

Cognitive Bias

“That’s not my fingerprint, your honor,” said the defendant.

Yet, the Federal Bureau of Investigations expert explained that he studied high-resolution images of the prints on a computer screen, identified fifteen points they shared, and reached a firm conclusion: a “100 percent identification.” Next, he asked two experienced colleagues to review the prints: the chief of his unit and a retired FBI examiner with thirty-five years of experience. Each of the three experts agreed 100 percent.

The judge sided with the FBI and ordered Mayfield detained as a material witness to terrorism. Mayfield knew that he was innocent. He had converted to Islam years earlier, and the FBI theorized that perhaps he had formed an allegiance to militant Islamic groups and traveled under a fake name. The FBI placed Mayfield under twenty-four-hour surveillance, and then arrested him. Mayfield’s lawyer counseled him that he could be detained indefinitely and might face the death penalty.

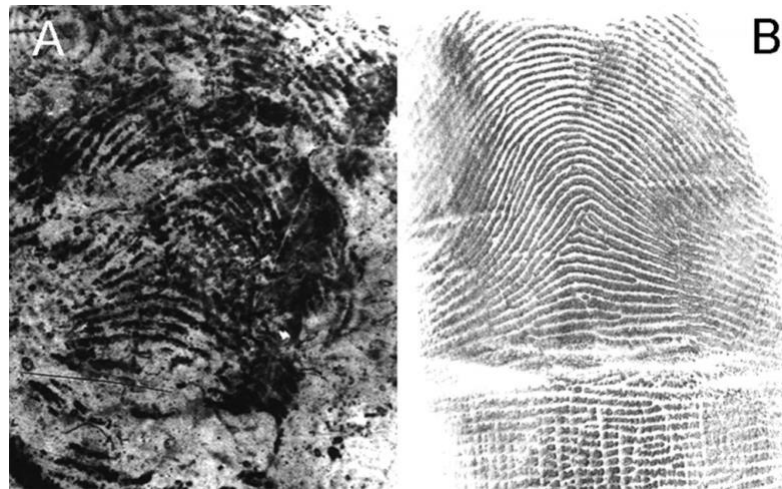


Brandon Mayfield

[Image Source: <https://pamplinmedia.com/ht/117-hillsboro-tribune-news/358625-238233-inside-the-maelstrom-brandon-mayfield-reflects-on-america-13-years-later>]

Then, on May 20, 2004, the prosecutor stood up in court and told the judge something unexpected: that morning the government “received some information from Spain” which “casts some doubt on the identification.” Spanish authorities “determined completely” that the print belonged to a known Algerian terrorist. The FBI agreed to release Mayfield, dropped all charges a few days later, apologized to Mayfield, and a federal investigation followed.

People assume fingerprint evidence is nearly infallible. Fingerprint comparisons are fallible, however, including because of bias. Bias played a role in this error. Fingerprints that are lifted from crime scenes are often smudged, incomplete, or found on a surface that is not ideal for preserving the fingerprint pattern. Examiners are almost always operating under circumstances where the materials are ambiguous and, thus, there is room for interpretation and judgment.



A = latent print lifted from the bomb. B = Mayfield's "matching" print.

Several forms of bias may have played a role. Each of the three experts noticed clear differences between Mayfield's print and the crime scene print (above), but downplayed them, after hearing that their colleagues thought there was an "identification." The process they used involved looking back and forth between the suspect and the crime scene print. Circular reasoning resulted, as a later investigation found, buttressing their faulty conclusion that there was a match. Mayfield was a practicing Muslim, and post-9/11, the FBI may have believed that based on his religion, he was more likely to be involved in terrorist activities, despite never having been to Spain and not having left the country in years.

Everyone is biased—and that is usually a good thing—unless life and liberty are at stake in a criminal case. Every day we make use of decision-making shortcuts in trivial ways. For example, without knowing it, we will often make decisions based on how attractive or pleasing something appears, such as picking a book or a wine bottle based on the design on the label. We also tend to gravitate towards options that are familiar rather than risk something new. Often a book or a bottle of wine with an artistic label *will* be a good one. And if we are wrong, then the consequences are pretty limited. Forensic analysis is different. If a forensic examiner relies on shortcuts and falls prey to bias, an innocent person go to prison while the culprit remains free.

In psychology, the decision-making shortcuts that can contribute to biased decisions and errors are called “heuristics” or “cognitive biases” and are defined as:

The class of effects by which an individual’s preexisting beliefs, expectations, motives, and situational context may influence their collection, perception, or interpretation of information, or their judgments, decisions, or confidence.¹

There are several different kinds of cognitive bias. For instance, “confirmation bias” occurs when people have existing beliefs, and this frames how they perceive and evaluate information. Put another way, people who already have an opinion about what the right answer is will struggle to objectively evaluate the evidence and come to an impartial conclusion.

To provide a concrete example, consider a fingerprint analyst who receives a latent fingerprint from a crime scene to compare to a suspect print. They have worked with the lead investigator before and know that it is a great detective who rarely sends through samples for analysis unless they have done a lot of investigative work already. Based on their past experiences with this investigator, they are fairly certain the suspect print will match. Unfortunately, this means the analyst will tend to examine the fingerprints in a way that will confirm this belief.

This would not be a problem if fingerprint work, or other forensic disciplines were so objective that it would be very hard for bias to influence one’s decisions. However, there is a great deal of subjectivity in patterns like latent fingerprints. There is often a great deal of room for interpretation. Thus, “contextual bias” is a term to describe situations where irrelevant or only tangentially relevant information influences a person. When the correct decision in a situation is not immediately apparent, people will normally begin to look for other information that might help.

Consider again the fingerprint analyst example. For instance, if the police investigator tells them that “this guy has been in and out of jail for most of his adult life” then this provides powerfully biasing contextual information. We often do not want jurors to hear about a person’s criminal history, because it is so prejudicial. Yet there are no rules preventing a forensic examiner from hearing such information.

There are often no rules for what police may share with forensic examiners. The case file might contain information about other forensic evidence that suggests the suspect is guilty—such as a confession. The case file may say what race the suspect is or detail the person’s criminal history. None of this biasing information may be needed to conduct the forensic analysis. Indeed, police may include this biasing information on the very forms they use to submit information to a crime lab.

¹ Kassin, Dror, & Kukucka (2013)

Empirical Work on Cognitive Bias in Fingerprint Analysis

In perhaps the most famous study in all of forensics, five highly experienced fingerprint examiners reviewed prints in the course of their ordinary work. Itiel Dror, David Charlton, and Ailsa Peron conducted this study in 2006, two years after the Mayfield debacle. These fingerprint examiners were told that the prints they would be examining were the ones that the FBI erroneously matched, leading to their wrongful accusation of Mayfield.

What these experts did not know was that the crime scene fingerprint and suspect fingerprint they were shown were actually materials that each had examined already, in their routine work, and judged to be from the same source. Many of these experts reached a different conclusion this time, in light of this additional, highly biasing contextual information. Three of the experts now decided that these fingerprints were not a match, and one concluded that there was insufficient information to make a call. Only one examiner made the same decision again despite the contextual information and judged the fingerprints to be a match.

This study showed that expert examiners are not immune to the powerful influence of extra information that is not directly relevant to the task at hand. Second, even the methods used in a well-established discipline like fingerprint analysis, cannot prevent biasing effects. Finally, it is *possible* for examiners to make the correct judgment even in the face of biasing information, but the majority of examiner will fail to do so.

Studies like this have now been conducted in a host of forensic disciplines. There are other important sources of bias. Experts are also biased by the side that hires them. If forensic examiners at crime labs feel that they are retained only by police and prosecutors, they will tend to view their role in a different way than an expert hired by the defense. This has troubling consequences in criminal cases, where often the defense does not receive any funds for an expert.

We are all biased and all experts can be biased as well. What can be done about this problem? Labs can prevent examiners from receiving such biasing information. Rather than work as part of a team with law enforcement, the science function should be kept independent. A scientist conducts experiments impartially, making observations based on data and not based on personal beliefs. In the same way, forensic professionals should be required to do their work without the types of case-details that will affect their analysis. Their work should be focused on careful analysis and not getting the results that police desire.

Reference: Dror, I. E., Charlton, D., & Péron, A. E. (2006). Contextual information renders experts vulnerable to making erroneous identifications. *Forensic science international*, 156(1), 74-78.