

# Population Statistics

panel discussion

*Geoffrey Stewart Morrison*



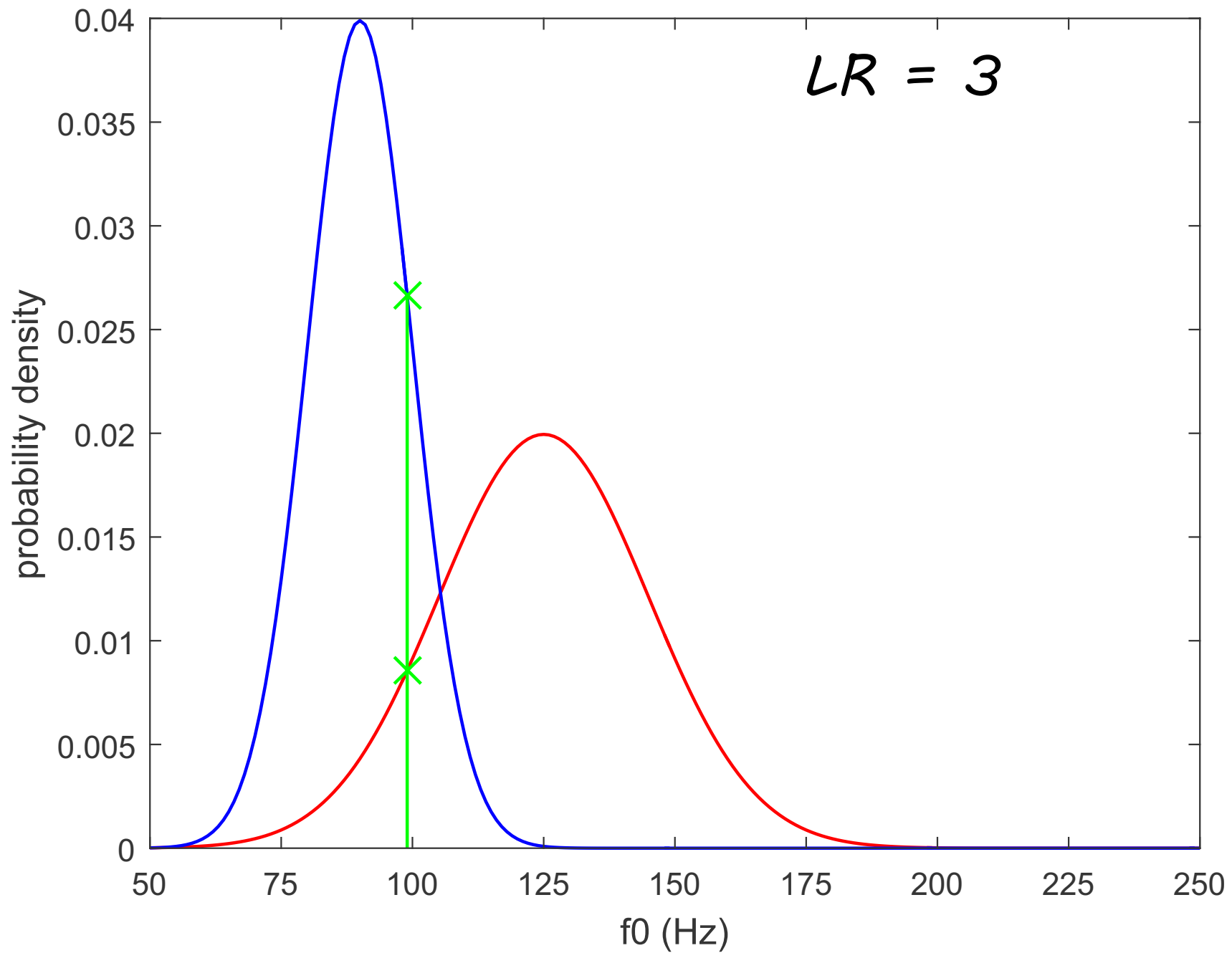
Aston University

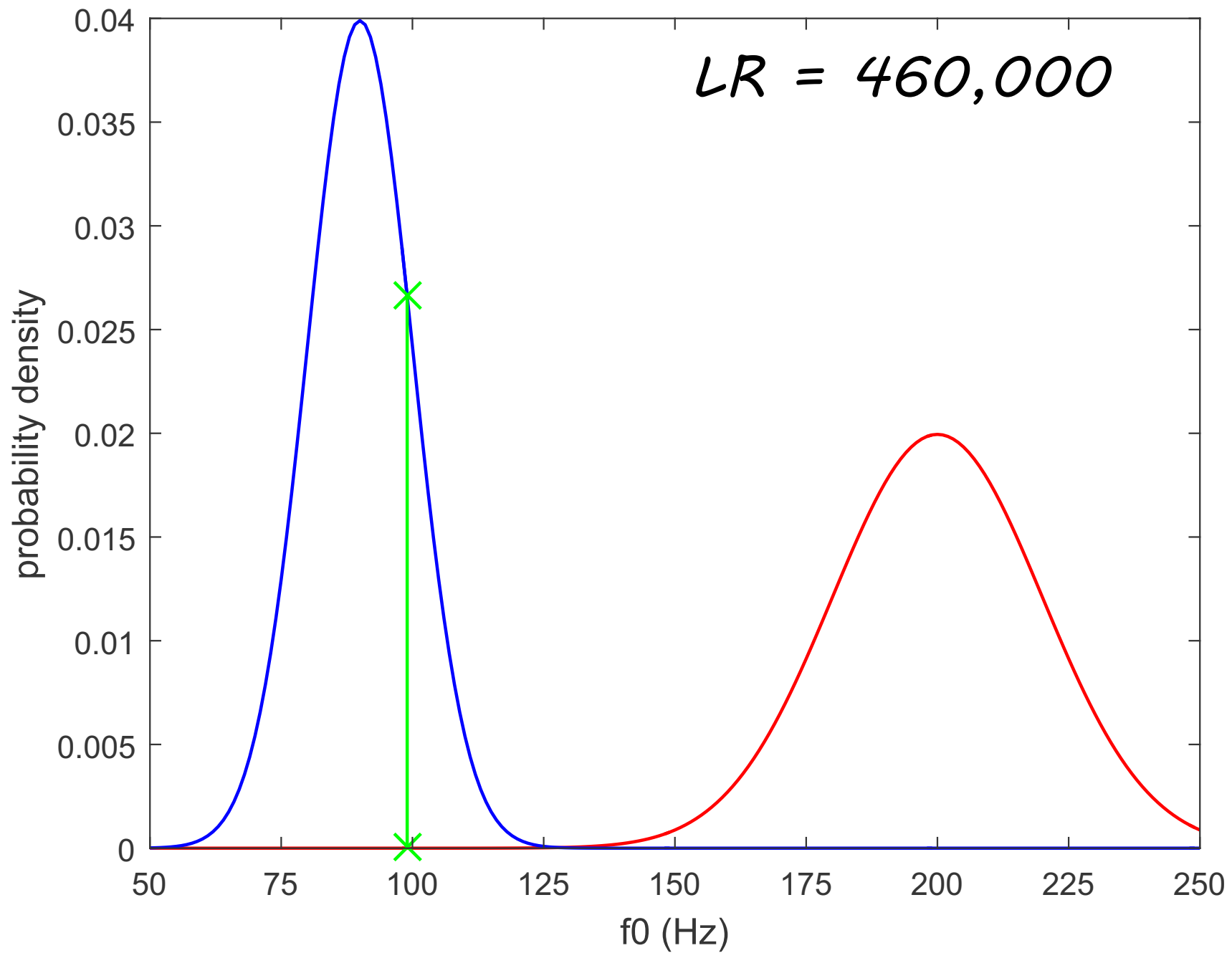
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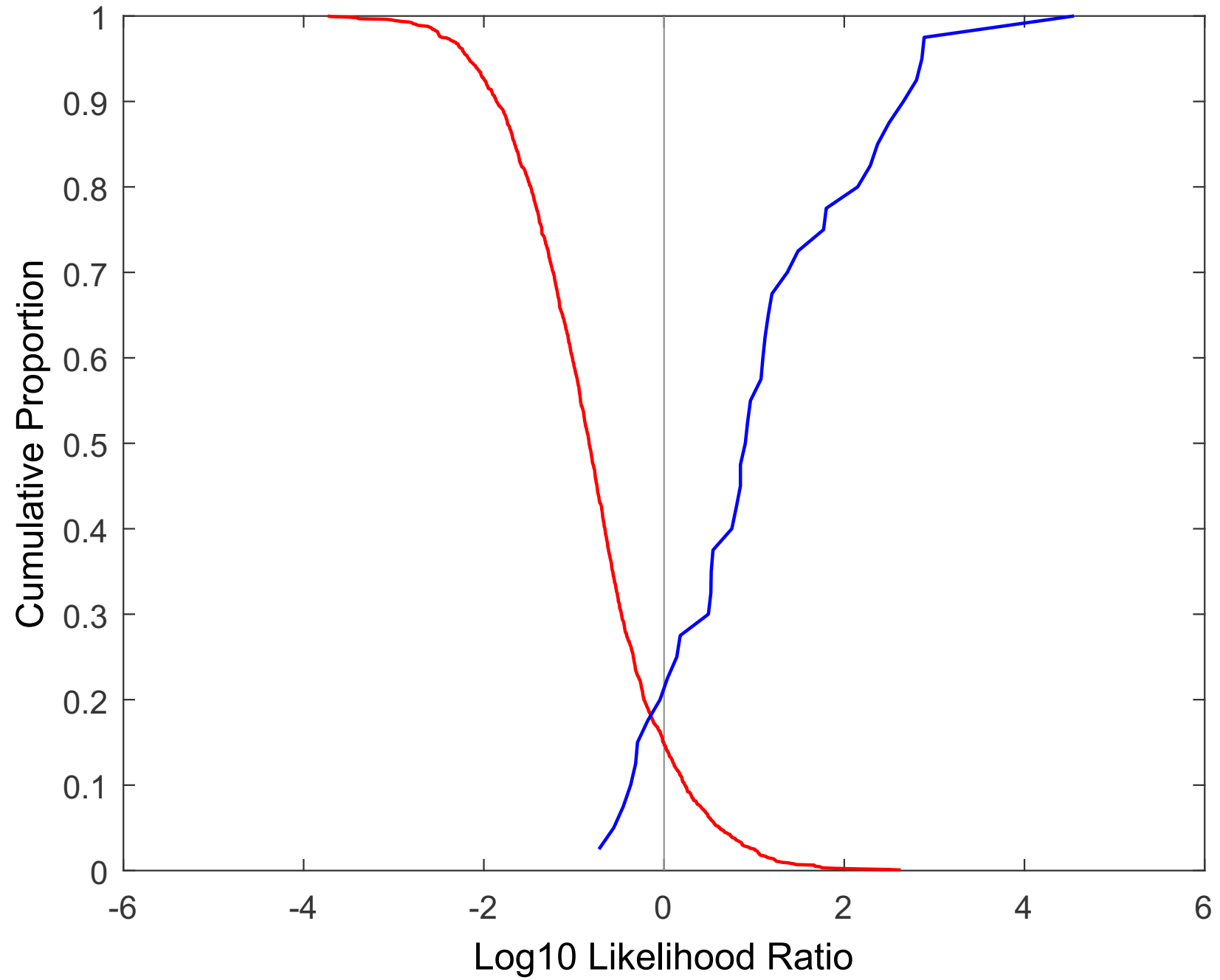
$$\frac{P(E|H_s)}{P(E|H_d)}$$

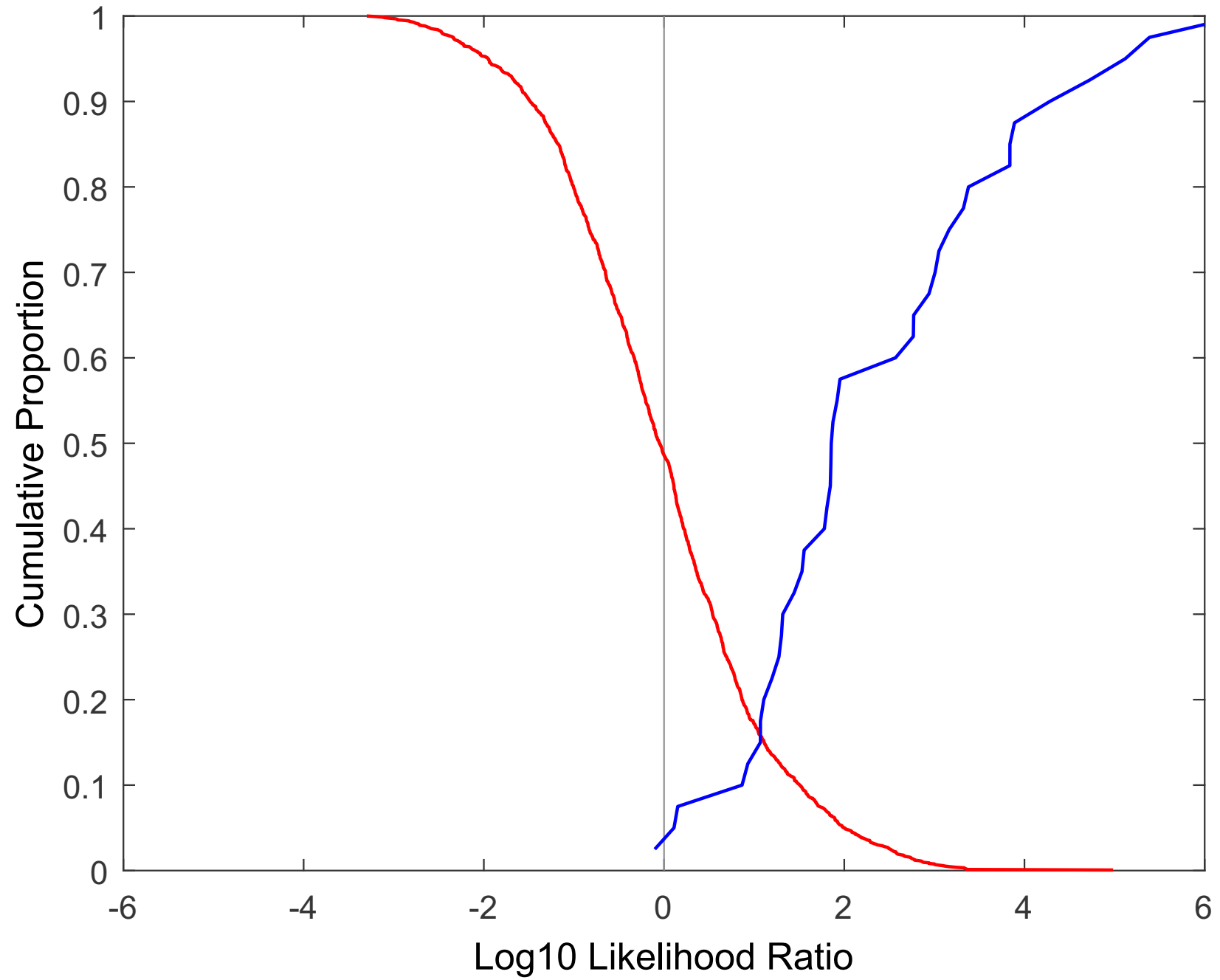
probability of the **evidence** if it **came from the known source**

probability of the **evidence** if it **came not from the known source**  
**but from some other source selected at random from the**  
**relevant population**









**Q:** How is the decision as to what constitutes the relevant population influenced by the case specific context? What is the best approach to determining what constitutes the relevant population?

**A:** Population of speakers who could potentially have been the source of the questioned-origin recording, e.g.,

- same language
- same accent
- same sex

as the *speaker on the questioned-origin recording*.

Must *not* use information about the known speaker.



**Q:** Who should be responsible for determining what constitutes the relevant population?

**A:** In the *first instance*, the decision is made by the *forensic practitioner*. The forensic practitioner must clearly communicate what they have adopted as the relevant population so that the trier of fact can decide whether the forensic practitioner set out to answer an appropriate question. In the *final instance*, the forensic practitioner's decision is accepted or rejected by the *trier of fact*.

**Q:** How can databases help to determine what constitutes the relevant population?

**A:** The forensic practitioner's decision as to what constitutes the appropriate question to answer, and therefore what constitutes the relevant population, must come before the process of obtaining a sample of data representative of the relevant population.

One should not confuse *population* and *sample*.

The sample must be representative of the relevant population.

*Thank You*

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## Some of my and my colleagues' publications related to this topic:

- Morrison GS, Thompson WC (2017). Assessing the admissibility of a new generation of forensic voice comparison testimony. *Columbia Science and Technology Law Review*, 18, 326–434.
- Morrison GS, Enzinger E, Zhang C (2017). Reply to Hicks *et alii* (2017) Reply to Morrison *et alii* (2016) Refining the relevant population in forensic voice comparison - A response to Hicks *et alii* (2015) The importance of distinguishing information from evidence/observations when formulating propositions.  
<http://arxiv.org/abs/1704.07639>
- Morrison GS, Enzinger E, Zhang C (2016). Refining the relevant population in forensic voice comparison – A response to Hicks *et alii* (2015) The importance of distinguishing information from evidence/observations when formulating propositions. *Science & Justice*, 56, 492–497. <http://dx.doi.org/10.1016/j.scijus.2016.07.002>
- Enzinger E (2016). Comparison of GMM-UBM and i-vector models under casework conditions. *Implementation of forensic voice comparison within the new paradigm for the evaluation of forensic evidence* (ch. 4). PhD dissertation, University of New South Wales. <http://handle.unsw.edu.au/1959.4/55772>
- Morrison GS, Stoel RD (2014). Forensic strength of evidence statements should preferably be likelihood ratios calculated using relevant data, quantitative measurements, and statistical models – a response to Lennard (2013) Fingerprint identification: How far have we come? *Australian Journal of Forensic Sciences*, 46, 282–292.  
<http://dx.doi.org/10.1080/00450618.2013.833648>
- Morrison GS, Ochoa F, Thiruvaran T (2012). Database selection for forensic voice comparison. In *Proceedings of Odyssey 2012: The Language and Speaker Recognition Workshop, Singapore* (pp. 62–77). International Speech Communication Association.