

Pstružina Karel: Scientific Methods as Reference Tools of Mind

Key words:

Scientific Methods, Observation, Structure of Mind

Abstract:

My intention is to offer for recognition view on scientific methods as the top result human mind and look for how something such like scientific methods are present in our minds. It means I would like to trace down objective processes that are carried out when scientists work.

They are several windows by which we can penetrate to our mind. We use the language as such window mostly; next window is neurophysiological approach; we can investigate the mind through artificial intelligence, too; etc., but I offer a proposal to use scientific methods as a window to mind. I hope it could be useful for specification the terms thinking as well as the consciousness.

I would like to begin my attempt to show what I have in my mind on the example scientific observation. But the same window to mind could be opened through all scientific methods, not only through scientific observation.

If I want to give an answer then I must investigate the process scientific observation at large and through that I can explain the operation of thinking, too.

Thinking makes not only matching and associative linking to other intentional contents of mind and evaluation of them but also thinking is still focused on the result of observation.

I infer from that several conclusions that will be in center of my contribution.

It is not long time ago when I red the book: The Nature of Consciousness¹ edit by Block, Flanagan and Guzeldere. One section of this book has topic: Consciousness, Science and Methodology on which participate: O. Flanagan, A.I. Goldman, P.S. Churchland, D.C. Dennet together with M. Kinsbourne, N. Block, and R. Van Gulick.

I do not tell about to see you that also in Czech Republic such books are red, but because I think there are many issues in methodological questions especially how we can study the consciousness and what the methodological approach could be appropriated for scientific investigation this very specific phenomenon.

I do not want to quote from this book, too. At the section on the methodological approach is stressed the quarrel between follower of top - down versus bottom - up approaches. These debates are very often perhaps because the methodological approach determines the result of research works as methods usually do.

W.H. Calvin makes such remark on this theme:

*We've actually needed two metaphors: a top-down metaphor that maps thoughts onto ensembles of neurons, and bottom-up metaphor that accounts for how ideas emerge from those apparently chaotic neuron ensembles. But the neocortical Darwin Machine may well do for both metaphors – if it really is the creative mechanism within.*²

My intention is to offer for recognition something else. It is to turn round the view on scientific methods. It means to do not look on the scientific methods as staring point of scientific work but as one of the top result human mind and look for how something such like scientific methods are present in our minds. It means I would like to trace down objective processes that are carried out when scientists work.

They are several windows by which we can penetrate to our mind. We use the language as such window mostly; next window is neurophysiological approach; we can investigate the mind through artificial intelligence, too; etc. but I offer a proposal to use scientific methods as a window to mind. I hope it could be useful for specification the terms thinking as well as the consciousness.

Of course from the methodological point of view if we want to trace down the thought's processes through functioning scientific methods we will be on position top - down methodological approach. But for my opinion such speculation is legitimate because the scientists for example neuro-physiologists

¹ The Nature of Consciousness, A Bradford Book, The MIT Press, Cambridge, London 1997, pp. 95 - 181

² Calvin W.H.: How Brains Think New York, BasicBooks, 1995 p. 150

must know what they are looking for. Speculation is useful and scientific means if it is based on scientific findings.

(What are they the scientific findings that we can consider as a solid base for speculation about our minds?)

I think they are:

- *Consciousness cannot be localized at any place in brain.*
- *Consciousness emerges from the modular structure of brain*
- *Consciousness is not unit entity but it is entity world)*

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What are doing scientists during scientific observation?

Every observation especially scientific observation needs the object that will be observed very purposefully and with concentration; and scientific observation must be systematic and planned, too.

I think concentration on object is very important because we can trace what our thinking is doing when it is concentrated and when it observes some phenomenon.

Thinking receives stimuli and thinking links them in association with some intentional content of mind during every day observation. It is very common that percepts are evaluated and thinking can stray us far away from the observed object very often. Object then fade out and intentional content of mind can be dominant. But during scientific observation it is by another way. Thinking receives the stimuli and thinking inclines to association, too. But concentration forbids to thinking in wondering and it focuses thinking in object still and still.

What does it mean?

They are three way of explanation for this phenomenon at least:

- Thinking is split into two streams;
- They are higher mental functions that are able to govern thinking; (at this concrete example it is concentration;
- Thinking is able skip over from one object of attention to next one.

What is it my position?

If I want to give an answer then I must investigate the process scientific observation at large and through that I can explain the operation of thinking, too.

The scientific observation differs at several aspects from our everyday observation. They are:

- The everyday perceptions are circumstantial and the mind evaluates them from the different point of view. In contrast scientific observation is pre-planned and focused on the part of reality.
- Scientific observation has scenario and the results are interpreted through the presupposed hypotheses.
- The results of scientific observation confirm or disprove the neuro-modular picture of world.
- If the neuro-modular picture of world is confirmed then the results of scientific observation can generate explanation power of theory.
- If the results of scientific observation disprove the hypothesis about object then reconstruction of neuro- modular picture of world begin, it means neuronal circuits and modules must be modified.

It is point when I would like to make the notes to modular organization of brain (and perhaps the mind, too).

M.S. Gazzaniga refers by such words about modularity:

*... the brain is organized in terms of modules. The idea of modularity is central to modern cognitive neuroscience ...*³

They are many metaphors by which the authors render the modular brain's configuration:

- Patchworks
- Tales
- Mosaics
- Etc.

For my opinion they are plane level metaphors. I offer spatial sequence metaphor of matrjozka or Chinese's boxes.

³ Gazzaniga, M.S.: Nature's Mind: New York 1992, Basic Books, p. 121

What do I mean?

The matrojozka or Chinese's boxes demonstrates plasticity mental representation of world. The matrjozkas or boxes are encapsulated and they create the very structural mental organization that is exploited by thinking during observation. Some of matrjozkas or boxes represents intentional content of percepts. Another of matrjozkas or boxes represents hypotheses about our expectation how the reaction of object will be. The contents of another matrjozkas or boxes then include associative content of mind. The associations are connection and communication among matrjozkas or boxes based prevailing on the footworn connection in past. Hebbian learning rule is essential here. But perhaps harmony in oscillation may play the role, too. And by such way the new association can come into existence.

Thinking makes not only matching and associative linking to other intentional contents of mind and evaluation of them but also the thinking is still focused on the result of observation. It means some of matrjozkas or boxes must include states of mind that allow something such like directivity.

I infer from that such conclusion: the consciousness is not unified and it is not integral. Consciousness is very modular and disposes by different functions. The directivity or focusing on is one of them. But they are another modules that include the motivations, plans, purposes, awareness operations of thinking, etc. It means consciousness is divided into modules that are enable to control and to govern to scientific observation by involvement some of its substructures.

And second conclusion is: Thinking is perpetual stream; it is movement that is able to absorb intentional contents of modules and to match them together. Some of the modules and their contents are privileged and such modules have influence on the movement of thinking they determine what thinking will be doing.

In the case of scientific observation such privileged modules will be:

- Focusing on;
- Purposes; and of course
- Awareness of percepts and their matching with expectation.

Modular structure of mind is enabled to explain why some of modules (matrjozkas or boxes) are privileged. It is for my opinion therefore, that scientist must know what he or she wants to see or find out. It means, scientist must dispose by some imagination about reaction of object in determine conditions. This imagination is in mind of scientist before observation. It means scientist disposes by hypothetic model of object's reactions that is present in mind before

observation or experiment. Such imagination is based on the perpetual activity of neural circuits that are focused by habituation on expectation what will be next event. And scientific observation only makes proof that our expectation has been good or wrong. It means thinking is generated and thinking rushes on reality of the world with some presuppositions and tests its hits rate.

It is very similarly how K.R.Popper wrote about:

*Theories are nets cast to catch what we call “the world”: to rationalize, to explain, and to master it. We endeavour to make the mesh ever finer and finer.*⁴

And it is especially perpetual activity of neuronal circuits that guarantee privileged position these matrjozkas or boxes of expectation and purposes in the structural movement of thinking. These neuronal circuits are active still during scientific observation.

If I return to explanation of my position now then I suppose that the thinking works in parallel operation, it means thinking is split to several streams despite of fact that we are aware only one of them at every moment. Very similarly we can exploit another scientific methods to the investigation of mind.

⁴ Popper, K.R.: The Logic of Scientific Discovery, New York, Harper Torchbooks 1965, p.59