INDUCTION WITHOUT FALLIBILITY, DEDUCTION WITHOUT CERTAINTY

Draft of August 05, 2024

Matheus Silva

The conventional understanding on deduction and induction can be summarized as follows: in deductive inferences, the evidential strength provided to the conclusion is such that the truth of the premises guarantees the truth of the conclusion. In inductive inferences the evidential support provides a weaker guarantee because the truth of the premises only makes the conclusion more likely, not certain. It can be argued that this picture is misleading and overly simplistic, because inductive reasoning can be certain and deductive inferences can be defeasible.

The textbook examples of induction were introduced as a cautionary tale about the fallibility of empirical generalizations. It doesn't matter how large is your sample of white swans observations, the generalization that all swans are white can still be defeated by the counterexample of a newly discovered black swan. Inductive inferences are defeasible and require epistemic humility. This view is in stark contrast with the supposed infallibility of deductive reasoning. Yet, an ever increasing pile of failed mathematical proofs that were thrown in the dustbin of history show that deductive reasoning is also defeasible.

In a deduction, the conclusion is necessitated by the premises, meaning the conclusion cannot be false if the premises are true. This conceptual requirement is often conflated with a different thesis, namely, that the conclusion must be certain given the premises. However, even if this conflation were accepted, it doesn't follow that the inference is certain because the conclusion is certain given the premises. This is a fallacy. Conversely, in an induction, the fact that an inference leads to an uncertain conclusion does not imply that the inference itself is uncertain. The nature of the propositional content presented in the conclusion doesn't reflect the reliability of the inference that draws the conclusion. To think otherwise would be a category mistake.

It's also clear that inductive reasoning can lead to conclusions that will never face any counterexamples. For example, the generalization that the sum of two even numbers is even is definitive because all even numbers share the same properties. This inference is both inductive and certain. If we deny this result, induction will be reduced to uncertainty, rather than being regarded as distinct forms of inference such as generalizations and previsions.

It's also entirely reasonable to state that there are fallible grounds to accept an inference even though the truth of the premises should ensure the truth of the conclusion. If the textbook characterization of deduction were to be believed, this statement would have to be an inconsistency, even though is consistent. We don't assume that mathematicians should be charged with incoherence for not ascribing certainty to their proofs. To demand complete certainty as a basic requirement for reasoning in any given domain is both excessive and unrealistic. Deduction without certainty is just as plausible as induction without fallibility.