

Quiz

1. Which of the following statements could be correct? Justify your answers.
 - a. A likelihood ratio is a numeric statement of the strength of the evidence.
 - b. A likelihood ratio is the probability that the voice on the questioned-voice recording has the same origin as the voice on the known-voice recording.
 - c. A likelihood ratio is the probability that the questioned voice and the known voice come from the same speaker versus that they come from different speakers.
 - d. A likelihood ratio is the probability of observing the properties of the sample of questioned origin and the properties of the sample of known origin if it were true that they had the same origin versus if it were true that they have different origins.
 - e. A likelihood ratio is the probability that the acoustic properties of the voice on the offender recording came from the suspect.
 - f. A likelihood ratio is an estimate of the probability of observing the acoustic properties of the voice on the offender recording if it were produced by the suspect versus if it were produced by some other speaker selected at random from the relevant population.
 - g. A likelihood ratio of 1 million is equivalent to “identification”, a likelihood ratio of 1 over 1 million is equivalent to “exclusion”, and a likelihood ratio in between is equivalent to “inconclusive”.
 - h. A forensic likelihood ratio is a strength-of-evidence statement in answer to the question: How much more likely are the observed differences/similarities between the known and questioned samples to arise under the hypothesis that they have the same origin than under the hypothesis that they have different origins?
 - i. The forensic scientist reports that the probability of the measured DNA profile occurring is 6 million times more likely if it came from that accused than if it came from some other unrelated person selected at random from the population of the country. In summarising the evidence the judge states that it the probability that the DNA belongs to the accused is 6 million times greater than the probability that it does not come from the accused. This is an example of the prosecutor’s fallacy.

2. Which of the following is/are correct? Justify your answers.

- a. The validity and reliability of a forensic comparison system can be measured using false alarm and miss rates respectively.
- b. Forensic comparison systems should be tested using a standard set of data which reflect a broad range of conditions found in forensic cases.
- c. The log likelihood ratio cost (C_{llr}) is a measure of the reliability of a forensic comparison system.
- d. Accuracy is a synonym of reliability.
- e. Precision is how close on average the output of a system is to what the ideal output should be if one knows the truth regarding the input.
- f. After testing the performance of a forensic comparison system, one can modify the system in an attempt to get a better result.
- g. It is not necessary to run one's own validation tests of a commercially produced forensic analysis system if the results of validation tests conducted by the manufacturer are available.
- h. The data used to test a forensic comparison system should consist of pairs of samples in which one sample has conditions reflecting those of the suspect sample in the case under consideration and the other sample has conditions reflecting those of the offender sample in the case under consideration.
- i. Forensic practitioners are trained to be very careful when conducting casework, so their performance on casework will be better than their performance when they know that it is only a test.
- j. In designing tests of the performance of forensic analysis systems, one needs to know the details of how each system works so that one can design an appropriate test for each system.
- k. It is not possible to measure the precision of a forensic comparison system that outputs likelihood ratios.
- l. A car which never starts is reliable.