed, and lied to about the recovered evidence in the case (McCrary, 2009). Michael’s “confession” included such statements as: “I’m so sorry that I can’t even remember what I did to you.... I never meant to hurt you and the only way I know I did it is because they told me I did.” Despite such dramatic warnings of unreliability, police charged Michael with murder. He was later released after blood discovered on the clothing of a homeless man who had been trying to enter homes in the neighborhood the night of the murder was matched through DNA to the victim.

Finally, certain forensic science techniques have come under scrutiny for exaggerated claims, unreliable analyses, and the use of outright junk science (National Research Council, 2009). Guy Paul Morin was accused of murdering nine-year-old Christine Jessop who lived next door to him in Queensville, Ontario (Makin, 1992). Forensic scientists testified at trial that hairs and fibers seized from Morin matched those recovered from the murder scene. However, this claim was overstated and the forensic analyses were unreliable (Kaufman, 1998). Moreover, the fact that some of the evidence had been contaminated was not communicated to either police investigators or Crown counsel. Morin was convicted but later exonerated by DNA testing of semen stains found on the victim’s underwear. The Ontario Centre of Forensic Sciences subsequently underwent a major scandal and overhaul.

The relationship between the influence of evidence and its reliability can be expressed as follows:

$$P_{final} = r P_{prior} + (1 - r) P_{post}$$

where:

p_{final} = final probability of the hypothesis (adjusted for the evidence, given its reliability)

r = reliability of the evidence (expressed as a probability)

P_{prior} = prior probability of the hypothesis (before the evidence)

P_{post} = posterior probability of the hypothesis (adjusted for the evidence, assuming its total reliability).

Assessing the reliability of trustworthy witnesses and valid forensic techniques is also necessary as honest mistakes are possible (and even probable). For example, a witness might describe a criminal as younger than he actually is, or a pathologist could estimate the time of death in a murder as later than it really occurred. If a description involves a range (e.g., “25 to 35 years of age,” versus “late 20s”), then it will usually be more accurate (reliable) than a point estimate, albeit, at the cost of precision and investigative utility.

SRIP

In addition to significance and reliability, evidence must also be independent; derivative evidence does not contribute anything new to an investigation. Finally, it is important to understand how all the evidence fits together. This pattern must be considered as a whole and cherry picking avoided. However, as explained below, if detectives suffer from confirmation bias, there is a risk that the evidence supporting the dominant investigative theory will be overemphasized while any conflicting evidence will be downplayed.

In summary, detectives need to consider questions of significance, reliability, independence, and patterns (SRIP) to fully understand the probative value of an item of evidence (Eck & Rossmo, 2019):

- significance (strength of the evidence = ratio of guilt to innocence probabilities)

- reliability (accuracy/truthfulness of the evidence)
- independence (is it a unique contribution?)
- pattern (holistic consideration of all the information – avoid cherry picking).

Criminal Investigative Failures

Understanding the anatomy of a criminal investigation helps to both focus police efforts and highlight risks of failure. While evidence flows through all phases of an investigation, it takes on varying complexions and vulnerabilities at different points. Problems with evidence at any stage can lead to an investigative failure.

A detective must conduct a thorough investigation while avoiding a number of potential traps. There are three types of criminal investigative failure: (1) ignored crimes;⁵ (2) unsolved crimes that should have been cleared; and (3) wrongful convictions (Rossmo, 2009). While the second type of failure is the most common, the third is the most damaging. Research suggests that all three failure types share common causes (Rossmo & Pollock, 2019).

Using a scheme derived from Reason's (1990) failure domains, Rossmo and Pollock (2019) analyzed in detail a number of criminal investigative failures ($N = 50$) for murder and rape/sexual assault, most of which were wrongful convictions; 84% occurred in the United States, 10% in Canada, and 6% in Europe. Causal factors were identified for each case and categorized as personal, organizational, or situational in nature. Personal problems were within the individual control of a detective (e.g., rush to judgment, tunnel vision, logic errors, etc.). Organizational issues were within the control of the police agency (e.g., lack of resources, groupthink, interagency communication failures, etc.). Situational influences were outside the control of the criminal

⁵ Ignored crimes are those police fail to recognize as such, despite the evidence, due to incompetence or negligence. In 1979, Theresa Allore's body was found lying face down in a creek a mile outside the small rural village of Compton in the Eastern Townships of Québec (Allore & Pearson, 2009). Concerned about protecting the reputation of the local college, police dismissed the 19-year-old's death as an accidental drug overdose, despite no pathological evidence supporting their theory. Her death is now considered a murder, perhaps linked to other similar homicides of young women in the region. However, the case remains unsolved because of the failure to properly collect and retain evidence from the original scene. In the mid-1990s, a large number of street sex trade workers reported missing from Vancouver's Downtown Eastside were written off by the investigative manager as simply a matter of the women having left town. The Vancouver Missing women case eventually metastasized into the Pickton Pig Farm serial murder case, the worst in Canadian history (Oppal, 2012).

justice system (e.g., intense media attention, deceitful witnesses, etc.). The causal factors were also analyzed by proximity and interconnection. Finally, concept maps were constructed for each case outlining the various causal factors and their relationships with each other.

Of the 363 identified causal factors ($\bar{x} = 7.3$), 61% were personal in nature, 21% were organizational, and 18% were situational (see Figure 2). These were coded into 40 categories, the top eight (20%) of which accounted for half of all causes: confirmation bias, tunnel vision, intense media attention, management/supervision issues, careless/incompetent investigation, improper interrogations, rush to judgment, and improper forensics. These were further grouped into nine meta-categories, the most dominant of which involved cognitive biases. Particular factor combinations tended to cluster together; for instance, high-profile crimes often caused a rush to judgment, followed by the premature shift from an evidence-based to a suspect-based investigation. These problems then led to tunnel vision and confirmation bias, ultimately producing an evidence failure (Rossmo & Pollock, 2019).

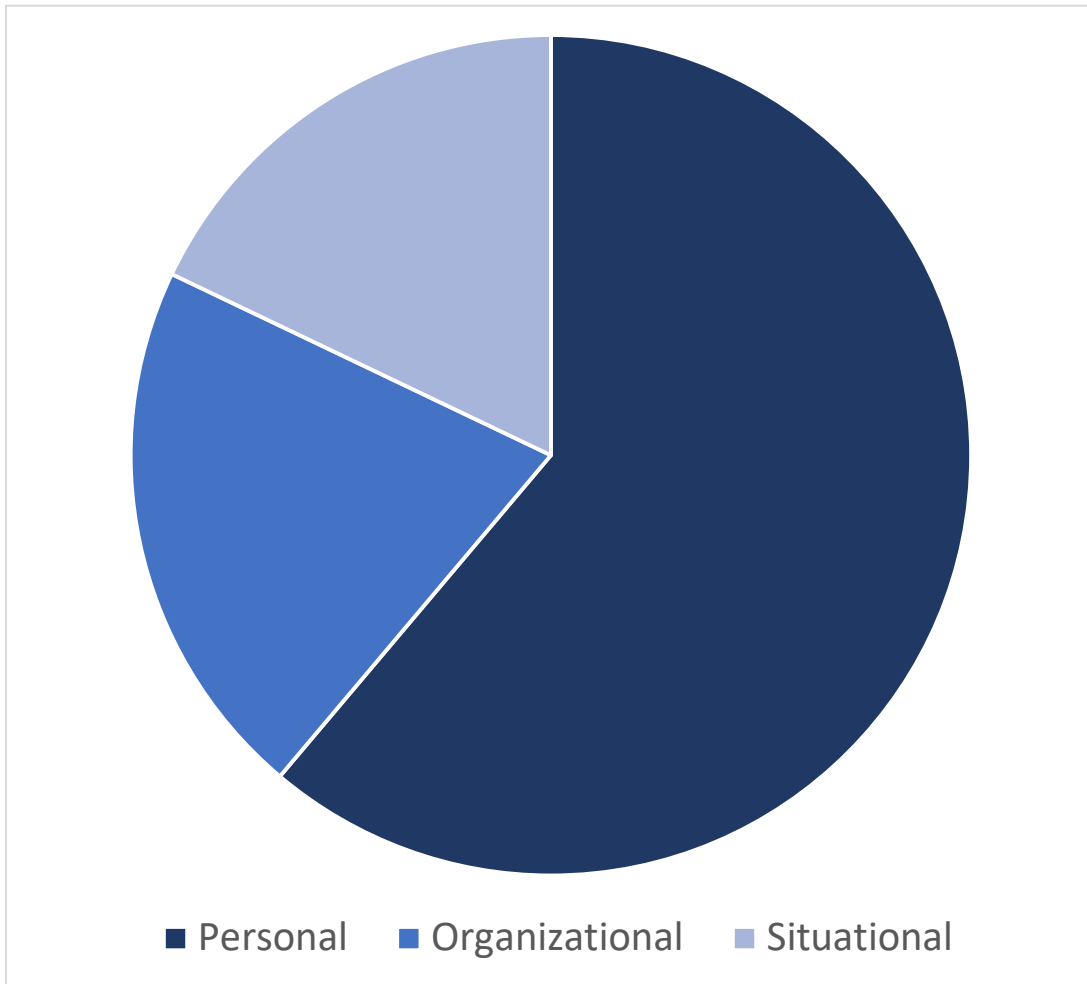


Figure 2. Causal Factor Classification.

Evidence Failures

As evidence flows through all phases of a criminal investigation, any integral evidentiary problems risk derailing a successful outcome. There are three types of evidence error that can impede or bias detective decision-making:

1. evidence collection – a failure to collect all the relevant evidence necessary to thoroughly investigate the case (e.g., crime scene evidence, neighborhood canvass, interviews);
2. evidence evaluation – a failure to assess evidence reliability (the probability an item of evidence – e.g., a confession, a witness statement, a lab analysis – is accurate or true); and

3. evidence analysis – a failure to logically analyze the evidence (e.g., significance, reliability implications, connections, patterns).

These errors often originate from a rush to judgment, followed by tunnel vision, confirmation bias, and/or groupthink. Research on the systemic causes of criminal investigative failures has found most involve multiple issues, 92% of which include evidence evaluation problems (Rossmo & Pollock, 2019). Figure 3 illustrates this breakdown.

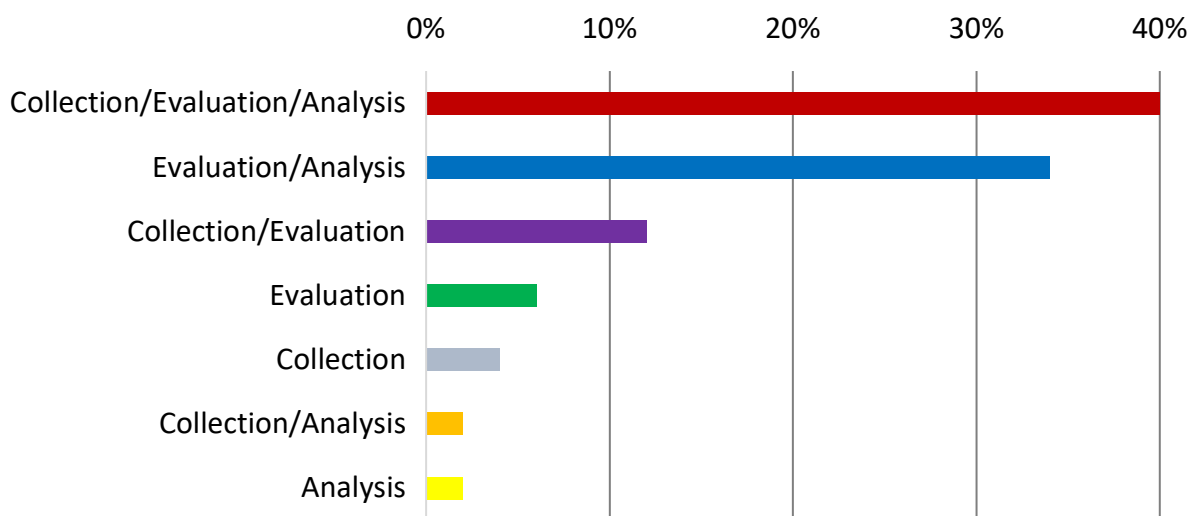


Figure 3. Evidence Failure Modes.

Evidence collection failures probably play a more significant role in unsolved crimes that should have been solved. A criminal investigation is a form of historical science (Cleland, 2002). Classical experimental sciences, such as physics and chemistry, observe and test to validate or falsify hypotheses (Lakatos, 1970; Popper, 1965). The process is inductive and forward-looking in that the results of an experiment are, by definition, only known in the future. By contrast, the evidential reasoning of historical sciences, including paleontology, astronomy, and geology, follows a more deductive process. Traces of past events are exposed and explanatory hypotheses formulated (Cleland, 2001). The classical sciences reason from causes to effects, while the historical sciences – investigations included – reason from effects to causes. For the latter, the search for evidence

takes on a primary role as traces generated by past events may exist but remain undiscovered. And undiscovered evidence can never be evaluated or analyzed. In a criminal investigation, the probability of discovery is a function of elapsed time as most evidence eventually decays. Cold case detectives “face problems of faded memories, missing witnesses, retired police officers, misplaced evidence, and altered crime scenes. Their criminal investigative expertise must be combined with historical research skills” (Rossmo, 2017, p. 560).

Case Study

The infamous wrongful murder conviction of David Milgaard provides a useful case study for examining the functional phases of a police investigation, the role of evidence significance and reliability, and the causal structure of a criminal investigative failure.

On the morning of January 31, 1969, 19-year-old nursing assistant Gail Miller was attacked while walking to the bus stop on her way to work at City Hospital in Saskatoon, Saskatchewan (Boyd & Rossmo, 1992, 2009). She was raped, stabbed, and left in a snowbank in an alley less than a block from her home in the neighborhood of Riversdale. The temperature with wind chill that morning was 42 degrees below zero Fahrenheit.⁶

David Milgaard, then a 16-year-old “hippie,” became a suspect in the crime. He had set out from Regina on a road trip with two other teenagers, Ron Wilson and Nichol John, to buy drugs. They drove to Saskatoon to pick up another friend, Albert “Shorty” Cadrain (who had the money to fund their enterprise), but ended up lost and stuck in the snow. Milgaard and Wilson separated to look for help, while John stayed in the car because of the cold. The teenagers were eventually able to free their vehicle and find Cadrain’s home.

Police recovered items from Miller’s purse leading from the crime scene to the Cadrain house, a block and a half south of the murder. They subsequently interviewed the three teenagers, who all denied knowing anything about the crime. However, Albert Cadrain later told detectives he saw blood on Milgaard’s clothing that morning, though no one else observed this. Investigators repeatedly questioned the teenagers. Eventually, and only after spending a night in jail, John told

⁶ Imperial measurements were used in Canada in 1969; -42° Fahrenheit is equivalent to -41° Celsius.

police she saw Milgaard stab Miller and provided a statement describing the attack. He was then arrested, charged with murder, and convicted.

Milgaard spent 23 years in prison. He was denied parole because of his refusal to admit guilt. In 1997, DNA testing conducted by a forensic laboratory in England determined that semen stains on the victim's uniform matched Larry Fisher, a convicted serial rapist, who caught the same bus at the same transit stop as Miller did every morning, and coincidentally lived in the basement suite of the Cadrain house. Milgaard was exonerated and received \$10 million from the Saskatchewan government. Fisher was convicted of first-degree murder and sentenced to life in prison, where he died in 2015.

cESO Schema

The framework of the cESO (crime-evidence-suspects-offender) schema can be used to analyze the Milgaard case.⁷

Evidence

Upon discovery of the murder, police investigators took photographs, recovered two pale yellowish frozen clumps from the snow by Miller's body, conducted an area search (in which they found the victim's purse and contents, wallet, sweater, and right boot), and interviewed people within a four-block radius of the crime scene, including those who used the same bus stop as she did. The frozen clumps consisted of seminal fluid and pubic hairs. The seminal fluid contained type A blood antigens, present in about 40% of the population. Semen was recovered from Miller's vagina during her autopsy, but for some unknown reason was not subjected to any laboratory tests. Semen stains on her white nursing uniform were completely overlooked by the crime laboratory and consequently were not submitted to forensic analysis.

Suspects

Police initially thought that a serial rapist in the Riversdale neighborhood might be the killer; however, the rapes stopped after the murder and this lead dried up. Miller's boyfriend was

⁷ The following discussion focuses on only key parts of the investigation; for more detail, see "Investigation into the Death of Gail Miller" (Chapter 8), *Commission of Inquiry Into the Wrongful Conviction of David Milgaard* (2005).

investigated and cleared. A total of 208 suspects were eventually checked, with sex offenders and criminals known to have used a knife prioritized. The items from Miller's purse led police towards the nearby Cadrain house, focusing suspicion on Milgaard and his associates. The Regina teenagers were literally in the wrong place at the wrong time. It likely did not help that they were petty criminals involved in drug trafficking in a former temperance colony.

Offender

Detectives concentrated on the four youths and began to pressure them in an effort to generate evidence linking Milgaard back to the murder. Police thought they finally had their break when John gave a statement claiming to be an eyewitness to the crime. Detectives subsequently arrested Milgaard and charged him with murder. However, John's evidence was flawed; police failed to properly consider the circumstances under which they had coerced a statement from her and what this meant for the reliability of her evidence (see below). "Evidence" derived from a suspect thought to be the offender is not really evidence if the suspect is innocent, and such an approach is risky if investigators suffer from cognitive biases and ignore reliability problems.

The real murderer was Larry Fisher, the Riversdale serial rapist police had first suspected. However, when Fisher's wife told police her husband might be the killer of Gail Miller, they dismissed her warning because Milgaard had already been convicted (Milgaard & Edwards, 1999). In 1997, DNA obtained from the semen stains on Miller's nursing uniform (originally missed by the crime laboratory) established a positive link between Fisher and the murder.

Evidence Significance and Reliability – John's Statement

Key excerpts from Nichol John's statement to the police follow (*Commission of Inquiry Into the Wrongful Conviction of David Milgaard*, 2005):

After we got to Saskatoon we drove around for about 10 or 15 minutes. Then we talked to this girl. This was in the area where Sgt. Mackie drove me around.

Ron was driving the car at this time. He drove to the curb where Dave spoke to this girl.

Dave was on the outside passenger side of the front seat. Dave opened the door to talk to this girl as she approached along the sidewalk.

Dave asked this girl for directions to either down town or Pleasant Hill. He offered to give her a ride to where ever she was going. She refused the ride.

Dave closed the door and said ‘The stupid bitch’.

We started to drive away and only went about half a block when we got stuck. We ended up stuck at the entrance to the alley behind the funeral home.

Ron and Dave got out and they tried to push the car. They couldn’t get it out.

I recall Dave going back in the direction we had spoke to the girl. Ron went the other way past the funeral home.

The next thing I recall is seeing Dave in the alley on the right side of the car. He had a hold of the same girl we spoke to a minute before. I saw him grab her purse. I saw her grab for her purse again. Dave reached into one of his pockets and pulled out the knife. I don’t know which pocket he got the knife from. The knife was in his right hand. I don’t know if Dave had a hold of this girl or not at this time. All I recall seeing is him stabbing her with the knife.

The next I recall is him taking her around the corner of the alley. I think I ran after that. I think I ran in the direction Ron had gone. I recall running down the street. I don’t recall seeing anyone. The next thing I knew I was sitting in the car again. I don’t know how I got back to the car.

John’s statement was significant and highly probative as it positively identified Milgaard as the murderer. It should have been evident, however, that its reliability was low. John was a 16-year-old street youth and drug user. She continued to travel with Milgaard after the day of the murder. The stories she told police varied greatly. She was under pressure by detectives to talk about the Miller case, and the day before her statement she was arrested and jailed overnight. Afterwards, she claimed she could not remember anything about the attack.

Moreover, John’s description of the location of the attack was not consistent with the route Miller typically took to the bus stop – the shortest path, a three-minute walk (Rossmo, 2016). On the morning of her murder, she left her home five minutes before the bus was due (what you would expect given the extreme cold), and there is no reason she would have been at the place where John said the attack occurred.

Most critical, the physical evidence failed to support John’s description of events. No blood was found in the snow where she claimed the attack happened or anywhere other than by Miller’s

body. Even more problematic, while the pattern of cuts in the victim's coat matched the pattern of her stab wounds, there were no cuts in her nursing uniform. This meant that, at some point, Miller's coat had to have come off, her uniform pulled down, and her coat put back on again. John described none of this.

There were significant inconsistencies between Nichol John's statement and the other evidence in the case, and the risk of her lying simply to get the police to leave her alone should have been considered. Despite its unreliability, the statement had great significance and the police and prosecutor believed her. Unfortunately, so did the jury. This flawed piece of evidence ended up playing a key role in the wrongful conviction of David Milgaard.

Concept Map

The Milgaard wrongful conviction can be deconstructed by identifying its causes and their relationships. The primary cause of this criminal investigative failure was confirmation bias on the part of police detectives, which resulted in a biased interpretation of evidence. However, as in most other such failures, several causal factors were involved and interacted to produce the outcome. Specific causal factors included:

- Unsolved sex murder – Police were under pressure because they had not solved a high-profile sex murder.
- Fisher-Cadrain house coincidence – Fisher, the real killer, lived in the basement suite of the Cadrain house. Items from Miller's purse and clothing were recovered between the murder scene and the nearby Cadrain house.
- Cadrain's deceitful witness claim – Albert Cadrain told police he saw blood on Milgaard the day of the murder, something no one else noticed. Cadrain may have been jealous of Nichol John's interest in David Milgaard and/or motivated by the reward money.
- Police pressure on juveniles – Detectives put pressure on Milgaard's teenage friends because of Albert Cadrain's deceitful claim that he had seen blood on Milgaard, and because of the proximity of the Cadrain house to the murder scene.

- John's untruthful witness statement – Nichol John gave detectives a statement, after considerable pressure (including being arrested and spending a night in jail), claiming she witnessed Milgaard attack Miller on the street, stabbing and then dragging her into an alley. However, her description of events was inconsistent with the physical evidence (e.g., location of attack, lack of blood stains in the snow, coat cuts and wound pattern).
- Confirmation bias – Police detectives suffered from confirmation bias, which resulted in the biased evaluation and interpretation of evidence. John's statement was taken at face value and its unreliability was ignored; the limited opportunity for Milgaard to commit the murder given the known timing of events was not considered; exculpatory witnesses were discounted; Milgaard's "hippie" lifestyle and drug use were considered relevant.
- Erroneous pathologist probability estimate – A trace amount of semen found in the snow at the murder scene was determined to have originated from someone with type A blood. Tests showed Milgaard was a non-secretor, meaning there would have been no antigens in his semen. The pathologist tried to explain this discrepancy with a highly improbable scenario involving a genital injury.
- Lab missed evidence – The RCMP forensic laboratory failed to find the killer's sperm on Miller's white nursing uniform. Consequently, physical evidence that would have excluded Milgaard in 1969 was ignored.

The concept map for the Milgaard case is presented in Figure 4:

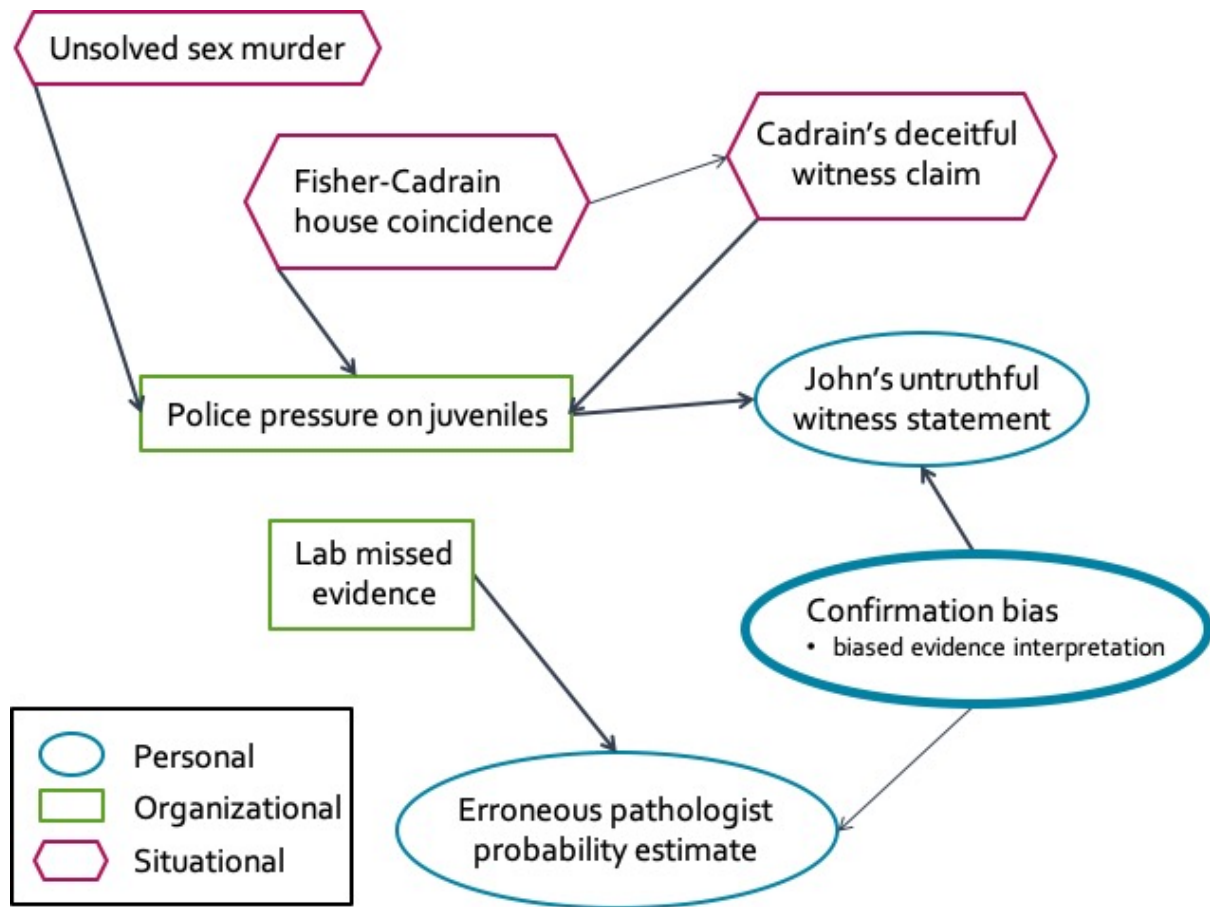


Figure 4. Milgaard Case Concept Map.

Conclusion

Police investigators are routinely expected to solve a case quickly and move on to the next one – often within 48 hours (Simon, 1991). But production pressures can undermine detective work. Undiscovered evidence cannot be analyzed, plays no role in the search for suspects, and will never be used to convict the offender. Time constraints jeopardize accurate reliability assessments and encourage cognitive biases. Resource limitations translate into evidence that is not fully analyzed in the forensics laboratory or in the minds of detectives.

These issues are particularly problematic in big cities where the preponderance of crime occurs. Most crimes remain unsolved and even many serious crimes such as murder are never cleared by police (Eck & Rossmo, 2019). An understanding of the anatomy of a criminal

investigation, however, may help suggest remedies for stalled or cold cases by highlighting specific problem areas. Some questions that might be considered include:

- Was any evidence missed; if so, can it still be recovered? Has reliability been properly evaluated? Was the evidence logically analyzed and holistic patterns developed?
- Is the suspect pool broad enough? Is information overload a problem? Are there sufficient resources for prioritizing and assessing suspects?
- Are failure risk factors present; if so, how can they be mitigated and managed?
- What type of evidence will most likely establish guilt in this particular case? Has sufficient effort been devoted to developing it?

Evidence is the *sine qua non* of any investigation; it originates from the crime itself and flows through every phase of the process. Each of these stages involves different objectives and requires distinctive tactics. A better appreciation of the structure and nature of the criminal investigative function is necessary if we want to maximize its probability of success while minimizing the risk of failure.

Références

Allore, J. et Pearson, P. (2009). What happened to Theresa Allore ? Dans D. K. Rossmo, *Criminal investigative failures* (p. 219-252). Boca Raton, FL : Taylor & Francis.

[Google Scholar](#)

Boyd, N. (2019). *Canadian law : An introduction* (7^e éd.). Toronto, Ontario : Nelson Publishing.

[Google Scholar](#)

Boyd, N. et Rossmo, D. K. (1992). *Milgaard v. The Queen : Finding justice – Problems and process*. Burnaby, Colombie-Britannique : Criminology Research Centre, Simon Fraser University.

[Google Scholar](#)

Boyd, N. et Rossmo, D. K. (2009). *Milgaard v. The Queen : Understanding a wrongful conviction for sexual homicide*. Dans D. K. Rossmo, *Criminal investigative failures* (p. 179-204). Boca Raton, FL : Taylor & Francis.

[Google Scholar](#)

Chaiken, J. M., Greenwood, P. W. et Petersilia, J. (1976). *The criminal investigation process : A summary report*. Santa Monica, CA : Rand.

Google Scholar

Cleland, C. E. (2001). Historical science, experimental science, and the scientific method. *Geology*, 29(11), 987-990.

Google Scholar 10.1130/0091-7613(2001)029<0987:HSESAT>2.0.CO;2

Cleland, C. E. (2002). Methodological and epistemic differences between historical and experimental science. *Philosophy of Science*, 69(3), 474-496.

Google Scholar 10.1086/342455

Commission of inquiry into the wrongful conviction of David Milgaard. (2005). *Transcription of witness statement of Nichol John dated May 24, 1969*. Repéré à http://www.publications.gov.sk.ca/freelaw/Publications_Centre/Justice/Milgaard/PublicDocuments/march7/NicholJohn/018589.pdf

Google Scholar

Cory, P. de C. (2001). *The inquiry regarding Thomas Sophonow*. Winnipeg, Manitoba : Queen's Printer.

Google Scholar

Eck, J. E. et Rossmo, D. K. (2019). The new detective : Rethinking criminal investigations. *Criminology & Public Policy*, 18(3), 601-622.

Google Scholar 10.1111/1745-9133.12450

Eddy, S. R. (2004). What is Bayesian statistics ? *Nature Biotechnology*, 22(9), 1177-1178.

Google Scholar 10.1038/nbt0904-1177

FPT Heads of Prosecutions Committee Working Group. (2004). *Report on the prevention of miscarriages of justice*. Ottawa : Department of Justice. Repéré à <https://www.justice.gc.ca/eng/rp-pr/cj-jp/ccr-rc/pmj-pej/p7.html>

Google Scholar

Horvath, F., Meesig, R. T. et Lee, Y. H. (2003). *National survey of police policies and practices regarding the criminal investigation process : Twenty-five years after Rand* (NCJRS 202902). Washington, DC : U.S. Department of Justice.

Google Scholar

Iversen, G. R. (1984). *Bayesian statistical inference* (Sage University Paper series on Quantitative Applications in the Social Sciences, No. 07-001). Beverly Hills, CA : Sage.

Google Scholar

Kaufman, F. (1998). *The Commission on Proceedings Involving Guy Paul Morin : Report*. Toronto, Ontario : Ontario Ministry of the Attorney General.

Google Scholar

Klockars, C. B. et Mastrofski, S. D. (dir.). (1991). *Thinking about police : Contemporary readings* (2^eéd.). New York, NY : McGraw-Hill.

Google Scholar

Lakatos, I. (1970). Falsification and the methodology of scientific research programmes. Dans I. Lakatos et A. Musgrave (dir.), *Criticism and the growth of knowledge* (p. 91-196). Cambridge, Royaume-Uni : Cambridge University Press.

[Google Scholar](#)

Makin, K. (1992). *Redrum the innocent*. Toronto, Ontario : Viking.

[Google Scholar](#)

McCrary, G. O. (2009). Who killed Stephanie Crowe ? Dans D. K. Rossmo, *Criminal investigative failures* (p. 143-178). Boca Raton, FL : Taylor & Francis.

[Google Scholar](#)

Milgaard, J. et Edwards, P. (1999). *A mother's story : The fight to free my son David*. Toronto, Ontario : Doubleday Canada.

[Google Scholar](#)

National Research Council. (2009). *Strengthening forensic science in the United States : A path forward*. Washington, DC : The National Academies Press.

[Google Scholar](#)

Oppal, W. T. (2012). *Forsaken : The report of the Missing Women Commission of Inquiry. Executive summary*. Victoria, Colombie-Britannique : Gouvernement provincial de la Colombie-Britannique.

[Google Scholar](#)

Popper, K. R. (1965). *Conjectures and refutations : The growth of scientific knowledge*. New York, NY : Harper and Row.

[Google Scholar](#)

Reason, J. (1990). *Human error*. Cambridge, Royaume-Uni : Cambridge University Press.

[Google Scholar](#) [10.1017/CBO9781139062367](https://doi.org/10.1017/CBO9781139062367)

Robertson, B. et Vignaux, G. A. (1995). *Interpreting evidence : Evaluating forensic evidence in the courtroom*. Chichester, Royaume-Uni : John Wiley & Sons.

[Google Scholar](#)

Rossmo, D. K. (2000). *Geographic profiling*. Boca Raton, FL : CRC Press.

[Google Scholar](#)

Rossmo, D. K. (2009). *Criminal investigative failures*. Boca Raton, FL : Taylor and Francis.

[Google Scholar](#)

Rossmo, D. K. (2016). Case rethinking : A protocol for reviewing criminal investigations. *Police Practice and Research*, 17(3), 212-228.

[Google Scholar](#) [10.1080/15614263.2014.978320](https://doi.org/10.1080/15614263.2014.978320)

Rossmo, D. K. (2017). Geographic profiling in cold cases. Dans R. H. Walton (dir.), *Cold case homicides : Practical investigative techniques* (2^e éd.) (p. 559-582). Boca Raton, FL : CRC Press.

[Google Scholar](#)

Rossmo, D. K. et Pollock, J. M. (2019). Confirmation bias and other systemic causes of wrongful convictions : A sentinel events perspective. *Northeastern University Law Review*, 11, 790-835.

[Google Scholar](#) [10.2139/ssrn.3413922](https://ssrn.com/abstract=3413922)

Simon, D. (1991). *Homicide : A year on the killing streets*. New York, NY : Ballantine Books.

[Google Scholar](#)

Willmer, M. A. P. (1970). *Crime and information theory*. Édimbourg, Écosse : Edinburgh University Press.

[Google Scholar](#)

Anatomie d'une enquête criminelle

Résumé

Malgré l'attention considérable portée à l'étude du maintien de l'ordre, les criminologues omettent l'une de ses principales fonctions. Les enquêtes criminelles impliquent environ 16 % du personnel d'application de la loi et jouent un rôle majeur, en fonction de leurs succès et de leurs échecs, dans la manière dont les forces de l'ordre sont perçues par le public. Cette lacune scientifique est d'autant plus surprenante compte tenu du rôle primordial que jouent les détectives et les enquêteurs policiers quant à la suite des choses. Sans la résolution du crime et l'arrestation de l'individu fautif, aucune autre instance du système de justice – procureur, avocat de la défense, juge, juré, probation, maison de détention, prison, libération conditionnelle, réinsertion sociale – n'entre en jeu. Les quelques recherches menées sur le sujet se sont surtout intéressées à l'aspect organisationnel et technique du travail de détective. J'opterai ici pour une approche différente et analyserai l'anatomie d'une enquête criminelle : sa structure sous-jacente, ce que cette démarche implique et exige, comment atteindre ces exigences, quelles en sont les failles, et où est la place à l'amélioration. Les points plus spécifiques que sont la phase opérationnelle de l'enquête, la définition et la nature de la preuve et la structure systémique derrière l'échec d'enquêtes seront aussi abordés. L'enquête dans l'affaire Gail Miller-David Milgaard servira d'exemple à l'étude.

Mots clés :

Enquête criminelle, détectives, maintien de l'ordre, échec du processus d'enquête criminelle, condamnation injustifiée.

Anatomía de una investigación penal

Resumen

A pesar del interés considerable por el estudio del mantenimiento del orden, los criminólogos omiten una de sus funciones principales. Las investigaciones penales implican alrededor del 16 % del personal de aplicación de la ley, y juegan un rol importante en función de sus éxitos y fracasos en la forma en la que las fuerzas del orden son percibidas por el público. Esta brecha científica es todavía más sorprendente teniendo en cuenta el rol primordial jugado por los detectives y los investigadores policiales en cuanto a lo que sigue. Sin la resolución del delito y el arresto del individuo infractor, ninguna otra instancia del sistema de justicia – procurador, abogado de la defensa, juez, jurado, libertad condicional, centro de detención, cárcel, liberación condicional, reinserción social – entra en juego. Las pocas investigaciones sobre el tema se interesaron sobre todo en el aspecto organizacional y técnico del trabajo de detective. Voy a optar aquí por una aproximación diferente, y analizaré la anatomía de una investigación penal – la estructura subyacente a ella, lo que implica y exige este procedimiento, cómo conseguir estas exigencias, cuáles son las fallas, y en dónde se podría mejorar. También serán abordados puntos más específicos, como la fase operacional de la investigación, la definición y la naturaleza de la prueba, y la estructura sistémica detrás del fracaso de las investigaciones. La investigación sobre el asesinato de Gail Miller-David Milgaard servirá de ejemplo para el estudio.

Palabras clave

Investigación penal, detectives, mantenimiento del orden, fracaso del proceso de investigación penal, condena injustificada.