Innocence Lost:

An Examination of Perspectives, Causes, and

Possible Recompenses to Forensic Science Failures

Samuel Werder

George Mason University

**Introduction**

Since 1760, Blackstone’s ratio has provided a guiding standard for criminologists. While frequently exaggerated, the ideal of the better option being “that ten guilty persons go free than one innocent suffer” is shared among criminal justice professionals around the world. This axiom works in theory, but the American criminal justice system still occasionally fails in practice. Since 1989, as of the date of this writing, more than 2,426 people in the United States have been convicted for crimes they did not commit (National Registry of Exonerations, 2019). Of those 2,426, 23% were the result of false or misleading forensic evidence (National Registry of Exonerations, 2019). These 559 innocents are just as much victims as are the ones against whom crimes are perpetrated. While false convictions are indeed rare, this in no way implies that such incidents are of any less importance. There are several schools of thought explaining why forensic science fails in criminal investigations, each encapsulating certain facets of the issue but failing to explain the issue in its entirety. Hence, this literature review will explain the basic history and theory behind forensic science, examine the differing perspectives between the conventional “bad apples” metaphor and the perspective offered by organizational theory, some possible errors that may adversely affect the justice process to include cognitive biases, and possible methods that could at bare minimum repair the damage inflicted by these injustices.

**Forensic Science Basics**

Forensic science is the application of scientific methods and experiments to solving criminal investigations. Beginning in the early 1900’s with the work of French criminologist Edmond Locard and his exchange principle, stating that every contact leaves a trace of both parties involved in said contact, forensic science has become one of the most effective weapons in the arsenal of criminal investigators. With its reliance on scientific standards and principles, forensics has been termed by many in the field of criminology as a gold standard in terms of evidence. However, the vast majority of forensic evidence relies on a visual comparison by a trained expert. Evidence such as toolmarks, hair and fiber analysis, and fingerprint analysis all rely on an expert to examine the results and determine whether a match or relative similarity exists. In most cases, forensic examinations conclude when the forensic analyst attempts to “connect the dots” (Gabel & Wilkinson, 2007). What has become apparent in recent years is, while the science may be sound, the human element behind the examinations may not be as reliable as was initially believed. There are errors that can occur, and those errors can result in the misrepresentation of forensic evidence, the destruction of that evidence, or the production of erroneous results that mislead judges, juries, and other forensic scientists that review the cognitively contaminated evidence. Advancements in DNA testing are a more exacting tool and therefore are more highly publicized in the popular media, but developments that undermine or disprove prior forensic staples are less-highly publicized (Gabel & Wilkinson, 2007).

**“Bad Apples” vs. Bad Orchard**

The common method of approaching errors in criminal labs is by treating those incidents as singular events. This has led to the idiom of a “bad apple,” where simply removing it from the equation corrects the error. However, in recent years this approach has come under scrutiny from several researchers. Many criminologists have openly questioned the “bad apple” rhetoric. Kassin et al. (2013), which studied FBI forensic laboratories and errors that occurred therein, stated that the errors they found were “not easy to dismiss as … the product of mere ‘bad apples’.” This is significant because the FBI prides itself on its rigorous standards of training and practice, and continually maintains a team of highly competent forensic examiners (Kassin et al., 2013). Among the critics of the “bad apples” rhetoric, most notable is William Thompson, noted criminologist and author of “Beyond Bad Apples: Analyzing the Role of Forensic Science in Wrongful Convictions,” who took a different path in attempting to understand how the justice system can produce wrongful convictions that were the result of catastrophic failures in forensic science. Thompson expanded on Kassin et al.’s remarks by examining the situation through the perspective of organizational theory. Thompson’s point of view, while not directly shared among other criminologists, is mirrored in the works of other researchers. Frasier-Mackenzie et al. (2013), for example, noted that the knowledge of a prior examiner’s determination could influence the decision of the reviewing examiner. In “Cognitive and contextual influences in determination of latent fingerprint suitability for identification judgments,” Fraser-Mackenzie et al. discovered that a reviewer aware of the initial examiner’s conclusion that a known fingerprint and a latent exemplar fingerprint are a possible match, that reviewer is then more likely to assume that the initial analysis was accurate regardless of the initial validity of the comparison (Fraser-Mackenzie et al., 2013). According to Reardon (2014), only 60% of publicly funded crime labs had an independently certified criminalist on staff, which severely limited the proficiency of the labs, overworked the existing forensic specialists, and possibly reduced the overall quality of output from those labs (Reardon, 2014). Thompson (2008), concludes the argument for a “bad orchard” perspective by stating that criminologists tend to think that replacing the “bad apples” solves the causal issues. However, when one stops to consider why there are so many “bad apples” and why they seem to repeat themselves, it begs the question as to whether the apples themselves are to blame, of if the orchard that grows them might share some responsibility.

**Possible Errors**

**Cognitive Biases**

According to various sources, cognitive biases can be especially damaging to forensic analyses. Edmond et al. (2015) asserts that certain incidents of domain-irrelevant information can tamper with the analyses of forensic technicians. As Edmond et al. (2015) states, “forensic science is commonly shown as being independent corroborations for other pieces of evidence. However, some experts may be influenced by other pieces of evidence, and thereby unconsciously alter their perceptions of their examinations.” When shown to other parties, such as juries, reviewers, or other investigators, those “cognitively contaminated conclusions” create a cross-contamination that exposes others to the same bias (Edmond et al., 2015). As previously stated, the mere knowledge that a prior examiner deemed a pair of fingerprints to be a positive match would influence a reviewer in such a way that he or she would be more likely to confirm the reported match regardless of its veracity. This stems from a sense of overconfidence in forensic examiners regarding the skills those same examiners possess. Furthermore, many forensic experts consider themselves “objective and immune to bias” (Kassin et al, 2013). This is surprising especially when a possible conflict of interests exists regarding the use of experts in a court setting. This conflict of interests presents itself whenever the prosecutors call forensic examiners who work for the police force as expert witnesses for the prosecution in a criminal case (Kassin et al., 2013). This unduly influences those experts to be potentially apt to side with whichever legal team called upon them.

**Misrepresented Forensics**

Another more common form of failings in forensic science is the misrepresentation of those sciences within courts of law. Whether accidental or intentional, this has occurred with some frequency since the propagation of the CSI Effect, which features an increased request for forensic evidence by juries. This effect came about around the turn of the millennia with the debut of the television series “CSI: Crime Scene Investigation,” a crime-drama program that heavily dramatizes the forensic science aspects of a criminal investigation. Shows like “CSI” make forensic science appear to be infallible and perpetually available in any criminal investigation. Such programs remove the human element of the forensic examiner from the process, giving the illusion that when a “match” occurs, it is always correct. These shows also perpetuate the illusion that forensic science is an inherently simple process. In reality, this is very rarely the case, and not all forensic science practices are as reliable as Hollywood would like the public to believe.

Fingerprint evidence, for example, has been a staple of forensic examination and identification since the 1800’s. Gabel & Wilkinson (2007) state that the three main tenets of fingerprint evidence are: (1) no two fingerprints have been found to be identical between two people, (2) a fingerprint’s specific ridge detail will remain unchanged during a person's lifetime, and (3) fingerprints have general ridge characteristics specific enough to permit systemic classification and comparison between exemplars. However, Gabel & Wilkinson (2007)’s research found that “[t]here is no actual evidence that an individual's fingerprints are unique to all others in the world.” Instead, fingerprinting is another exercise in an examiner’s subjective interpretation of evidence. Another researcher found something similar regarding the actual print examiners. Reardon (2014) found a 2011 study showing that professional examiners incorrectly matched two fingerprints once every 1,000 examinations. Furthermore, the same study noted that those very same experts missed 7.5% of all correct matches during the duration of the study.

Other researchers have found something similar regarding the courts. According to Kassin et al. (2013), courts often “blindly accept forensic science evidence without much scrutiny.” Kassin et al. (2015) states that this results when the basic truths behind forensic science practices are not known as a matter of absolute fact. A prime example is fingerprint evidence, which as previously stated, has yet to be conclusively proven to be a completely unique identifier.

**Possible** **Recompenses**

With a situation as grave as an unjust justice system, steps need to be taken to reform the system and improve its faults. Several researchers concur, and there have been numerous solutions presented. To counter the argument that wrongful convictions are too infrequent to concern oneself with, Edmond et al. responds by saying “[i]t is not an appropriate response to these dangers to suggest that they are trivial or rare or can somehow be addressed through explanation and judicial warnings at trial” (Edmond et al., 2015). All researchers in the community agree that preventing miscarriages of justice are of vital importance, and that certain steps should be maintained to uphold the cause of justice. Kassin et al. (2013) furthers Edmond et al.’s perspective, stating that judges, justices, and juries need to be educated in forensic science to some extent to allow for more exact and knowledgeable conclusions. Furthermore, any trier of fact, such as those mentioned above, needs to ask the examiners questions that are more exacting. Kassin et al. (2015) asserts that one of these questions must be “what did the examiner know and when did he or she know it?”, among other such questions intended to probe for the possibility of contamination across items of evidence that are allegedly “independent and corroborative” (Kassin et al., 2013). Along with becoming more inquisitive into how evidence is processed, several researchers also recommend the formulation of a new law to assist the legal community with addressing faulty forensic practices and a more targeted training/education system to reduce the likelihood and effects of bias on forensic examinations.

**New Legislation**

According to Gabel and Wilkinson (2007), the new law should accomplish three main things. First, the law should affect only the postconviction phase of the criminal justice process. Second, the law should be crafted such that it is used to manage the “fallout” from certain discredited scientific practices. Third, the new law should be written such that it is forward-looking, and thus be able to accommodate the possibility that other forensic science practices are no longer reliable. With these main points in place, the purpose of this law is to heavily increase the use of postconviction DNA testing and accommodations for claims of innocence after convictions.

**Requirement for Increased Education/Training**

There have been numerous cases in which forensic examiners holding independent certifications seemed to be less susceptible to the affects of bias. A study conducted in 2013 by Fraser-Mackenzie et al. tested whether the introduction of domain-irrelevant information would bias examiners and cause an incorrect result during a fingerprint examination. The study found that examiners tested who held a certification by the International Association for Identification (IAI), the world’s largest professional forensic science organization, “appeared to be less affected by the contextual effect of comparison prints on suitability judgments” (Fraser-Mackenzie et al, 2013). This means that an independent certification made those forensic analysts less likely to be affected by potentially biasing information. Thompson (2008) furthers this assertion by stating that a forensic analyst does not need to know the statements of any witness in order to examine evidence. Furthermore, neither does a witness need to know the results of a forensic test in order to relay their testimony or statement to the investigators.

**Conclusion**

As in any field, criminological researchers have varying viewpoints when it comes to key issues. These differing opinions stem from personal experiences, professional training, and thematic influences. There are intersections of opinion, however, such as the overwhelming recognition that forensic science practices need to be reformed. More than 21,290 combined years of freedom have been lost due to wrongful convictions (National Registry of Exonerations, 2019). In order to prevent the theft of any further years from the innocent due to punishment for crimes that those persons did not commit, many criminologists agree that changes need to occur within the criminal justice process.

Beginning with the common belief that replacing the “bad apples” that create failures and injustices is the proper solution to the problem, several high-profile criminological researchers disagree, and state that approaching the situation from an organizational standpoint would be more effective. Concerning the possible errors that may arise, those same criminological researchers also agree that cognitive biases and misrepresented forensics are of great importance and preventing their continual influence should be of high concern to criminal justice professionals. In the realm of possible recompenses, those same criminological researchers agree yet again that new targeted legislation is required in order to increase the use of postconviction DNA testing, and that more exacting training is required of professionals to reduce the risk of bias affecting their judgments.

In summation, a “Bad Orchard” perspective, when coupled with an understanding of the inconsistencies present in currently accepted forensic science practices, can yield a better understanding of how forensic science can fail and provide better avenues for circumventing those failures. Furthermore, new legislation, better training of forensic scientists, and encouraging experts to become independently certified in their specialty could further help prevent false convictions resulting from failings in forensic science.

Some gaps in the research exist that require further study. Some areas that are open for study include the question of what precise type of information is specifically biasing to forensic analysts. Another question is whether or not one so-called “bad apple” can propagate further instances of forensic failures.

A quote from actor and screenwriter Val Uchendu can sum up the achingly poignant sense of loss in the forgotten victims of the criminal justice system, the wrongfully convicted: “Loss is like a wind, it either carries you to a new destination or it traps you in an ocean of stagnation. You must quickly learn how to navigate the sail, for stagnation is death.”

References

Edmond, G., Tangen, J. M., Searston, R. A., & Dror, I. E. (2015). Contextual bias and cross-contamination in the forensic sciences: the corrosive implications for investigations, plea bargains, trials and appeals. *Law, Probability and Risk*, *14*(1), 1–25. <https://doi.org/10.1093/lpr/mgu018>

Fraser-Mackenzie, P. A. F., Dror, I. E., & Wertheim, K. (2013). Cognitive and contextual influences in determination of latent fingerprint suitability for identification judgments. *Science & Justice*, *53*(2), 144–153. <https://doi.org/10.1016/j.scijus.2012.12.002>

Gabel, J. D., & Wilkinson, M. D. (2007). Good science gone bad: How the criminal justice system can redress the impact of flawed forensics symposium. *Hastings Law Journal*, *59*, 1001–1030..

Kassin, S. M., Dror, I. E., & Kukucka, J. (2013). The forensic confirmation bias: Problems, perspectives, and proposed solutions. *Journal of Applied Research in Memory and Cognition*, *2*(1), 42–52. <https://doi.org/10.1016/j.jarmac.2013.01.001>

Reardon, S. (2014). Faulty forensic science under fire. *Nature News*, *506*(7486), 13. <https://doi.org/10.1038/506013a>

The National Registry of Exonerations - Exoneration Registry. (n.d.). Retrieved April 9, 2019, from <https://www.law.umich.edu/special/exoneration/Pages/about.aspx>

Thompson, W. C. (2008). Beyond bad apples: analyzing the role of forensic science in wrongful convictions symposium - wrongful convictions: Causes and curses - panel two: experts and forensic evidence. *Southwestern University Law Review*, *37*, 1027–1050.