

## Authors' Response

Sir,

We agree that there is a need for empirical research on the extent to which (and the circumstances under which) observer effects can influence the interpretation of DNA test results. We also think it would be foolish to assume, in the absence of such research, that observer effects are not a problem for DNA interpretation. Observer effects are a basic phenomenon of human psychology that has been observed in a broad variety of contexts (1,2). The tendency of human observers to interpret data in a manner consistent with their expectations and desires has been called "one of the most venerable ideas of traditional epistemology" as well as "one of the better demonstrated findings of twentieth-century psychology" (3). Empirical studies have confirmed that observer effects can influence latent print examinations (4–8), handwriting identification (9), microscopic hair analysis (10), and forensic psychological assessment (11). To assume without evidence that forensic DNA analysts are somehow immune to this apparently universal human tendency requires an unwarranted leap of faith.

Observer effects are strongest when the data are ambiguous and when observers are influenced by strongly held expectations and motives (1,2,12–14). Both of these circumstances can arise during interpretation of DNA evidence. The potential for ambiguity in DNA test results has been widely noted (15–19) particularly in cases involving mixtures and limited quantities of DNA that may result in incomplete profiles. The authors of the NIST 2005 mixture study quoted prominent forensic scientist Peter Gill saying "If you show 10 colleagues a mixture, you will probably end up with 10 different answers" (19). Furthermore, DNA analysts often approach such data with strongly held expectations about what they will find.

Scientists in most fields use "blind" or "double-blind" procedures when relying on subjective judgment to interpret data (1,2). They do so because they recognize the importance of minimizing observer effects in scientific analyses. It is time for forensic scientists to join the rest of the scientific community in recognizing this problem and in taking obvious, common sense steps to deal with it, such as the sequential unmasking procedure that we have proposed (21).

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