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Deduction (demonstration) it’s not the only type of inference 🡪 INDUCTION: most discussed because it is controversial from a logical point of view.

## David Hume (1711-1776)

One of the greatest philosopher ever 🡪 during his life time he struggled to be recognized as a philosopher because he went against religion. Just with Kant there is the acknowledgment that Hume was a good philosopher.

Inference: INDUCTION 🡪 major logical problem: “*the problem of induction*”

There is a vast literature on induction and on attempted solutions to this problem

No conclusive solution to the logical side to this problem 🡪 attempts to find limited solutions from those who claims that induction is widely use in everyday life = FIND A WAY TO MAKE USE OF IT

## Induction

How does the inductivist reasoning work?

What does a logic of induction amount to?

General features: a. All Italian eat pasta a. and b. are the premises;

b. E is Italian c. is the conclusion

**---------------------------------**

c. E eats pasta

= deduction reasonement

We start from a universal statement and we conclude something about a singular case, which is entailed by the universal statement itself. **DEDUCTION**

Peculiarity of deduction: if the premises are true then the conclusion is true too. If the premises are false then the conclusion is false too. The reason for this is that we conclude something about the middle term (E) that is included in the major term (E is Italian) 🡪 E falls within the appropriate category

how do we know that the premises are true?

Knowing if the premises are true in deduction is not a problem, at least for logic because we are interested in the form not in the content. But for Aristotle deduction was to find a way to have a proper reasoning for science.

Laws of nature: universally true

How do we know that *all Italian eat pasta*? 🡪 one way of doing it find out what a number of Italians actually do, we try to observe what all these people do. Once we have a wide enough number of the same conclusion then we feel entitled to conclude that all Italians eat pasta 🡪 we end up with a GENERALIZATION

We start from a finite list of instances to end to a universal statement 🡪 induction by enumeration: the most simple

*Conditions for generalization*:

* Wide enough number of repeated cases
* No conflict among the cases
* The properties we generalise about should refer to the same objects
* ….
* We can build more and more conditions

## Principle of Induction

**Principle of induction**: on the bases of which we reach an inductive generalization

If a large number of As have been observed under a *wide variety of conditions*, and if all those observed As without exceptions possessed the property b

Then

**All As have b.**

It makes legitimate how we go from observation to a generalization which include all those instances and possibly more yet to be realized (of the same kind).

= we can have degree of confidence

Activity of generalization creates big problems

*Example of problem*: Swans are observed to be white up to a certain point in time

We can make two conclusions: 1) the next swan will be white

2) All swans that will be observed will be white

= problem from logical point of view: premise can be true and the conclusion might be false *🡪 no logical contradiction in claiming this*. Premise – true

Conclusion – False

It is true that all the swans observed up to this point are white (true premise), but is not true that all swans are white (conclusion false because I don’t know about the next swan)

Now we reason in terms of probability but even if we have “probability” and add the term “probably” there are still problems.

More problem: we want to calculate how high and how low are the probability that an event occurs

Frequencies also are established by means of observation 🡪 problem remain: we don’t have it with deduction

= we all use this principle in our everyday life

We reason inductively (also scientists use it)

Deduction much safer than deduction 🡪 it leads necessarily to certain conclusions (if premises are true conclusions are surely true)

= it doesn’t happen to induction

Logic doesn’t seem to help us to decide about this field

If we stick to deduction we would not go that far 🡪 science would not be ampliative

Deduction or deductive reasoning does not expand my knowledge

Induction is an example of ampliative reasoning 🡪 we bet on the assumption that past and present resemble the future. I try to make a claim, an argument. To some extent we bet on some resemblance.

= we are prepared to put some faith on this assumption

How risky is following induction? problem that troubled Hume

## Hume

Basic distinction in his philosophical system

Objects of human inquiry: Relation of ideas 🡪 every affirmation which is either intuitively or

demonstratively certain. Propositions that are describable by

the mere operation of logic. SELF EVIDENT.

  Matters of fact 🡪 “*the sun will rise tomorrow*” is as intelligible as its opposite. The

two propositions are not in contradiction with each other.

Relation of ideas are subject of logical contradiction; they can be demonstrated as being false but the same does not happen with matters of fact because they either assert or imply existence. The proposition “*the sun will rise tomorrow”* cannot be true unless the sun exists and we may say that the proposition asserts the existence of an object that will behave in a particular way or not. Existence as such is not a matter of logic, we can figure out a notation to represent existence but it was just an assumption of existence, but is impossible to quantify it as a logical item.

Hume: there is no logical relation between the sun, the verb to rise, and tomorrow. No relation that determine the truth of this proposition. No contradiction in assuming alternative state of affairs. (we might also assume that the *Sun won’t rise tomorrow)*

It is not possible to find out whether a proposition like *“the sun will rise tomorrow”* is true only by means of reason. It is only by experience that we can determine which of the alternative possible state of affairs is actually true.

Reasoning inductively is a prediction 🡪 not truth

Any *apriori* knowledge of matters of fact is impossible

Hume’s question: *what is “the nature of that evidence which assumes us of any real existence and matter of*

*fact, beyond the present testimony of our senses, or the records of our memory.”*

*(IV, Part I, 23)*

= What induces us to make decisions about something that is not happened yet? And doing with logical confidence? How we exercise logical reasoning in doing this?

How possible and legitimate is it to infer a universal generalization from a collection of observation concerning what the sun has done until today?

All reasoning concerning matters of facts are similar to the type of reasoning we use when we relate a cause and effect

**Causal reasoning** 🡪 exempla of reasoning when matters of fact are involved. I*t is by means of that relation alone that we go beyond the evidence of our memory and our senses*

=

Only a very limited amount of factual knowledge is based on what we perceive directly, by means of direct acquaintance, most of what we know is because we associate and remember previously perceived events. Most of our factual knowledge concerns whether facts that are remote from the present, in space or in time, or both; they are so remote that we don’t have knowledge directly, only by recollection that we acquire a knowledge. I make connection about present and past events.

Connection btw a present fact and another fact which the former is inferred from.

How do we reason here?

Exactly in the same way in which we reason when we connect an effect to a cause.

*‘the knowledge of this relation is not, in any instance, attained by reasoning apriori; but arises entirely from experience.’*

EXPERIENCE 🡪 EXPECTATION

We are able to anticipate the connection on the basis of past records. We get habituated to reason in a particular way on the basis of what happened before.

Experience let us believe that something will occur even before it actually happens.

Expectation transform itself on a habit of thought

Repeated connections 🡪 create *custom*

*‘such is the influence of custom, that, where it is strongest, it not only covers our natural ignorance, but even conceals itself, and seems not to take place’*

We do things almost automatically and we don’t realize what we are doing 🡪 instead, we think that we infer something logically viable: *misconception*. Expectation seems a logical inference but it is actually a psychological trick played on us by customs.

He comes up with a counterargument (in order support his claim)

* *If we were to pronounce about the effect of a certain object presented to us without consulting past observation, how would the mind proceed?*

So far, he claimed that the only guide was thanks to past observations

The mind has not help from experience in this case, it has to work on relation of ideas.

1. the mind should **invent or imagine** some event as an effect arbitrarily.
2. Tie between cause and effect also **arbitrary**

(1) How would the mind proceeds? The mind would find itself in a position of inventing or imagining some event ascribing a certain object to produce a certain effect. Invention is an arbitrary move.

We cannot find the effect in the supposed cause.

The cause and the effects are two separate things 🡪 in Hume’s thought

We cannot see the effect inside the cause.

*“the rock broke the window”* it seems that the cause (the rock) is one object and the effect (the window) is another.

**Hume:** The *rock hitting the window* caused *the window to break.* 🡪 2 separate events

Hume’s famous example: the motion in one billiard ball is distinct from the second billiard ball which is moved by the first. Two events, we say that one is the cause of the other just because one happens before the other.

*“Here is a billiard ball lying on the table, and another ball moving towards it with rapidity. They strike; and the ball which was formerly at rest now acquires a motion. It is evident that the two balls touched one another before the motion was communicated, and that there was no interval betwixt the shock and the motion.* ***Contiguity*** *in time and place is therefore a requisite circumstance to the operation of all causes. It is evident, likewise, that the motion which was the cause is prior to the motion which was the effect.* ***Priority*** *in time is therefore another requisite circumstance in every cause.”* But this is not all 🡪 **Regularity**

**Contiguity:** the things should be next to each other

*Three requisite to decide what is a cause and what is an effect*: contiguity, priority and regularity. They cannot be invented by the mind they have to be inferred by experience.

This view was savagely criticized after Hume: different vision by **John Stuart Mill**

(2) If the relation of cause and effect is an invention of the mind then the connection between cause and effect is arbitrary 🡪 how do we know where the billiard ball will end up? If we just use the mind the ball can go in different directions equally conceivable by the mind. No constrain to the mind

If all alternatives are equally consistent and without contradiction 🡪 by reasoning only not able to find justification to give preference to one outcome instead of the other.

Hume’s conclusion*: ‘when we reason apriori, and consider merely any object or cause, as it appears to the mind, independent of observation, it never could suggest to us the notion of any distinct object, such as its effect; much less, show us the inseparable and inviolable connexion between them. A man must be very sagacious who could discover by reasoning that crystal is the effect of heat, and ice of cold, without being previously acquainted with the operation of these qualities.’ (Sect. IV, II, 27)*

= only experience tells us about cause and effect

Only experience can teach us causal correlation

## Compare deductive (I) and causal reasoning (II)

(I)

* Either it is raining or it is snowing
* It is not snowing

--------------------------------------------

* It is raining

(II)

* There is a flash of light (A-event)

-----------------------------------------------

* There will be a clap of thunder (B-event)

1. Lets try to deny the conclusion

Suppose in the conclusion you claim *it is not raining* but, in this way, the second premise contradicts the first 🡪 mess

1. Lets try to deny the conclusion

*There would not be a clap of thunder*, it the light of past experience we might be fool in saying this but we are not contradicting. We are not saying P and not-P.

Make causal inference work by adding a new premise

* *If there is a flash of light, then there will be a clap of thunder*

It would make the inference work but it does not solve our problem 🡪added premise is not known apriori but also this claim is about past experiences. Problem that we are hitting against

**Problem of induction**

What allows us to infer that just because past A-events have been followed by B-events, future A- events will be followed by B-events.

We are moving in a circle 🡪 we try to give an answer to this type of questions with the question itself. We are basing our inference on record of past experiences

**SLIDES “recap”**

Hume has already answered these questions:

1. What is the nature of all our reasoning concerning matters of fact?

They are founded on the relation of cause and effect.

1. What is the foundation of all our reasoning and conclusions concerning that relation? experience

Still to be addressed: **What is the foundation, or justification, of all conclusions from experience?**

How can we ensure the validity of the inference from experience? How can we claim from “past A-events have always been followed by B-events” to “if there is an A-event, then there will be a B-event”?

→ Even if we have experience of how cause and effect actually work, our conclusion from having that experience is not actually founded on reasoning, or any process of the understanding: this means that there is no rational justification of the inference can be given from experience. So, there is no logic.

Hume’s defence of his argument 🡪 Assumptions to his argument:

* Experience is what gives us only direct and certain information of singular object at precise time: we only have perception of individual objects
* To extend what I observe here and now to future times and future objects yet to be observed, I need an extra-step, a ‘process of thought, or an inference’.

Structure of his argument:

→ how do we link proposition a (I have found that such an object has always been attended with such an effect) and b (I foresee that other objects, which hare in appearance similar, will be attended with similar effects)?

To go from a to b, we need a ‘medium’ or an additional premise (c = *all of our experimental conclusion proceeds upon the supposition that the future will be conformable to the past – section IV, II, 32)*.

He says that c is a medium that is not justifiable through reason.

## The Principle of induction

For, the principle of induction (or of the uniformity on nature) ‘The same pattern of relations between kinds of events – the same laws of nature – will hold in the future as have held in the past’ is rejected by Hume, because no one can safely justify this additional premise. And this is the problem of induction.

The reasoning behind the problem of induction:

Step 1. All reasonings are a) relations of idea OR b) matter of facts/existence

Step 2. No reasoning of type a) applies to b)

Step 3. We should look at reasoning type b)

By resorting to type b) we will enter into some kind of ***vicious circularity*** because c) cannot be established by inductive inference because all inductive inferences presuppose c) as their foundation.

*‘all our experimental conclusions proceed upon the supposition that the future will be conformable to the past. To endeavour, therefore, the proof of this last supposition by probable arguments (…) must be evidently going in a circle, and taking that for granted, which is the very point in question.’ (Sect.IV, II, 30)*

*‘to say [that the argument for c)] is experimental is begging the question. For all inferences from experience suppose, as their foundation, that the future will resemble the past (…) if there is any suspicion, that the course of nature may change, and that the past may be no rule for the future, all experience becomes useless, and can give rise to no inference or conclusion. It is impossible, therefore, that any arguments from experience can prove this resemblance of the past to the future; since all these arguments are founded on the supposition of that resemblance.’ (Sect. IV, II, 32)*

## What is circularity in an argument?

**Deductive circularity** is an argument which uses its conclusion as its premise. (it is the simplest version)

Most extreme case “p therefore p”; less extreme case “p&q&r therefore p”

**Inductive circularity** 🡪 c) the future is conformable to the past

🡪 c) is supposed to justify all inductive inferences

🡪 But c) is itself an inductive inference, i.e. from “the future has always resembled the

past” to “the future will always resemble the past” SO we basically use induction to

justify induction 🡪 **vicious inductive circularity**

Therefore, induction is not based on reason but there can be a psychological explanation: effect of custom. It is an instinct, something that mind uses independently from reason.

“*Custom is the great guide of human life. It is the principle alone which renders our experience useful to us, and makes us expect, for the future, a similar train of events with those which have appeared in the past. Without the influence of custom, (…) we should never know how to adjust means to ends (…). There would be an end at once to all action (…)*”

Why not using experimental inference? *“if there is a suspicion that the course of nature may change, and the past may not be a rule for the future, then all experience becomes useless, and can give no rise to any argument or inference.”*

So why use induction?

Being an instinct, is something we cannot choose: we are made this way, we cannot make our beliefs on future if not in this way. *“It is an operation of the souls, when we are so situated, as unavoidable as to feel the passion of love, when we receive benefits; or hatred, when we meet when injuries. All these operations are a species of natural instincts, which no reasoning or process of the though and understanding is able…”*

To act goal-oriented action, we need induction 🡪 we are able to act in a normal life; Customs are the great guide of human life.

*‘For wherever the repetition of any particular act or operation produces a propensity to renew the same act or operation, without being impelled by any reasoning or process of the understanding, we always say, that this propensity is the effect of custom.’*

[Sect. V, I, 36]

## Hume conclusions

a. Inductive Reasoning (=IR) cannot be rationally justified

b. IR is instinctual, therefore inevitable 🡪 it is not a piece of reasoning but it is at the basis of our beliefs on

our present and future.

c. IR is at the basis of our beliefs about the future

d. IR informs both scientific inquiry and purposive action

e. IR is indispensable to both scientific inquiry and purposive action.

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Suppes, *introduction to logics*, what to be done are chapters 1,2, 3 and not everything in the chapters: she just wants us to get the essential part. In this week she will upload only the part we need to do.

## RECALL

The logical inference is not as certain as for instance deductive or syllogistic inferences. The problem is that we are making an inference from one sentence to another, when actually these two are not directly connectable.

HUME → How can actually make sense and justify rationally the link between these two propositions? The connection is not automatic: we need to imagine a *medium,* an additional premise. This creates the problem: it is just a replication of the performance of the inductive process, that we want to justify not to replicate. This addition will make the inference work but by using the very type of inference that is under scrutiny: I use induction to justify induction. This creates a *vicious circularity*.

Why are we all then prepared to attribute authority to experience, to induction? There is no logical explanation, ‘this how we reason psychologically: we are habituated in making this type of connections every time we are exposed to the currency of a certain event correlated to another’.

Inductive reasoning is not an inference is just an expectation we create because we instinctually approach the world.

He settled the question not for logicians but for the rest of humanity.

## The problem which followed

There are several problems at this point: Hume’s answer does not close the problem, on the contrary, he opened the debate. And it is still open nowadays.

Let’s focus on **two issues**:

1. If induction cannot be rationally justified, does it mean that induction is not rational or even irrational? And if we all use it, are we all irrational? Are we all fool?

(Especially when it comes to scientists it becomes a big issue). It would make us sceptical about almost anything, also discoveries of science: we could question many foundations of the many beliefs that we have. Put in question all rational creations of common sense use, about world, action etc.

What is thought to objective is under severe threat.

Question of the foundations of our beliefs. Every event becomes an open question.

1. If an inductive inference still makes a certain conclusion look ‘reasonable’ can reasonableness be all justified? What is the nature then of reasonableness? How can we account for it?

Even if we cannot say from a logical point of view that induction is rational can we at least find a way to say it is reasonable for all of us to use it?

Given that the root that Hume suggested for us (strictly logical rules) cannot be pursued, is there another path to be followed so to save induction?

There is a lot at stake.

## Russel

**B. RUSSEL** entered the debate: *Problems of Philosophy*, in the sixth chapter ‘On Induction’.

How can we say that induction is reasonable?

He started from a canonical Humean position

The belief in future occurrences of a certain phenomenon based on past occurrences of the same phenomenon is a reasonable belief depending on the number of the case observed. (condition of *wide enough number*)

“*Experience has shown us that, […], the frequent repetition of some uniform succession or coexistence has been a cause of our expecting the same succession or coexistence on the next occasion*”

BUT this is still a matter of expectation, that could be deceived at any time. 🡪 example of the chicken: *‘the man who has fed the chicken every day throughout his life at last wrings its neck instead, showing that more refined views as to the uniformity of nature would have been useful to the chicken.’*

He states that by induction we should never look at absolute certainty but at probability: “*the most we can hope is that the oftener things are found together, the more probable become that they will be found together another time, and that, if they have been found together often enough, the probability will amount almost certainty. It can never quite reach certainty, because we know that in spite of frequent repetitions there sometimes is a failure at last, as in the case of the chicken whose neck is wrung. Thus, probability is all we ought to seek”*

= rethink inductive reasoning on the basis of making a calculation of probabilities

Possibility of failure is always possible 🡪 only certainty is that a conclusion is probably true = the only reasonable conclusion we can hope for

SO, the reasonableness of induction crucially depends on probability, in Russel’s description of the problem. If we claim this as acceptable, we should not look for proof that our expectations must be fulfilled but we should only seek for probable reason to put faith on inductive reasoning.

**Probable reason** for Russel is the belief in the uniformity of nature. Same as in Hume but the difference is that we should not expect from it any certainty or justification for the use of induction, but we should look for probable truths. 🡪 belief of uniformity of nature is only probable

The reasonableness of induction depends strongly on probability: so, there is no final proof that prediction about the future will turn to be true but the only certainty we have is their probability to be truth.

**Russel reformulated the principle of induction:**

“*When a thing of a certain sort A has been found to be associated with a thing of a certain other sort B, and has never been found dissociated from a thing of the sort B, the grater the number of cases in which A and B have been associated, the greater is the probability that they will be associated in a fresh case in which one of them is known to be present”*

On the basis on frequencies in which we have observed this associations 🡪 changes our belief that those things are connected (also in the future)

As a corollary he adds “*under the same circumstances, a sufficient number of cases of association will make the probability of a fresh association nearly as certainty, and will make it approach certainty without limit*” 🡪 this principle applies both to simple cases/observation and to the principle itself.

Following the probabilistic type of reasoning we will always be short of certainty

We can understand why certain expectations are formed following this pattern of events but this is not answer to whether it is rational to follow them: it is our habit to form expectation this way but can the habit itself be justified rationally?

TWO WELL-KNOWN REPLIES TO THIS QUESTION:

1. One directly from Russel’s probabilistic reformulation of induction approach 🡪 **pragmatic justification of induction**, by Hans Reichenbach in *Experience and Prediction (1930s)*

The inductivist is like a gambler, someone who puts its odds on a particular outcome and by doing this he assesses is stakes: an inductivist scientist who posits that the proposition of As that are Bs in m/n is **not asserting nor believing** that this is even likely to be true in reality.

“to posit” 🡪 *we do not thereby say that we are convinced of its happening the proposition about its happening is true; we only decide to deal with it as a true proposition. The word ‘posit’ may express this taking for true (…); the reason why we decide to take this proposition as true is that the decision leads us, in repeated applications, to the greatest ratio of success*

We do not say that we are convinced that something will surely happen, we only decide to deal with it as a true proposition. We are positing our stakes on the matter.

The word explain that we are establishing a proportion on the actual stake, and the reason is that this decision leads us in repeated applications to the greatest ratio of success.

We are not asserting in the fact that is 100% true 🡪 ***it’s our best bet***

An inductivist is making a bet such that if there is such a proportion in nature, then adoptive the inductive reasoning is the best to find this out. All we know is that if we know that there is a truth, the process of induction will probably success in finding out the truth. Induction will succeed if truth is possible.

It is our best assumption about the future: “*The inductive inference is a procedure which is to furnish us with the best assumption about the future. If we do not know the truth about the future, there may be nonetheless a best assumption about it, i.e. a best assumption relative to what we know”*

Giving what we know, betting on induction is our best chance to know the truth. This is the best we can do. In the absence of certainty, rather than leaving it to the chance, it is better to give a try. We should have faith in induction. Betting at our best is the best we can do

= this is why it is called **the pragmatic justification**

In the absence of certainty rather than just leaving it to chance, the active man is the one who tries to do something about the future 🡪 predict the future, and the best is to think how to set out his stakes

*“if we sit at the wheel of a car and want to turn the car to the right, why do we turn the wheel to the right?”*

*(p.347)*

We should have faith in induction, induction will succeed if success is possible

**How satisfying is the justification of pragmatic justification:**

*A blind man who has lost his way in the mountains feels a trail with its stick. He does not know where the path will lead him, or whether it may take him so close to the edge of a precipice that he be plunged into the abyss. Yet he follows the path, groping his way step by step; for if there is any possibility of getting out of the wilderness, it is by feeling his way along the path. As blind men we face the future; but we feel a path. And we know`; if we can find a way through the future is by feeling our way along this path*

= it is better than nothing

BUT is it a really satisfactory solution? If by reasoning inductively we feel as justified as the blind man following the footstep, how can we really explain the spectacular successes of modern science, and of technology?

🡪 this does not give us any support that the principle of induction may be true

= pragmatically it is good enough

## Peter Strawson

1. More **philosophical-analytical perspective** 🡪 by the Oxford philosopher, Peter Strawson (1950s)

He believed that all the question, of rationally trying to justify induction, is ‘ill-posed’, wrong; it is based on a crucial confusion. 🡪 subtle argument

Trying to justify induction is a non-question

If we buy Strawson’s argument we do not need to conclude that induction is irrational because he separates the question of justifying induction, from the question whether induction is rational, and whether if it is rational for us to use it.

By saying that we cannot justify it he can still rescue the idea that for us is rational to use it.

= also this argument has some limitations, poses some challenges

To ask for a ‘justification’ of induction is to ask for a justification of induction in general, as a pattern of reasoning 🡪 so we are not immediately asking to justify this or that belief reached through induction.

BUT to ask for such a justification is to ask for a proof of validity of this type of reasoning, it has to be deductively valid: it is like assuming deduction as the logical standard by means we assess the validity of all types of arguments, prototype of logic, just one standard under which we decide ‘good’ and ‘bad’ logic. This very proof pertains to a different type of logical reasoning, deduction.

There is only one logic 🡪 deduction

Induction has to be subdued to the same type of justification of deduction in order to prove its validity.

This route seems to escape the absurdity that induction in general, as a pattern of reasoning, can be justified by inductive standards (brought Hume to say that induction has a problem of vicious circularity) but this new route we’re taking is as absurd as the other: we’re subduing the justification of a type of reasoning that will end up transforming that type of reasoning in something that is not

Transforming induction in deduction, something into something that is not.

**THE PROBLEMS IN JUSTIFYING INDUCTION ARE:**

* either we transform induction into a different type of reasoning
* or we submit it to a type of proof that does not pertain to it

= both move are bad moves

*Can we give another sense to the demand of justification, a different way of honouring this idea that we want to get more certain about it?*

‘*Sometimes it* (the demand for justification) *is expressed in the form of a request for proof that induction is a reasonable or rational procedure, that we have good grounds for placing reliance upon it*.’

= **Unattainable proof**: 🡪 induction is rational only if it can be justified

🡪 Induction cannot be justified

🡪Therefore, induction is not rational.

He claims that *rationality and justification do not involve one another*: you can deny one and retain the other, he demonstrates that induction can still be rational without being justified.

Given the argument what we should do, in order to reject the conclusion, I should reject at least one of the premises, SO let’s try to reject the first premise: why should we accept that induction needs to be justified in order to be rational?

* **‘induction is rational’ is an analytic truth**, almost a tautology: *It is an analytic proposition that it is reasonable to have a degree of belief in a statement which is proportional to the strength of the evidence in its favour; and it is an analytic proposition (…) that other things being equal the evidence for a generalization is strong in proportion as the number of favourable instances, and the variety of circumstances in which they have been found is great … so to ask whether it is reasonable to place reliance on inductive procedures is like asking whether it is reasonable to proportion the degree of one’s convictions to the strength of the evidence. Doing this is what ‘being reasonable’ means in such a context.*

*Example:*

Let’s try to analyse *“we have good grounds to believe that p”:*

believe that p → *“every case of f is a case of g”*;

Good ground for p → *“in my experience every time I came across an f I also came across a g”* .

= providing inductive support for his very belief, this is what a good justification is all about

Strawson claims then that: There is nothing else to rationality than this. This is what **being rational** amounts to.

Being rational is an analytic truth because is like a tautology

* **Justifying induction in meaningless**: *to what standards are we appealing when we ask whether the application of inductive standards is justified or well grounded? If we cannot answer, then is no sense has been given to the questions*

It makes sense to ask if certain beliefs are justified or whether certain procedures for building our beliefs are justified, and to answer these questions we might appeal to inductive standards BUT asking of the very validity of induction is like asking *is the law legal?*. It does not make sense.

It meaningless to inquire whether induction itself is justified.

**He predicts an OBJECTION**: some people might say that even if we call beliefs based on induction ‘rational’, still it does not follow that these beliefs indeed are rational. We might call them rational, but are they rational?

how does it respond to this? The demand of justification in the case of induction is based on a confusion btw two propositions:

1. [the universe is such that] induction will continue to be successful (*principle of uniformity of nature)* 🡪this is about a matter of fact, non-linguistic facts, it is contingent, it is a posteriori, it is not a linguistic fact: all of our expectation can turn out to be false. Assert regularity of the universe. It can only be true after past experiences. It is conceivable that all our expectations that we had built on induction might be false.
2. Induction is rational 🡪 it has to do with meaning, it has to do with linguistic formulation, it is an analytic proposition, it is necessary, it is a matter of definition, it is a priori, it has to do with a linguistic issue. It does not depend on the state of the world, it’s a matter of what we mean by the word **rational**: *To have good reasons for any such opinion is to have good inductive support for it.*

“**even in a chaotic universe, induction would still be rational**”

*the chaotic universe just envisaged, (…), is not one in which induction would cease to be rational; it*

*is simply one in which it would be impossible to form rational expectations to the effect that specific*

*things would happen. It might be said that in such a universe it would at least be rational to refrain from forming specific expectations, to expect nothing but irregularities. Just so. But this is itself a higher-order induction: where irregularity is the rule, expect further irregularities. Learning to count on things is as much learning an inductive lesson as learning what things to count on.*

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Induction would still be rational also in a chaotic universe, teaching us to not make predictions.

**THEN**: proposition **2** does not depend on proposition **1**. Even if **1** become false (universe totally chaotic), **2** would still hold. Hume was right when he pointed out that proposition 1 can become false, induction cannot be justified, because to do so we have to rely on proposition 1. But this does not imply that proposition 2 becomes false as well we can still hold to rationality to be applied to induction.

The totally contingent fact that the world has an order, is a condition for the likewise contingent fact that we continue to form rational opinion about unobserved events that we account on. This is why this type of contingency is also a source of anxiety.

But after all, who decides how to define our practices? Following induction is a practice of a community, us, of individuals who like to call themselves rational. Can we really argue that rational coincide with what a certain community decides it is rational. With what standard this community decides it might be the case?

How can we negotiate different definitions of rationality?

So, we build standard of rationality, but this standard is defined as such through induction.

If we use inductive procedures we are all rational 🡪 but there are different points of view of what rationality is

**Salmon**, another scholar, said *“if you use inductive procedures you can call yourself reasonable – and isn’t that nice!”*

## Lewis Carroll: What the Tortoise said to Achilles

**Moral of the story:** Carroll makes a point about logic 🡪 he proves that in the inductive process we can only reach a possible conclusion.

Induction is not worse of deduction. Paradox

Only if you believe in the logical way of reasoning, you can say that logic has a value. **We have to believe in logic, for logic to work.**

The tortoise can call itself out and the only way Achilles can convince it is through logic, he does not have any other tools.

Looking for justification of logic