

Phil/LPS 31 Introduction to Inductive Logic

Lecture 7

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Topics

- ▶ Hume's Problem of Induction

Recap

- ▶ Last time we finished by juxtaposing deductive inference and inductive inference as follows:

Deductive Inference	Inductive Inference
Non-ampliative	Ampliative
Necessary propositions	Contingent propositions
Entailment	Conditional Probability
Apriori justification	Aposteriori justification
Monotonic	Non-monotonic

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- ▶ While some of the distinguishing features of each kind of inference have only been known recently, others have been known for a very very long time.

Introducing David Hume

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- ▶ More generally, since Hume was what philosophers call an **empiricist**, Hume's question was: **what empirical justification** do we have to validate inferences that extend our empirical knowledge beyond pre-existing empirical knowledge?
- ▶ The answer he wanted was that the only empirical justification was **custom and habit**. But before he could say that this was **the only** empirical justification, he had to show that **no other non-empirical justification** was possible! Let's see how he did it. His strategy shows **one limitation of deductive logic** in science and motivates **the search for an inductive logic**.

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- ▶ Reasoning concerning matters of fact and existence corresponds to inductive inference. So it is ampliative, contingent and justified aposteriori. For Hume, examples of this kind of reasoning are (1) predictions and anticipations of experience and (2) universal generalizations in science.

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- ▶ Hume then argues that even here, the empirical justification for this kind of inductive reasoning is **custom and habit**.

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- ▶ Recall that a knowledge claim K is known apriori if its justification is independent of experience.
- ▶ Hume's answer is that a person who has **had no experience** of diamonds or of ice – which are very similar in appearance – has is no way of knowing apriori that intense heat and pressure can produce diamonds but would destroy ice. Likewise, a person who has **had no experience** of fire or snow has no way of knowing that the former will feel hot while the latter will feel cold.

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- ▶ Therefore, claims of the form A causes B cannot be apriori knowledge.

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- ▶ Therefore, A causes B is known apriori.

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- ▶ Philosophers who say A causes B is known apriori must be assuming that there is a necessary connection between the initial motion of the one ball and its collision with the other?
- ▶ One way to think about what “a necessary connection” means is to think of inferences from instances of A (cause) to instances of B (effect) as truth-preserving in the same way that the rules of inference in deductive logic are truth-preserving.

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- ▶ So if A causes B is necessary, then it “could not have been otherwise.” The sense of “it could not have been otherwise” is that A followed by not B would be a contradiction (i.e., unsatisfiable) in the same way that the negation of Modus Ponens is unsatisfiable.

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- ▶ Hume’s strategy is to show that there is no contradiction in A followed by not B .

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 - ▶ When they collide, the two balls might vanish in a puff of smoke.
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 - ▶ The ball that is initially at rest might remain fixed while the moving ball returns in the direction from which it came.

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- ▶ The uniformity of nature is the claim that the regularities that have been observed to hold up to now will continue to hold in the future.
- ▶ But what empirical justification do we have for the belief that nature is uniform?
- ▶ While considering the possible answers to this question Hume uncovered a logical circle and a serious limitation of the use of deductive logic in science.

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- ▶ It is **circular reasoning** because the answer supposes the question itself. Why B? Because B.

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 - ▶ There is no contradiction in supposing that the sun will not rise tomorrow morning.

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- ▶ Custom and habit seem to philosophers to be the sort of things that provide **no rational justification** for any sort of inference.
- ▶ So there is a stronger reading of Hume arguments according to which Hume's problem of induction is that there is no rational justification for inductive inference.

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- ▶ In the case of deductive logic, the justification of the rules of inference there was that the good rules of inference are precisely those rules of inference that are truth-preserving. But we have seen that these rules are truth-preserving because they are non-ampliative.

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- ▶ In the case of deductive logic, the justification of the rules of inference there was that the good rules of inference are precisely those rules of inference that are truth-preserving. But we have seen that these rules are truth-preserving because they are non-ampliative.
- ▶ Do we have a similar criterion for selecting the inductive rules of inference that are good? In other words, **is inductive logic possible?**

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- ▶ We could, on the other hand, try to offer an inductive justification for inductive reasoning. But any such justification would be circular – it would involve the use of induction itself to justify induction.
- ▶ The result is that, on either alternative, it is impossible to provide a suitable justification for the kinds of reasoning indispensable to science – and to common sense as well.