

Review of: "Occupation from a perspective of complementarity - Part 1 - Background to the development of a concept"

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Potential competing interests: No potential competing interests to declare.

Comments to the author:

I am interested in the interdisciplinary research and exploration process on complementarity described in the article, as well as the explanation of the mechanism of wave particle duality. Here, I would like to raise some questions and suggestions.

To apply complementarity from the field of physics to other disciplines, it is necessary to first unify the definition and significance of complementarity, so as to refer to the role of the concept of complementarity obtained in physics research and apply it to other disciplines. If the key significance of complementarity exhibited by two disciplinary fields is different, then the value of complementary rules discovered in physics cannot be effectively utilized. In this perspective, if the definition of complementarity is changed too much in interdisciplinary research, it may lose the value of interdisciplinary research. The mutuality of opposites such as yin and yang, matter, and antimatter, the duality of waves and particles, the intersubjectivity, relationship between phenomena, seems to represent different meanings. Perhaps relying on Sharing Rule of Regularity to supplement it may make it easier to understand the viewpoint.

In addition, based on the combination-sharing theory and sharing rule of regularity, many of the content described in this article will be better explained. As described in the article, "The latter could be seen as coming into play once complementarity is applied in the disciplines that Bohr (1948) suggested might benefit from such an approach: biology, psychology and anthropology. In moving from one discipline (e.g. physics) to another (e.g. anthropology) there are different rules or conventions of interpretation that come to apply. Discipline-specific limitations on what constitutes a phenomenon may impose restrictions on what is considered examinable, in order to make it fit within the rules of that discipline." Based on the perspective of combination-sharing theory, when regularity is transformed from one thing to another, it will undergo regularity sharing and expression based on the inherent regularity of the latter thing, which can serve as a basis for explaining this part of the content.

The article describes that Heisenberg's interpretation was that subjectivity is involved, first in the choice of experimental conditions, and also in the interpretation of the results. Bohr was not entirely satisfied with Heisenberg's subjectivist interpretation, based on both logical and humanistic considerations. The possibility of two mutually exclusive 'subjective' models as descriptive of the same 'objective' phenomenon leads to complete relativism in science. The consequence is that the notion of objectivity is overthrown and science itself is relativised to one of many possible 'language games' (a

position taken by Wittgenstein in his later years. See Wittgenstein, 1953). For this content, different explanations can also be proposed, that is, two mutually exclusive subjective models may activate different potential regularities within the target object, or there may be another situation where when one potential regularities are selected to activate, the other so-called complementary regularities may disappear; So the concept of objectivity cannot be overturned.

We may be able to better understand the arguments of Heisenberg, Schrödinger, and Bohr, as well as the significance of complementarity, through the following metaphorical means. Assuming the following situation, if Heisenberg only discovered liquid water, he would consider water to be liquid; When Schrödinger only discovered water in the gaseous state, he would consider it to be in the gaseous state; However, Bohr believed that both of their findings were objective phenomena, so he believed that water was both liquid and gaseous. When explaining the form of water, the views of liquid and gaseous states were both correct and complementary, attempting to fully explain the state of water's existence; However, water also has solid water. When Bohr discovered the existence of solid water, he would believe that solid water is also the state of water, and it must also be complementary to liquid or gaseous water. Therefore, there are multiple types of complementary relationships, rather than two opposite complementary relationships similar to yin and yang. It is easy to see that the complementarity of the above forms of water existence comes from subjectivity, and objectively it is the different manifestations of the physical state of water after the integration of water and different environmental regularities. Different environmental conditions such as temperature can determine the performance of different physical characteristic states of water. Perhaps different experimental and observational methods, as specific environmental conditions and regularities, activate the expression of the potential for different regularities in water or electrons. And the different activity manifestations of these target objects activated by different environmental conditions will form complementary relationships with each other, in order to obtain a more perfect explanation of the regular content of the thing.

The author's description of complementarity in the article is relatively scattered, sometimes giving the impression that the content is contradictory, as described in the article: "However the phrase 'opposites are complementary' is misleading. Not all opposites are in fact complementary.", "Complementarity describes the situation where phenomena (which consist of entanglements between the observer and the observed) are regarded from the perspective of their relationship with other phenomena. Complementarity is about relationships between phenomena.", "Intersubjectivity is an inherent part of the complementarity relations.", "Complementarity between phenomena is about knowledge, not about the phenomena themselves.", "What henceforth defines complementarity in science is not that various descriptions 'oppose' each other; it is that there are certain different descriptions of phenomena that are each recognised as scientifically well supported both theoretically and by evidence. It is also recognised that since each of these descriptions has aspects of indeterminacy factored in (as formalised mathematically by Heisenberg), no one description can be regarded as complete. Since individual descriptions are recognised as incomplete by themselves, it makes sense to regard at least some of the incomplete descriptions as complementary parts in the production of a more complete account of the whole." According to the above description in the article, the author's definition of complementarity is the complementary relationship between the subjective content describing different phenomena within a thing as a whole. It is suggested that if the final section can summarize the definition of complementarity, the content may be clearer.



Best wishes,

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