Cheatography

Statistics Cheat Sheet

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Scientific Approach

Systematic Empiricism

Public Verification

Solvable Problems

Strategies in Behavioral Research

Descriptive

Correlational

Experimental: Cause & Effect + Manipulation + Random Assignment + Control

Quasi-Experimental: Less Control and/or No Random Assignment

Empirical Cycle

Observation: research question

Induction: observable facts --> general theory *

Deduction: general theory --> hypothesis (or research question) **

Testing: Collecting > Analyzing > Conclusions

Evaluation: Confirmation or Falsification? Adjust/Expand/Improve? Critical Review

* Theory: Set of propositions that attempts to explain relationships among a set of concepts

** Hypothesis: Prediction following from theory (logic) -- could be conceptual (abstract) or operational (concrete)

Proof or Disproof

Proof: Logically Impossible

Disproof: Practically Impossible

* Methodological Pluralism is the variability of methods

Variance: Measure of Variability

$$\text{Variance} = s_y^2 = \frac{\sum (y_{ij} - \bar{y})^2}{n-1}$$

Calculating Variance

1. Compute the grand mean (GM)
2. Subtract GM from each observation (= **deviation score**)
3. Square each deviation score
4. Add all squared deviations → **SS(total)**
5. Divide by *n-1*

Total = Systematic + Error

Total All differences between observations

Systematic Differences between groups

Error Unexplained differences

Systematic Variance

$$\text{Systematic variance} = \frac{\sum n_j (\bar{y}_j - \bar{y})^2}{n-1}$$

1. Compute the group means (and the grand mean)
2. Subtract grand mean from each group mean
3. Square each deviation
4. Multiply by the number of observations in that group
5. Add all squared deviations → **SS(between)**
6. Divide by *n-1*

Error Variance

$$\text{Error variance} = \frac{\sum (y_{ij} - \bar{y}_j)^2}{n-1}$$

1. Compute group means
2. Subtract group mean from each observation in that group
3. Square each deviation
4. Add all deviations → **SS(within)**
5. Divide by *n-1*

Variance Accounted For (VAF)

is the proportion of the total variance that is systematic variance

VAF = Systematic Variance / Total Variance

VAF = 0 = no relation = no systematic variance

VAF = 1 = perfect relation = no error variance

Cohen's Rule of Thumb (VAF)

Small 0.01

Medium 0.06

Large 0.15<