

Inductive Reasoning

Dem Hume : No justification (?)

The only way to justify an inductive inference is by making an inductive inference

⇒ No non-circular way to justify induction

[Assumption : To justify a method (like induction) requires knowing with certainty that it works.]

Different Topics :

- ① what types of inductive inferences are there?
- ② Are there standards by which we can judge good inductive inferences from bad ones?

↘

Fallacy = a bad inductive argument
 (not a factual error or a false belief)

Types of Inductive Inferences & Associated Fallacies

- I. Enumerative Induction
- II. Analogical Induction
- III. Inference to the Best Explanation (Abduction)

I. Enumerative Induction

Reasons from a finite amount of data to a particular or general claim.

Two Common Types:

- A. Statistical Syllogism
- B. Inductive Generalization

A. Statistical Syllogism

X% of all F's are G's.

S is an F.

S is a G.

F = reference class

G = attribute class

Ex 1: 99% of all humans have 10 fingers.
 Jones is a human.
Jones has 10 fingers.

F
G - Things with 10 fingers

Ex2: 99% of all shop instructors have < 10 fingers.
Jones is a shop instructor.
 Jones has < 10 fingers.

Note: Suppose premises of both examples are true.
 But conclusions are contradictory
 What standards should we impose?

Criteria for strong Stat. Syll.

- (1) Percentages must be appropriately high
 (or low for negative case)
- (2) All available relevant info must be used in
 selecting reference class.

< Why is fact that Jones is a shop instructor more
 relevant to how many fingers he has than fact
 that he is human? >

Fallacy of Incomplete Evidence =

Ignoring all available relevant info in selecting
 reference class in a stat. syllogism

Ex1 commits This fallacy

Ex 3: 90% of Harvard Med School faculty are male.
Dr. Veronica Jones is a member of HMS faculty.
 Dr. Veronica Jones is a male.

Ignores relevant available fact: "Veronica" is usually female name.

3 Types of Stat. Syllogism

(i) Argument from Authority

β = True claims

most of what S says^F about P is true.

C is what S says about P.

C is true.

Criteria

- (1) S is an expert about P.
- (2) P is uncontroversial.

Ex 1: Steven Hawking is an expert on astrophysics.
Hawking says black holes radiate energy.
 Black holes radiate energy.

Ex 2: Hawking says Larry was the funniest Stooze.
 Larry was the funniest Stooze.

Ex2 is a Fallacious Argument from Authority

-violates (1) and (possibly) (2).

(ii) Argument Against the Person (ad hominem)

Most of what S says about P is false.

C is what S says about P.

C is false

Strength depends on how Prem#1 is justified.

Two Fallacious ad hominems:

(a) Abusive ad hominem = attacks character of speaker

(b) Circumstantial ad hominem = attacks circumstance of speaker (nationality, religion, politics)

Ex = Bush's economic plan will fail because

(1) He's a dim-wit.

(2) He's a conservative republican.

(iii) Argument from Consensus

most of what people agree on is true.

C is something people agree on.

C is true.

usually fallacious

Criteria - usually unmet

(1) consensus of experts

(2) C is true on consensus by definition

B. Inductive Generalizations

X% of observed F's are G's.

X% of all F's are G's.

3 elements: (i) total population

(ii) sample population

(iii) sample taken as representative of total

Criteria:

(1) sample must be large enough

(2) sample must be varied enough

Ex : 80% of polled voters plan to vote republican.
(1000 voters)
(corp execs)

80% of all voters plan to vote republican.

violation of (1) : Fallacy of Hasty Generalization -
 using an insufficient sample size
 in making an inductive generalization

violation of (2) : Fallacy of Biased Statistics -
 using an insufficiently varied
 sample in making an inductive
 generalization

How to avoid violations of (1) & (2) : 80% of polled corp
 execs.

(a) Weaken conclusion by

- (i) changing total pop → 80% of all corp execs
- (ii) including margin of error → 80% of 1000 voters...
 ↘ 70-90% of all voters...

(b) Include more info in
 premises

Fallacy of Misleading Vividness :

Ignoring a strong inductive generalization (122 hold) based on a small amount of (irrelevant) vivid info.

Ex: 95% of sampled VW vans are reliable.
95% of all VW vans are reliable.

Situation: Your friend's van is falling apart.
⇒ You decide not to buy a van.

II. Analogical Induction

Objects of type X have properties F, G, H, ...

Objects of type Y have properties F, G, H, ... and Z.

Objects of type X have property Z.

Ex: Humans & chimps have similar physiologies.

Chimps can handle space flight.

Humans can handle space flight.

Criteria

(1) similarities must be relevant

(2) dissimilarities must not be relevant

Violation of (1) & (2) = Fallacy of Faulty Analogy

(Chimps might have had a different inner ear construction)

III. Inference to the Best Explanation (Abduction)

H_1, H_2, H_3, \dots all explain P .

H_1 is the best explanation of P .

H_1 is true.

ex: Creationism and Evolutionary Theory both explain the existence of present plant & animal species.
Evolutionary theory is the best explanation of the existence of plant & animal species.

Evolutionary Theory is true.

Criteria:

→

Schick & Vaughn: (1) A "good" explanation is one that systematizes and unifies our knowledge

Big Problems →

- criteria of adequacy:
 - simplicity
 - conservatism
 - scope
 - fruitfulness