



“What does your conclusion really mean?”

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Topic areas to be discussed

- Can your conclusion be misinterpreted?
- What are the limitations of your conclusion?
- What is the significance of you conclusion?

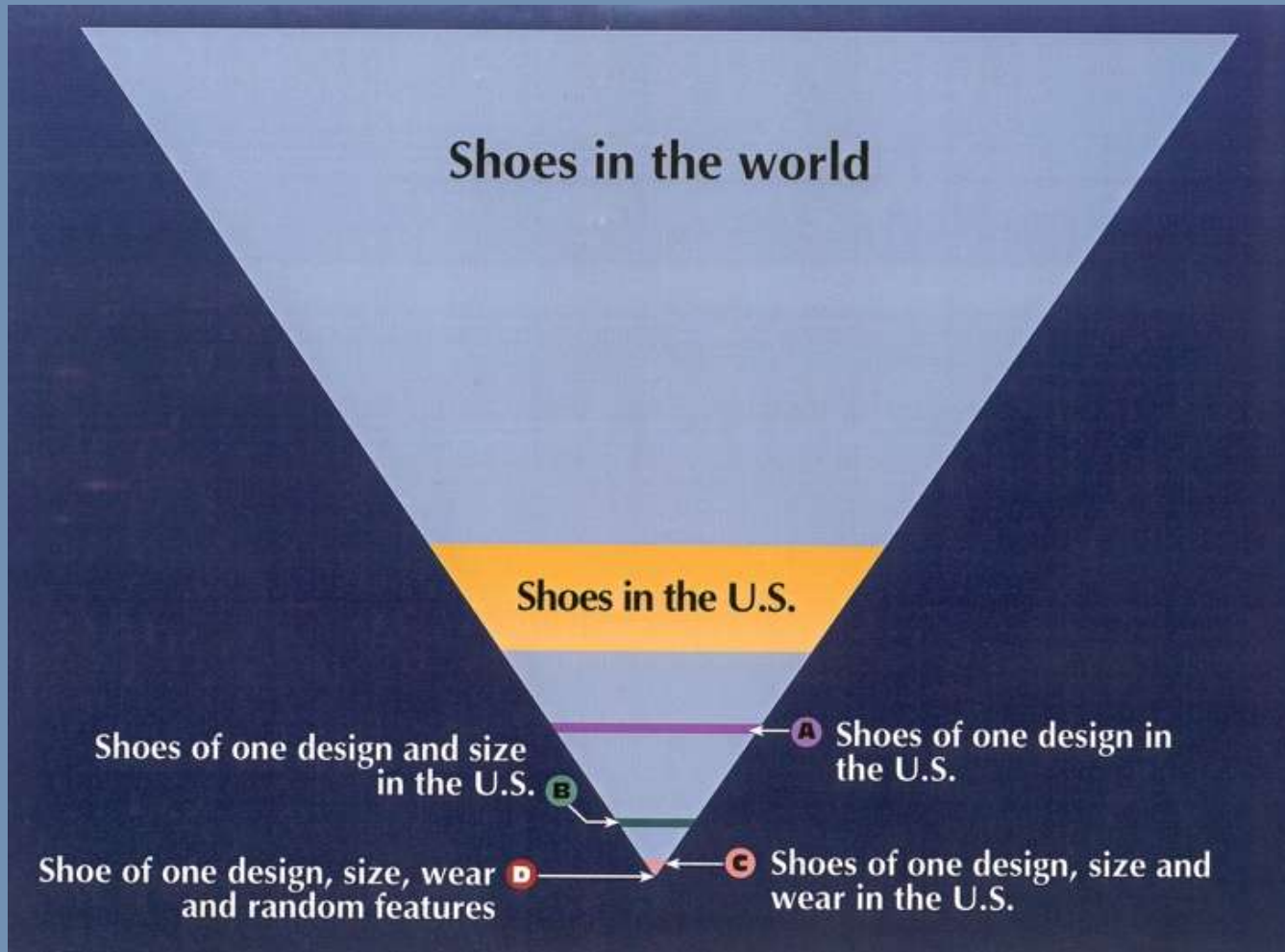
Brief Background

- Court decision out of the UK 2010
- Defendant was tried and convicted of murder
- Case involved a footwear comparison
- The use of “could have made” vs. “likelihood ratio” in reporting conclusions

Could have made

- *This opinion indicates that a combination of two or more class characteristics correspond between the questioned impression and the known source.*
- *“The footwear impression depicted in the Q1 photograph corresponds in physical size and design with the K1 left NIKE shoe.”*

Significance of “could have made”



Likelihood Ratio

- *How likely is it to obtain a piece of evidence given a proposition, compared to how likely is it to obtain the same piece of evidence given an alternative proposition. Once a numerical value is calculated, the strength of support for a proposition can be expressed.*
- *“In my opinion there is a moderate degree of scientific support for a view that the Nike trainers made those marks”*

Likelihood ratio scale

Value of likelihood ratio	Verbal equivalent
>1-10	Weak or limited support
10-100	Moderate support
100-1000	Moderately strong support
1000-10,000	Strong support
10,000-1,000,000	Very strong support
>1,000,000	Extremely strong support

Issues raised by the court

- The examiner explained that he had based his opinion on his experience and the formula for calculating a likelihood ratio merely as a guide. He used very conservative figures to produce likelihood ratios for the frequencies of the pattern (P) and size (C) and the amount of wear (W) and damage (D) and that a database of 8,122 shoes had been used for the calculation of P.
- Formula used by examiner: $P \times C \times W \times D$

Issues from the Court

- P: used the frequency of the pattern used in the internal database of the laboratory
- C: used the figure of 3 percent of population was size 11
- W: considered that the amount of wear on the shoes meant that half of the shoes of this design and approximate size configuration could be excluded
- D: considered that he could exclude very few pairs of shoes that could not be previously excluded by other factors

Issues raised by the Court

- The footwear data used in this case was only available to examiners from one laboratory.
- There may be times when an examiner could go further in expressing a more evaluative opinion where the conclusion is that the impression “could have been made” by the footwear, but no likelihood ratio or any other mathematical formula should be used in reaching that conclusion.

Issues raised by the Court

- Where a sufficiently reliable database is available, as in the case of DNA, then a straight statistical model could properly be used.
- Currently there are no such databases for footwear impression available.

Outcome of Appeal

- The conviction was quashed and a retrial was ordered.