**The Achilles' Heel of Fingerprints**
**Washington Post By Jennifer L. Mnookin, Commentary**
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Three highly skilled FBI fingerprint experts declared this year that Oregon lawyer Brandon Mayfield's fingerprint matched a partial print found on a bag in Madrid that contained explosive detonators. U.S. officials called it "absolutely incontrovertible" and a "bingo match." Mayfield was promptly taken into custody as a material witness. Last week the FBI admitted that it goofed; the print actually belongs to Ouhnane Daoud, an Algerian.

Fingerprint evidence has long been considered an infallible form of proof, powerful enough to support a criminal conviction even without any other evidence. But when three top experts manage to blow such an important identification, our longstanding faith in fingerprints must be questioned. Nor is this the only such mistake to come to light in recent months. In January a Massachusetts conviction was overturned when the fingerprint identification, the cornerstone of the case, was shown to be erroneous.

In fact, the science of fingerprinting is surprisingly underdeveloped. We lack good evidence about how often examiners make mistakes, nor is there a consensus about how to determine what counts as a match. Our current approach to fingerprint evidence, in which experts claim 100 percent confidence in any match, is dangerously flawed and risks causing miscarriages of justice.

In Mayfield's case, the FBI located 15 points of similarity, places where the particular ridge characteristics of two prints "matched." Even the Spanish authorities, though doubtful about the match, identified eight points of similarity. While many American examiners no longer exclusively count points, experts have declared positive fingerprint matches in court after finding even fewer than eight points.

Different examiners and jurisdictions set their own standards, and the courts in the United States have left the definition of a match up to the experts themselves. Though defense attorneys have in recent years mounted challenges in court to the reliability of fingerprinting, judges have largely turned a deaf ear. What happened to Mayfield should encourage them to listen more closely.

Fingerprinting, unlike DNA evidence, currently lacks any valid statistical foundation. This is gravely troubling. Even if we assume the unproven hypothesis that each fingerprint is unique when examined at a certain level of detail, the important question is how often two people might have fingerprints sufficiently similar that a competent examiner could believe they came from the same person. This problem is accentuated when analyzing a partial print, as those recovered from crime scenes frequently are. How often might one part of someone's fingerprint strongly resemble part of someone else's print? No good

data on this question exist.

The growing size of computer fingerprint databases makes this issue still more acute. As a database grows in size, the probability that a number of people will have strikingly similar prints also grows. Instead of ignoring the issue, forensic scientists need to investigate the frequencies of different ridge characteristics and develop difficult proficiency tests that examine the capability of fingerprint experts to accurately differentiate between superficially similar prints.

The FBI called the resemblance between Mayfield and Daoud's prints "remarkable." What is truly remarkable is that we simply do not know how often different people's prints may significantly resemble one another, or how good examiners are at distinguishing between such prints. DNA profiling provides what is called a "random match probability": the odds that the DNA of someone picked at random would match the profile in question. With fingerprinting, we entirely lack the information to provide an equivalent statistic. Yet without this knowledge we cannot accurately evaluate the evidentiary value of a supposed fingerprint match.

The Mayfield misidentification also reveals the danger that extraneous knowledge might influence experts' evaluations. If any of those FBI fingerprint examiners who confidently declared the match already knew that Mayfield was himself a convert to Islam who had once represented a convicted Taliban sympathizer in a child custody dispute, this knowledge may have subconsciously primed them to "see" the match. Fingerprint identification as it is now practiced is not like a double-blind scientific study. Examiners, typically law-enforcement employees, are frequently privy to outside knowledge about a case, which creates a genuine risk that their examination will inadvertently be contaminated. There is simply no excuse for failing to develop internal procedures to protect examiners from extraneous knowledge.

Until now, many people in the field of fingerprinting have defensively resisted calls for additional research and investigation of fingerprinting. Because experts are permitted to testify about "100 percent positive" matches and to claim in court an error rate for the technique of zero, they have little incentive to support any research. No matter how accurate fingerprint identification turns out to be, it cannot be as perfect as they claim.

But what befell Mayfield is embarrassing enough that it may end the defensive posturing and prompt fingerprint experts to acknowledge the acute need for better information and more caution. If this error leads fingerprint experts, judges and lawmakers to throw their support behind additional study and procedural reform, there will at least be a silver lining.

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