Jack the Ripper: A Wrongful Conviction

ABSTRACT: Readers of the significant media coverage generated by a recent article published in the *Journal of Forensic Sciences* might conclude DNA has finally solved the mystery of Jack the Ripper's identity. They would be wrong. The approach used by Louhelainen and Miller to analyze mtDNA recovered from a shawl allegedly taken from the murder scene of one of the Ripper victims required three antecedent building blocks: 1) connecting the shawl to the scene of the fourth murder; 2) connecting DNA recovered from the shawl to the victim, Eddowes; and 3) connecting DNA recovered from the shawl to the suspect, Kosminski. There are serious issues with each of these prerequisites. The underlying errors in logic and probability – tunnel vision, suspect-based focus, confirmation bias, uncritical acceptance of assumptions, unreported error rates, and probability mistakes – are the same ones found in wrongful convictions and other criminal investigative failures.

KEYWORDS: forensic science, Jack the Ripper, wrongful convictions, probability errors, confirmation bias, mtDNA

A cottage industry has developed around attempts to identify Jack the Ripper, with books and documentaries regularly claiming to have "solved" the case.[1] Readers of the significant media coverage generated by a recent article published in the *Journal of Forensic Sciences* might conclude DNA has finally resolved this mystery. They would be wrong. Louhelainen and Miller's mitochondrial DNA analysis linking an old shawl allegedly taken from the murder scene of Catherine Eddowes to a well-known Ripper suspect suffers from a number of issues (1). The focus in this commentary is on the problematic assumptions, interpretations, and conclusions surrounding the forensic examination (with any technical concerns left to DNA experts).

Realistically, the task of identifying Jack the Ripper is nearly impossible given the 131-year time interval. There are only three ways to solve a crime: 1) an eyewitness; 2) a confession; or 3) physical evidence (2). Modern efforts to uncover the Whitechapel murderer are typically limited to trying to establish direct or (more often) indirect connections between a particular candidate suspect and the Ripper's crimes, victims, and/or locations. At best, such associations can only be probabilistic. At worst, they fall into the trap of a suspect-based investigation, an error often seen in wrongful convictions (3).

The validity of any forensic analysis depends on the reliability of its underlying assumptions, which can only be assessed by considering the circumstances surrounding the crime and the details of its investigation. The approach used by Louhelainen and Miller required three antecedent building blocks: 1) connecting the shawl to the scene of the Ripper's fourth murder in Mitre Square; 2) connecting DNA recovered from the shawl to the victim, Catherine Eddowes; and 3) connecting DNA recovered from the shawl to the suspect, Kosminski. There are serious issues

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[1] A sample of these book titles include *Jack the Ripper – Case Solved*, *Jack the Ripper Unmasked*, *Jack the Ripper: Finally Revealed*, *Jack the Ripper – Case Closed*, *Naming Jack the Ripper*, and so on.

undermining each of these prerequisites; until they are resolved, little confidence can be placed in the analysis or its conclusions.

Murder Scene

Catherine Eddowes, the victim in the center of this controversy, was one of two women attacked by Jack the Ripper in the early hours of Sunday, September 30, 1888. Just after 1:00 am, the body of Elizabeth Stride was found in a courtyard next to the International Working Men's Educational Club on Berner Street in Whitechapel. Her throat had been cut and her windpipe severed. The doctor who performed Stride's autopsy concluded she quickly bled out (4). As she had no other injuries, police believed her killer was interrupted by a carriage entering the courtyard.

At 1:45 am, the badly mutilated body of the night's second victim, Catherine Eddowes, was found by a patrolling police constable in Mitre Square in the City of London. Her throat had been deeply cut and she had been disemboweled, her entrails thrown about her neck. Her nose, ear, and eyelids had been sliced, and her left kidney removed. These wounds appeared to have been inflicted postmortem as no blood spurting was observed on the bricks around her body. At Eddowes' inquest, police surgeon Dr. Frederick Brown testified he would not expect to find much blood on the killer, a caution seen in the Ripper's other attacks.

The murderer narrowly escaped being caught in Mitre Square. He had a brief window – less than 10 minutes – to attack his victim, mutilate her body, and then escape. At 1:00 am, Eddowes was released from police cells, following her arrest for drunkenness the evening before. At 1:35 am, Joseph Lawende and two friends leaving the Imperial Club at 16-17 Duke Street saw her talking to a man dressed as a sailor with a reddish handkerchief around his neck (but no shawl). Eddowes and this man were standing at Church Passage and Duke Street, only 50 yards from Mitre

Square. Ten minutes later, Edward Watkins PC 881 of the City of London Police discovered her eviscerated body.

Dissection of Connections

Murder-Shawl Connection

The provenance provided for the shawl by Louhelainen and Miller is scant, sketchy, and problematic. They state (p. 1):

In 1888, Acting Sergeant Amos Simpson originally recovered the shawl from the scene of one of the murders, and more recently, it was stored in the Metropolitan Police Crime Museum, also known as the Black Museum. The location and movements of the shawl are recorded in the provenance letter, written by a direct relative of Amos Simpson.

The provenance letter (Fig. 1), prepared in 2007, states nothing more than the shawl was given to the writer's great-grandmother by Amos Simpson and then passed down by family members. The shawl was later purchased by Russell Edwards, an "amateur sleuth," at an auction in 2007 (5). Apparently the Black Museum was asked at some point if they could authenticate the item; this did not work out too well as the examining expert dated the shawl to the early 1900s (6).

Simpson was a member of the London Metropolitan Police.[2] However, Mitre Square, where Eddowes was murdered, is in the City of London and outside the Met's jurisdiction. We would have to imagine that Simpson somehow left his beat, and then stole evidence from the murder scene of one of the most notorious cases in England's history. Even more amazing would be the City of London Police officers, including Assistant Commissioner Sir Henry Smith who rushed to

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[2] For a family recollection of Constable Simpson's career, see: https://forum.casebook.org/forum/ripper-discussions/police-officials-and-procedures/general-police-discussion/8659-pc-amos-simpson.

the scene, allowing him to take the shawl. Moreover, it is unclear why Simpson should have wanted the item. It was so bloodstained that a section was apparently cut out and removed by his wife, making the shawl worthless as an item of clothing (1). If it was meant to be a macabre "souvenir," it does not follow that Simpson would then give it to his wife or let her remove the bloodied segment.

Eddowes-Shawl Connection

While several witnesses saw Catherine Eddowes on Saturday, at the police station, and early Sunday morning, no one described her wearing a shawl. Nor is one mentioned in the list of her clothing detailed in the autopsy report of Dr. Brown (7). Louhelainen and Miller themselves argue the shawl was too expensive to have been owned by the destitute and homeless Eddowes.

They circumvent this problem by suggesting the shawl actually belonged to the killer rather than Eddowes. However, this workaround just leads to more unanswered questions. Why would the Ripper wear a woman's shawl? And why would he carelessly leave it at a crime scene, out of character with all his previous caution?[3]

Over the past century, the shawl has had multiple owners and was handled by and exposed to an unknown number of people (6). Contamination is a major problem in mitochondrial DNA analysis because of its sensitivity (8). Louhelainen and Miller therefore try to connect the shawl to Catherine Eddowes by analyzing those stains they deemed to be blood. However, a review of the language they use to describe this process exposes multiple uncertainties (p. 5; italics added):

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[3] Losing the shawl at the murder scene would be even more unlikely if Louhelainen and Miller are correct that it "could not have been used as an outer garment as exposure to rain would probably have released the blue dye" (p. 5).

- The stains consisted of various spatter-type stains *considered* to be blood, a *possible* imprint of internal organs and stains that *followed* the behavior of semen stains under reflective UV light.

- The investigation focused on forensic-related stains, that is, stains, which *looked like* they originated from blood, imprints of internal organs or semen, as *indicated* by the forensic imaging analysis.

- Mitochondrial DNA was amplified from the stains *judged* to originate from blood or internal organ imprints.

- The limited length and the fact that none of the sequences retrieved matched the owner of the shawl or laboratory personnel *suggests* that these sequences indeed originated from the event when the stains were originally formed.

These statements of probability (or mere possibility) are not supported by confirmatory tests, confidence estimates, or error rates.[4] The suppositions then crystalize into hard facts, their uncertainty ignored, to serve as foundations for the DNA analysis. The shawl stains are transformed into *19th-century* stains, *victim* stains, and *suspect* stains – all in the absence of any definitive proof.

Kosminski-Shawl Connection

Kosminski Lineage

Louhelainen and Miller claim "mtDNA sequences obtained from semen stains match the sequences of one of the main police suspects, Aaron Kosminski" (p. 2). Kosminski was first

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[4] Forensic scientists have been criticized for imprecise language during trial testimony (e.g., "cannot be excluded"), and a failure to articulate test error rates (9).

identified as a suspect in an official but confidential report written by Sir Melville L. Macnaghten,[5] London Metropolitan Police, on February 23, 1894 (but only made public in 1951). In his report, Macnaghten briefly discusses three suspects, the second of whom was Kosminski (10):

> Kosminski, a Polish Jew, & resident in Whitechapel. This man became insane owing to many years indulgence in solitary vices. He had a great hatred of women, specially of the prostitute class, & had strong homicidal tendencies; he was removed to a lunatic asylum about March 1889. There were many circs connected with this man which made him a strong 'suspect'.

Prior to this, Kosminski's name does not appear in the extant official police files (7). Macnaghten's report did not mention Kosminski's given name, age, or address. The existence of an Aaron Kozminski, a Colney Hatch Asylum inmate, was discovered in 1987 through the efforts of a researcher; various efforts have since been made to link Kozminski to Kosminski, all requiring convoluted reasoning and multiple leaps of faith (6). There is no evidence connecting Aaron Kozminski to the original police suspect and many reasons to distinguish them (e.g., different committal dates, different death dates).

At times various Ripperologists, in an effort to fit a particular suspect into this frame, have argued the name was actually Kosmanski, Karminski, Kasminsky, Klosowski, Konovalov, Pedachenko, Ostrog, Cohen, or Chapman (11,12). Kosminski is a toponymic surname, derived from the Polish locality Koźmin, and likely not uncommon in late-19th-century Whitechapel where many Eastern European immigrants resided. In summation, we do not know which Kosminski Macnaghten was referring to, let alone who his current descendants are. Beyond explaining that reference samples were obtained from maternal descendants of the suspect, Louhelainen and

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[5] Macnaghten joined Scotland Yard in 1889, a year after the murders, and had no direct involvement in the investigation (4). He later became Assistant Chief Constable of the Criminal Investigation Division (CID).

Miller do not elaborate on their genealogy work. Such research would have been complicated by the fact that mtDNA is only maternally inherited, meaning Kosminski could not have been the genealogical starting point (13).

Louhelainen and Miller portray Kosminski as one of the "main" and "most well-known" suspects "as identified by multiple persons linked to Scotland Yard" (pp. 2, 9). Again, no details or supporting references are provided for these assertions. The reality is that Kosminski is just one of many Ripper suspects. Macnaghten himself was inclined to exonerate Kosminski and considered Montague Druitt, another suspect, to be the most likely candidate for Jack the Ripper (6). But this is all just speculation.

Most serial murder investigations suffer from information overload[6] (15). True to form, there are over 500 Ripper suspects listed in the files of *Casebook: Jack the Ripper*, 31 of whom are considered "main" candidates, though there is no real evidence for any of them (16). However, Louhelainen and Miller do not mention testing any other individuals; indeed, the resources necessary to trace the descendants of numerous suspects would have been prohibitive. Multiple suspect testing also alters DNA probability calculations. Assuming Kosminski was the only suspect looked at in this analysis, the question has to be asked – why him? He was only one of many possibilities. Given all the other equally likely (or dubious) suspects, it is rather incredulous this effort hit the nail on the head the first time around.

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[6] The 1975-1980 police inquiry into the 20 attacks (13 murders) of the Yorkshire Ripper, named after his Whitechapel forerunner, amassed 268,000 names (14).

Semen Stains

Louhelainen and Miller try to link the killer to the shawl on the vague basis of "stains that illustrated semen-like behavior during the initial inspection ..." (p. 8). However, there was nothing suggesting sexual activity at any of the Ripper's crime scenes. More specifically, the medical examiner who attended Eddowes' murder site found "no trace of any recent sexual connection" (4).

In 1988, the FBI Behavioral Science Unit prepared a criminal personality profile for Jack the Ripper. After analyzing the crime scenes, police reports, photographs, victimology, autopsy reports, and area demographics, they concluded the crimes were blitz attacks and lust murders. They found the offender exhibited a high degree of psychopathology, but no evidence of sexual assault (15).

Given the lack of a confirmatory test for semen, the failure to provide an error rate for the visual inference method, no evidence of sexual assault at any of the five canonical Ripper crime scenes, the short time available to the killer in Mitre Square, and the FBI behavioral profile, there is little basis for concluding semen stains were on the shawl, let alone they originated during Eddowes' attack.

DNA Analysis

<u>Mitochondrial DNA</u>

Even though Louhelainen and Miller state their initial aim was not to solve the Jack the Ripper case, in fact that is exactly what they eventually claim: "The completed DNA sequences displayed an overall match for both the suspect candidate and the victim ..." (p. 5). The use of the word "match" is misleading in the context of this analysis. Mitochondrial DNA is not a unique

identifier; it can eliminate suspects in a criminal investigation but not implicate them (17). If the relevant haplotype sequence frequency is small, mtDNA may exclude a significant portion of the population, producing random match probabilities on the order of 0.01 to 0.001 (18). It is best thought of as supplementing other investigative information and is rarely the only evidence in a criminal case.

Louhelainen and Miller report mtDNA profile frequencies of 1.9×10^{-2} for Kosminski and 1.3×10^{-3} for Eddowes, based on EMPOP database material for a pure European population. They note that to the degree this population reference differs from that in 1888 East London, their figures will be off. The calculate by multiplication the probability of finding both profiles as 2.5×10^{-5}. However, even in the unlikely event the shawl really was recovered from the murder scene, the conditional probability that Kosminski was Jack the Ripper is not increased by the presence of Eddowes' DNA.

Moreover, it is the source probability, not the random match probability, that is relevant here: "the *random match probability* is the probability that a person randomly selected from a population would match the trace evidence as closely as the suspect. The *source probability*, in contrast, is the probability that the suspect is actually the source of the recovered trace evidence" (19, pp. 165-166). The random match probability is based on the number of loci matches, while the source probability is a function of the random match probability and the number of potential suspects (20). There were thousands of Londoners in the latter category, so the source probability that Kosminski is Jack the Ripper is actually very low. And because only a single person was looked at, the DNA probabilities of other suspects remain unknown, precluding any meaningful comparison.

<u>DNA Phenotyping</u>

Louhelainen and Miller also conducted a phenotypic analysis: "The results [brown hair, brown eyes] were in full accordance with one of the very few witness statements considered reliable: a male with brown eyes and brown hair. Although these characteristics are surely not unique, they fully support our hypothesis" (p. 9). This statement is also misleading. First, they fail again to provide any contextual information, such as who this witness was or why he was considered credible, that could be used to evaluate their claim. This is certainly no consensus on the issue of "good witnesses." Macnaghten himself wrote in his report, "No one ever saw the Whitechapel murderer; many homicidal maniacs were suspected, but no shadow of proof could be thrown on any one" (10). Second, the results of a phenotypic analysis are probabilistic, not definitive, and the relevant confidence level should also be documented.[7] Third, as the authors acknowledge, the discrimination here is limited and dependent upon the frequency of brown eyes and brown hair amongst males in 1888 Whitechapel. Finally, this analysis does nothing to support the suspect hypothesis for the simple reason that there is no record of Kosminski's eye or hair color.

Discussion

Little confidence can be placed in any of the three prerequisites underlying the mtDNA analysis. To summarize the major problems and questions:

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[7] Prediction models may also not represent the full range of human genetic diversity. DNA phenotyping predicted the Golden State Serial Killer would have green or hazel eyes; in fact, Joseph James DeAngelo, Jr. has blue eyes.

- *Murder-shawl connection*. The shawl lacks a reliable provenance. The murder occurred in the City of London but Simpson was a Met officer. Why would Simpson steal (or be allowed to take) evidence from a notorious crime scene?

- *Victim-shawl connection*. No one saw Eddowes wearing a shawl, and it was too expensive to be owned by her. Alternatively, why would the Ripper wear an item of women's clothing or carelessly leave it at a murder scene? What error rates were associated with the stain analysis and what was the impact of contamination?

- *Suspect-shawl connection*. The Ripper attacks were not typical sex crimes and no sperm was recovered from any of his murder scenes. No one knows who the original Kosminski police suspect was, let alone who his relatives and descendants are. Why was Kosminski the only Ripper suspect selected for mtDNA comparison, and what is the likelihood he coincidentally ended up being a "match"? The DNA phenotyping is irrelevant because Kosminski's eye and hair color are not known.

The underlying errors in logic and probability in this article – tunnel vision, suspect-based focus, confirmation bias, uncritical acceptance of assumptions, unreported error rates, and probability mistakes – are the same ones commonly found in wrongful convictions and other criminal investigative failures (21).

Tunnel vision involves a narrow focus on a single theory, such as the exclusive targeting of Kosminski for the mtDNA test, and can lead to a premature shift from an evidence-based to a suspect-based investigation. Confirmation bias, a type of selective thinking, then becomes a problem (22). Human inclination is to confirm our theories by seeking supporting information, interpreting ambiguous information as backing our beliefs, and minimizing inconsistent

information.[8]   Within the context of a criminal investigation, confirmation bias may cause a detective to accept at face value evidence that supports the investigative theory, skeptically dismissing contradicting evidence, and failing to consider alternative hypotheses. Cognitive biases often lead to logic and probability errors, including the uncritical acceptance of investigative assumptions and a disregard of error rates (26).

Criminal investigations are about establishing the probability of a suspect's guilt. But a chain of inference is only as strong as its weakest link. In this case, the mtDNA analysis forms just one part of the equation; the probability the shawl was connected to the murder scene and its stains linked to both Eddowes and Kosminski also has to be factored in. However, all three of these connections are dubious given the problems and questions discussed above.

Conclusion

The cover of the book *Naming Jack the Ripper* proclaims: "New crime scene evidence. A stunning forensic breakthrough. The killer revealed." In truth, this is more of a spectacular forensic failure. The reported examination suffers from many of the same problems and mistakes commonly seen in wrongful convictions. The aura and language of science was used to mask problematic assumptions and spurious inferences. The results of the mtDNA analysis completely depend upon the strength of the connections between the shawl and the murder scene, the shawl and Eddowes, and the shawl and Kosminski. The probabilities for each of these links are so

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[8] The story of the shawl echoes that of the Ripper diary, a 1992 hoax involving a Victorian scrapbook missing its first 20 pages (23). Both artifacts suddenly emerged, after remaining hidden for over a century, containing incriminating evidence pointing towards (different) Ripper suspects. And both enabled their discoverers to publish books: *The diary of Jack the Ripper: The chilling confessions of James Maybrick*; and *Naming Jack the Ripper* (24,25).

attenuated that the mtDNA random match figure reported by Louhelainen and Miller is almost irrelevant.

DNA analysis is the most reliable technique in the criminal investigator's toolkit (9). But forensic scientists must complement their laboratory techniques with critical thinking skills. "Too many analysts see the problem as a blood or semen stain examination, rather than the general criminalistics problem of the question of source or contact.... [A failure to frame] intelligent questions is inimical to the analysis of physical evidence in a specific case" (8, p. 134).

References

1. Louhelainen J, Miller D. Forensic investigation of a shawl linked to the "Jack the Ripper" murders. J Forensic Sci doi: 10.1111/1556-4029.14038. Epub 2019 Mar 12.

2. Klockars CB, Mastrofski SD, editors. Thinking about police: Contemporary readings. 2nd ed. New York: McGraw-Hill, 1991.

3. Rossmo DK. Criminal investigative failures. Boca Raton, FL: Taylor & Francis, 2009.

4. Rumbelow D. Jack the Ripper: The complete casebook. Chicago: Contemporary Books, 1988.

5. Connor S. Jack the Ripper: Has notorious serial killer's identify been revealed by new DNA evidence? Independent. 2014 Sep 7; https://www.independent.co.uk/news/science/has-jack-the-rippers-identity-really-been-revealed-using-dna-evidence-9717036.html#comments (accessed 2019 Apr 4).

6. Whittington-Egan R. Jack the Ripper: The definitive casebook. Stroud, Gloucestershire: Amberley Publishing, 2018.

7. Evans SP, Skinner K. The ultimate Jack the Ripper companion: An illustrated encyclopedia. New York: Carroll & Graf Publishers, 2000.

8. Rudin N, Inman K. An introduction to forensic DNA analysis. 2nd ed. Boca Raton, FL: CRC Press, 2002.

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

10. Evans SP, Skinner K. Jack the Ripper and the Whitechapel murders. Kew, Surrey: Public Record Office, The National Archives, 2002.

11. Howells M, Skinner K. The Ripper legacy. London: Sphere Books, 1987.

12. Wilson C, Odell R. Jack the Ripper: Summing up and verdict. London: Corgi Books, 1987.

13. Luo S, Valencia CA, Zhang J, Lee N, Slone J, Gui B, et al. Biparental inheritance of mitochondrial DNA in humans. Proc Natl Acad Sci U S A 2018;115(51):13039-44.

14. Doney RH. The aftermath of the Yorkshire Ripper: The response of the United Kingdom police service. In: Egger SA, editor. Serial murder: An elusive phenomenon. New York: Praeger, 1990;95-112.

15. Rossmo DK. Geographic profiling. Boca Raton, FL: CRC Press, 2000.

16. Casebook: Jack the Ripper. https://www.casebook.org/intro.html (accessed 2019 Apr 4).

17. Melton T. Mitochondrial DNA examination of cold case crime scene hairs. In: Walton R, editor. Cold case homicides: Practical investigative techniques. Boca Raton, FL: CRC Press, 2006;335-44.

18. Butler JM. Fundamentals of forensic DNA typing. Burlington, MA: Academic Press, 2009.

19. Gigerenzer G. Calculated risks: How to know when numbers deceive you. New York: Simon & Schuster, 2002.

20. Robertson B, Vignaux GA. Interpreting evidence: Evaluating forensic evidence in the courtroom. Chichester: John Wiley & Sons, 1995.

21. Rossmo DK, Pollock JM. Confirmation bias and other systemic causes of wrongful convictions: A sentinel events perspective. Northeastern University Law Review 2019;11(2):790-835.

22. Oswald ME, Grosjean S. Confirmation bias. In: Pohl RF, editor. Cognitive illusions: A handbook on fallacies and biases in thinking, judgement and memory. Hove, UK: Psychology Press, 2004;79-96.

23. Butts W. The diary of Jack the Ripper [Review of The diary of Jack the Ripper: The discovery, the investigation, the debate]. Manuscripts 1994, 66:131-3.

24. Harrison S. The diary of Jack the Ripper: The chilling confessions of James Maybrick. New York: Simon & Schuster, 1994.

25. Edwards R. Naming Jack the Ripper. Guilford, CT: Lyons Press, 2014.

26. Rossmo DK. Case rethinking: A protocol for reviewing criminal investigations. Police Practice and Research 2016;17(3):212-28.