

Table 1
Categories of
Deceitful Tactics and Abuse of the Scientific Process
(source: P.H. Gleick, Pacific Institute, 2007)

There are many tactics used to argue for or against scientific conclusions that are inappropriate, involve deceit, or directly abuse the scientific process.

Appeal to Emotion

This is a large category and involves using various tactics to incite emotions in people in order to persuade them that a particular argument or hypothesis is true or false, independent of the scientific evidence.

Appeal to Fear

Appeal to Flattery

Appeal to Pity

Appeal to Ridicule

Appeal to Spite

Personal (“Ad Hominem”) Attacks

This approach uses attacks against the character, circumstances, or motives of a person in order to discredit their argument or claim, independent of the scientific evidence.

Demonization

Guilt by Association

Challenge to Motive (such as greed or funding)

Mischaracterizations of an Argument

This approach typically mischaracterizes an issue or evidence and then argues against the mischaracterization. It can include.

Begging the Question

Circular Reasoning

Partial Truths

Selective Choice of Problems

Straw Man Argument (includes substituting a distorted, exaggerated, or misrepresented position for the one being argued)

Loaded Question (includes posing a question with an implied position that the opponent does not have.)

False Dichotomy (for or against)/False dilemma (includes assuming that there are only two possible opinions or choices.)

Misplaced Burden of Proof

Confusing Cause and Effect

Red Herring (includes presentation of an irrelevant topic to divert attention from another topic.)

Slippery Slope (includes the assertion that one event must inevitably follow from another)

Inappropriate Generalization

Accusing all of a group of people or arguments or set of facts as having the characteristics of a subset of that group.

Misuse of Facts

Numerical Mischaracterization

Selective Choice or Presentation of Data; Biased Sample

Inadequate Sample; Hasty Generalization; Leaping to a Conclusion

Selective Omissions of Data

Illusory Precision (where precision isn't needed or available)

Inappropriate Vagueness (where precision is needed)

Unrelated Facts (bringing unrelated facts that seem to support a conclusion)

Misuse of Uncertainty

Misplaced Certainty

Misrepresentation of Uncertainty

False Authority

Including appeal to authority not competent to address issue

Hidden Value Judgments

Including judgments based on ideological or religious rationales rather than reviewable and testable evidence.

Scientific Misconduct

The violation of the standard codes of scholarly conduct and ethical behavior in professional scientific research, including:

Fabrication (the fabrication of research data and observations)

Falsification (manipulation of research data and processes or omitting critical data or results)

Failure to Acknowledge and Correct Errors

Science Policy Misconduct

The manipulation of the process of integrating science and policy, including:

Packing Advisory Boards

Imposing Litmus Tests

Altering or Suppressing Information

Bullying of Scientists

Selective Funding or De-funding

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