Journal of Applied Research in Memory and Cognition 2 (2013) 78–81

Contents lists available at SciVerse ScienceDirect

Journal of Applied Research in Memory and Cognition

journal homepage: www.elsevier.com/locate/jarmac

Reply

New application of psychology to law: Improving forensic evidence and expert witness contributions

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ARTICLE INFO

Article history:
Received 5 February 2013
Accepted 5 February 2013

Keywords:
Bias
Forensic science
Expert decision-making and judgment
Psychology and law
Criminal justice

ABSTRACT

Psychology has made a tremendous contribution to law by showing the malleability of eyewitness perception and memory, and developing best practices for obtaining eyewitness identifications. We suggest that even expert scientific witnesses, which the court heavily relies on as objective and impartial, are also susceptible to bias from various psychological influences. For example, forensic examiners' interactions with detectives and exposure to information about the case can bias their judgments. We discuss the ten commentaries on these issues across a range of forensic science domains, and affirm what reforms are needed.

Our discussion of bias focused on forensic examiners, but the problem applies as much, if not more, to other types of lay and expert witnesses. The subject of bias within the context of the criminal justice system arouses a range of responses. It is interesting that while some commentators are "confident that the problem is not as immense as this article would encourage one to believe" (Butt, 2013), others argue that we "probably undersell the problem of contextual influence, which is, in all likelihood, even broader and more ubiquitous than suggested" (Charman, 2013).

Some commentators agree with many of our proposed recommendations but take issue with the feasibility of their implementation due to fiscal constraints and other pragmatic considerations. As Charlton (2013) eloquently puts it, "Policing these days is as much about balancing the books as it is about balancing the scales of justice." What is reasonable and justified to spend on improving forensic science, expert witnesses, and the criminal justice system as a whole, is a political, philosophical, and social question—not a matter for science. However, we take issue with some of the "practical" objections to our proposals for the following reasons:

1. Many of our recommendations do not involve extra effort or resources. Cole (2013) specifically noted that "the proposed reforms are relatively low cost and will unquestionably improve the integrity of forensic science." In fact, some reforms may reduce cost and increase efficiency of workflow. For example, buffering forensic examiners from the undue influences that result from interacting with detectives, reading irrelevant information from case files, etc., will not require more work and effort—if anything, it will reduce time wastage from such exposures to extraneous and task-irrelevant information that they do not need.
2. The suggested recommendations that may require more time and effort do not need to be applied to every case. Currently, there is no 'triage' implemented in forensic work. As in medicine, we would suggest that forensic laboratories work "wisely" and apply different protocols depending on the complexity of the case. Currently, the same procedure is applied for the most self-evident cases and to those that are the most difficult and complex. By applying procedures selectively rather than across the board, costs will be maintained
3. Especially in organizations with a strong culture (as in military, police, and medical settings), change—relative to keeping things as they are, the path of least resistance—is hard to make. Once made and implemented, however, changes become routine and are accepted. Eventually what often follows from implementation is not mere acceptance but enthusiastic support (e.g., initial resistance in the medical community to Louis Pasteur's proposal to minimize contamination by using sterilization in hospitals). In recent years, despite concerns over cost and feasibility, this has been the way many police departments have reacted to reforms to eyewitness identification practices (Garrett, 2013) and the video recording of interrogations (Sullivan, Vail, & Anderson, 2008). Along with many commentators, we believe it is similarly

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http://dx.doi.org/10.1016/j.jarmac.2013.02.003

important for the forensic community to take steps to minimize psychological contamination, just as they do with physical contamination.

4. Even if we accept that practical considerations limit forensic analysts from taking all necessary steps to protect themselves from extraneous influences, we believe that they should acknowledge their exposure to potentially biasing information and give the court an accurate account of these limitations. They cannot mislead the court and continue to claim that they were objective, impartial, and not exposed to irrelevant potentially biasing information. Charlton (2013) notes that "Fingerprint examiners are discouraged from displaying uncertainty or self doubt. It is a sign of weakness within the fingerprint profession to display anything other than absolute certainty." Similarly, Elaad (2013) states that "overconfidence is related to experts' reluctance to admit that they don't know when in doubt. Such admission stands in contrast to their self-perception as able experts." This posture needs to be corrected and the limitations acknowledged.

Forensic confirmation biases are a predictable result of the human cognitive and psychological systems (Haber & Haber, 2013). They occur without awareness or intention. This contribution of psychology to law, and specifically to administering justice, is of paramount importance. Our analysis makes a compelling case that such biases are not limited to laypersons; they also occur among experts who provide scientific and seemingly impartial evidence.

Our findings are not directed to cases involving intentional misconduct, but to those involving hard working and dedicated experts whose judgments are biased. It is incorrect to conceptualize cases "where individuals knowingly issued false examination results," as instances "that represent motivational biases" (Butt, 2013). The biases we are most concerned with affect perception, cognition, and decision-making unintentionally, often without awareness. If these problems of bias and error were rooted in examiner misconduct, then the problem and solutions would become a matter of ethics (and easier to detect and deal with). Often the forensic community misunderstands and misconceptualizes cognitive bias as an ethical issue that can be eliminated by mere willpower; this is not the case.

Therefore, it is important for the forensic community to understand, take on board, and take actions to deal with cognitive bias. Examiners must be blinded to irrelevant information that may contaminate their evaluation—as, for example, when "forensic experts develop a belief or hypothesis based on information gathered from the investigation files" (Elaad, 2013). We disagree that it is acceptable practice to tolerate forensic examiners' exposure to extraneous information for their "personal satisfaction which allows them to enjoy their jobs" (Butt, 2013). Furthermore, the idea that one can expose them to such information "without actually altering their judgment" (Butt, 2013) contradicts what we know about the human cognitive system, psychology, and data from scientific research across a variety of domains—including forensic science.

Confirmation bias research in forensic science may seem controversial to some practitioners. However, a good deal of research in other domains provides important insights that are relevant to forensic science (see Haber & Haber, 2013). Furthermore, the problem of confirmation bias has been highlighted by the Office of the Inspector General into the FBI Mayfield case (OIG, 2006), the National Academy of Science Report into forensic science (NAS, 2009), the National Institute of Standards and Technology Expert Working Group on Human Factors in Latent Print Analysis (NIST, 2012), and the Scottish Public Judicial Inquiry into fingerprinting (Campbell, 2011). In this regard, it is important to note that the null findings cited by Butt (2013) and Elaad (2013) were possibly due to methodological issues—such as, the participants were not doing routine casework and they knew they were being observed. For contextual information to take full effect a certain protocol and setup must be followed (see, Dror, 2009). For example, Dror and Rosenthal (2008) examined decisions where forensic examiners did not know they were part of a study and being observed. Similarly, Dror, Wertheim, Fraser-Mackenzie, and Walajtys (2012) examined contextual influences on 55,200 actual forensic decisions.

The need to take preventative actions to minimize bias is clear. For the forensic sciences to realize their contribution to the criminal justice system, the forensic community must embrace the need rather than dismiss it. Such actions are especially critical if indeed fingerprinting and other forensic domains lack objective criteria, are characterized by "ambiguous directions" (Triplett, 2013), and do not provide "detailed and precisely defined methods" (Haber & Haber, 2013; also see NAS, 2009). Haber and Haber (2013) note that "without a step-by-step procedure, it is easier to pursue a biased choice." The idea of implementing "a numerical standard of how many characteristics are sufficient to establish an identification" (Triplett, 2013) will not solve the problem, as cognitive bias plays a role in deciding whether or not a characteristic is even present. In fact, not only do examiners vary in terms of how many characteristics they see in a print, but the same examiner will vary in terms of how many characteristics he or she sees from one point in time to another (Dror et al., 2011).

It is important to understand that such biases are not limited to fingerprinting; they apply to many other forensic domains. For example, Elaad (2013) observes these problems among polygraph examiners; Heyer and Semmler (2013) describe the same biases in the domain of facial image comparison; and Kassin, Dror, and Kukucka (2013) discuss handwriting, fire investigation, mixture DNA, and firearms. Furthermore, the problem is not limited to knowledge concerning the background of the case and suspect (Butt, 2013). Confirmation biases may emerge from a whole range of sources (Nickerson, 1998). One clear example is when evidence is examined against a "target" suspect. This contributed to the FBI misidentification of Mayfield (i.e., the circular nature of how forensic evidence was examined and evaluated). Although such circular examination is still commonplace, the FBI has changed its procedures so that examination is more linear: Evidence is first examined and evaluated in isolation from a target.

The FBI is not the topic of our article or a topic of our scientific investigations. However, the changes in the FBI exemplify the kind of openness and change that is needed for forensic science to move forward. Although Cole (2013) commends the FBI for its progress, he criticizes their lack of openness and notes that our characterization of their new Standard Operating Procedures (SOPs) is based on "hearsay." These statements were true in the past (and one of us experienced them first hand, more than once). In recent years, however, the FBI has changed a great deal. Not only have they started to look at error rates and examiners' performance (e.g., Ulery, Hicklin, Buscaglia, & Roberts, 2012), but they also acknowledge the potential of bias and have modified their procedures to address these issues. Furthermore, they provided us with their SOPs, as did 36 other forensic laboratories, with an aim that we examine them in order to identify vulnerabilities to bias and suggest improvements. Although there is always room for further improvement, we acknowledge the steps that have already been taken. In our view, the FBI deserves such recognition.

In some ways, we may have understated the bias problem and its consequences. Garrett (2013) correctly draws our attention to the fact that although different types of evidence may seem independent, they are in fact "commonly developed at the same time by a group of law enforcement actors working together"—hence, the risk of cross-contamination, as seen in several wrongful conviction cases (also see Kassin, Bogart, & Kerner, 2012). In addition, Charman (2013) correctly distinguishes between the *evaluation* of evidence, as we discussed, and the *integration* of various items of

evidence, a process that is also subject to contextual bias, as seen in the work of detectives, prosecutors, judges, juries, and appeals courts. It is important to note that:

1. Often forensic examiners are police officers working on an investigative team within the legal system. It is vital to make sure that Garrett's (2013) observations justify and motivate the need to isolate the forensic examiners from undue influences, and let them do their jobs as scientists, driven by the forensic data.
2. The forensic examiner's role is to focus on and evaluate a single piece of evidence. It is not their role to integrate their observations with (let alone be influenced by) other lines of evidence. The problem with forensic work is not only that examiners are tainted by other evidence and extraneous contextual information, but that they also present themselves in court as objective, impartial, and immune to these influences.
3. The forensic examiners can be (and should be) the "safeguard" for the subjective errors made by detectives, judges, and jurors. If they are focused on a single piece of evidence and scientifically examine it in isolation, then their work can bring great power to the administration of justice. Certain forensic sciences have this potential when properly executed, blind to contextual irrelevant information.

At times, irrelevant contextual information may well lead the forensic examiner to reach the "correct" decision. Elaad (2013) notes that, "Contamination does not necessarily lead to increased error rate" and "may improve the accuracy of their conclusion." Butt (2013) makes a similar point in asserting that bias influences forensic examiners, but "not necessarily in a bad way." We do not share this perspective. In these approaches, the scientific examiners integrate evidence, rather than scientifically evaluating a single item (see Charman, 2013; Garrett, 2013). Furthermore, while masking irrelevant information may not always promote correct decisions, and may even "reduce accuracy and increase the time taken to make a decision" (Heyer & Semmler, 2013), these decisions will be based on the forensic evidence—not on extraneous information. When forensic examiners rely on such information, they misrepresent to the court what they did and the diagnostic power of their evidence. They also reach their conclusions for the wrong reasons. Thompson (2011) articulates the problem this way: "By considering contextual information, analysts may well become more likely to interpret their evidence correctly—that is, to reach conclusions that correspond to what actually happened. Yet by doing so, they also (paradoxically) undermine the ability of the trier-of-fact to determine the truth... by helping themselves be 'right' such analysts make it more likely that the justice system will go wrong. By trying to give the 'right' answer, they prevent themselves from providing the best evidence."

One way to deal with multiple issues (e.g., contextual bias, having a target suspect, circular reasoning) is to have an "examiner be presented with six samples—one belonging to the suspect and five plausible fillers. From that array, he or she would then seek to determine which, if any, constitutes a match to the evidence found at the crime scene or on the victim" (Kassin et al., 2013). In their commentary, Wells, Wilford, and Smalarz (2013) propose the use of a "filler-control method," modeled after the ideal eyewitness lineup (Wells et al., 1998), which is consistent with our recommendation (also see Saks, Risinger, Rosenthal, & Thompson, 2003). Our research suggests that the need for such a countermeasure should not be limited to eyewitnesses but required also for expert scientific evidence. We call for the recognition of such a need, and welcome Wells et al.'s (2013) highly articulate rationale for a filler-control method not only to control for contextual bias but as a means of uncovering incompetent examiners, a lack of reliable science, and fraud.

Forensic errors are one of the causes of erroneous convictions, but they are not all and only a consequence of bias. To be sure, no one knows the extent of the problem. Cole (2013) makes a good point that even though improvements resulting from the adoption of bias-reducing procedures will be difficult to detect, "bias-reducing procedures should be adopted in forensic science, as they were in medicine and astronomy, because they are better procedures that improve the integrity of forensic science."

We agree that the study of forensic error is a new area of inquiry and that it has not yet been fully explored (Triplett, 2013); hence, we call for more research (Dror & Cole, 2010). In light of basic psychological science, however, and the forensic research reviewed in our article, the time is ripe for change to take place (Risinger, 2009). It is important to note that the issues discussed in our paper are not limited to forensic examiners; they apply to a wide range of expert witnesses that play an increasing role in the courts. To enhance the contribution of expert witnesses and scientific evidence, it is important to "forge closer academic/professional partnerships where key stakeholders can work together to seek mutually acceptable solutions" (Charlton, 2013; see also Campbell, 2011). In this way, psychological research can contribute to the fair and accurate administration of justice.

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