

**Commentary on:** Budowle B, Bottrell MC, Bunch SG, Fram R, Harrison D, Meagher S, Oien CT, Peterson PE, Seiger DP, Smith MB, Smrz MA, Soltis GL, Stacey RB. A perspective on errors, bias, and interpretation in the forensic sciences and direction for continuing advancement. *J Forensic Sci* 2009;54(4):798–809

Sir,

In their recent article, *A Perspective on Errors, Bias, and Interpretation in Forensic Sciences and Direction for Continuing Advancement*, Bruce Budowle and his coauthors address many issues of current interest in forensic science, from ethics to statistics (1). We applaud their attempt to initiate a discussion that might foster further development of an over-arching strategy for enhancing the forensic sciences. We hope to contribute to that discussion by commenting on their treatment of our proposal for sequential unmasking procedures (2) designed to minimize bias resulting from domain-relevant information presented prematurely to the examiner.

We are heartened to note the open acknowledgment and acceptance that “confirmation and contextual biases are inherent in the psyche of human beings...” and that “...they also may cause a loss of objectivity...” and that “...personal biases might override sound judgment, may affect interpretations in certain circumstances, and need to be minimized.” These statements seem inconsistent, however, with the authors’ stated belief that “...bias is not a serious pervasive concern...” However, they offer no data to support this belief. We have discussed in detail (3,4) studies that suggest the opposite (5–9). Further, several of us review work from forensic laboratories on a daily basis and have had occasion to observe first hand the workings of forensic laboratories nationally and internationally. In our experience, the opportunity for, and the realization of, subconscious bias is more pervasive and insidious than Budowle et al. seem to believe. In addition, even if bias substantively affects only a small subset of forensic case outcomes, the issue still merits serious concern.

Budowle et al. correctly define *confirmation bias* as “...a proclivity to search for or interpret additional information to confirm beliefs and to steer clear of information that may disagree with those prior beliefs” and *contextual bias* or *context effect* as “using existing information or consistency to reinforce a position.” We agree with their assertion that “We cannot deny that these biases exist; they are necessary for human beings to function. Unfortunately, they also may cause a loss of objectivity. Therefore, personal biases might override sound judgment, may affect interpretations in certain circumstances, and need to be minimized...” and that “Some blinding of the ancillary information may have merit and should be considered by the forensic community.”

Given this recognition of the reality and ubiquity of observer effects, we were disappointed that the authors did not express greater enthusiasm for our proposed sequential unmasking protocols. Specifically, Budowle et al. also report that, “On the other end of the spectrum, recently a letter describing a sequential unmasking approach has been proffered for DNA interpretation. This letter has some points that are difficult to reconcile such as a case manager solely deciding what to test, how to test, and to supervise testing. This suggestion would strip the laboratory of a wealth of experience in carrying out an analysis and would rely on

only one individual to effect case analyses.” This characterization suggests that some of the content of our letter (and even its main title: “Sequential unmasking”) has been misunderstood.

We certainly do not accept that it is necessary or desirable for one individual to function as the sole case manager for a laboratory, or that a single individual would have full control over all aspects of testing, or that the experience of all other analysts in the laboratory would be ignored. For example, we specifically state that, “After the results of the initial interpretation are documented, information about reference samples should be unmasked in a sequential manner.” And, with the calculated intention of forestalling criticisms such as has been leveled in the paper under discussion, we went on to clarify that, “We are not suggesting that forensic scientists be blind to information that might afford them the greatest opportunity to generate reliable information from evidentiary samples.” We did not suggest that one and only one individual in a laboratory (or external to the laboratory) be designated as the sole case manager that would “effect case analyses” and feel that a better design, both administratively and professionally, would be to rotate responsibilities amongst qualified analysts, maximizing both education and experience. Many laboratories that use a group approach to case analysis already employ some form of a rotating case manager to organize individual cases (10).

Budowle et al. state that, “Some critics have suggested blind analysis is a possible way to alleviate the effects of contextual and confirmation biases.” They continue with, “A hair or shoeprint examination carried out without knowing the estimated time between the crime and collection of reference samples could lead to erroneous interpretations. Ignoring elimination samples, when interpreting analytical results from evidence in a rape case, can provide false leads and reduce the power of the analysis. Complete ignorance to case-specific information exhibits poor judgment and should not be considered.” Again, we have not suggested that a report be issued without considering such information, nor that complete and enduring ignorance of case-specific information is a good idea. Intrinsic to our proposal is the idea that the analyst eventually will gain access to all domain-relevant information but that, in contrast to current practice, such information will be revealed sequentially. Decisions and conclusions must also be documented chronologically relative to the unmasking of each additional piece of information. Such a process patently precludes any notion that the analyst would ultimately lack information relevant to arriving at a complete and informed conclusion.

Finally, in our continual review of forensic DNA protocols across the nation, we have been pleased to see that many laboratories (such as the Virginia Department of Forensic Science) have begun to include at least some elements of sequential unmasking, the simplest and most important being initial interpretation of evidence samples independent of any information about the reference samples. This implicit acceptance of the idea of sequential unmasking goes a long way toward minimizing observer effects, and their attendant dangers in forensic analyses.

Budowle et al. suggest that “The best way to overcome and prevent potential biases in judgment is through peer review,” specifically “blind verification” as a favorable alternative to proactively minimizing the risk of inadvertent error by implementing sequential unmasking type protocols. First, the term “peer review” properly applies to a specific process through which a manuscript submitted

for publication in a professional journal is anonymously reviewed by several individuals in the same field to determine its suitability for publication. Co-opting this term as a synonym for the internal technical review performed in a forensic laboratory is inappropriate and misleading. It implies greater weight and authority to an internal technical review than is merited, conferring upon it a false sense of autonomy and independence. Use of the term "verification" to describe an independent examination of an item or data is also problematic. The term strongly implies that the conclusion of the primary analyst will in fact be verified, and would seem to leave little room for refutation. As thought follows language, we suggest that the use of more neutral terms such as examination, interpretation, or analysis is more appropriate. Most importantly although, we are not aware of any published data that indicate that the implementation of these types of quality assurance measures, as used by forensic laboratories today, minimize subconscious bias. These procedures do not substitute for sequential unmasking.

Forensic science is an evolving field. Almost a decade ago, two of us (11) published an editorial titled, "How much should an analyst know?" The answer was, "as much as possible." At that time, Inman and Rudin insisted that the effects of subconscious bias could be countered using similar suggestions to that of Budowle et al. In the intervening years, and in large part based on updated information gained by independently reviewing hundreds of laboratories, they have updated their beliefs and refined the question. They now agree with the other authors of this response that the correct question must be, not only, "How much should an analyst know?", but also "When should they know it?"

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