

In the Name of Science: Don't Tamper with the Deceptive Truth...

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Abstract: Werner Heisenberg (1901-1976) is one of the most controversial, most ambivalent and most important figures in the history of modern science. The debate surrounding him with respect to nuclear weapons and National Socialism appears unending. Even though Heisenberg's uncertainty principle of the quantum system and his involvement in the Nazi atomic bomb project have been thoroughly discussed in various journals over the past decades, no communication has ever been published at a holistic level of his greatest Nobel-prize winning achievement in theoretical physics. In order to fill up this hole, this piece explicitly communicates the Heisenberg's paradox at all levels of science.

Humans are the most curious creations of God. They are creatures who always have questions and endlessly look for answers: equipped with his five senses, man explores the universe around him and calls the adventure Science [1]. The most eager ones devote their entire lives to satisfy their nosiness under the name of scientific research. But what really is science? It is a systematized knowledge covering general truths, requiring an eternal process aimed at gathering data about nature and the entire universe to provide and enhance in-depth understanding of all aspects of the world.

The evolution of research approaches reflects our increasing hunger for knowledge throughout the history of the men. Starting with mere observations of the ancient Egyptians, Greeks, and other highly civilized cultures, the purely phenomenological methods are now replaced by experimental studies. With the advancement of science, researchers record better, more accurate and more complete information. Both early and modern scientists share the common notion that the result of a study has to precisely reflect the process or phenomenon, and give a true answer for a question posed. Any research, therefore, has to be carefully designed to fulfill this lofty and, more importantly, a credible, veracious goal. This is easily met by today's experts by following strict guidelines and protocols to conduct unconfounded studies, widely accepted by all members of the current scientific arena. An important obstacle, however, still remains to be intact. This challenge is to avoid the Heisenberg phenomenon of affecting the system by measuring it.

German physicist Werner Karl Heisenberg (1901-1976) won the Nobel-prize for the creation of quantum mechanics in 1932. His observation uncertainty principle rules that the

more precisely the position is determined, the less precisely the momentum is known in this instant, and *vice versa*, as described in his *Uncertainty paper* of 1927 [2]. Heisenberg's achievements in theoretical physics constituted an essential component of the broader interpretation of this quantum mechanical theory in science in general, known as the Heisenberg phenomenon. Seen holistically as coordinated enactors of this principle, uncertainty has far-reaching impacts and consequences. Based on the scientific, bioethical and philosophical implications of the seemingly harmless sounding uncertainty relations, scientists do affect and manipulate the system by simply observing it (*eg.* by fluorescently labeling a molecule, by using fixatives to assess a tissue under the microscope, or even by utilizing flash-light to take a picture of a nocturnal animal, *etc.*), thus producing minimal artifacts that may not accurately reflect the intact whole. In every research, therefore, is a degree of deception. A scientist, be extremely critical or not, tend to believe his or her own results. Because the artifacts of today's research are so irrelevantly low, any published data of a carefully designed study can be replicated with the same degree of artifact by other scientists to yield the same result so as the broader scientific community accepts it to be correct without any further questions or hesitation. Considering Heisenberg's phenomenon, however, this "truth" is a misconception: unintentional deception and self-deception by modifying the system during scientific research.

Are we so gullible? Do we readily accept a false answer to our questions simply because there is no other explanation, or because it sounds convincing? Apparently yes! Our entire life is shadowed by illusion. Our belief in our own existence in the present is an error, but we still claim to live in the very concurrent moment. If we talk to someone, for example, it takes time for the voice of our partner to reach our ears, and to process it by our brain. By the time we realize what has been said, it is already the past. Similar errors lie in staring at the sky during a romantic summer evening:

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photons from the stars travel billions of years to reach our eyes, so what we see is already the history of the distant galaxy. If we believe we live in the present instead of in the past, we obviously accept the results of scientific research without contemplating on Heisenberg's principle. Probably our past is our present – and our slightly untruthful scientific observations represent the truth. But how can scientists cope with this paradox? Are they blinded to the truth? Or it is simply impossible to overcome this phenomenon? Probably Heisenberg's personal dilemmas might give an explanation, or at least a relief. He fully understood both the moral and scientific issues involved in his work as chief physicist for the Nazi atomic bomb project during the World War II. We do not know where Heisenberg stands on the question, whether the German scientists could not, or could and would

not, work on the making of atom bombs [3]. Broadly in line with this, we cannot explicitly claim that by ignoring Heisenberg's phenomenon in science in general is historically false and corrupt. The scientific vagueness and deception to bolster Heisenberg's theory, therefore, has to be continued. This, however, apparently fits harmoniously with the great edifice of SCIENCE.

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