Comment on Cognitive and Human Factors in Expert Decision Making: Six Fallacies and the Eight Sources of Bias.

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ABSTRACT: Expert decision-making in forensic science can be influenced by various sources of implicit bias. In practice, it is not always possible to combat such biases, even when forensic scientists are aware of them or when bias mitigation techniques are in place. Greater levels of documentation can offer a complementary solution. Such documentation should include all decisions, communications, and information shared within forensic casework. Forensic scientists can then be more transparent when communicating their judgments and the contexts upon which they are based.

Dror[1] contributes to the important discussion about how implicit bias impacts expert decision-making in forensic science. He presents six bias fallacies, eight sources of bias, the concepts of bias cascade and bias snowball, and a brief discussion of a number of ways to minimize cognitive bias. He does not, however, explicitly discuss a key bias countermeasure—*transparency*. In this context, transparency is about applying the principle of 'openness' in the forensic science process (during crime scene investigation, laboratory analysis, and court decision making).[2] It is about the abilities of forensic scientists to properly document and disclose the contexts in which their judgments and conclusions are based.

In reality, cognitive bias cannot be 'overcome'[1] or eliminated from forensic casework, but rather it can be minimized. Additionally, in some situations it is difficult to combat bias even when bias mitigation techniques are in place. Certain sources of bias are minimized when a laboratory applies one or more countermeasures (e.g., context mangers to prevent task-irrelevant information from reaching forensic examiners[3]), but other sources can still remain (e.g., workplace stress and other organizational factors[4]). Important as well, forensic scientists and managers might not be aware that they are prone to implicit bias, i.e., *Bias Blind Spot*[5] (see also the fifth fallacy[1]). If scientists do not recognize their unintentional biases in judgments, by default, they would not take the necessary steps for combating these biases in the first place.

Pragmatic reasons can also hinder the implementation of bias mitigation strategies discussed in Dror.[1] For example, sharing forensic intelligence can be time-sensitive in certain criminal investigations.[6,7] Even when a laboratory uses a bias countermeasure, such as a case manager, scientists carrying out the work can be under two competing demands: either to directly exchange potentially contextual information with investigators, or to direct all communications through case managers. The latter can impede time-sensitive, critical information from reaching appropriate stakeholders in a timely manner. Furthermore, many laboratories worldwide have not yet implemented bias minimization techniques.

It is in these situations that bias countermeasures and the control of task-irrelevant information can fail. A complementary solution would be to document all case decisions and communications, be transparent about them, and disclose them (see the *forensic disclosure*[8]). Forensic scientists should not only document what they believe is important at the time, but everything related to the case at hand. Documentation should include positive and negative findings, written and verbal communications, and "different conclusions and their probability…rather than one conclusion."[1] This greater level of documentation is useful not only to combat cognitive bias, but also to fulfil ISO (International Organization for Standardization used in laboratories) requirements for accreditation.[9]

Hence, when time-sensitive contextual information is directly shared between the forensic scientists and the investigators, implicit bias can occur. However, by using proper documentation and disclosures of these communications, the examiner can clearly and transparently demonstrate the context of their decisions. Examiners can justify the bases of their conclusions to legal and other stakeholders who can then make independent assessments about whether the conclusions were influenced, and whether the forensic science evidence should be accepted.

It should be emphasized that transparency, as described here, is not a solution on its own but rather should accompany and complement other bias mitigation strategies. In addition, practical challenges exist in implementing such detailed documentations and disclosures. For instance, there is still a lack of consensus on what is considered to be task-relevant and task-irrelevant within the various forensic science domains.[10] Consequently, some forensic scientists may not have clear-cut guidance on what specific information they should document as task-relevant versus task-irrelevant. This can make the concept

of transparency itself open to interpretation and bias. Hence, until a consensus is reached, a practical approach would be to document as much detail as possible regarding all casework communications and decisions (whether task-relevant or not) at the time they are made. Legal, investigative and other stakeholders can then have the 'full picture' in deciding the appropriate weight to give the forensic science evidence (and even, whether or not to accept it at all). Hopefully, the issues explicated here will drive further conceptual and empirical research efforts to better understand how transparency in the decision-making process within forensic science can be effectively implemented in practice.

In short, bias mitigation strategies are important for improving the quality of forensic science judgments, but they are not enough. Greater levels of transparency in disclosing the contexts of judgments are necessary as well, particularly when implicit bias cannot be effectively combated.

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