Dealing with the Problem of Induction, and how to put induction to use

**Where is the problem then?**

1) If induction cannot be logically justified, should we conclude that it is not rational, or irrational? If we don’t believe in induction, can we still speak about laws of nature? We would end up saying that there is no regularity in nature, so sciences themselves would be terribly threatened.

2) Is it reasonable to use induction? What do we mean by reasonable? Does reasonableness find a justification? This calls into question our behaviour

**B. Russell**, *Problems of Philosophy*, ch.VI ‘On Induction’

Reasonable, but how reasonable? Never Certainty, only **Probability**

The belief in future occurrences of a certain phenomena based on our past acquaintance with that phenomenon is a reasonable belief provided that it depends on the number of cases observed.

‘Experience has shown us that the frequent repetition has been a cause of our expecting the same succession’ however we all know that this behaviour will only take us to construct crude expectation, which could be misleading.

Via induction, given this threat of the crudeness of our expectation, we should only look for **probability**, never for certainty. The reasonable of following induction depends on probability, we should never seek for a proof that our reasoning must be always fulfill, but to some probable reason that makes our reasoning likely to happen. The content of the probable reason is the belief of the uniformity of nature, which is probable but never logically justified.

‘The greater the number of cases in which A and B have been associated, the greater is the probability…’  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.

The best we can do is aiming to probability.

*It is our habit to form expectations this way but, how rational is it to follow this line of reasoning? Can habit itself be justified rationally?*

**Hans Reichenbach**, Experience and Prediction (Pragmatic justification of the laws of induction) - ***Pragmantic Justification***

*Betting on Nature*

He states that the inductivist is like a gambler, he’s not asserting that the red color will come out, not even believing the red will come out. An inductivist scientist who posits that the proportion of As that are Bs is m/n is not asserting not believing that this is even likely to be true in reality.

*“To Posit”*

“By ‘posit’ we do not thereby say that we are convinced of its happening, we only decide to deal with it as a true proposition (how probable is that the event is going to happen?). The reason why we decide to take the proposition as true is that this decision leads us to the greatest ratio of success”.

*Betting on induction*

The inductivist is making a bet such that if there is such a proportion in nature, then adopting the inductivist reasoning is the best way to find this out.

*A best assumption about the future*

In the absence of certainty/ of knowledge about the future we make the best assumption relative to what we know.

*Acting in accordance with the inductive principle*

In the absence of certainty we do not leave it to chance

*Induction is our best bet*

Induction will succeed, if success is possible.

*How much of a justification… Is it really a satisfactory solution?*

“As blind men we face the future; but we feel a path. And we know, if we can find a way through the future it is by feeling our way along this path”. If by reasoning inductively we are as justified as the blind man following the footstep, can we really explain the spectacular success of modern science and of technology?

*Betting —> Probability*

Building a good inductive logic was what all these people wanted to do, because it would give us a good account of the relation between our statements and experience.

We will never reach the certainty of truth of the statements, but degrees of verifiability (or degrees of confirmation).

**Logical Positivism**

* The Vienna Circle (Schlick) and “The Scientific World Conception: The Vienna Circle” (1929)
* The Berlin Circle (Reichenbach)

Both groups were primarily concerned with the logical analysis of scientific knowledge

It was a very influential movement in philosophy. It took off in Austria during the 1920s, when M. Schlick founded the Vienna Circle, a very interdisciplinary group of people that began meeting in a cafeteria in Vienna to discuss the implication of recent development in logic. Then the views of the group spread out to German, where the Berlin Circle (logical empiricism) was found by Reichenbach. Both groups were interested in the logical analysis of scientific knowledge. The so-called principle of confirmation was studied by these groups. In 1929 they published a manifesto, a paper where the two groups explained what they were after.

***Shared vision of LPs***

Critical attitude against traditional philosophy:

* Philosophy should deal with the only type of genuine logic, i.e. science. (metaphysics = nonsense)
* The tasks of philosophy was to be neat and clear.
* Philosophy needs a rigorous logical language.

*Classical and Logical Positivism:*

* There is knowledge only from experience
* The application of a certain method, namely logical analysis
* It is the method of logical analysis that essentially distinguishes recent empiricism and positivism from the earlier version. The aim of scientific effort is to reach unified science, by applying logical analysis to the empiric material.

*The scientific conception of the world.*

We have characterised the scientific world-conception essentially by two features:

* First it is empiricist and positivist. There is knowledge only from experience, which rests on what is immediately given. This sets the limits for the content of legitimate science
* Second, the scientific world-conception is marked by application of a certain method, namely logical analysis.

**The Unity of Science**

* Descriptive task: universal language of science (any science), formulates its knowledge and its results
* Normative Goal: this language prescribes how a science should formulate its theories, laws… to qualify them as scientific

*What logic?*

* Only modern symbolic logic (“*logistic*”) succeeds in gaining the required precision of concept definitions and of statements

*What philosophy?*

What should all science adopt as a method? The logical analysis.

The logic is the modern symbolic logic, which is the only that succeeds in gaining the required precision of concept definitions and of statements. Philosophy becomes the method of logical analysis. The task of logical analysis is to sort out what statement are meaningful and meaningless.

The content instead comes from experience, from nature. A statement is **meaningless when it has no empirical material**, hence no content  “The notion that thinking can lead to knowledge out of its own resources without using any empirical material”.

**The only acceptable statements for LPs are:**

* Synthetic statement a posteriori (scientific statements)
* Analytic statements a priori (all the statements that belong to logic and mathematic).

Philosophical roots of distinction and the Criterion of meaning full ness for LPs

* Relations of Ideas
* Matters of fact

The logical positivists use the distinction made by Hume to understand if a statement is meaningful or not.

For them the only meaningful assertions are either those belonging to logic or those concerning state of affairs that can be verified empirically. All propositions that don’t belong to either of these categories are nonsense. So in this sense the propositions of metaphysics are all nonsense.

*Verification*

* A criterion of meaning
* A test to discover whether a statement is meaningful

Verification was one of the most discussed items in positivism, because it admitted too many exceptions. One famous objector is Karl Popper.

**What is the principle of verification?**

Verification was considered as THE criterion of mean, by following it we ask ‘Under what conditions a statement has meaning?’. It appears also to be a test to discover whether a statement is meaningful.

**Ayer**’s *Language, Truth and Logic* (1936)

He put forward the most important issue in logical positivism. He became so the leader of the LP movement in the UK. Empiricism was born in the UK and Ayer saw in this continuity the possibility of bringing the LP there.

“We say that a sentence is meaningful if and only if we know how to verify the proposition which it purports to express, that is what observations would lead us to accept the proposition as being true, or reject it as being false.” A sentence only has meaning if and only if it can be proved true or false by observation. The observations should be possible in principle, and verifiable in principle.

***Verifiable in principle***

‘That there are mountains on the farther side of the moon’  \*\*At the time this proposition was still not verified, but was still a possibility it was true/false.

* Logical possibility to conceive of the observations that would make the statement true or false
* Truth after verification (logically speaking)

“So that I am unable to decide the matter by actual observation. But I do know what observations would decide it for me, if, as is theoretically conceivable, I were once in a position to make them. And therefore I say that the proposition is verifiable in principle, if not in practice, and is accordingly significant.”

It didn’t have a content of experience to study, but it still was possible in principle since we can give T or F even if the content is still not proved at a particular time (Verified in principle not in practice). It is a meaningful proposition. Verifiability is a criterion of meaning if it is conceivable as a logical possibility at least. The truth of the proposition comes only after verification (in logical terms), so a true statement is a statement that is verifiable by empirical observation.

*Unverifiability in principle*

* No observations could prove the sentence either T or F
* Meaningless proposition

In this sense a meaningless proposition is a proposition which cannot be verified or proved it either true or false.

***Strong Formulation [Schlick]***

“The meaning of a proposition is the method of its verification” (Schlick)

Conclusive verification

*Too Strong [Ayer]*

Conclusive Verifiability might be too strong and selective. If we accept conclusive verifiability as our criterion of significance our argument will prove too much. It is of the very nature of these propositions that their truth cannot be established with certainty by any finite series of observations. It is useless in a sense.

*Universal propositions*

In principle possible to be true or false by observation to a high probability. There is never a conclusive verification that works for every single instance therefore universally.

Historical proposition [Ayer]

“England was conquered in 1066 by the Normans”. How can we verify this proposition by observation? We could never prove this fact, not directly but we could use other observation from studies, record of events… that can at least render the proposition probable).

**Strong and Weak Verifiability**

Ayer thought that we should distinguish between a **strong version** and a **weak version**. “A proposition is said to be verifiable (strong) if and only if its truth could be conclusively established in experience. But it is verifiable (weak) if it is possible for experience to render it probable”.

**Only Weak Verifications**

Weak verifications allows us not to consider nonsense some proposition, saying that they are verifiable by direct/indirect experience. Following Ayer’s reasoning, only the weak version of the verification principle is utilisable (because the strong version implies that we cannot decide on anything, since to approve conclusively a proposition there is the need for infinite empirical evidence).

*Appeal to relevance [Critic to Ayer]*

According to I. Berlin weak verification is an ambiguous type of concept, because it could “open the gates for any statement…provided that someone can be found to claim that observation is in some sense relevant to it” making it a kind of subjective criterion.

A:If the observation is somehow relevant to decide whether something is right or not, then this thing makes sense.

B: Anything can be relevant the! It’s subjective

*Self-Refutation*

In the effort of making this concept stronger, they got to a point where they understood that the principle itself is self-refuting. This principle of verification contains a self-refuting mechanism, since we cannot demonstrate that saying ‘the meaning of a sentence is its verifiability’. We cannot demonstrate it before applying this proposition (still a vicious circle). On what grounds do we accept the meaningfulness of the sentence ‘the meaning of a sentence is its verifiability’?

What was taken as an axiom from Logic Positivist is like metaphysics, namely nonsense.

*Inductive inference*

There is not such a test, so we should pronounce this proposition meaningless. Ultimately verifiability itself becomes a piece of metaphysics. One way to overcome this difficult was to address the problem of meaning by a different perspective. By doing this we are renouncing to verification.

*Falsification rather than verification*

What we should aim to in science is falsification rather than verification. In this way we are able to make use of a deductive type of reasoning.