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Extracts and Basic Concept in Philosophy of Science

Premises for Theoretical Reflection

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Premises for Theoretical Reflection

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Introduction

This document presents a basic concept of Philosophy of Science - POS – its main structure and some main positions.

The subject itself stands as difficult and complicated, but the intention here is to give an idea of what this subject is about – its structure and content.

POS focus and essence is: How to get knowledge – or more precisely – how should it be we come to have knowledge about the world at all?

When we perceive and reflect the world and matters connected to us – that being scientific or daily facts or phenomena – how could we know we have the *true* knowledge of them?

In POS there exist a few central or main positions that stand antagonistic to each other concerning the right way to come to knowledge. They can roughly be classified by two superior perspectives:

1

Subject ----------→ Object

that says: the object of knowledge lies *outside* of and should be *independent* of the subject who perceives it and trying to get to know it.

The formula concerned this should be:

“What the eye sees” (perceives) – with focus on “what” – the object for perceiving – which stands as neutral and objective whoever might perceive it.

This is the *empirical* position.

2

Subject<-->Object

that says: the object of knowledge should *not* be neutral to, or independent of who perceived it. On the contrary: the object is always *interpreted* by the subject or observer and therefore never should be neutral and outside his/her mind. It is – so to say – created or constructed by the subject or perceiver him-/herself. Subject and object are never separated. The “object” becomes – exist *as* interpreted by the subject.

The formula for this should be: “The eye (the subject) that sees” (perceives). The focus should be on the subject/observer/interpreter – and in fact not on the isolated object, that being physical, psychological or social phenomena.

This should represent at least some theoretical overview concerning the matter in question, giving the superior distinction regarding perception, reflection and understanding.

Now, we are in need of definitions concerning a few key concepts linked to philosophy itself.

When speaking of *Ontology* – we should mean the position of the "being itself", simply saying the matter which stands as "real" and representing the "reality" independent of us being aware of it or not, the reality that exist in itself.

With *Epistemology* we should mean the manner in which we interpret and understand the world – what frame or framework of interpretation we should use – or perhaps are born with. What type of knowledge is in question?

With *Empiricism* and *Positivism* we should mean:

Objective, neutral experience, with positivism considered a more consequent and radical variant of empiricism itself.

Rationalism, meaning you cannot start with direct and neutral experience like empiricism asserts, rather with a cognitive reflection or idea considered the matter in question, and out of *this* starting collecting empirical data and information.

Logical Positivism. The Vienna Circle

We shall call attention to the perhaps first extensive program or position of POS in history, namely the so called “Vienna Circle” or – more scientifically termed: “Logical Empiricism” or ”Logical Positivism”.

Initially: What does Empiricism vs. Positivism stands for?

As already mentioned: *Empiricism* means the position that knowledge is gained or “discovered” mainly by experience and perception, allowing us learning from the objective and neutral world of phenomena existing “outside” our minds; so to say neutral objective facts, then representing the objective and “true” world. *Positivism* again, stands for perhaps a more consequent or radical version of empiricism - giving little room for underlying factors and the construction of theoretical hypothesis or theories; instead considering our scientific based – and basic - experiences, rather originated in direct observations as well as experimental and for example statistical procedures.

Now then: What does, on the other hand, *logical* here stands for? It should mean there existing no possible way collecting knowledge out of strict experience and perception, instead exclusively out of logical reasoning. A logical statement may by principle consist of two kinds: 1) *Logical definitions* and 2) *Logical deductions or conclusions.*

A logical definition may go like this: “A circle is round”, A bachelor is an unmarried man”. These statements are true by definition, not by virtue of some empirical investigations. They are therefore named: A priori true, or analytic.

Now, the second - logical deduction or conclusion - is structured as follows:

Example 1:

First premise: “All humans are mortal”

Second premise: “I am a human”

Logical conclusion (out of these premises): “I am mortal”

Example 2:

First premise: “All humans have four arms”

Second premise: “I am a human”

Logical conclusion (out of these premises): “I have four arms”

Should this conclusion be logical? – Yes, on pure abstract premises, which doesn’t mean they make references to reality.

Example 3 (taken from the Ludvig Holbergs famous play or comedy “Erasmus Montanus” from 1723. The character was an educated man, had been studying in Copenhagen and

came home to his village or homeplace, having fun with his not that well educated family and friends by presenting them for some (absurd) logical dilemmas. One goes like this:

First premise: “Stones cannot or are not capable of flying”

Second premise: “Mother Nille (his mother) cannot or is not capable of flying”

(Logical conclusion (out of these premises): “Mother Nille is a stone”.

Now: what is wrong with this conclusion? The answer should be: The conclusion does *not* follow logical from the premises.

Now, logic like this contrast pure empiricism which is built on experience and perception. Such experience may be built on commonsense, observation – or can be scientific, building on certain methods like more systematic observations, interviews, experiments or statistics. The basic principle here should be collecting as much empirical material and experiences as possible, making it possible to reach some conclusion or confirmation regarding how the world or problem in question must *be* – or basing this on a high rank of probability. This method is named *induction* and says the more your observations, experiences and perception being confirmed, the higher the chances should be that these confirmations is based on truth. This principle again is named *verification* or confirmation and is by the Vienna circle or school regarded the very criterium of science, and

simultaneous rejecting or turning down what they call “theoretical or metaphysical speculation”, that cannot be confirmed by experience. However, the Vienna School in addition accepted the principle of logical deduction or conclusions, stressing the argument that pure logical deduction itself is not linked to reality and experience, instead representing a basic principle of abstract reasoning.

There exists another distinct differential between two concepts important to mention. That is between so called *synthetic* and *analytic* sentences. A synthetic sentence should go like this: “There is a book lying on the table in the next room” – meaning it is formulating an empirical assertion concerning the real world which has to be checked out and must be confirmed true by empirical confirmation. On the other hand, an analytic sentence should for example be: “A circle is round” – meaning it cannot by checked out being true by empirical confirmation, because it is a logical and abstract definition, being true only by *definition*.

Karl Popper and Critical Rationalism

Now, turning to the great philosopher *Karl Popper* who was making crucial contribution to POS, underscoring that the principle of *verification* and *induction* in fact making *no* guaranties concerning scientific study or conclusions at all.

Parenthetically speaking, though induction should not be regarded a proper criterium of science, we should in fact be totally dependent of it through life and our daily activities. We simply *have* to take things for granted to function satisfactory and not starting systematic, empirical and cognitively reflecting on it; on every day's routines and activities, we are doing by autopilot so to say For example: getting up in the morning, going to the toilette, having your breakfast, taking the bus to the university, - you don't have to or cannot check out empirically or scientific, whether, or for what reason there should be water in the tap, that the fridge is functioning proper in preserving your food for consuming, weather the bus to the university being operative or weather the university still exist, and so on.

All these matters are taking for granted and *should* in fact be taking for granted for us being able living a proper and meaningful life. But all the way this is built on direct *induction*, again made out through long-term experience. But strictly scientific, it is not built on systematic scientific

observation – only on temporary and reflexive intuition – built on former confirmed experiences.

Then: You are forced relying on simple and direct induction to properly function and managing your daily life.

What then, should the crucial difference between induction and deduction regarding basic scientific methods?

Let's make reference to the well known case of Gravitation Theory as standard example:

Claiming: "When I drop this object I have in my hand, it will fall to the ground, due to the gravitation power" – Here, I use the method of *deduction*, making logical conclusion out of some universal accepted theory or truth and what should necessarily follow from it. Starting with something of a *totality*: Gravitation power and theory operating on *universal* terms, valid concerning all matters or objects, forever, in question.

On the other hand, making the following claim: "When I drop this object, it should fall to the ground, because my experience tells me that this has always been the case or result taken place when I have been dropping objects from my hand". Then, on the other hand, I am using the method or argument of *induction* – making my conclusion out of numerous examples and experiences in the past.

Now, Karl Popper asserted that these two principles or methods operating on their own hand exclusively, both are insufficient as superior or autonomous principles for scientific research and understanding. Popper attacked the Vienna-Circle or Logical Positivism's view of how scientific knowledge and understanding should be produced, precisely by their use of the *verification principle* - in other words *induction*. If repeated confirmation regarding your observations should be considered the criteria for science and knowledge, you should do unnumberable observations – still without reaching final conclusion. On the other hand: how many counterexamples should be sufficient in undermining the whole base of knowledge? Just *one*. Explaining: Suppose all yours and your predecessors' observations has confirmed that "all swans are white" this statement will finally be taken for granted, then given the status of a "scientific confirmed" fact or truth. But just *one single* observation of a black swan – you are in fact not able to foresee what observations you will make in the future – is sufficient to eliminate the whole scientific "truth" that "all swans are white". It wouldn't help if you already have made thousands and millions of observations of exclusively white swans. Still, this wouldn't give it the status of universal truth. Popper then, out of this, proposed another and quite different criteria for science or guarantee regarding scientific knowledge, namely the principle of *falsification*. He was asking the question: In what way should we get to true or secure knowledge? The answer should be: Only by demonstrating or proving how and why an observational statement in fact is *not* true, instead proved false or wrong.

Taking the example of the white vs. black swans. The statement “all swans are white”, is obviously not true, secure and confirmed, how many millions of just white swans you will ever observe, because you can never foresee what you will meet, what your observations should be in the *future*. But you should be able falsifying or rejecting this statement by observation of just one single black swan. And this in fact, represents the only secure scientific principle or criteria in making knowledge: The possibility to disprove a statement claiming to representing knowledge and science. When you have made one observation of a black swan, you can be completely sure that the claim: “all swans are white” is not true, instead false. The very *demarcation* concerning knowledge and truth then, should be proving that something is wrong – *not* that something being true by confirmation over period of time. According to Popper we’ll never get in position proving that something is universal true, because we can never be sure we have got control over all the relevant factors, data and causes in question; for example, what observation we will be able to make in the future, for example due to better methods. But then you may claim: How could falsification give us more information and knowledge when not based on a growing store of true and in fact confirmed statements? Popper asserts that using the falsification principle in testing out statements and hypothesizes of statements claiming to be true, in fact gives us increasing knowledge, leading to the eliminating of false or mistaken statements and hypothesis. Connected to this, Poppers conviction should be that neither induction, nor

deduction stands as sufficient or adequate principles behind scientific research.

Popper in fact, *denied* using an *empirical* based confirmation method, instead operating from a so-called *rationalist* position; meaning starting with using your *reason* and *intelligence*, setting up a hypothesis of what could and *seems* to be the case or truth, and *then* testing this out empirical.

Out of this, Popper himself recommended a certain method suitable and qualified for achieving knowledge –precisely by *combining* the principles of deduction *and* induction - realizing that either induction, nor deduction isolated being capable as adequate methodical principles or tools themselves - named the *hypothetico-deductive* method which can be put on the following formula:

H(1): Main theoretical hypothesis of what is believed to be the case and therefor has to be tested out empirically (*rationalism*)

I: Empirical implications of the theoretical hypothesis that is tested out. (*empiricism*)

Two alternatives here should be considered possible:

1 H(+) The hypothesis is confirmed

2 H(-) The hypothesis is not confirmed, but rejected, or in Poppers term: representing *falsification*.

To give you a standard example or demonstration:

A simple hypothesis (H) should be:

“Due to the gravitation power, all objects being dropped, should fall to the ground.”

This, being a fair hypothesis, then must be put on a form or state which make it possible to be tested out. This should be the *falsification* test. This should be formulated:

Implication (I): “When I drop this object from my hand it should fall to the ground.

Note: The inference, conclusion, or deduction from the general law concerning the gravitation theory towards what should be empirically expected in (I) the testing phase, constitute the *deduction* element, part or phase, while the specific test, made by dropping the object, constitute the *induction* element or phase. You can perform it over and over again, getting it confirmed – still not to achieve secure or universal knowledge.

Note: When a hypothesis is confirmed, this is *not absolute* – just temporary or preliminary. Hypothesis should possibly *never* be complete confirmed – simply because we never know what will turn up in the future, regarding new facts, data and further research. Confirmed hypothesis thus, never represent final truth. We say it only represents *temporary confirmations*. This is in fact represents very strict or harsh conditions.

On the other hand, a rejected hypothesis represents final truth. Have in mind the claim “all swans are white”, which can never reach the status of universal truth, even if a million

observations confirm it; but its rejection on the other hand will turn out just that – giving only one single example to prove it, namely the observation of for example just one single black swan.

Note that Popper is not asserting that a hypothesis in fact *has to be* falsified in each single case or experiment – just that each hypothesis *must* be formulated in a way allowing or open up for the *possibility* of falsifying or rejecting it.

The Semmelweis Case

Now, let's turn to a decisive or important example or case, demonstrating the importance of this hypothetico-deductive model and its relevance for practical research. Some may already be familiar with it. It is taken from medical history and is known as the "*Semmelweis Case*". This case in fact demonstrates the use and relevance of the hypothetico-deductive method long before it was even invented or formulated. It took place in the 1840'ies in a hospital in Vienna where *Ignaz Semmelweis* served as a young doctor, at the obstetric clinics. Here he noticed a significant difference concerning the death-rates or mortality in *Puerperal fever* or *Childbed fever* between to clinics: here named 1. and 2. It seemed obvious that something was radical different in the two clinics, causing big and unnatural differences in mortality, with significant higher rates in clinic 1 compared to clinic 2. He then started a systematic study, in order to uncover and explain these differences; to eliminate them clinically.

First, he made observations, identifying many of the existing differences between the two clinics. Note: He had to *start* with observations, but on the basis of them, the real research then went on with setting up theoretical hypothesizes that was tested out. There were a lot of differences in each clinic's procedures, some of them apparently more important than others.

One of the most obvious was that in clinic 1 the childbirth was carried out with the mother lying on her back, while in clinic 2 the mother laying in lateral position. Semmelweis then got the idea that this difference caused the significant higher death rates in clinic 1.

The hypothesis then, which is generally formulated, became:

H: “Puerperal fever is caused by the birth position with the mother lying on her back”.

The next step then was to empirically test out this idea or hypothesis. The obvious intervention was to introduce and carry out the same procedure as clinic 2 at clinic 1. Putting it on a form or level of falsification, that would go like this:

I: “If the patients on clinic 1 can be brought to give birth laying in the lateral position, mortality will decrease to the level of clinic 2.”

This is a direct empirical test making it possible to falsify the hypothesis. In this case this was exactly what happened. It was falsified by showing no effect on mortality when the birth positions were changed in accordance with the clinic 2 procedures.

Semmelweis tested out several other hypothesizes, made out of observations of different routines in clinic 1 and 2, but all with the same results: No change in mortal rates. This, all the way seemed like a waste of time, giving no precise answer regarding the very causes of Puerperal fever.

But according to for example Popper, that would be like making the wrong conclusion. In fact, on the basis of the

many falsified hypothesizes, we know a lot more, simply by elimination or exclusion, ruling out many false or mistaken assumptions, thus gradually getting closer to the obvious or apparently right conclusion.

One of the observations Semmelweis made was that while in clinic 2 the birth was carried out by *midwifes* spending their whole time at the clinic, while in clinic 1 it was carried out by doctors or medical students arriving from the morgue or autopsy clinic where they had already been performing autopsy. *After* the autopsy they went to the obstetric or birth clinic 1 helping with the birth. Semmelweis idea now, was that the doctors, after doing the autopsies, by their hands, carried with them something he named *Cadaverous particles*, meaning some type of poison from the dead bodies; in turn poisoning the women when handling and taking care of them, thus inflicting them puerperal fever. A rather crucial observation made way for this hypothesis. He observed one of his colleges doing autopsy, cutting himself with the scalpel and then developed symptoms much like the women with childbed fever and finally died.

Here it should be important to remember that during the period of time when Semmelweis lived and worked, little or nothing was known regarding infections, bacteria, germs and that kind of stuff. This knowledge arrived later in the century, with Louis Pasteur, Robert Koch and others.

Then, Semmelweis' research was limited and restricted to the empirical level, looking for external connections between observable factors and data, not experiments detecting

microbiological processes that would directly prove the existence of bacteria and infections.

He then started with a new hypothesis – in fact not knowing what cadaverous particles or corpse poison really *was.* It went like this:

H: “Cadaverous particles transmitted from the doctor’s autopsy cause childbed fever”.

This was then put on the level of falsification, meaning making it possible to be tested out empirically:

I: “When the doctors either don’t enter the birth clinic 1 after doing autopsy, or don’t carry out autopsy before entering the birth clinic, death rates due to childbed fever will decrease to the level of clinic 2”.

This hypothesis then, *was confirmed*.

Still, one should not take for granted that the decrease in fact was the result of the doctors moving from the morgue to the clinic. Instead, one should be in need for a further hypothesis with stronger links between the corpse poison and childbed fever. Another important or decisive observation made by Semmelweis outside the hospital, so far solved that problem. He had noticed that people working with emptying and cleaning up the latrines and toilets around the city, afterward washed their hands in some sort of a strong chlorinated mixture to get rid of the strong smell they got on their hands after doing their work. Semmelweis then got the idea that this strong mixture also could become effective in removing the corpse poison on the doctors’ hands, thus making up an

even tighter and more direct connection between the doctors' autopsy resulting in corpse poison and the infection inserting the birth giving mothers. The theoretical hypothesis thus became:

H: "Chlorinated mixture removes the cadaverous particles or corpse poison"

Testing this out, putting it on the level of falsification, then should be:

I: "If the doctors wash their hands in chlorine before entering and starting to work with the women in the clinic, the death rates will decline".

And this hypothesis too was *confirmed*, making an even stronger evidence concerning the connections between the doctors' autopsy, the presence of corpse poison, the following infection and the death rates due to childbed fever.

This stands as an enormous triumph for science and Semmelweis himself. But then, did he become a hero?

Unfortunately, Semmelweis' findings lacked scientific explanation at that time. As already mentioned, these came later, with Pasteur and others.

In fact, his observations and findings was rejected by the dominant proponents of the already existing science at that time, obviously threatening their authority, and he finally was dismissed from his position.

Semmelweis' work and findings was indeed impressive and revolutionary. His method proved to be true – but should it be taken for granted regarding all or majority of scientific work and methodology – meaning the hypothetico-deductive model? There is in fact strong evidence for not doing that.

Imre Lakatos

It should be of importance introducing another outstanding philosopher of science, named *Imre Lakatos*.

Lakatos was one of Poppers students, but later criticized him, even himself starting from a rationalistic position. In his opinion however, Poppers' perspective, built on the hypothetico-deductive method, exemplified by the Semmelweis case, sometimes proved too simple and shallow, not taking in account that having a hypothesis rejected while tested out, should not mean one having to declare it falsified, in order to dismiss it. When Semmelweis was in his right in using falsification consequently, this was simply due to the fact that he had control over all the significant factors, variables and data operating, and by straightforward research was able dismissing or rejecting the different hypothesis he sat up when proved wrong, one by one. He could do that, mainly because he had control over a rather small universe, including just a few departments of a hospital and a rather small population operating there.

But Lakatos' point of view should be that this *not* being the case concerning the better part of scientific research. Research usually takes place within the frame of a huge complex unforeseeable world or universe, characterized by the researcher at starting point *not* having control of all influencing factors in work. Thus, the researcher should have

to operate under conditions where you don't exactly know who all the factors or parameters being in work really are. Basically, this represents a critique of Poppers concept or idea of scientific rationalism and progress, itself represented by use of falsification test, which is considered naïve. Within an area of research there will *always* exist hypotheses that are not confirmed, but instead rejected, simply because you cannot control or account for all the – perhaps unknown data and factors operating – influencing the result. In Poppers view, this meant that the hypothesis should not be confirmed but rejected; automatically meant it could not be true – in other words it had to be rejected as false. But Lakatos then, says this should be too simple to account for scientific rationality and progress. Lakatos' answer to this, then, is to construct, or postulate a so-called *Research Program* containing specific elements and rather basic theoretical assumptions. This opens up for a more progressive and sophisticated type or idea of scientific progress and rationalism; out of the possibility of including a much wider scope of significant factors and assumptions in the very concept of science and rationality. It is, within this concept, crucial to include and incorporate *universal* elements and conditions concerning the very area of research itself. You should be fully capable in including elements and preconditions from many fields and areas in this scientific model, in order to present a more complete scientific way of working and understanding. Elements of this model should also include social and historical conditions. Lakatos' research program contains particular or specific universal elements

being able to account for and including certain conditions and elements *outside* the specific data being in focus concerning the research in question.

Note: The case or perspective of *correlation statistical analyses* here is replaced in favor of a more extensive and comprehensive research or study, taking into consideration *hidden* factors and variables operating, perhaps more basic and universal; however initially not being manifest. Correlation studies themselves, just uncovering some connection between, say two factors, without uncovering the causal relations between them; sometimes just revealing some rather mysterious connections without explaining them.

Lakatos' research program itself roughly consists of:

1) *A hard core* – consisting of some universal and essential ideas and theories "lying behind" or being at the bottom of and making the premises of the ongoing research – conditions that are never questioned and are accepted as some, rather crucial starting point. Examples of such universal theories should be Newtons' Gravitation theory, the theory of Evolution, "the rise and fall of Biological development" and other specific theories from the natural sciences. Here we should notice: Usually it is easier to make strong theories within the natural sciences, because you are operating with more *constant*, objective matters, facts and data. This

contrary to the humanistic and social sciences where facts and matters often seem to undergo changes due to changing conditions and circumstances, for both social and interpretative reasons. For example medical and perhaps specially psychiatric diagnoses – although considered objective and referring to something real when being accepted and operative, often undergo changes, even under more administrative circumstances – regular psychiatric congresses and so on.

Nevertheless, even within these sciences it should be possible starting research operating with basis theories, some sort of a "hard core" which is taken for granted in constituting the premise of the research, for example human development, human learning, human interaction and interpretation, human aggression, basic social control and morality, and so on. The idea now, pointed out by Lakatos, is that hard core basic theories, taken for granted and constituting the starting point for the research, do not have to be rejected even if they don't pass empirical tests and thus are falsified in Popperian manner. Both Lakatos and most science point out that there will always exist accepted theories and hypothesizes that are not confirmed, instead rejected and falsified, but emphasizing that this does not mean we immediately are forced to reject them and turn them down. The reason for a hypothesis and theories not being confirmed often is caused by a lack of control over perhaps unknown parameters and causal relations that are revealed during *later* research, giving adequate meaning to the former rejected theory or hypothesis.

Lakatos' strategy within his research program paradigm then is to take this into account and consideration and move to step 2 in the program, constructing:

2) *A protective belt* "surrounding" the hard core. This consists of a specific *Auxiliary hypothesizes*, supporting the original hypothesis or theory, in trying to rescue it.

This may seem a little bit vague, but will be demonstrated through a significant example, even if it is taken from astronomy. Sometimes during the 19th century, between1800 and 1900, astronomers studying the solar system had found at that time the furthest away planet, happened to be the Uranus. Their instruments at that time did not make it possible to discover planets farther out in space. But knowing the size of each known planet and the distance between them made it possible, with the help from Newton's mechanic laws, to calculate and work out each planets' orbit. The problem, however, was that the furthest away planet, Uranus - its orbit - did not behave the way it should in accordance with Newton's laws. Measuring this, with the result then, that it did not confirm Newton's theory, should – in accordance with the falsification criteria – imply that hypothesizes made out of the Newton theory was rejected, and consequently Newton's theory or laws was falsified. But then, what did the scientists, or astronomers at that time do? They found, after earlier and numbers of experiments, observations and experiences that Newton's theory was that exact and brilliant that it simply *could not be* wrong. They

then decided to hold on to it and rescue it with help of a supporting or auxiliary hypothesis to the original Newton laws. This rather speculative hypothesis, that was worked out was: “If we assume a planet X placed outside Uranus somewhere, with a postulated or believed certain distance Y from Uranus and with a certain volume or mass Z influencing Uranus orbit, then this should explain Uranus orbit in accordance with Newton’s laws. The measures Y and Z was of cause pure speculations, not based on experience, experiments or observations, but just constructed as pure theory, to fit with or adapted to the Newton theory. This should be an example of, not “making the map match the terrain”, but the opposite: “making the terrain match the map”, the map being the postulated theories.

What did they do then? Perhaps *nothing* at all. They just continued working, using Newton, without further evidence. Then *later*, the found the planet Neptun, with exactly the same measures and positions, considered mass or size and distance from Uranus as expected, or presumed in accordance with the auxiliary hypothesis. (NB: History tells it was discovered by German astronomer Johann Gottfried Galle 1846, and estimated theoretical or hypothetical in accordance with Newton by Urbain Le Verrier).

This then, introducing an example of the necessity of *not* falsify or reject broad founded theories or hypothesizes out of just one or even a few tests and observations – simply because usually, we initially have no control over every parameter and data operating and influencing a certain

object and project within the research field or universe. Therefore, we should take into consideration that such unknown data may interfere with the research result, thus disturbing or disrupting the causal effect of the factors in question.

This should demonstrate an example regarding the use of supporting or auxiliary hypothesis taken from natural science and astronomy. – just to demonstrate its basic logic and premises. But we should be able to use or transfer this logic or principles to more social, psychological and health fields too. Just presenting an example: The case for *human intelligence*. (The mean score in a population is 100 IQ points- is a measure of mean itself). The subject itself may, however, be controversial. You may ask: does there actual exist a phenomenon like universal intelligence among humans? We should not draw any conclusions here regarding that matter. But suppose you are motivated doing research or make reflections regarding intelligence standard or level quotient IQ or differences among for example different ethnic groups or people. You *may* operate with or presume a sort of basic theory here – "a hard core" – saying that average IQ between different ethnic groups, all over the world or among such different groups within a larger culture or civilization, they all being humans, may be equally equipped concerning intelligence, meaning should be at the same average or mean. But then, when trying to confirm that hypothesis, for example measuring and comparing the IQ between black and

white people in USA – which has frequently been done – or other places, you may find significant *differences* between the two groups, mostly in favor of white people, making some assertions that intelligence lies in biology and the genes of ethnic groups or "races", and should never be changed. You may also compare other ethnic groups, white, Asians, Africans, and so on, finding significant differences here too. Then, do these differences imply that the hypothesis of equal IQ scores or intelligence level between different ethnic groups - the rather "hard core" assumption that there being just one and only one type or level of intelligence for every human group or culture - are falsified and have to be rejected? Not necessary! Usually, you will find the initial hypothesis so valuable or useful, and in many situations correct, that you should wish to protect it; which will be done by making a "protective belt" made out of different auxiliary hypothesis. These for example being:

Different supporting or protecting hypothesis saying that there exist distinct historical reasons for the group- or culture-based differences in IQ, for example that marginal groups have been kept down, not been allowed good jobs, education, so on, been kept in poverty, influencing their abilities to achieve or perform on IQ tests, or so on.

Here we also should pay attention to the so-called *Flynn – effect* (named after the philosopher or political scientist James Flynn) saying that intelligence levels in a certain population should have a tendency increasing over time, when the culture develops culturally, economic, educational

and so on. Then: Potentially you will be able to defend the “hard core” idea or hypothesis that all ethnic groups and cultures having the same potential for intelligence; it is just the specific social circumstances intervening and operating, temporarily preventing this. Circumstances that should and will change in the course of tima.

Another such supporting hypothesis should be saying that the IQ test themselves are not neutral, but are constructed on basis of white, western, middleclass values, not necessary reflecting problems and basic perspectives in other cultures; perhaps making it difficult for members of these cultures to perform adequately on western-like intelligence tests in gaining high scores.

But remember: It should never be enough just to accept one single auxiliary-hypothesis, how excellent and brilliant it may seem. Next, this hypothesis *too* has to be tested out- with the risk of this again being falsified. We should have no guarantee it being confirmed or say, representing the truth. In the end, if all the auxiliary hypothesis trying to protect the “hard core” is being dismissed and rejected, the hard core itself should be declared “degenerated” and will have to be dismissed, according to Lakatos.

Introducing Post-Empiricism

Till now, Philosophy of Science itself has been demonstrated a rather objective affair, meaning the case perceiving, handling and managing reality and data, has assessed or identified them "outer" objective matters. The problem, or the way to reach knowledge and understanding, has been finding the best way to test out the data reflecting this reality. We have not questioned the very *nature* of this "outer" reality or empiricism itself, just tried to *uncover* it.

But within these positions, *objectivity* rules, meaning you should use *empirical* methods, among others, statistics, to uncover, say health problems – for example connections between social status and health. Variables and data should be expressed by *numbers*, meaning representing neutral, objective phenomena, which may be manipulated and measured statistically.

Anyway, now we have reached a great watershed or divide concerning our very understanding of that outer reality. This divide position in Philosophy of Science is often named *Post-empiricism*, exceeding empiricism itself, meaning don't taking outer, direct experiences and data as objective facts for granted. Instead, they *question* the very status of empirical facts and postulated theories asserting there should exist an outer objective reality we through daily experiences and

scientific methods are able to perceive and grasp – the way they really exist.

Instead of trying to uncover objective empirical fact, presuming that human perception and experience are basically objective, perceiving the world as it "really is" and giving access to the "real world", post empiricism often question just this, instead asserting that human perception are never neutral – but instead always *interpreted*. In fact, *interpretation* itself precisely represents the *human* way of perceiving and experiencing the world, particularly our *social* world, other *humans* and *human relations*.

We should find or uncover a number of schools and traditions here, often of different kinds, but simultaneously sharing some basic features or traits.

A few of the most prominent schools and traditions here should be: *Thomas Kuhns theory of Scientific Revolutions and Paradigms*, *Phenomenology and Hermeneutics, and Constructivism.*

We shall dig a little deeper into them for a while, but let's first introduce the philosopher *Norwood Russel Hanson*. In 1958 he published a famous book: "*Patterns of Discovery*", where he asserted all human perception being "theory loaded". In fact, there exist no way we could possible perceive the world as neutral. We always see it "as something" – meaning we are forced to make certain interpretations of it the moment we perceive it. He

demonstrated this by presenting some ambiguous pictures or drawings, demonstrating that neutral or objective perception being impossible. Different subjects always interpreted them qualitatively different when having them presented. The point here should be, the drawings themselves being ambiguous, leaving it to the subjects' own interpretation to decide what the figures "really" show, or what kind of "meaning" or significance one should give them. Thus, perception should not be neutral, reflecting the world objectively.

This should be the main point concerning different versions of post-empiricism: There exists no neutral, objective truth to discover or uncover. All knowledge we being able to discover and acquire should be *interpreted* knowledge.

Below, we shall have a look at a few significant theories within this tradition or way of reflecting, specially:

Thomas Kuhn and the theory of Scientific Revolutions and Paradigms

Phenomenology and Hermeneutics

Constructivism

In addition, we'll take å look at two specific traditions, representing a reaction to and critique of these, of course, not falling back to the position of empiricism:

Realism and Pragmatism

Thomas Kuhn

Thomas Kuhn reached much fame for his perspective or theory concerning scientific development and progress. He wrote the perhaps most famous book ever in Philosophy of Science: “The Structure of Scientific Revolutions”, 1962, with a 2. ed. in 1970 holding an important Postscript, aiming at making it clearer or clearing up what a paradigm exactly *is*, which remained vague in the first edition.

Usually scientific progress had been regarded a neutral objective process, developing through the accumulation and progress towards gaining more and more knowledge.

Kuhn’s perspective represents a break with this way of thinking. Science and scientific progress should *not* be considered a rational process. Instead, it involves and should be the product of many factors, including social, historical, ideological, psychological ones, and in addition - specific personal, career-oriented elements. This makes it impossible to compare, say measure two different perspectives of science up against each other, because no objective measures, standards or comparison exists or *can* exist. The different perspectives or models of science instead should be characterized as *incommensurable*, meaning making it impossible to decide which should be best or “worst”, because this implies some outer neutral objective standard to measure them up against. The different perspectives then, in

a way seem to live in “different worlds”, with their own standards, their own ways in understanding science, and so on. Personal interests, ambitions and careers also become significant, out of the importance of identifying with and in defending the “right” and dominant scientific position.

Historical, social and personal factors concerning reality defines what science is and what it is not. Thus, science, according to Kuhn, is not primarily a question of accumulation of, say neutral knowledge and understanding – it is a competition between different schools and traditions, where the winner, the specific school, tradition or frame, gets in the position of defining science and in fact the world itself, representing what becomes the general accepted theory(ies) and methods.

Kuhn named these different accumulations or collections of ideas and perspectives a *paradigm*. And he asserts that scientific progress and development take place through - not neutral accumulation of knowledge - but instead through competition between qualitative different ways or kinds of thinking, reflecting and in fact doing science. It is said that the paradigm, the specific way of thinking and doing science that has the best ability or way of explanation; the paradigm being able to explain perhaps more than the other paradigms, will be the winner. This paradigm then, decides which data are legitimate, what methods are to be used - each paradigm representing its own logic.

The point then, should be that the winner will exclude all the other paradigms. There will be no place for them in the

scientific and academic world, and they will be regarded or considered “pseudo-sciences – not real sciences, rather pure speculations.

Each paradigm runs through several different stages, from “birth to death”, then taken over by a new paradigm, better fit for understanding and dealing with the world and scientific problems in question. This transition from one paradigm to another, is often named a *scientific* or *paradigmatic revolution*.

Usually, we should operate an overview and description of the significant and qualitative different stages in work:

STAGE 1

There exists a pre-paradigmatic stage were no paradigm has been constituted or reached dominance. There exist no rules for what science should be, and there exist some open competition here.

STAGE 2

A certain paradigm is constituted and generally accepted. Agreements of how the world is to be understood and exactly what science should be.

Here we should experience a growth or accumulation in academic work, courses, education, production of textbooks,

scientific journals and literature, academic positions and so on.

STAGE 3

A period of so-called *normal science*. This is the regular science work or activity phase, using accepted methods and theory, doing so called “puzzle solving” – working in accordance with the accepted and dominating paradigm. This includes working with well-known and accepted problems and believed solutions. Other opposing paradigms are not considered; their supporters or followers are not offered positions or being accepted in academic journals and so on. Proponents of the paradigm in position will usually claim to the accepted theory and not accept other results and perspectives in understanding and doing science. This, according to Kuhn is above all a *social* process, and a matter of personal interest and prestige and academic positions regarding the dominant proponent of the paradigm. Remember Semmelweis’ destiny when he challenged the established medical paradigm at his time understanding fever, and specially the medical establishment who had built their whole carrier on the already exciting and accepted medical science before Semmelweis.

STAGE 4

A so-called *anomaly* arises when one or numbers of unexpected research results appear which is not in

accordance with the existing paradigm, theory or earlier confirmed research and experiences. The anomaly itself cannot be refused as some accidental event, and it cannot, it seems, be solved within the existing dominate paradigm. It continues to assert itself; again and again.

STAGE 5

This opens up for a period named a *crisis* for the paradigm in position; during which problems cannot be solved within the old paradigm' methods and where new approaches, theories, ways of causality and methods become necessary and are finally permitted.

STAGE 6

One or more of these new approaches can prove successful in solving the problems leading to crisis for the old dominate paradigm; then leading to a "paradigm shift" or precisely a "*scientific revolution*".

STAGE 7

The new paradigm constitutes itself, meaning that new ideas, methods, textbooks, courses, etc. are introduced. A new standard for scientific work is constituted and we are into a new phase of *normal science*.

Kuhns' arguments and theory above all, are taken from the natural sciences, which by him is regarded the only "mature" sciences because it has developed some sort of unified paradigm – universal way of thinking or reflecting – that counts for the whole science. This in contrast to, say, human and social sciences, demonstrating their immature nature, being split up in many different models, theories and schools of perspectives and explanations. For example, sociology, split up in macro- vs micro- explanations concerning the same matter or question: What constitutes the society? Psychology split up in lots of schools – for example behaviorism finding its basis in open behavior, psychoanalysis on the other hand, having its basis in drives and repressed "inner" feelings or emotions and humanistic psychology focusing on personal "growth" and self-realization or self-expression.

Kuhn asserts that different paradigms are incommensurable – meaning they can't be compared or measured up against each other, which, for that matter, should mean or presuppose demanding and introducing an outer neutral objective standard to measure them up against, concluding which is the "best" regarding the problem in question. This begs for *relativism*.

However, there exist a problem here. If a new paradigm are able to solve more problems or problems better than the old paradigm, then an objective standard are in fact set. Then, no relativism exists. Kuhn himself denied he was a relativist, but at the same time asserting that paradigms were incommensurable.

There are probably many examples of dominating paradigms, denying alternative ones to come into position, and in addition, at later stages or phases, new paradigms challenging and replacing old ones. In medicine for example, the most outstanding example is the case of *alternative medicine*, also known as *naturopathy,* which is not accepted within the dominating or prevailing medical science – all rough the alternative medicine sometimes apparently comes up with good results concerning recovery, for example using acupuncture. But the theory and explanation behind, for example referring to blocking of energy flood and so on, is not accepted and has not been found valid by scientific accepted methods.

But wrong theories can lead to “right” results, meaning result concerning recovery.

On the other hand, “right” theory sometimes will not be confirmed or verified. They say Copernicus theory of the planets orbits was falsified for 100 years before it was proved right.

Phenomenology and Hermeneutics

We now turn to *phenomenology and hermeneutics.* These positions seem copying or joining mostly the same logic as for example Hanson and Kuhn, but still represent their own tradition and way of reflection. Further, hermeneutics and phenomenology are deeply interweaved with each other, and by some observers the same philosophers are regarded as respectively or both hermeneutics and phenomenologists.

Phenomenology originates from the philosophy of Edmund Husserl. It arises out of so-called *intentionality*, founded by Franz Brentano. Intentionality means that human mind always is "intended" - meaning it consciously and intentional is directed *towards* something. We never perceive something neutral; we always give it a certain meaning. This of cause stands in opposition to classical empiricism. Empiricism may *describe* phenomena, but cannot *explain* it; meaning giving it a reasonable meaning and understanding. Brentano's view should be that the mind itself is in need to explain things. There exists no explanation by neutral referring to matters and things, as perceived by itself. For Brentano, intentionality is a property of mental states. The point here is: What is psychological relevant and meaningful concerning the mind and the subject in question? *Not* what might be social right and relevant in the objective manner. The mind's intentionality may be about proper things, but may also deal with imaginations, phantasies, etc. This will be of importance,

for example in psychiatry, say regarding illusions, paranoia, psychoses; in understanding the patient's experiences, regardless of them being in accordance with outer reality. This principle should perhaps, and is often named "solipsism", meaning the only matter that could stand as true, is the mental reflections of the subject's isolated mind. A more systematic method here used by phenomenologists is named "bracketing" or perhaps "epoche" – meaning consequently putting reality in a way "in parenthesis" - meaning not taking notice of reality aspects with say, a patient's social status, position and surroundings.

Hermeneutics itself represents and old tradition and in fact a program and method for *interpretation* and *meaning*. In the beginning, hermeneutic should be considered a pure method for interpreting texts. The starting point being: What was meant or intended from the writer's point of view with the text in question?

Today, hermeneutics represents an important reaction and alternative to empiricism, or empiricist science, occupied not just with texts, but also with human subjects as such, social matters and cultures.

Original hermeneutics, named "the art of interpretation and meaning", was occupied with interpreting bible-texts and other literary texts. For example with Bible texts: "What has God meant by the following bible quote", and so on.. .

Later, through modern times, hermeneutics became the tool for interpreting humans, individuals – presupposing humans existing and given the status as so-called significant creatures, creating their own meaning while living. Asserting: “You can’t objectify humans”; meaning not understanding them from outside by neutral criteria like the empiricists did. Instead, you will have to interpret and understand them on their own terms.

Hermeneutic became significant in understanding foreign cultures, which in turn had to be understood on their own terms too, not by universal objective standards. The often different customs and rituals we may be observing by comparing these different cultures, tells us that there often are few neutral phenomena and data, but instead local customs giving meaning to the members of the local culture in question. What seems normal in one culture, thus may not be in another.

The keyword here being *meaning*: Something or anything itself being *meaningful* exclusively connected to, or in a context or “field” of relations to meaning-status of other objects, phenomena and humans. There is no such thing as a neutral, objective autonomous element standing outside relations – and meaning - itself.

Two main positions can be detected within hermeneutics. First those who understand and use hermeneutics as a mere *method* for understanding and doing research on humans, human relations and social factors; and second – the most fundamental – those who asserts hermeneutics, not an

outside and limited method, but a human condition itself, a fundamental way of living. Also characterized as a universal or *ontological* hermeneutics concerned with the rather fundamental mode of human existence.

Earlier hermeneutics philosophers, like Friedrich Schleiermacher and Wilhelm Dilthey, stressed the fundamental ontological difference between the nature- and the human-sciences. Dilthey himself declared: “Nature we *explain*, but the human we *understand* (meaning: interpreting)”.

But a fundamental, *ontological* hermeneutics, represented by Martin Heidegger and his student Hans Georg Gadamer - representing a so-called “*Dasein-philosophy, /”Being” or “being there” (in the world)* asserting that we always *are* or *exist in the world*, in a context of meaning and relations; unable to take an objective, position in analyzing phenomena neutral in the way nature sciences demand - reject this differentiation (between nature and the human), stressing that every or both phenomena – nature *and* man, (meaning every human) – are interpreted from the very start. Everything then, are original interpreted and constructed – (something we will return to later – specially dealing with the theoretical position *constructivism*).

One way of demonstrating this then, is by use of the famous, so called *hermeneutic circle*, by many stressing that perhaps “hermeneutic spiral” should be a better characterization. Mainly because we here, unlike a “real”circle, never reach the starting point again.

Pre-assumptions here should be:

1. No information or human experience stands at the outside as neutral and objective. Everything, every data and knowledge are basically *interpreted*, within a distinct frame of expectation from the perceiver, meaning the subject or individual's point of view. Neutral observation, registration and perception is impossible. Everything is interpreted from the start, because this is the nature and logic of humans always "being in the world", being a part of a social reality or community. There is no neutral "Archimedean point" outside this reality which explains objectively. Words, phenomena, etc. only gives meaning within a certain context.

This should be named or characterized: the"*Whole","Frame"*

or "*Totality"* condition or dimension.

2. When perceiving and experiencing certain single occurrences, these are interpreted within the established frame – the totality - but *next* gives birth to a new or changing - or expansion of the already existing frame of interpretation. This is important: Meaning or having the consequence that nothing remains unchanged. Human lives are always synonymous with development and *change*. We are never able getting back to some "starting point"

This second phase representing the *"Part"* or "*Particular"* within the "circle".

3. The consequence of this should be a *new* frame of interpretation being established, giving meaning to the subjects' new perceptions, experiences, representing a qualitatively new *totality* or *whole* of frame.

4 Witch in turn make way for qualitatively new experiences and interpretations, represented at the *part* or *particular* of the "circle".

Of cause, this more remind us of a spiral with qualitative new stages, instead of a circle repeatedly going back and forth concerning the very starting point.

However, considering the hermeneutic circle as a perpetual wavering between the *whole or general* and on the other hand the *part or particular*, *should* possibly be regarded a "circle move"

Note that classical phenomenology, although by some regards are related, stands in contrast to the ontological hermeneutics represented by Heidegger and Gadamer; the last mentioned stressing the fundamental stand of "man being in or within the world, or part of the world as the certain basis of human life itself. Heidegger, being a student of Husserl, broke with him and his traditional phenomenology, with its focusing solely on the isolated mind

and experience – his bracketing; instead asserting that man himself should not be understood as the isolated mind (isolated from the world), but instead, on the contrary as *always being in the world*, for example meaning different cultures, different changing historical circumstances and so on.

Constructivism

In fact, Heidegger's view makes way for a basic or fundamental modern *constructivism or social constructivism*, saying there exists no objective reality outside the actual world people live in, giving them meaning and knowledge. Knowledge then should not be considered *objective*, but instead *constructed* in accordance with the world and the very reality people live within. A reality that is always social and *historical* constituted and constructed. This superior view, that no knowledge, it being "everyday" ordinary or scientific, should be regarded or understood as objective, but are always made up, constructed by changing social and historical circumstances, making way for a basic *relativism* or social and individual constructivism.

The idea of constructivism in fact goes back to the 18th century and the great philosopher Immanuel Kant. He asserted that man should not be capable in perceiving or grasping outer world as "it really is". Instead, as humans, we are only capable in perceiving it in certain respects, more specific; designed to perceiving it through special and fundamental mental *categories*, like *time*, *space*, *reason*, *causality*, and so on. We then construct reality in accordance with these categories. However, in what way the world *really* exist, should be beyond our understanding, meaning: human knowledge. For Kant then, there exists a fundamental distinction of what he called "thing-in-itself" ("das ding an

sich") – the postulated real life and, on the other hand, "thing for us" ("das ding für uns") – the way we are in need to perceive the world through our categories. These categories then, which nature has equipped us with, are constructions, which we in fact are forced to perceive and experience world matters through.

Recent constructivism however has, to a considerable extent, left this individual perspective concerning the construction of reality, and instead turned to *social*, *historical*, *political* and *ideological* factors explaining how constructions are made and come to work. The basic idea should be that our way of perceiving things, our concepts, ideas, words and categories doesn't *mirror* or *reflect* reality, but instead are *constructed* by us out different *ideological* and *social* reasons. The proof or evidence for this should for example be the fact that the very categories, the concepts, words, explanations we use in understanding both daily and scientific matters, significantly *change* in the course of time; as times passes by. What might be "true" today, should not be tomorrow. A striking or convincing example should be medical and psychiatric diagnosis, which from the very start we actually know will eventually change, or perhaps rather consecutive changing.

Now, there seems to exist different kinds of constructivism: The most important maybe, should be the division between *strong* and *moderate* constructivism. Strong or *radical* constructivism asserts there doesn't *exist,* nor *can* exist *anything beyond* constructions and language itself. *Moderate* constructivism on the other hand, admits that there is or may

be a real world behind the constructions itself, but that this itself should only appear available or accessible through constructions, not directly through empirical perception and experience. Some moderate versions will admit there is a "real world" behind the constructions, but usually will deny the possibility of getting access to it. They will deny the criteria of both *truth* and *correspondence* regarding human knowledge (meaning there being an accordance between concept and empirical reality). In fact, we never reach the point perceiving the world directly, as it "really exist". There exists no correspondence between the concepts and theories we use and the real, objective world – according to this position.

Constructivists, at least a few of them, for example deny that there should exist such a thing as mental illness. Official descriptions of this, for example *diagnostic* categories, claiming to be objective, is, according to constructivism, nothing more than ideological constructions, originated from the community's own needs to categorize human problems and relations in specific ways for ideological and power reasons and motives. In other words: They represent the society's motivations for social control over its members. They are not mapping devices for a real-existing reality. These constructions can and will undergo changes over time, due to changing social and ideological circumstances, but in the bottom lies the idea that *illness* and *psychiatric* problems don't exist as individual objective conditions.

Realism

There exist, however, certain reactions to the constructionist-movement and its way of explaining knowledge and truth. One of the recent and most significant critiques has come from so called *realism*. Realism in fact exist in many version. Basically, it asserts there exist a "reality" which in addition, is open or accessible for knowledge, understanding and uncovering. This should be in opposition and contrary to constructionism witch just asserting that true reality should *not* be available for uncovering, knowledge and understanding. One version of realism being in fact *empiricism*, being dealt with and discussed earlier, which is based on experience, devaluating the importance of theory and causality, or casual explanation, thus presupposing a *real* world of objectivity being possibly reflected in the direct and immediate manner. The new or more advanced realism, however, asserts that we can use theory to get access to reality by uncovering and explaining it by theory and causality. Thus, theories are not mere constructions with no references to realty, as constructivism asserts. They are significant tools in uncovering and understanding reality and thus has reference to reality itself. This rather new and interesting realism today is therefore the variant that is built upon and include theory in its very concept. Here too, we may experience several variants. A significant version in my opinion should be a so-called *transcendental realism*,

meaning we may find truth by going beyond the more direct and immediate experience a “practical” empiricism itself is built on, and seeks truth by going *beyond* this and rely on finding underlying structures being formulated by theoretical concepts and theories. The concept “transcendental” itself in fact also was derived or taken from the philosopher Kant and here referring to the very matter, conditions and reality beyond the limits of human consciousness and experience.

This version concerning the realism movement, in particular has its proponent in English philosopher Roy Bhaskar. He starts out with the following condition or argument:

Science exists, and it exist just because there exists an independent and structured world to operate on, to carry out science on. A world it is possible to reveal or uncover – by science. Or else science itself should be meaningless.

This leads us to analyzing reality and realism along three levels or premises:

Premise or Level 1: You’ll have to presume or presuppose an *existing* world *independent* of humans and human consciousness. At this level there should exist no need of any knowledge concerning *how* this world looks like or really is structured. This should be named or characterized an *intransitive* level, due to the fact it doesn’t claim any specific knowledge considering the structure of this world. It’s only premise should be that the world exist independently, beyond human consciousness and reflection.

Premise or Level 2: You should presume that this world holds or owns a *distinct structure not* made up, formulated or theoretical structured by humans. It is, like level 1, just a premise saying *how* this world exist; what it really *is*, independent of us. However, this premise includes *some* knowledge concerning this structured world, about certain laws of nature; for example that gravity power exist, that biological development exist, and so on. The very claim concerning *distinct* knowledge will be stronger here than at level 1. Realism at this level 2 will entail or involve level 1, but not the opposite or other way reversed. This level too should be named or characterized an *intransitive* level, due to the fact that its only references should be to conditions which exist independent of humans.

Premise or Level 3: This level of realism will include the belief and assertion that certain groups, classes and categories exist and that these could and should be formulated by scientific language, by concepts, theories, hypothesis', models of causality and so on. The idea or premise then, should be that these theories, concepts, etc. could and *should reflect reality*. Here we may observe the fundamental difference between realism and constructivism, were the latter precisely *denying* that theories, concepts and science itself can reflect and represent reality. Instead, realism's premise is precisely that theories, science, being able to – and consequently *will* - reflect reality. Realism at this level should entail or involve level 1 and 2; but not the opposite or reversed will be the case.

Contrary to the two preceding levels, this 3. level should be named or characterized *transitive*, because it is operating with and explaining realism and reality by *theoretical constructed* concepts, which can, or *will* change and being reformulated in the course of time. The fact that concepts and theories, meant to reflect reality, will undergo changes, however, does not mean they are unable to reflect this reality. In other words: It does not undermine realism itself. But the fact that theories, models, paradigms change, should mean that this level of realism - based on explicit theory - must be transitive, accepting that the very formulations of reality itself changes, undergoing transitions and changes. Theories may prove wrong for several reasons, but if you are able stating, or establishing that some theories should be *wrong*, then you have simultaneously or logically stated that something – on the other hand - should or must hold the status of *truth* or *right*.

My own point of view, or say my own perspective here, should be in accordance with the idea that might be named or characterized a so called “analogy of glasses”, more specific: “analogy of lens of glasses” where concepts and theories should be seen, or rather imagined as glasses with different levels of adaption and adjustment; where again the glasses or lenses representing the best sharpness or reflecting the world most precise and accurate, and those lenses with bad sharpness reflecting it with weaker sharpness – both *still reflecting reality*. The same goes with the relation between good and weaker theories. According to realism, all theories – good and bad ones – always reflect reality, the one way and

another. Logically, dealing with some bad or wrong theory always presupposes another better or “true” theory; otherwise, it should be quite meaningless characterizing the bad theory “bad” in the first place.

A consequence of Bhaskar’s theory of science, or philosophy, asserting there exist real and independent structures in the world, behind the surface, but available for revealing or being uncovered by scientific work, should be that he introduces a “depth-realism” in 3 stages, or more correctly: *Levels*.

The first, and deepest being the “real” level, representing the underlying structures and mechanisms, the casual factors underlying a phenomenon; not direct available for conscious knowledge. (for example underlying drives according to psychoanalysis)

The second, called the “actual” level, representing mechanisms and phenomena, not necessarily available for instant experience and knowledge, but may be available through research and scientific work. (for example aggression – just actual, because it may be disturbed or “drowned” by other stronger factors operating on the same matter – for example strong socialization inhibiting the primary drives and urges to demonstrate aggression in the first place).

The third, called the “empirical” or “manifest” level which we openly and instantly perceive and experience. (for example violence and anti-social behavior).

Pragmatism

Another, relative recent theory trying to explain reality itself, and being situated somewhere between or at the point of intersection between realism and constructivism is that of *pragmatism*. Originated from philosopher Charles S. Peirce, holds that the realism or "reality-potential" of theories, the very criterion, should *not* be they being absolutely true or not, but instead their *usefulness*. If a theory shows useful in *explaining* matters or useful concerning *intervening* with reality, meaning: should be used in solving different tasks and problems, then it holds a certain value of truth itself, for example using physical theories when sending people to the moon, using a specific theory when doing psychotherapy which have proved effect, medicines and technical procedures that cure medical problems and so on. For example, the question concerning psychological theories when doing therapy may not be whether they should be considered essential true or not, but whether they, the one way or another, being useful in solving (clinical) problems. Pierce added a third factor to the classical methodological dyad *induction* and *deduction*, mentioned earlier; namely that of *abduction* – meaning *not* starting with induction (collecting empirical data) or deduction (doing logical conclusions) but contrary: with abduction, meaning starting with a preliminary or tentative theory, in order to achieving instant meaning out of experiences and empirical material. The point here should

be employing the theory as long as it proves useful explaining matters, but on the other hand being in position of making a switch over to another theory later if this new one should prove even more useful or given better understanding. Pragmatics imagine we never reach to the level of a “final” true theory explaining the world and totally representing reality; but instead insisting that all explanations and theories being determined to change during the course of time and history, as history and reality itself changes.

There are a few prominent theorists or philosophers who should be associated with pragmatism and perhaps some versions of realism. Hillary Putnam uses a so called “argument of fruitfulness” which means support or approval of the best available *explanation*, the one that explain the phenomenon in question best. The fact that some explanations works better than others, should prove that something *exist* and *function* (the realist argument).

Ian Hacking, on the other hand, uses a so called “argument of intervention”, meaning if a theory should be *useful* in getting something *done* or *handle* and *solve* specific *cases* and *problems* successfully, this means something must *exist*. (the realist argument).

Evaluations

It seems important to keep in mind that Philosophy of Science itself doesn't represent or constitute a certain *theory*, instead it constitutes a certain *meta-theory* or *level* – meaning: "a theory of theories itself. The consequence of this *could* be that the different perspectives or positions should, or in fact *could not* possibly be evaluated against each other, simply because their object for research and reflection, their basic matters, not being identical. For example: The position of *empiricism* is dealing with overt and neutral experience and knowledge and – on the other hand – hermeneutics addresses itself to "inner" reflections and interpretations.

However, some conclusion concerning comparison and relevance should be made. To a certain extent, this could be done introducing or making use of a perspective of "time" and history, thus implicating the logic of development and progress. The position of logical empiricism when being introduced, obviously represented a progressive step concerning systemizing of data, meaning the whole field of phenomena constituting the world or reality itself, this representing the very object of empirical scientific research. However, empiricism itself had focus on and naturally was restricted to registration and systemizing overt and believed neutral data. Scientific work is still – to a considerable extent - operating on such assumed

objective terms, for example through broad and extensive epidemiological studies, based on statistic methods.

However, in recent years – in the course of time - certain reactions toward this apparently unproblematic objective perspective or “cosmology”, due to a perhaps natural development of philosophical and scientific progress, was challenged by theoretical positions asserting that the assumption that human perception itself being basically objective and neutral, perceiving reality as it “really” is, thus giving us access to the “real world”, should not be considered valid. Instead, these qualitatively new positions insisted on the statement that reality always appear as interpreted instead of neutral and objective; thus clearing the way for a broader and more nuanced picture of both reality and the very objects of research itself. In addition, it opened for a focus, not only on “outer” perceived and believed neutral phenomena and data, but also on the “inner” individual “realm”, like human psychology, interpretation, motives, emotions, etc. – in addition to human relations and interactions. This, in turn made way for methodological development, including so-called qualitative research. The fact is however, that the different positions in my opinion doesn’t exclude each other, instead supplying or completing each other, thus broaden the very field of research and science itself.

This theoretical turn towards a more interpretative and qualitative (instead of empirical quantitative based) position again made way for a stronger interest and focus

on mere relativistic philosophy, ending up in constructivism and so-called “post-modernism”. A reaction to this way of understanding reality, and not least science and philosophy itself, should be the position of realism, making theoretical objections to constructionism and its premise saying no objective or real understanding should be possible.

However, we should perhaps realize or accept that reality itself holds or should be interpreted in both objective and relativistic manners; thus making the most complete understanding concerning this reality available to us.

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