Reading Assignment 7: Evidence in Classical Statistics

Assigned Readings
1. S. C. Fletcher and C. Mayo-Wilson. "Evidence in Classical Statistics". In: *The Routledge Handbook of the Philosophy of Evidence.* Ed. by M. Lasonen-Aarnio and C. Littlejohn. 1st edition. London New York: Routledge, Dec. 2023, pp. 515–527

2. S. Fillmore-Patrick. "Reliabilism and Frequentist Hypothesis Testing". United States, 2026

Questions   Answer questions three through five, seven, and nine.

1. In your own words, state one or two questions philosophers interested in the ontology of evidence have asked. What reason do Fletcher and Mayo-Wilson claim those questions are typically ignored in discussions of statistical evidence?

2. In your own words, explain Fletcher and Mayo-Wilson's distinction between statistical and scientific hypotheses. If possible, given an example of each.

3. Fletcher and Mayo-Wilson draw an analogy between the lesson Nozick draws from his "grandmother" thought experiment and Mayo and Spanos' motivation for introducing the concept of severity. In no more than a few sentences, explain the analogy. **Hint:** It might help to begin with a sentence of the form "Nozick's thought experiment is intended to show that ____ [is or is not] a [necessary or sufficient] condition for knowledge just as Example 1 shows ____ [is or is not] a [necessary or sufficient] condition for a hypothesis test to [do what?]." Then explain how Nozick's modification to his theory of knowledge is analogous to Mayo and Spanos' modification to Neyman-Pearsonian testing.

4. Do Fletcher and Mayo-Wilson agree that Example 1 is a counterexample to the claim that "For x to count as evidence *for* a hypothesis H, the probability of observing x if H were true must be high"? Explain.

5. Summarize the objection summarized in footnote 16. Then draw the table (describing the distributions types of balls in two urns) described in the footnote 16 and explain how Fletcher and Mayo-Wilson use that table to respond to the objection.

6. What is the "bad lot" objection, and why do Fletcher and Mayo-Wilson claim that Mayo and Spanos have an advantage in answering the objection in ways that likelihoodist and Bayesian approaches to induction do not?

7. Using an example of your own design, explain the "probabilist's objection" to frequentist hypothesis testing. You might wish to model your example along the line of Fillmore-Patrick's example involving a rare disease.

8. What is the "replication crisis"? In no more than three sentences, explain how Ioannidis "example" might be used to explain the replication crisis if frequentist testing procedures are widely used.

9. Fillmore-Patrick considers two possible replies to the probabilist position (which she roughly endorses). Summarize the second reply (about adjusting statistical conventions) and why she believes the reply is inadequate.