Expertise in Forensic Science

Raymond Nelson, MA, NCC

- “The six most questionable word used to formulate the justification for a conclusion by any forensic analyst are 'BASED ON MY TRAINING AND EXPERIENCE...' Training and experience in the absence of demonstrative evidence mean little to me. A reputable examiner should be able to show the decision maker – the prosecutor, the defense attorney, the judge and the jury – the basis for a conclusion which is understandable and can be justified by data or images. If the examiner resort [only] to the 'trust me, I know what I am doing logic,' a red flag should immediately go up: DON'T TRUST HIM!”

Joseph Bono, MA
President,
American Academy of Forensic Science
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Quinsey & Ambtman

- Journal of Consultiong and Clinical Psychology (1979)
  - 9 High School teachers
  - 4 experienced forensic psychiatrists

Hypothesis

- Experienced Psychiatrists would make more accurate ratings than teachers
- Experienced psychiatrists would attend to more specialized information than teachers
- Experienced psychiatrists would have better agreement (reliability) than teachers

Null Hypothesis

- There would be no difference
  - Ratings of teachers and psychiatrists
  - Information used by teachers and psychiatrists
  - Interrater agreement among teachers and psychiatrists

Experiment

- 9 child molesters
- 10 property offenders
- 11 serious offenders against adults
- Three ratings
  - Likelihood of a property offense
  - Likelihood of an assaultive offense
  - Seriousness of an assault should one occur
- Also rated whether the offender should be released

Results

- Good agreement between teachers and psychiatrists
- Low interrater aggreement in both groups
- Neither psychiatrists nor teacher used more specialized information
- Teachers rated child molester and adult assaulters as more likely to commit a an assault
- Psychiatrists rated patients more likely to commit property crimes

Nancee Burguone

2011 APA Conference

Showed interview view to experienced examiners.

Asked participants to judge deception or truth-telling from behavior.

Results

Experienceed examiners achieved accuracy equivalent to chance.

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What to do

- Point to the Evidence
- Show the math (not just the procedure)
  - Level of statistical significance
  - Normative data

Daubert v. Marl Dow Pharmaceutical, Inc. (1993)

- New test for the admissibility of scientific evidence under the Federal Rules of Evidence
  - Replaced the Frye v. United States (D.C. Cir. 1923) test, which required that novel scientific evidence be "generally accepted" before being admissible in court
- Judge is gatekeeper (Rule 702) to ensure scientific expert testimony is based on “scientific knowledge”
- Scientific knowledge = scientific method
  - Hypothesis (falsifiability)
  - Experimental testing to prove or falsify the hypothesis
  - Subject to peer review and publication
  - Known potential error rates (norms)
  - Standards and controls for operation

Scientific Method

- Hypothesis (falsifiability)
- Experimental testing to prove or falsify the hypothesis
  - Null hypothesis (H is wrong or makes no difference)
- Subject to peer review and publication
- Known methods to calculate potential error rates
  - Normative data
- Standards and controls for operation

Scientific Statements

- All statements are probability statements
- All test results are probability statements
  - Calculation of estimates of the normative data
    - Population norms
  - Calculation of the range of bias or error
    - Errors of measurement
  - Calculation of the test result
  - Calculation of the level of statistical significance

- What is the level of statistical significance for the manual scores of a multiple issue screening test?

- Is statistical significance measured and calculated by ipsative methods or through the use of norms (normative data)?

- What normative data are used to calculate the level of statistical significance for the manual scores of mixed issue screening exams?

- What are norms?

Normative Data

Norms (normative data) provide us with a description of what the data normally look like for most people (95%) of the population.

Although the exact population data are sometimes unknown, normative data can be estimated from representative samples.

Normative data are used to calculate the level of statistical significance or probability of error when a decision is made regarding whether an individual belongs to a particular group that is represented by the normative data.

Take Home Points

- Expert opinions are based on data and evidence
- Opinions without data and evidence are personal opinions – even if they come from a subject matter expert
- Opinions without evidence are scientific questions called hypotheses
- Most Hypotheses turn out to be false

Take Home Points

- Beware of experts who engage in "EXPERTIZING"
  - Believing their expert opinion is somehow more accurate than non-expert opinion
- Expert opinions are welcome in court
  - Courts have to make decisions about matters for which they lack expertise
- Expert opinions in science are hypotheses that must be researched

End

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