Sample Size Fallacy

The **Sample Size Fallacy** refers to the **misinterpretation** or **overestimation** of the **reliability** of **study** findings based on an insufficient or inappropriately small sample size. It occurs when conclusions are drawn with unwarranted confidence despite inadequate statistical power or representativeness.

Characteristics

- Treating results from a **small or underpowered study** as if they were conclusive
- Failing to account for **random variation**, **outliers**, or **false positives**
- Reporting **subgroup differences** or **dose-response trends** in small samples as if statistically robust
- Using limited data to justify broad or clinical recommendations

Consequences

- Inflated **effect sizes** due to random variation
- Increased risk of **type I (false positive)** and **type II (false negative)** errors
- Misleading interpretations, especially in **exploratory** or **post hoc** analyses

Examples

- A study with 12 patients per arm concluding that one drug is “more effective”
- Subgroup analysis in a trial with 8 total responders
- Descriptive statistics used to define “optimal dosing” without statistical significance

Why It Matters

- Undermines **scientific validity**
- Leads to **publication of spurious results**
- Wastes resources on follow-up studies of **false leads**

Related Concepts

- Underpowered Study
- Publication Bias
- Overgeneralization
- Rhetorical Inflation
- Statistical Significance vs. Clinical Relevance

See Also

- How to identify flaws in scientific articles
- Effect Size Interpretation