



B182 Practical Ways to Address Cognitive Bias in Forensic DNA Decision Making

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After attending this presentation, attendees will better understand the impacts of cognitive bias and balanced approaches that may be employed to reduce their effect in the context of a forensic DNA workflow.

This presentation will impact the forensic science community by allowing attendees to consider the possible effects of cognitive bias in forensic DNA testing and by providing a roadmap of general pathways to address the influences of cognitive bias on forensic decision making.

Cognitive bias, an inherent part of human intelligence, may influence decision-making and even the workflow processes of individuals and their laboratories. Seven sources of bias have been identified that may affect forensic decision making; they are related to human nature, environment, culture, and experience, as well as case-specific information. While bias in itself may not cause error, the outcome of cognitive bias, if not monitored and addressed effectively, is that analyses and interpretations may be compromised. Nevertheless, practitioners that are unaware of their inherent bias have generated reliable interpretations of DNA results; however, there also are well-documented examples in which bias has indeed negatively impacted decision making and the interpretation of forensic DNA analyses, such as working and reasoning backwards, from the suspect to the evidence (i.e., fitting the DNA profile from the known reference sample to the DNA evidence profile(s)). Through education and training, forensic scientists can be better prepared to reduce error that may be caused by cognitive bias; for example, by using Linear Sequential Unmasking (LSU).

Factors that impact bias cannot be managed by simply listing them or by individual responsibility. In addition to cognitively informed education and training, other mechanisms should be considered. A cognitively informed risk assessment of the entire DNA workflow can explore which procedures are most efficient in reducing the influences of cognitive bias. As an example of an assessment related to DNA technical review, a hierarchical approach has been advocated as a quality assurance practice to resolve disputes between analysts and reviewers. Alternatively, cognitive research indicates a hierarchical approach may introduce a variety of biasing factors that question the process, such as base rate expectations or favoring one individual's opinion over another. Mitigation could perhaps be better addressed by an independent blind review process that documents all opinions. A conclusion can then be determined, including the possibility of reporting the sample as inconclusive.

Context management of irrelevant information is another area to explore to determine how best to provide suitable information to a casework analyst without presenting information that could lead to bias during testing, analysis, or interpretation. The LSU approach requires first determining what information the examiner needs and making sure he/she receives all information required, but making a reasonable effort to minimize exposure to irrelevant information (especially the potentially more biasing irrelevant information). Second, the LSU approach requires managing the time and sequence in which relevant information is provided to the examiner. For example, avoiding working backward from the known suspect to the evidence by first evaluating the evidence from the crime scene, and only subsequently, sequentially, and linearly presenting the known suspect. Alternatively, a strong and effective technical review process could reduce the effects of cognitive bias on the final outcome in a systems-based approach.

This presentation will cover the important need for proper training and education concerning cognitive bias, practical suggestions on methods to control irrelevant task information, interpretation strategies to minimize bias, and suggestions for quality assurance procedures. Proactive mechanisms for quality enhancement are always preferred to reactive approaches to address error that may arise; however, the choice of approaches to improve quality by controlling the effects of cognitive bias must be balanced based on the overall impact on quality, realities, and the constraints of working in a forensic DNA laboratory, the importance of communication with investigators, proper decision making for analysis of samples, and cost-benefits to the system. Procedures that handicap the workings of the crime laboratory or add little value to improving the operation are not advocated, but simple yet effective measures are suggested.

Forensic DNA Decision Making, Cognitive Bias, DNA Workflows