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Commentary on: Curley LJ, Munro J, Lages M, MacLean R, Murray J. Assessing cognitive bias in forensic decisions: a review and outlook. J Forensic Sci doi: 10.1111/1556-4029.14220. Epub 2019 Nov 6

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Abstract

In their recent critical review titled "Assessing Cognitive Bias in Forensic Decisions: A Review and Outlook," Curley et al. [1](#) offer a confused and incomplete discussion of "task relevance" in forensic science. Their failure to adopt a clear and appropriate definition of "task relevance" undermines the central conclusion of their article—the assertion that it is not necessarily an error for forensic scientists to rely on task-irrelevant information and that "task-irrelevant contextual information may sometimes aid forensic decision makers." This conceptual flaw in the article becomes clear when we define "task relevance" appropriately, in the manner it was defined by the U.S. National Commission on Forensic Science [2](#). The Commission's definition provides a bright-line standard for distinguishing contextual information that is helpful and should be considered from contextual information that is unhelpful and should not be considered. Once that matter is clarified, it becomes possible to discuss intelligently whether steps should be taken to minimize examiners' exposure to task-irrelevant information in order to reduce the potential for contextual bias.

Disciplines

Forensic Science and Technology

Comments

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See Original Article *here*
See Authors' Response *here*

Editor,

In their recent critical review titled "Assessing Cognitive Bias in Forensic Decisions: A Review and Outlook," Curley et al. (1) offer a confused and incomplete discussion of "task relevance" in forensic science. Their failure to adopt a clear and appropriate definition of "task relevance" undermines the central conclusion of their article—the assertion that it is not necessarily an error for forensic scientists to rely on task-irrelevant information and that "task-irrelevant contextual information may sometimes aid forensic decision makers." This conceptual flaw in the article becomes clear when we define "task relevance" appropriately, in the manner it was defined by the U.S. National Commission on Forensic Science (2). The Commission's definition provides a bright-line standard for distinguishing contextual information that is helpful and should be considered from contextual information that is unhelpful and should not be considered. Once that matter is clarified, it becomes possible to discuss intelligently whether steps should be taken to minimize examiners' exposure to task-irrelevant information in order to reduce the potential for contextual bias.

When writing about contextual bias in forensic science, commentators initially used the term "domain-irrelevant" to refer to information beyond what a forensic scientist should properly consider (3,4). The term "task-irrelevant," introduced by the National Commission in 2015, represented a conceptual advance because it recognized that the "relevance" of information to a forensic scientist depends on the specific task the scientist is performing. As the Commission explained,

Evidence that is task-relevant during the evidence collection and evaluative phases may not be task-relevant during the analytic phase. For example, statements of witnesses about what happened during a crime may be task-relevant when deciding what evidence to collect at a crime scene or what examinations are needed. Such statements may also be task-relevant when making an overall assessment of the case in light of the forensic evidence. But witness statements generally are not relevant to the task of interpreting analytic tests. The results of analytic examinations and comparison should depend on the physical evidence examined, not on what witnesses say (2).

The National Commission provided a logically rigorous definition of task relevance: Information "is task-relevant for analytic tasks if it is necessary for drawing conclusions (i) about the propositions in question, (ii) from the physical evidence that has been designated for examination, (iii) through the correct application of an accepted analytical method by a competent analyst" (2). In a Technical Appendix, the Commission offered a mathematical definition, saying that information is task-relevant if it affects the conditional probability of the evidence being

examined under the propositions being considered. In other words, information is task-relevant if it has *probative value* for distinguishing the propositions the forensic scientist has been asked to evaluate (5). It is task-irrelevant if it has *no probative value* for that purpose.

Curley et al.'s claim that "task-irrelevant information may sometimes aid forensic decision makers" rests partly on their failure to recognize that information can be relevant to some tasks yet irrelevant to other tasks. Their failure to draw this distinction may lead forensic scientists who perform analytic tasks to give weight to contextual information that has no probative value for the task they are performing and that should properly be ignored. Consider, for example, a police report that says a witness observed the perpetrator, who he recognized as the defendant, touch a particular item. That information is certainly task-relevant when the forensic scientist's task is deciding where to look for fingerprints, but it is task-irrelevant when the forensic scientist's task is deciding whether a latent print found on the item originated from the defendant. The information in the police report has no effect on the conditional probability of the friction ridge patterns observed in the latent print under the relevant propositions—that is, that the latent either did or did not come from the defendant. Hence, this contextual information has no probative value for fingerprint examiner's analytic task. It would therefore be a mistake for the examiner to give weight to this information when comparing the prints.

Once this matter is clarified, it is possible to discuss intelligently whether steps should be taken to reduce the examiner's exposure to task-irrelevant information in order to reduce the potential for inadvertent contextual bias (6,7). Perhaps the collection of latent prints and the comparison of latent prints should be conducted by different people. Perhaps the examiner who compares the prints should not read the police report before doing so. Whether the steps needed to reduce examiners' exposure to task-irrelevant information are worth the effort is certainly an important issue for discussion. Let's not distract attention from that important discussion by pretending that information that is clearly task-irrelevant might somehow be necessary and helpful to the examiner's task.

Curley et al. also seem confused about whether forensic scientists should consider the "prior odds" of the hypotheses they are asked to evaluate. They note that this practice "may be ethically questionable and not justified legally" but go on to suggest that forensic scientists do it anyway because it might improve the accuracy of their decisions. This suggestion flies in the face of clear statements to the contrary in the National Commission's document on task relevance:

When performing analytic tasks, FSSPs should draw conclusions solely from the physical evidence that they are asked to evaluate (along with any task-relevant context), and not from any other evidence in the case. Fingerprint examiners should draw conclusions from fingerprints, tool mark examiners from tool marks, DNA experts from

biological evidence. It would be inappropriate, for example, if analytic conclusions were influenced by whether the suspect made incriminating statements or had a criminal record, or whether other forensic evidence implicated the suspect. Those are matters to be considered by police, prosecutors, and jurors, not matters that should influence a scientific assessment of evidence (2).

Forensic scientists may well be able to improve their accuracy by considering task-irrelevant information, but only by delving into matters beyond their scientific expertise (8). Suppose, for example, that a bite mark examiner is asked to determine whether a defendant was the source of a mark found on a victim. The bite mark examiner may well be able to improve his accuracy by taking into account other evidence (e.g., DNA analysis of saliva on the skin), but the improved accuracy has nothing to do with the examiner's putative scientific expertise. It arises entirely from the examiner going beyond the evaluation of the bite mark evidence to consider evidence from other domains—evidence that will also be considered by police, prosecutors, and jurors. This creates the “criminalist's paradox”: By considering task-irrelevant information, the bite mark examiner may become more accurate, but the examiner's testimony is difficult to evaluate and may be misleading because it rests, in part, on consideration of other evidence that the trier of fact will also be considering (5,9). The increase in the examiner's accuracy may, paradoxically, undermine the accuracy of the legal system (5,9).

Curley et al. mention the criminalist's paradox but seem to dismiss it as either unimportant or as just one of several factors to be considered when assessing whether forensic scientists should consider “task-irrelevant” information. They never say whether they agree or disagree with the ethical and legal objections to considering prior odds, and if so why. More importantly, they fail to recognize that the underlying issues are not merely about ethics or legality but concern a matter of fundamental scientific importance—the proper basis for a scientific opinion in the field of forensic science. In order to have a coherent discussion of contextual bias in forensic science, and what to do about it, we must first agree on what is the proper basis for a forensic science opinion.

This fundamental issue was addressed squarely in the National Commission's erudite discussion of task relevance (which Curley et al. unfortunately ignored). The Commission's treatment provides a strong conceptual foundation for analysis of these issues. It should be the starting point when discussing what forensic scientists should and should not consider when performing various tasks. While it is conceivable that forensic scientists' reports might in some unusual instances be more useful to the legal system if they consider information that falls outside

the Commission's bright-line definition of task relevance (5), the case for routine reliance on such information (if it can be made at all) will need to be made in a careful, rigorous manner. Forensic scientists should be skeptical of claims that their work will benefit from the use of information that, by definition, lacks probative value for distinguishing the propositions they have been asked to evaluate. Lawyers will certainly be skeptical of such claims.

I hope that Curley et al. will give further consideration to the issues raised here and particularly to the National Commission's standard for task relevance. If they agree with the Commission's position, they will need to rethink much of what they said in their article. If they disagree with the Commission's position, they should say why. In either case, a forthright discussion of the proper basis for forensic science opinions will lead to more productive discussion of contextual bias in forensic science and what to do about it.

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