

# Conceptual frameworks of hypothesis testing

## Different questions answered by different approaches

### Fisherian significance testing

Primary question:

- Is the data surprising under  $H_0$ ?

Key concept:

- p-value as evidence

No decision rule

No Type II error

### Neyman-Pearson testing

Primary question:

- What decision rule controls error?

Key concepts:

- Type I error ( $\alpha$ )
- Type II error ( $\beta$ )

- Power

### Bayesian inference

Primary question:

- How should beliefs change?

Key concepts:

- Prior  $\rightarrow$  Posterior
  - Bayes factor
- Expected loss

### Popperian falsification

Primary question:

- Has the theory survived a severe test?

Key concepts:

- Risky predictions
- Refutation, not confirmation