Fallacy

A **fallacy** is a flaw in reasoning that leads to **invalid**, **misleading**, or **unjustified conclusions**. Fallacies may appear logical on the surface but fail under critical scrutiny due to errors in argument structure, use of evidence, or assumptions.

Types of Fallacies

- **Logical fallacies:** Errors in the structure of an argument (e.g., circular reasoning, false dilemma)
- **Statistical fallacies:** Misuse or misinterpretation of data (e.g., correlation ≠ causation, sampling bias)
- **Rhetorical fallacies:** Use of persuasive language to obscure weak evidence (e.g., appeal to emotion, authority)

Common in Scientific Literature

- Sample Size Fallacy
- Overgeneralization
- Publication Bias
- Rhetorical Inflation
- Misuse of **p-values** or **confidence intervals**
- Drawing **causal inferences** from **observational data**

Why It Matters

- Fallacies **undermine scientific credibility**
- They can **mislead readers**, clinicians, and policymakers
- Critical appraisal depends on recognizing and avoiding fallacious reasoning

Examples

- “This small study showed improvement, so the treatment must be effective.” → Sample Size Fallacy
- “If the drug worked in healthy young men, it will work in elderly women too.” → Overgeneralization
- “It’s published in a top journal, so it must be true.” → Appeal to authority

Related Concepts

- Bias
- Critical Appraisal

- Evidence-Based Medicine
- Causality vs. Correlation

See Also

- List of Logical Fallacies
- Common Statistical Errors
- Research Integrity and Ethics