

AAAS, PCAST and Validation: Questions and Answers

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The 2017 AAAS Report on Latent Fingerprint Examination and the 2016 PCAST report on forensic science both discussed validation of feature comparison methods in forensic science.

With respect to a recent suggestion that the AAAS report contradicts the PCAST report, the Chair of the AAAS working group on latent fingerprint examination provided this response.

*****Does the AAAS report suggest or imply that forensic techniques ought to be used without direct empirical tests of their accuracy?***

No, the report says exactly the opposite. It declares that empirical tests to measure the accuracy of the technique under conditions appropriate to its use in practice (sometimes called ‘black-box studies’) are absolutely necessary for establishing the validity of latent fingerprint examination. For example, the report states:

...when examining the scientific foundation of latent print examination, it is necessary to consider more than the degree of inter-finger and intra-finger variability, one must also consider research on how well examiners can, in practice, distinguish the impressions of different fingers (p. 14)

*****Does the AAAS report contradict the PCAST report with regard to the need for direct empirical testing of forensic science techniques?***

No. The AAAS report and the PCAST report are in complete agreement on the necessity of direct empirical testing to assess the accuracy of a forensic science method under conditions appropriate to its use in practice.

The AAAS report states this agreement clearly:

The PCAST report concludes, *and we agree*, that foundational validity can *only* be established by empirical research [emphasis added] (AAAS report, p. 14)

The AAAS report goes on to quote with endorsement and approval several passages from the PCAST report on the necessity of empirical testing for establishing foundational validity, including the following:

Scientific validity and reliability require that a method has been subjected to empirical testing, under conditions appropriate to its intended use, that provides

valid estimates of how often the method reaches an incorrect conclusion.... Without appropriate estimates of accuracy, an examiner’s statement that two samples are similar—or even indistinguishable—is scientifically meaningless: it has no probative value, and considerable potential for prejudicial impact. Nothing—not training, personal experience nor professional practices—can substitute for adequate empirical demonstration of accuracy. (AAAS report p. 14, quoting PCAST report p 46)

For subjective methods, foundational validity can be established *only* through black-box studies that measure how often many examiners reach accurate conclusions across many feature-comparison problems involving samples representative of the intended use. In the absence of such studies, a subjective feature-comparison method cannot be considered scientifically valid (AAAS report, p. 43, quoting PCAST report, p. 66)

*****Did the PCAST report and the AAAS report differ in their analysis of what kinds of studies are needed in order to establish the validity of latent fingerprint examination?***

The PCAST report distinguished what it called “foundational validity” (whether the method can in principle be reliable) from what it called “validity as applied” (whether the method has been applied in a manner that will produce accurate results in the case at hand). It concluded that sufficient research has been done to establish the “foundational validity” of latent fingerprint examination but called for a continuing program of “proficiency testing,” and for careful and transparent assessment of the work in particular cases, to help assure that the technique is valid as applied.

The AAAS report agreed explicitly: “[O]ur conclusions largely align with those of the PCAST report...” (p. 44). However, the AAAS report offered a more detailed assessment and discussion of the kinds of research needed to assure that latent print examination is valid *as applied*, declaring “[p]articularly with regard to the performance of human examiners we find that more and better research is needed.” (p. 14). It called for assessing examiner performance in a blinded manner by introducing known-source test samples into the flow of casework in forensic laboratories, so that examiners do not know when they are being tested. The PCAST report also mentioned the desirability of conducting what it called “proficiency testing” in a test-blind manner, and urged that such research be “vigorously pursued, with the expectation that it should be in wide use, at least in large laboratories, within the next five years.” (PCAST report, p. 59). The AAAS report went beyond the PCAST report by providing recommendations on how blinded research might be performed. It also discussed how the blinded research on examiner performance could be used to answer important questions about factors that affect examiner accuracy and to provide the feedback needed to improve laboratory performance.

*****The AAAS report mentions the concept of “convergent validity.” Was the report’s mention of this concept intended to suggest or imply that forensic science techniques can be considered valid in the absence of direct empirical tests of their accuracy or on the basis of studies that PCAST considered flawed and inadequate?***

No. The AAAS report was designed to provide a comprehensive review of the scientific literature on fingerprint evidence. Consistent with that goal, it discussed the convergence of findings across multiple studies of the accuracy of latent print examiners, including a number of studies that PCAST noted as having design flaws or other limitations that prevented them from being appropriate empirical tests for establishing foundational validity. The AAAS report also noted these flaws and limitations; it did not suggest that these studies were appropriate tests of the accuracy of latent print examination under conditions appropriate to use in practice. It found, however, that many of these studies were nevertheless worthy of consideration for other purposes, particularly for identifying factors that might affect the validity of latent fingerprint examination as applied (such as the quality of the latent print; training of examiners, etc.).