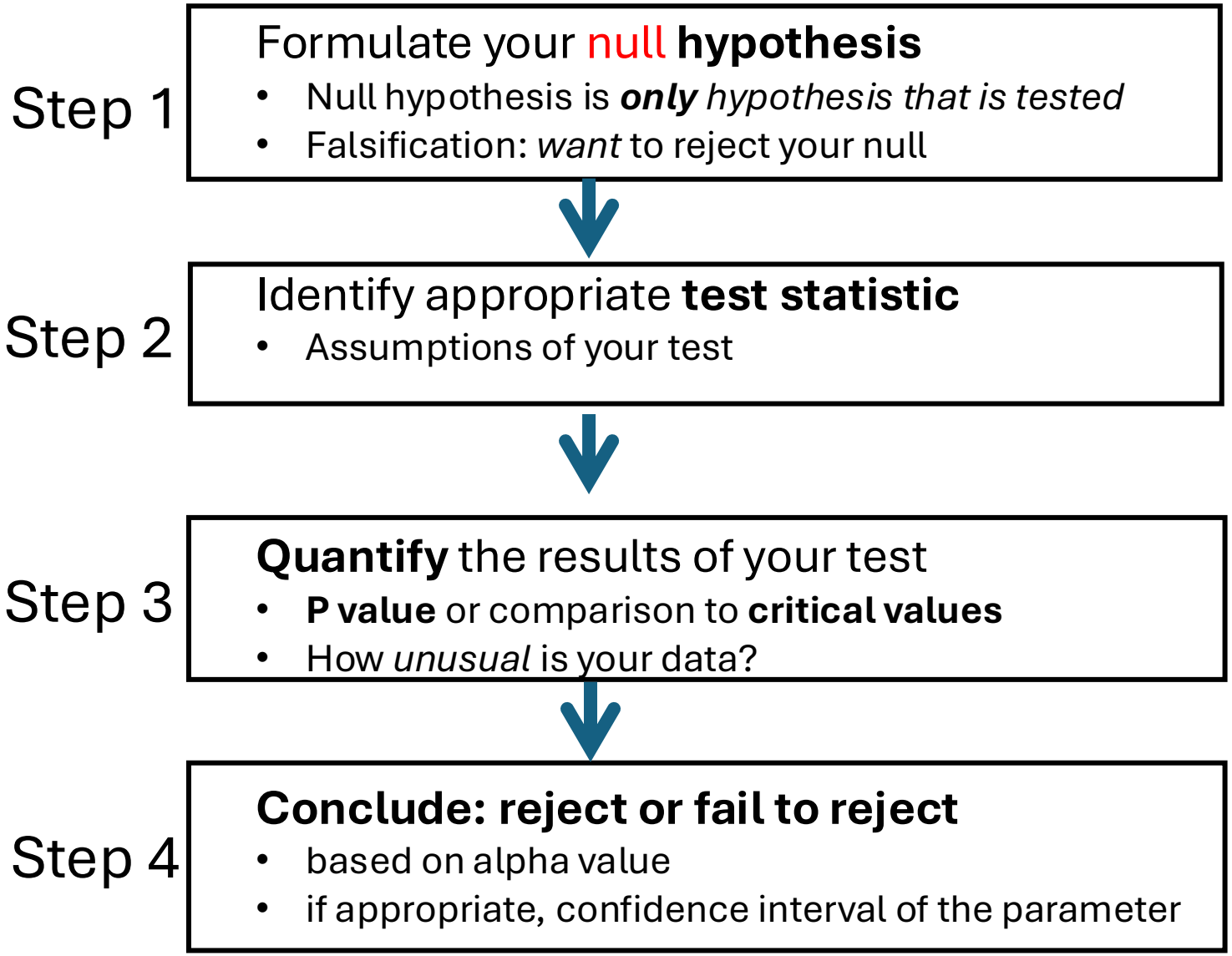
Module 4 Wrap Up: Hypothesis Testing

Applied Epistemology: A Framework for how we know things scientifically

Agenda:

- Working through examples of hypothesis testing
  - Binomial Example
  - χ^2 Goodness of fit tests

Your pipeline for hypothesis testing in statistics



χ^2 Goodness of fit test:

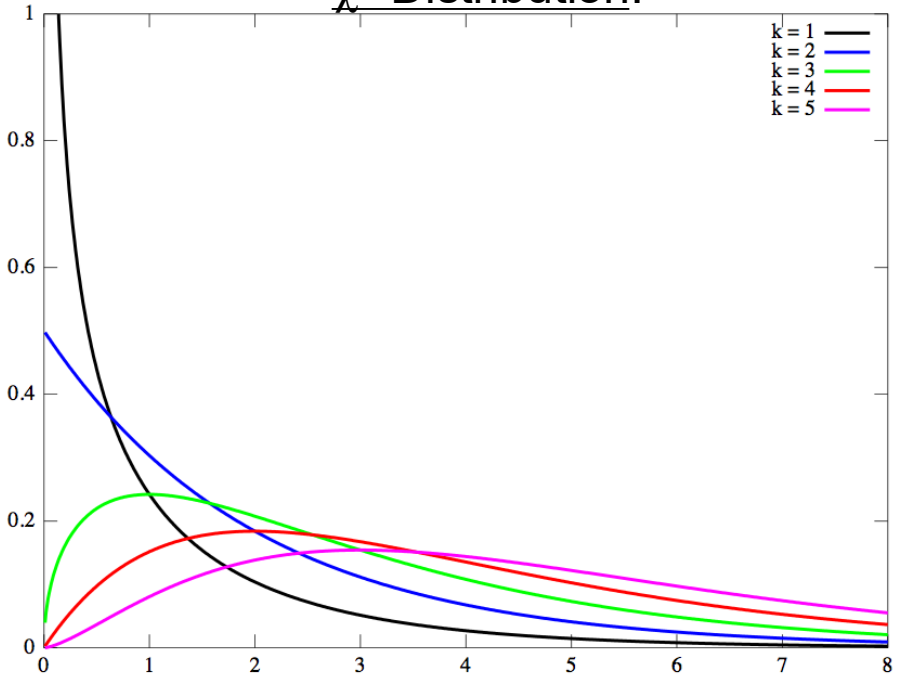
- **Compares observed counts to those predicted by a discrete probability distribution** - examples: uniform Distribution (approximately), Poisson Distribution
- Non-parametric (it does not require a normal probability distribution)

Assumptions:

- **Expected** counts should ≥ 5 in ≥ 80% categories
- No category should an **EXPECTED** value of <1

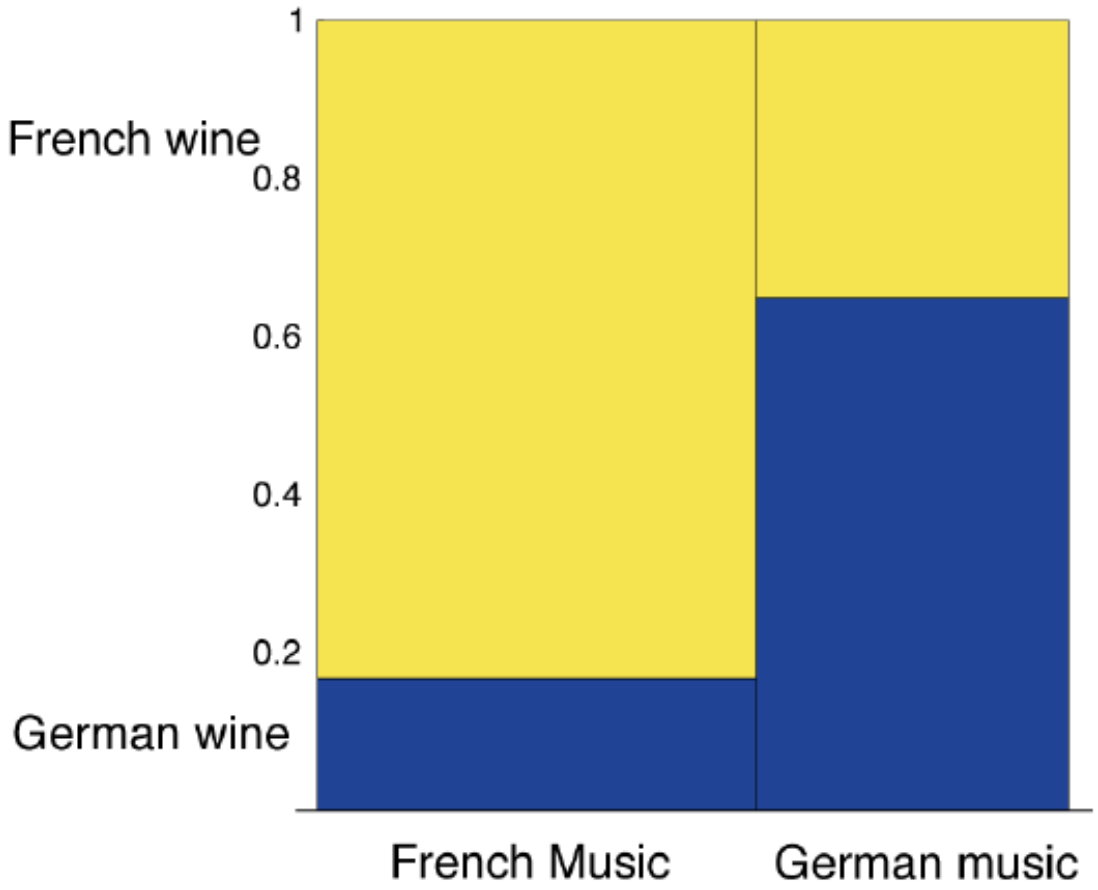
$$\chi^2_{df} = \sum_i \frac{(Observed_i - Expected_i)^2}{Expected_i}$$

χ^2 Distribution:



Example: Does the nationality of background music effect the nationality of wine that is bought?

Observed	French Music	German Music	Row Totals
Bottles of French Wine	40	12	**52**
Bottles of German Wine	8	22	**30**
Column Totals	**48**	**34**	**82**



χ^2 Contingency Test –> similar but not exactly as the same χ^2 Goodness of fit test. You can think of it as a subset of χ^2 Goodness of fit tests with some calculation differences. Basis of test is Multiplication rule with the assumption of independence. Degrees of freedom are calculated differently!