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Falsification and falsificationism

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ABSTRACT

Falsification is not meant to refute the theory, but only allows you to specify the probability of the truth of posed too. This action can be described as a set of hypotheses that have a researcher to help explain and describe the world around us.

***Keywords*:** falsification, falsificationism, counterfeiting, forg ery, fraud

1. INTRODUCTION

Falsification (trans. NLC. Falsificatio = counterfeiting, forgery, fraud) eng. falsification; Ger. Falsifikatio. Proceedings aiming to overturn a sentence, that is, an attempt to demonstrate its falsity. Such a procedure usually involves three stages [6]:

1. derivation of appropriate logical consequences of forged hypothesis; those consequences must be sentences observation;
2. execution of relevant experience (observation, experiment, measurement);
3. confrontation with the results derived consequence experience and any decision to reject the hypothesis. Falsifies is usually not a single thesis, but some of their team. Falsification is the criterion on the basis of a scientific conception of science (K. R. Popper), according to which:

a) the thesis must be subject to falsification;

b) does not attach much importance to the verification procedure, since the assertion can sometimes completely subvert and never can not be completely verified (with the exception of statements regarding finite and relatively not-great number of objects);
c) believes that the introduction of science thesis is not even verified valuable than refraining from introducing too insufficiently verified.

The idea of falsification "*Using observational data can not prove the truth of the theory or the probability that the theory is true. With the help of observations can only demonstrate its falsity*" [C. Popper]. As a criterion of scientific theories falsificationist understands science as a set of hypotheses that puts you to the test in order to properly describe or explain the behavior of some aspect of the world. Knowledge and use of falsification is essential scientist. Only the hypothesis system of hypotheses that are forged regarded as academic. The existence of a logical sentence or phrase observation, which are inconsistent with the hypothesis, that is, such that if this were true, it would falsify the hypothesis lead to the disqualification of the hypothesis as a scientific hypothesis. For ex ample [2]:

"*The rain always falls on Fridays*" phrase is falsifiable because they can not refute the observed rain falling in one of Fridays.

"*It's raining or not raining*" - No logically possible sentence could not refute this opinion, and so is this sentence no falsificationist

Alan Chalmers on the other hand believes that falsificationist thinks that the observation is under the guidance of the theory, and that assumes it. Rejects the belief that using observational data can prove the truth of the theory or the probability that the theory is true. The theories are speculative and hypothetical conjecture, they are products of the human mind which seeks to overcome the problems encountered by previous theories, and who tries to present a correct description of certain aspects of the world. After the formulation of the theory, they should be subjected to demanding and ruthless procedure of checking through observation and experimentation. Theories that do not cope attempts observations and experiments should be rejected and replaced by other speculative conjecture. Science develops by trial and error method (hypotheses and refutations) can survive only theories best suited. However, for any theory, we can not say that is true, we can hope that it is the best of the existing theories, that is better than any known to us before. The law or theory should inform us about how the actual behavior of the world and thus exclude certain ways of behaving in the world that are logically possible, but does not actually occur [3].

"*All planets move in ellipses around the sun*" - it is an example of a scientific opinion, because it says that the planets move in ellipses, and excludes the orbits.

The law should be formulated in a clear and transparent If the theory is worded so vaguely that it is not known what informs all the results of observations and experiments can be considered compatible with the theory and defend it from falsification. A good theory is one that contains assertions about the world with a very large range, which thus is highly falsifiable, and which at the same time there is no falsification whenever subjected to checking. Example [4]:

a) "*Mars moves in an ellipse around the sun*."
b) "*All planets move in ellipses around the sun*."

B sentence has higher status than a sentence, because he says everything that sentence and a lot of things besides. If the observations of Mars falsification a sentence, then the sentence would experience falsification b. Any falsification is falsification sentence and sentence b, but not vice versa.

Falsificationist thinks that the observation is under the guidance of the theory, and it is assumed that [A. Chalmers] The scientific work consists in proposing hypotheses with a high degree of falsifiability, and then thoughts and persistent attempts to falsify them. Theories about the high degree are better than less falsification theory, as long as they were not actually falsified. Falsified theories should be absolutely rejected. " *Falsificationers prefer bold guess having to solve some interesting problems, even (and especially) if it turns out to be a fake, than any list of true, but irrelevant platitudes ... in this way we gain the opportunity to learn from their mistakes and we learn a lot about truth and closer to it."* [C. Popper] Scientific progress is to move from problems to hypotheses and then to their criticism, their falsification and to new problems. Learning comes from the problems associated with the explanation of the behavior of some aspects of the world. Scientists propose falsifiable hypothesis as a solution to the problem. The new hypothesis must be falsifiable to a greater extent than the previous. As you progress, new theories have more and more information content. Modifying the ad-hoc involves attaching additional postulate or change one of the existing demands, which has no verifiable consequences. The theory of modified ad-hoc network is falsifiable less than its original version. This is not acceptable to falsificationists. Modification is not ad-hoc are acceptable and lead to new tests and increase the degree of falsifiability.

Example sentence: "*The bread is nutritious*"

1) Bread, except for the baking of the French villages, is nutritious
2) Any bread is nutritious, except bread baked with wheat, which is contaminated with a specific type of fungus.

Falsificationists say that confirmation - confirmation plays an important role in science. The purpose of science is the theory of falsification and replacing them better, that better pass tests. Confirmation of the new theory are important because they demonstrate that the new theory is better than the previous one, ie. That which was falsification in the light of experience gained with the new theory. Confirmation is considered significant if, in the light of the general background knowledge of the period is unlikely to come true, and so important confirmation for the theory depends on the historical context. The historical context for indukcjonisty is irrelevant. Cases confirming are those that provide an inductive support a theory, the greater the number of established cases confirming the greater the support for the theory and the more likely that it is true. All theories are acceptable temporarily, while rejecting the theory is final. Theorem falsificationist become questionable when the observation sentences are dependent on theory and may be wrong. Sentences observation, which are the basis of falsification, may prove to be false in the light of subsequent scientific achievements. The scientific theory is typically comprised of a set of universal sentences, which makes reliability. If scientists had followed the methodology falsificationism, then the theories widely recognized as the best, there evolve ever since been discarded immediately

after they are proposing. For each of the classic scientific theory can be found widely accepted view observation, which would be incompatible with the latter [7].

2. LOGICAL ARGUMENT IN FAVOR OF FALSIFICATIONISM

According to falsificationist can be shown that some theories are false; this can be done by using observations and experiments. There is a logical argument, which seems to support this belief falsificationist. As I mentioned in chapter two, even if we assume that in some way we have access to real observational sentences, nothing can be achieved universal laws and theories using deductive reasoning based solely on that basis. On the other hand, can be carried out deductive reasoning in which the premises are detailed view observation and conclusions falsity general laws and theories. For example, if we have the phrase, "*No black raven was observed in the place and time*," it logically follows that the sentence: "*All ravens are black*" is false. So reasoning: No black raven was observed at V and the time T. Not all crows are black. It is logically correct inference. If it is his premise, and rejects the request, a contradiction arises. This simple fact can be illustrated by the following examples. If you can determine by observation in some experiment that weight weighing ten pounds and the other weighing one pound, fall freely at the same speed, it is on this basis can be concluded that the claim that the speed of free fall is directly proportional to the weight of falling objects it is false. If you can prove beyond reasonable doubt that the path of the rays; 'light passing near the Sun undergoes a deflection, it is not true that light propagates along a straight line. With appropriate sentences details can therefore deduce the falsity of general statements. Falsificationist uses in his theory of this fact [1].

3. FALSIFIABILITY AS A CRITERION OF SCIENTIFIC THEORIES

Falsificationists understands science as a set of hypotheses that puts on trials in order to properly describe or explain the behavior of some aspect of the universe. However, not every hypothesis suitable for lego purpose. The existence a fundamental condition that any hypothesis or system of hypotheses must meet if it is to gain the status of a scientific law or theory, so if the hypothesis wants to be part of scientific knowledge, it must be falsifiable. Here is an example of simple sentences that are falsifiable:

1. All materials expand under the influence of temperature.
2. Heavy objects, such as brick, if they are dropped near the surface of the Earth, falling freely in the direction of the surface, as long as nothing gets in their way.
3. If a beam of light falls on a plane mirror, the angle of incidence equals the angle of reflection.

Sentence (1) is falsifiable because they can topple sentences by observation, according to which a substance does not expand when the temperature in a given time. This sentence can be falsified by examining the behavior of water at temperatures close to freezing point. Sentences (2) and (3) may be true. However, they are falsifiable in the sense that he meant falsificationist. It is logically possible, with another brick, which will be dropped, "*fall*" to the

top. There is no logical contradiction in the phrase, the "*Brick lifted upwards after it dropped*," although nothing can exist sentence observational support lego assertion. Sentence (3) it is falsifiable, since the incident beam of light 'on the flat mirror at an angle might / stand reflected at a right angle to the plane of the mirror. It never happens, if the reflection law is true, but there would be no logical contradiction if lak happened. The sentences (3) and (4) are falsifiable, even though they may not be true. The hypothesis is falsifiable if there is logically possible sentence or phrase observation, which is her true, that is, such that if were to prove true, it would falsify the hypothesis.

Falsificationist demands that scientific hypotheses are falsifiable in the sense that I just discussed. It demands it, because the data right or theory says anything about the world only because it excludes certain set of logically possible observation. If the sentence is unfalsifiable, then the world can have any property, can behave in any way, and yet it does not conflict with this statement. Right or scientific theory should inform us about the actual way the behavior of the world and thus exclude certain ways of behaving in the world that are (logically) possible, but does not actually occur. A glance at some of the rights that are typical components of scientific theories indicates that they meet the criterion of falsifiability. "*The opposite magnetic poles to Attract*", "*Mixing acid with the principle we get salt and water*" - with examples of rights falsifiable. Falsificationist says, however, that some theories. Although seemingly have the characteristics of good theory, really only they pretend to be scientific theories, because nothing is falsifiable, and should be rejected. Popper says that at least some versions of the Marxian theory of history, psychoanalysis, Freud and Adler's psychology have the disadvantage.

Their no falsification can be illustrated using the following, very simplified version of the psychology of Adler. Adler's basic contention is that human actions are motivated by the kind of feelings of inferiority. Imagine the following case. A man stands at the edge of the treacherous river, when suddenly the water near the child falls. This man or jump into the river to save the child, or do not jump. If you jump, then a follower of psychological theory to explain Adler, indicating how this fact supports his theories.

This man obviously wanted to overcome feelings of inferiority, and did so by proving that he is brave enough to jump into the water, despite the danger. If you do not jump, a follower of the theory of Adler also considers it a confirmation of his theory. He will tell if this man decided to overcome his feelings of inferiority by proving that it has enough strength to remain firm on the shore, when the child is melted. If this anecdote correctly describes the functioning of the theory of Adler, this theory is unfalsifiable.

Theorems of this theory can be reconciled with any kind of human behavior, which is why it does not tell us anything about the behavior of people. But before we reject the theory of Adler's for these reasons, it would, of course, is necessary to examine the same theories, not the simplified travesties. However, there is whole lot of social, psychological and religious theories that trying to explain everything, do not explain anything. The existence of a merciful God and the explosion of some terrible disaster can combine theories, which according to the situation says that the disaster was sent down to us in order to try our faith, or frogs punish us for our sins.

Many animal behavior can be understood in such a way that confirmed the belief that "*animals are there to fulfill the roles that have been assigned to them."* Theorists inclined to such explanations are guilty of sin and prophecies of the problem and avoid exposing

themselves to criticism falsificationist. If the theory is to have any information content, must bear the risk of possible falsification [5].

4. GRADES FALSIFICATION OF CLARITY AND PRECISION

A good theory or law is falsifiable because it says something specific about the world. Falsificationist to mean that the more falsifiable theory, it is better. The more theory about the world, it is more possible opportunity to demonstrate that the world really does not behave as theory says. Very good theory is one that contains assertions about the world with a very large range, which thus is highly falsifiable, and which at the same time does not falsification whenever subjected to checking.

Here is a simple example. Consider two laws:

a. Mars moves in an ellipse around the sun.
b. All the planets move in ellipses around the sun.

It is clear that the right (b), as part of scientific knowledge, has a higher status than the law (a). Law (b) tells us for everything the law says (a), but also a lot of things besides. If the observations of Mars falsification right (a), the falsification would experience the right (b). Each falsification (a) is therefore falsification (b) but not vice versa. Sentences observation of the orbits of Venus, Jupiter, etc., could forge the right (b), but they are not essential for (a). The set of observation sentences, which are used to falsify rights or theory, call for Popper, potential falsification this law or theory. So we can say that the potential falsification law (s) make up the collection, which is a subset of potential falsifiers of law (b). Law (b) is falsifiable to a greater extent than the right (a), which means that tells us it "s more, it is the law better.

The ratio of the theory of the solar system Kepler to Newton's theory is another example gradation falsifiability. For the theory of the solar system Kepler I acknowledge his three laws of planetary motion. Harvesting the potential falsifiers of the theory are of the opinion relating 'to the position of the planets relative to the sun at certain moments of time. Newton's theory, the theory of better replaced Kepler’s and is more general. It consists of Newton's laws of motion and law of gravity thereof, according to which all the pairs of bodies in the universe are attracted with a force inversely proportional to the square of the distance. Some potential falsificators Newton's theory are sets of sentences on the position of the planets at certain moments of time. But there are many others, among them the opinion about the behavior of falling bodies and pendulums, the relationship between the phenomenon of the tides of the sea and the positions of the Sun and the Moon, etc. It is much more opportunity for falsified Newton's theory than Kepler. Still, Newton's theory survived an attempt to falsify it, which proves its superiority over Kepler's theory. Theories about the high degree of falsifiability so they are better than less falsifiable theory, unless they are actually falsified.

This is an important issue for falsificacjonisly. Falsified theories, he says, is absolutely rejected. The scientific work is based on the hypothesis suggesting a high degree of falsifiability, and then deliberate and persistent attempts to falsify them. Popper writes: "*Therefore willingly admit that falsificationists like I will bold guess having to solve some interesting problems, even (and especially) if it turns out to be a fake, than any list of true, but*

irrelevant platitudes. We hold that len way we gain the opportunity to learn from their mistakes, and from revealing the falsity of our Guess we learn a lot about the truth closer to her."

We learn from our mistakes. Science develops through trial and errors. Due to the removal of rights and the theory of observation sentences is logically impossible, but it is possible deduction of their falsity. Forgery let it show; very important events, great achievements, key steps in learning. Claims of huge importance falsification spewed by falsificationists of extreme orientation, but they are very convincing and will be the subject of criticism in the following chapters. Because science is committed to the theory of high information content, falsificationist welcomes you with joy; bold, speculative guess. Applauds the bold hypothesis, if they are falsifiable and provided that they are rejected after falsification. This ambitious attitude radically different from the precautions recommended by the naive indukcjoniste. According to this second fact, learning can be enabled only theories that can prove their accuracy or high probability.

We can go beyond the immediate data of experience only when we use a valid inductive inference. While falsificationist is aware of the limitations of induction and the dominance of theory over observation. The secrets of nature can be, to disclose only through bold and insightful theory. The more daring theory is confronted with the real world, and the more fantastic are the guesses, the greater the chance of significant progress in science. There is no danger of spread of fantastic theory, because if they are incorrect as an explanation of the world, will be eliminated as a result of checking.

The requirement of falsifiability theory has the attractive consequence that theories should be formulated in a clear and precise. If the theory is formulated vaguely lakes that do not know about what actually says. Then all the results of observations and experiments can be considered compatible with this theory, so you can defend it against falsification. For example, Goethe wrote about electricity, "*it is nothing, zero, an ordinary point, which, however, lives in all visible beings, and it is also the starting point, where, thanks to the lightest stimulus arrives dual view, a view that shows up in order to disappear. The conditions stimulating these phenomena are infinitely varied, according to the nature of the various bodies*." It is very difficult to imagine what possible conditions could be falsified thesis proclaimed by this quote.

That is why it is so vague and indefinite (at least outside the context), it is no falsification. Politicians and the prophets avoid accusations of mistakes because they express vaguely as possible, so that their statements could be reconciled with everything that happens in the world. The requirement of a high degree of falsifiability rule out such maneuvers. Falsificationist demands that theories formulated clearly, because it is a condition of falsifiability.

Similarly with the precision. The more closely formulated the theory, the more it is falsifiable. If we agree that a better theory is falsifiable to a greater extent than another theory (assuming that it has not been falsified), we must agree, too, that better be more precise statements of a theory than others. "The planets move in ellipses around the sun" is a sentence more precise than "*Planets move along tracks which are closed around the Sun*" and is a falsificate thorem a greater extent. Oval orbit would falsificate first sentence, while each orbit that falsifies the second sentence, as forges / first. falsificationist is forced to select the first of those sentences. Similarly falsificationist must choose to say the speed of light in vacuum is 299.8 x lf /> m / s and not less precise, that this speed is 300 × 106 m / s, because the first

falsifiable is greater than the second. Closely linked to the requirements of precision and clarity of expression they arise naturally from falsification theory of science.

5. FALSIFICATIONISM AND PROGRESS

Progress in science falsificationist understood as follows. Learning comes from the problems of explaining the behavior of certain aspects of the world. Scientists propose falsifiable hypothesis as a solution to the problem. These hypotheses are then subjected to criticism and tested, and. Some of them will flash elimination. Others may be better. These should be even more severe checking and criticism. When a hypothesis that has survived diverse and demanding tests, will eventually falsification, there is a new, different from the initial problem. That's a new problem requires new hypotheses, after which there will be new tests and criticism. In this way, a process that goes on. You can never tell about the theory that is true, even if well exercised in the exams, but a theory can be said; that is better than another if it has undergone tests which led to the overthrow of the previous theory going back to falsification concept of scientific progress as a transition from the problems of the hypotheses, then their criticism, their falsification and to new problems. Presenting two examples; one for flying skills sparrows, the second concerns the progress in physics throughout history. 1. We start from the problem of sparrows flying at high speed without skipping difficulty branches of trees, telegraph wires, other sparrows and efficiently catch insects. Although fly almost exclusively in the day, it happens also in the night. This is an interesting problem, because the risk of falsification very probable hypothesis that animals, like people, are aware of using your eyes. Falsificationist attempt to resolve this problem by putting a hypothesis. For example, although sparrows are the eyes, the eyes are still very efficient in the way which has hitherto been unknown.

This hypothesis can be checked. First we let a group of sparrows to a darkened room, in which there are various obstacles and carry out in some way to assess the skills of sparrows in evading obstacles. Then all the sparrows we cover your eyes and again let in to the room. Prior to this experience, the researcher can perform the following deductive reasoning. One of the conditions of this reasoning is the hypothesis, which says that "*the sparrows can avoid obstacles on the fly through the eyes and without the use of his eyes could not so well IMAC.*"

The second premise is the description of the experimental set: in the description of this find themselves should Remote this group of sparrows hidden behind the eyes, so that they can not use them. With these two conditions, the experimenter may accurately conclude that this group of sparrows after covering over the eyes will not be as efficient in evading obstacles during the flight. We conduct an experiment and it turns out that sparrows avoid collisions as efficiently as before. The hypothesis has been falsified. It is now once again use your imagination and propose a new conjecture or hypothesis. One scholar suggests that perhaps the ears sparrows have something to do with their efficiency in evading obstacles. This hypothesis can try to subvert through tests involving the clogged ears sparrows before they are admitted into the room. This time, it appears that the ability to avoid obstacles decreased significantly hypothesis was confirmed. Falsificationist must now specify their hypothesis that it can be easily falsified. Falling suggestion that a sparrow receives the sounds of their own voices and rustling in the darkness.

Falsificationist coming now to the test to solve the problem, but does not consider that he was able to experimentally demonstrate how the sparrows avoid collisions with objects in flight. May appear on any number of factors, which show him the error. Perhaps the sparrows perceive sounds not through the ears, but some sensitive areas near the ears, the operation of which was affected by, clogging or discovered that a species of sparrows avoid collisions in a completely different way, and so sparrows used in the experiment were not representative the entire population of sparrows. While advances in physics from Aristotle through Newton to Einstein is an example of a slightly larger scale. Falsification description of this development is more or less the same. Aristotle's physics was to some extent the theory correct, as explained ZA- wide. An end to the phenomena. She explained why heavy objects fall to the ground (to find their natural place in the center of the universe), explained the operation of the siphon and pump (explanation is based on the impossibility of a vacuum), but the physics of Aristotle has finally been falsified in many other ways. Stones dropped from the top of the mast of the ship moving at a uniform speed fell on the deck n base of the mast, rather than at a distance from the base, as predicted theory of Aristotle. Jupiter's moons revolving around Jupiter and not around the Earth. In the seventeenth century it gathered a large number of other falsification. However, thanks to the hypotheses of Galileo and Newton came to the creation of a new physical theory, which displaced the physics of Aristotle. Newton's theory explained the problem of falling bodies, the action of siphons and pumps and everything explained the theory of Aristotle, but also explained the phenomenon embarrassing for the theory of Aristotle. In addition, Newton's theory explained the phenomenon, which the theory of Aristotle did not take at all into account, such as the relationship between the tides of the sea and the position of the moon, and to change the force of gravity with altitude press sea level. Newton's theory was successful for two centuries. Attempts to falsify it by reference to the anticipated new phenomena have proved ineffective. This theory has even led to the discovery of a new planet, Neptune. But despite its successes continuous attempts to falsify finally succeeded. Newton's theory has been falsified in many ways.

6. CONCLUSION

Falsification is important for a scientist, because it is a basis for issuing hypotheses have attempted and properly describe or explain the behavior of some aspect of the world. Therefore, knowledge and use of falsification is essential scientist. Only the hypothesis system of hypotheses that are forged regarded as academic. The existence of a logical sentence or phrase observation, which are inconsistent with the hypothesis, that is, such that if this were true, it would falsify the hypothesis lead to the disqualification of the hypothesis as a scientific hypothesis.

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