



Criminal Investigative Failures ***Avoiding the Pitfalls (Part Two)***

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Part one of this article focused on cognitive biases and how they can contribute to criminal investigative failures. Part two presents probability errors and organizational traps that can lead investigations astray. It also offers recommendations and additional strategies that investigators may find helpful.

PROBABILITY ERRORS

Probability and Psychology

Anyone who has spent a few hours watching people gamble will realize that probability is a difficult concept for

the human mind. Individuals often use heuristics—and suffer from biases—when dealing with probability. Police officers find it particularly hard to think probabilistically. Because of their street experiences, they prefer black and white, rather than shades of gray. Probability errors in criminal justice most often occur in the forensic sciences but also can happen in criminal profiling.

Coincidences and the Law of Small Numbers

A common problem with probability results from looking

for patterns in, or drawing inferences from, a small number of incidents. For example, an analyst examines the dates for a series of 15 street robberies and observes that none of the crimes occurred on a Thursday. Is this pattern meaningful? Probably not. With only 15 crimes, chances are at least one day of the week will be free of robberies.

Skeptics often say they do not believe in coincidences. However, when looking for patterns within large numbers of items (i.e., events, suspects), coincidences are inevitable.

The comparison of Presidents Kennedy and Lincoln provides a well-known example. The list of remarkable similarities is strictly the product of chance (with 43 U.S. presidents, 903 possible comparisons are possible) and cherry picking (noting similarities, while ignoring differences).

What role does coincidence play in major crime investigations? If enough suspects are looked at, by sheer chance, some will circumstantially appear guilty. A few people will just be in the wrong place at the wrong time. Efforts to solve a crime by “working backwards” (i.e., from the suspect to the crime, rather than from the crime to the suspect) are susceptible to errors of coincidence. If you look hard enough, you can usually find some sort of connection. These types of errors often are seen in the proffered “solutions” to such famous cases as Jack the Ripper.

Coincidences can be a trap when offender modus operandi and similar fact evidence are used for crime linkage purposes. Trawl search problems occur when only similarities, and not differences, are examined.¹ Comparisons of common similarities (e.g., vaginal intercourse in rape crimes) lack utility, while misspecifications of similarities can be misleading. Consider two juvenile murder strangulations involving body transportation and concealment.

While the similar crime characteristics suggest a link, more detailed examination reveals important inconsistencies. One victim was a 3-year-old male, manually strangled, his body found in a dumpster 100 yards from his house. The other victim was a 14-year-old female, strangled with a rope, her body found dumped in a river 20 miles from her home.

Double Counting

Extracting two elements of a crime from a common source and then erroneously treating them as separate aspects can mislead a criminal investigation. A rumor heard from more than one person does not necessarily verify the information as both individuals may have received it from the same source. Consider a behavioral profile of

a child murderer. Amongst other details, the profile estimates the offender's age and his vehicle type, derived from automobile insurance data. Using the profile, investigators evaluate two suspects—one matches both the age and vehicle criteria, and the other only the age. Who is the better suspect vis-à-vis the profile? Actually, they are equal. Derived from the age estimate, the vehicle type is not an independent profile element drawn from the crime scene (as opposed to a vehicle sighting by a witness). Treating age and vehicle type as two separate match points constitutes double counting.

Conjunction Fallacy

The conjunction fallacy occurs when investigators assign a higher probability to the

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overlap of two events than to either event separately. Probabilities are combined by multiplying them together, resulting in a product smaller than either initial probability (given noncertainty).² Conjunction fallacies have occurred in DNA matching, offense-linkage analysis, and crime forecasting.³ Imagine that a witness reports seeing a vehicle flee a nighttime gas station robbery in which the clerk was shot dead. He states that he had only a quick glimpse but is reasonably sure the vehicle was a gray domestic minivan. How much weight should be placed on this description?

This question has two parts. First, what is the probability the witness actually saw the offender's vehicle? In major crime cases, especially those involving significant publicity, the public's desire to help or become involved is high, but their information often proves unreliable. A generous assumption gives the witness a 75 percent chance of actually having seen the robber's vehicle. Second, how accurate is his vehicle description? The witness provides three descriptive elements. Assigning witness accuracy probabilities of 70 percent to the make, 90 percent to the type, and 60 percent to the color (under some streetlights, blue looks gray) puts the likelihood that the witness saw a gray American-made minivan

at only 38 percent. The probability that the offender was driving such a vehicle is only 28 percent (the probability the witness actually saw the vehicle times the probability of witness accuracy). This does not mean his information is not valuable. Obviously, suspect vehicles that are gray domestic vans should be prioritized and investigated. The problem only occurs when other suspect vehicles (e.g., blue imported SUVs) are ignored.



A lack of understanding of base rates can lead to misinterpreting research findings and forensic results.



Base Rates

A lack of understanding of base rates can lead to misinterpreting research findings and forensic results.⁴ Consider the oft-quoted fact, "Serial killers are usually white males." While technically correct, at least for the United States, this statement is incomplete. To understand it properly, the relevant base rates also must be considered. Three different studies of serial murderers found black offender

proportions of 16, 20, and 20 percent, and female offender proportions of 9, 10, and 16 percent. According to the 2000 census, the U.S. population is 75 percent white and 49 percent male. So, while disproportionately male, the only reason most serial killers in the United States are white is because most of the population is white. More important, all else being equal, serial killers are less likely to be white in predominantly black or Hispanic areas.

Errors of Thinking

Research has identified two errors related to the issue of probability within the court context, the prosecutor's fallacy and the defense attorney's fallacy.⁵ The prosecutor's fallacy occurs when people equate the probability of the evidence given guilt with the probability of guilt given the evidence. Put simply, while all cows are four-legged animals, not all four-legged animals are cows. This error (known as transposing the conditional) can occur in both forensic science and behavioral profiling. This is illustrated by the investigation into two bomb explosions that killed 21 people and injured 182.⁶ Police officers detained a group of men traveling to a funeral and had their hands examined for traces of nitroglycerine. A forensic scientist testified at their trial that he was "99 percent certain" the

defendants had handled explosives. It was later disclosed, however, that many other substances could produce positive test results, including nitrocellulose found in paint, lacquer, playing cards, soil, gasoline, cigarettes, and soap. The defendants had played a game of cards on the train shortly before their arrest. Their convictions were overturned on appeal, partly as a result of the forensic evidence being discredited because the scientist had transposed the conditional.

The defense attorney's fallacy occurs when evidence is considered in isolation, rather than in totality. This type of error happened during O. J. Simpson's preliminary hearing. The prosecution presented evidence that blood from the murder scene, when analyzed using conventional grouping techniques, matched the accused, with characteristics shared by 1 in 400 people. The defense argued that an entire football stadium could be filled with people in Los Angeles who also would match; therefore, the evidence was useless.⁷ While the first part of the defense argument regarding the number of matches is correct, only a limited number of those people had relationships with the victims and even fewer had any reason for wanting to kill them. The probability of an individual filling all three categories (equal

to the individual probabilities multiplied together) is very low. Consequently, the second part of the argument—that the evidence is useless—is incorrect.

ORGANIZATIONAL TRAPS

Inertia, Momentum, and Roller Coasters

Conservative in nature, law enforcement agencies can suffer from bureaucratic inertia, a lethargy or unwillingness to change,



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evolve, or act. Change is disruptive and requires effort, energy, time, and money. Most departments, however, have many competing demands with few, if any, spare resources. Inertia can slow an agency's response to a new crime problem, as the Green River Killer case demonstrated.⁸ Police admitted that they had no idea what they were getting into when they began their investigation, which took 20 years to complete.

Organizational momentum, the inability to change direction in the midst of a major investigation, is the converse problem. To redirect and shift its focus from an established theory of a crime or a particular suspect is particularly difficult when an agency has to admit publicly that the original direction was wrong. But, staying the course in light of compelling evidence pointing in a new direction can prove catastrophic. Police must strike a balance between stability and responsiveness. The mistaken witness report of a suspect white van in the sniper attacks in the Washington, D.C., area serves as an example. "It begs the question, did we publish composite pictures because witnesses saw the white van, or did we see the white van because we published the pictures? We should've paid more attention to the description of the Caprice and given it as much credibility as the van, but we didn't. In hindsight, it was a mistake made in the emotion of the moment. But, with all that we had set in place, we should've done better."⁹

Detectives working high-pressure murder cases often refer to investigative roller coasters, the ups and downs resulting from the pursuit of prime suspects. A problem can occur if suspect "Jones" emerges during the investigation of prime suspect "Smith." Investigators

typically see the viability of a new suspect relative to existing ones, so if Smith is the best current suspect, then Jones is relegated to a secondary status. When Smith is cleared, what happens to Jones? At best, Jones stays a secondary suspect; at worst, he will be overlooked altogether. Often discovered in cold case murder investigations, such suspects are obvious to the fresh eyes of new observers not subject to the psychological and organizational pressures that may have affected the original investigators.

Red Herrings and Rumors

In high-profile cases, the constant media attention brings forth a flood of public information, some of it relevant, most of it not. During the 3 weeks of the Washington, D.C., sniper case, for example, authorities received 100,000 calls, and more than 500 investigators pursued 16,000 leads.¹⁰ In such situations, the police run the risk of landing a red herring. Witness misinformation, compounded by organizational reluctance to accept that the witness may be wrong, has sent several high-profile investigations down the wrong path.¹¹

Suspect vehicle sightings appear particularly problematic and include several infamous examples, such as the white box truck/van seen so often during the sniper shootings in

the Washington, D.C., area (the shooters drove a blue sedan). In addition, some red herrings can result from mischief or greed. During the Yorkshire Ripper inquiry in England, investigators received three letters and a cassette tape from a person claiming to be the killer.¹² Experts analyzed the voice on the tape and concluded that the speaker likely came from the same area postmarked on the letters. The tape was not from

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the killer, however, and the focus on this location—75 miles north of where the real offender lived—hurt the investigation.

In major cases, particularly those involving large numbers of personnel and extending over long periods of time, internal rumors can pose a significant problem.¹³ A solidified rumor is gossip that has hardened into “fact” and taken as such by the investigative team. Most vulnerable are detectives who later join a prolonged investigation

and, therefore, receive most of their information secondhand.

Investigators need to outline their assumptions. If an assumption later turns out to be invalid, then everything following from it must be rethought. As the human mind does not automatically reevaluate information, specific organizational procedures must be established to address this issue. Documenting assumptions facilitates this process and protects investigations from “creeping credibility,” which occurs when an idea or theory gains credence from the passing of time, rather than from supporting evidence. A possibility hardens into a probability and then crystallizes into “certain fact.”

Investigation teams must understand their knowledge base. They can assess validity only if they know the data source. Otherwise, the information may be a solidified rumor or the product of creeping credibility. Some teams catalogue case information using three factors that can facilitate effective information sharing, allowing everyone (both present and future) to work from the same foundation.

- 1) What they know (facts).
- 2) What they think they know (theories or conjectures).
- 3) What they would like to know (key issues requiring additional data).

Ego and Fatigue

Ego, both personal and organizational, can prevent an investigator from adjusting to new information or seeking alternative avenues of exploration. For example, a homicide sergeant in a large metropolitan area told the author that his detectives could decide within 5 minutes of arriving at a crime scene who had committed the murder and would be correct 95 percent of the time. While impressive, the remaining 5 percent equates to more than one missed call every month. Therefore, detectives must have the flexibility to admit their mistakes and avoid falling into the ego trap inherent in usually being right. Stubbornness often coincides with ego and proves equally problematic.

Fatigue, overwork, and stress, all endemic in high-profile crime investigations, also can create problems for police personnel. Research has shown that sleep can significantly improve insightfulness.¹⁴ "It's necessary to be slightly underemployed if you are to do something significant."¹⁵ Tiredness dulls even sharp minds. Critical assessment abilities drop in overworked and fatigued individuals, who start to engage in what has been termed "automatic believing."

Groupthink

Groupthink, the reluctance to think critically and challenge

Strategies to Help Avoid Investigative Failures

- Encourage investigators to express alternative, even unpopular, points of view and assign the role of devil's advocate to a strong team member.
- Consider using subgroups for different tasks and facilitate parallel but independent decision making.
- Recognize and delineate assumptions, inference chains, and points of uncertainty; always ask, "How do we know what we think we know?"
- Obtain expert opinions and external reviews at appropriate points in the investigation.
- Conduct routine systematic debriefings after major crime investigations and organize a full-scale "autopsy" after an investigative failure.²³
- Encourage and facilitate research into criminal investigative failures and how they might be prevented.

the dominant theory, occurs in highly cohesive groups under pressure to make important decisions. First suggested after the disastrous Bay of Pigs invasion in Cuba,¹⁶ the main symptoms of groupthink include three fundamental aspects.

1) Power overestimation: belief in the group's invulnerability (resulting in unwarranted optimism and risk taking); and belief in the morality of the group's purpose (leading to ignoring the ethical consequences of decisions).

2) Close-mindedness: group rationalizations; discrediting of warning signs; and negative stereotyping of the group's opponents (e.g., evil or stupid).

3) Uniformity pressures: conformity pressures (those who disagree with the dominant views or decisions are seen as disloyal); self-censorship (the withholding of dissenting views and counterarguments); shared illusions of unanimity (silence is perceived as consent, and an incorrect belief exists that everyone agrees with the group's decision); and self-appointed mind guards (individuals who elect to shield the group from dissenting information).

Groupthink has several negative outcomes that spell disaster for a major investigation. Victims of this trap selectively gather information and fail to seek expert opinions.¹⁷ They

neglect to critically assess their ideas and examine few alternatives, if any, and do not develop contingency plans.

RECOMMENDATIONS

Police investigations can significantly benefit from the thoughts and opinions of independent experts. The British Home Office, frustrated over the lack of progress in the Yorkshire Ripper murder inquiry, formed an external review committee that included a civilian forensic scientist who studied the locations and times of the crimes and correctly concluded where the killer lived (despite the misleading letters and cassette tape mentioned earlier).¹⁸

Outside review also can play an important role. Police procedures in the United Kingdom require an independent review of unsolved homicide cases after 1 year.¹⁹ This produces two results. First, knowledge of this policy prompts detectives to leave no possibilities unexplored. Second, external reviewers are more apt to notice mistakes and omissions. This is the same basis as scholarly peer review, a foundation of scientific research.

As a final warning, research has suggested that even when individuals are aware of these problems, they still find them difficult to overcome. The dangers are especially great in high-profile cases of horrific crimes, such as sex or child murders.²⁰

Prosecutors and judges, as well as police officers, can fall prey to these traps.²¹ Training is an important first step, but insufficient by itself. Effort and vigilance also are required. Law enforcement agencies need to create formal organizational mechanisms to prevent these subtle hazards from derailing criminal investigations.

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CONCLUSION

Thankfully, most criminals are not masterminds, and, in many cases, the criminal investigation is a straightforward process. However, a major crime “whodunit” can be challenging and difficult. Certain factors identified with cognitive and organizational failures (low information levels, limited resources, and pressure to obtain quick results)²² are all too common in these investigations.

The criminal investigation process plays an important and special role in countries governed by the rule of law. Its function is to seek the truth,

“without fear or favor.” That task, integral to both public safety and justice concerns, must be conducted in an unbiased and professional manner. When it is not, the result is unsolved crimes, unapprehended offenders, and wrongful convictions. Understanding what can go wrong is the first step toward preventing a criminal investigative failure. ♦

Endnotes

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² There is an assumption of independence of events.

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⁵ *Supra* note 4 (Robertson and Vignaux).

⁶ *Supra* note 4 (Robertson and Vignaux); and B. Woffinden, *Miscarriages of Justice* (London, England: Hodder and Stoughton, 1988).

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¹⁰ *Ibid.*

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¹² R.H. Doney, "The Aftermath of the Yorkshire Ripper: The Response of the United Kingdom Police Service," in *Serial Murder: An Elusive Phenomenon*, ed. S.A. Egger (New York, NY: Praeger, 1990), 95-112.

¹³ Studies of rumor propagation have shown that as a rumor spreads, its dramatic components are exaggerated, while its qualifiers diminish or disappear altogether; see, T. Shibutani, *Improvised News: A Sociological Study of Rumor* (Indianapolis, IN: Bobbs-Merrill, 1966).

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¹⁵ Dr. James Watson, Nobel Laureate in Medicine and codiscoverer of DNA's molecular structure, commenting on the importance of unstructured time in thinking.

¹⁶ Yale research psychologist Irving Janis.

¹⁷ Department of Justice, Canada, FPT Heads of Prosecutions Committee Working Group, *Report on the Prevention of Miscarriages of Justice* (Ottawa, 2004).

¹⁸ S.S. Kind, *The Scientific Investigation of Crime* (Harrogate, England: Forensic Science Services, 1987); and *The Sceptical Witness* (Harrogate, England: Hodology, 1999).

¹⁹ While many other factors are involved, it is perhaps worth noting that homicide clearance rates in the United Kingdom are over 90 percent compared with 63 percent in the United States.

²⁰ R.J. Heuer, Central Intelligence Agency, Center for the Study of Intelligence, *Psychology of Intelligence Analysis* (Washington, DC, 1999).

²¹ *Supra* note 17; and P. de C. Cory, *The Inquiry Regarding Thomas Sophonow* (Winnipeg, MB: Queen's Printer, 2001).

²² P. Stelfox and K. Pease, "Cognition and Detection: Reluctant Bedfellows?"

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²³ For example, the Vancouver, British Columbia, Police Department assigned a deputy chief constable to review thoroughly what happened, as well as what failed to happen, after a problematic serial murder case.

Over the course of his 21-year policing career, the author worked assignments in organized crime intelligence, emergency response, patrol, and crime prevention. His interest in the subject of criminal investigative failures originates from various unsolved major crime cases for which he has consulted. Currently, he is working on a book on the topic. He thanks those detectives who willingly discussed what went wrong in their investigations and dedicates this article to them.

Snap Shot

Call of the Wild

The sound of sirens at the scene of an accident attracted and confused two coyotes.



Photos submitted by Peter A Marchica, III and taken in Joshua Tree, California.