

Lecture 10

Maher on Justification of Induction

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Scientific Thought II
Spring 2010

Introduction

- An **inference** is a psychological process in which a proposition (called the conclusion) is accepted on the basis of other accepted propositions (called the premises).
- **Inductive inference** used to be defined as inference from particular premises to a general conclusion. Now all inferences from the observed to the unobserved are called inductive.
- Hume, Popper, and others say that when we make inductive inferences we are making a synthetic assumption that can't be justified. (Hume said it is that the future will resemble the past. Popper said it is a principle of induction.)
- To see if that is true, we ought to first examine inductive inferences and determine what their form is. That's the first thing I'll do in this lecture.
- Once we have the form of inductive inferences right, we'll see that they don't assume anything of the sort alleged by Hume and Popper.

The form of inductive inference

The standard model

- *Example of an inductive inference:* After noticing that John hasn't attended class for 3 weeks, I infer that he probably won't attend today either.
- *Question:* What are the premises and the conclusion for this inference?

- *Standard model:*

John hasn't attended class for 3 weeks.

John won't attend class today.

What is above the line is a premise; the conclusion is below the line.

- *Characteristics of the standard model:* (1) Probability is not part of the conclusion; it is regarded as a relation between premises and conclusion. (2) The premises state non-epistemic facts, not facts about knowledge or evidence.

Standard model (again):

John hasn't attended class for 3 weeks.

John won't attend class today.

Criticism of the standard model

The conclusion is wrong: I don't infer categorically "John won't attend today," I know he might turn up. My conclusion is just that he probably won't.

How to represent the conclusion

- It needs to be a statement of probability: “Probably John won’t be in class today.”
- The probability here is ip . (If it was pp , I would still say the conclusion is only probable.)
- Ip is relative to evidence, so for an explicit representation of the conclusion we need to say what the evidence is.
- When people make ip statements without mentioning evidence, normally the evidence is their evidence, i.e., what they know.
- So the conclusion is:
 $ip(\text{John won't be in class today}|\text{my evidence})$ is high.

How to represent the premises

- The premises should support:

$ip(\text{John won't be in class today}|\text{my evidence})$ is high.

- What John has been doing is irrelevant to this, if it isn't part of my evidence. The only relevant synthetic facts are facts about what my evidence is.

- *Abbreviations:* E = John hasn't been to class for 3 weeks,
 H = John won't be in class today.

- The inference can be represented as:

I know E .

I have no other evidence relevant to H .

$ip(H|E)$ is high.

$ip(H|\text{my evidence})$ is high.

- I call this *the probabilistic model* of inductive inference.

Comparison of the models

- What people ordinarily say:

$$\frac{E}{\text{Probably } H}$$

- The standard model represents this as:

$$\frac{E}{H}$$

That is even more reduced than what people ordinarily say!

- We should add *more* to what people ordinarily say.
The probabilistic model:

I know E .

I have no other evidence relevant to H .

$ip(H|E)$ is high.

$ip(H|\text{my evidence})$ is high.

Hume and Popper revisited

- They say inductive inferences are based on a synthetic assumption that hasn't been observed to be true.
- The form of inductive inference:
I know E .
I have no other evidence relevant to H .
 $ip(H|E)$ is high.

 $ip(H|my\ evidence)$ is high.
- This is a deductively valid form of argument.
- The third premise is analytic if true.
- The first and second premises can be known by observing what my evidence is (together with knowing relevance relations, which are propositions about ip and hence analytic if true).
- So the argument is valid and the synthetic premises can be known by observation. There is no unobserved synthetic assumption!

- 1 Suppose you were to reason as follows: “Only a small proportion of people live to be 100 years old, so I will probably not live to be 100 years old.”
 - (a) How would your inference be represented in the standard model of inductive inference? State a criticism of this representation.
 - (b) How would your inference be represented in the probabilistic model of inductive inference?
- 2 Hume and Popper claimed that inductive inferences are based on a synthetic assumption that hasn't been observed to be true. Were they right? Justify your answer.