A New Dualistic Model on Mind-Brain Relationship; from the Perspective of Unification Thought

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1. Introduction

At the Unification Thought symposium 2001 at Czech, I read a paper on mind-brain problem and Unification Thought (UT). In that paper, I surveyed the history of mind-brain problem and various models. And, in conclusion, I mentioned about what is the future direction for the study on that problem from the perspective of UT. In this paper, I would try to describe a dualistic model on mind-brain relationship which could mediate the perspective of UT and modern science. Dualistic model of mind-brain relationship is the model which regard mind and brain are independent existence. Although, in modern world most of the scientists take monistic view which regards mind is only a phenomenon accompanied by brain activity. My opinion is that using a dualistic model we could simplify the hard problems which modern science faces trying to understand mind-brain relationship.

2. Mind-brain relationship from the perspective of medical science

Recent years, it has become popular to study about consciousness in the field of brain science. It has been known that there are no center in human brain where all neuronal information gather. Brain scientists often use the words “top-down” and “bottom-up” in neuronal information process, but they could not find the place in brain where the top of information processing is. There are two direction of study in this field; one is to find local

mechanisms or neurons that correlate with consciousness and the other is to find holistic mechanisms which emerges consciousness. Candidates for these neurons of mechanisms are 40 Hz oscillation of cortical neurons, re-entrant loops in thalamo-cortical systems, anterior cingulate system, superior temporal sulcus, global working space, and so on (Chalmers, DJ 1996). In most cases, researchers take materialistic and monistic view and think that mind is a phenomenon accompanied by neural activities or emergent phenomenon of complex neural interaction. But, few scientists regard it difficult to reduce mind to materialistic activities.

Japanese brain scientist, Kenichiro Mogi regards that there are three hard problem to solve in brain science correlated with consciousness (Mogi, K 2000). One is a problem of qualia. Qualia is a quality of our subjective experience. We feel numerous qualia from our environment; red color of rose, sound of violin, smell of beef stew, etc. These qualia of many things are very unique. When we feel some qualia, there are physical phenomenon which correlate with our sensation but qualia couldn't be reduced to physical phenomenon. Second is a problem of intentionality. When man recognizes something, there must be some intentionality at first. How man's intentionality is generated by brain activity is unknown. Third is a problem of self. Self is a deep phenomena to explain through the words of neuronal interactions.

In 2002, Jeffrey Schwartz, who is a professor of psychiatry at University of California Los Angels, wrote a book on mind-brain problem (Schwartz,JM 2002). The book, "The mind and the brain", show the dualistic model of mind-brain relationship with persuasive clinical and scientific evidence.

Schwartz's specialty as a psychiatrist is obsessive-compulsive disorder (OCD). OCD patients have repetitious and continuous thoughts, impulses, and ideas which couldn't be

controlled by themselves and suffer from these symptoms. And they sometimes have compulsive acts like washing their hands, or confirm their doors are closed, or counting numbers, to get some relief. OCD has correlation with abnormal functioning of brain, especially inferior and medial part of frontal lobe and basal ganglia. OCD patients are usually treated by serotonin related drugs and psycho therapy. Schwartz's study was to show that not only by drugs but also psychological intervention could change the activity of patients' brain. He showed it visually by using positron emission tomography (PET) which demonstrates metabolic rates of glucose in each brain region. His work was also introduced in "Principles of Neural Science"; which is a very famous textbook of brain science.

Schwartz argues that the result of his clinical study indicates the power of mind which can change neuronal networks as well as drugs. Materialists would claim that the result is just the evidence of the fact that the brain could change itself. However, that claim has self-contradiction from a perspective of cause and effect relationship, since it is known that there is no control center in our brain. He calls the power of mind "the force", and he thinks that it could also change the functional mapping of cerebral cortex. Schwartz wrote that when "the force" influences the brain, "attention" is very important factor. Man's attention, "the force", would influence on our brain physcically.

3. Quantum physics and information theory in correlation with mind-brain problem

Mind is a very weird phenomenon in a materialistic perspectives (Stapp, HP 2004). Also, quantum physics which handles laws of particles in very small world describes very weird world. Niels Bohr, who contributed to establish quantum physics, once mentioned the theory as "crazy theory". In quantum world, particles have dual character of particle and wave.

In macroscopic world, movement of objects are determined by physical laws either observation has done or not. But in microscopic world, a particle is only a bundle of probabilities which obeys the equation of Schrödinger's wave function before it is observed. However, once it was observed it becomes a particle. The phenomena, which a particle is determined as one existence when observed, is called "shrinkage of wave function". A enigma which lies in this strange phenomena are called "observation problem" of quantum physics. We couldn't determine the position of a particle and could only know the probability of a particle's existence at the point. So, the physical laws are deterministic in macroscopic world but, in the field of small particles, the laws are non-deterministic. There is no standard interpretation of the equation of Schrödinger, though it has been established since 1926. It is also suggested that non-local interactions, which means the particles away from each other could interact by unknown mechanisms, exist in that world.

Quantum physics can give advantages to dualistic model of mind-brain relationship in three points. One is it's non-deterministic character. Materialist has been reductionist and their world view has been deterministic. They thought every complex and higher level phenomena could be reduced to simple and lower level phenomena. And, higher level phenomena could be determined by laws of simple and lower level phenomena. So, radical materialist thought phenomena related to mind are generated and determined by physical laws, and consciousness is just an illusion. There are no free will. But in the world of particles, which is the ultimate garden of Eden for the reductionists, things are not determined in principle. Second is it's non-local character. Mogi pointed out that the phenomena of mind should be correlated with non-local interaction. Because, it suggests that there are some kind of interactions between separated neurons. He also wrote that there must be a special view point from where one

could see all the activities of neuron in the brain. He called it “small view point of God”, in contrast of “large view point of God” from where God can see everything in the world (Mogi, K 2004). The third point lies in the observation problem. Eugene Wigner, who was a Nobel prize winner as a physicist, interpreted shrinkage of wave function as a phenomena which is correlated with the consciousness of observer. That means some force of observer’s consciousness effects on the condition of a particle.

There is another implication in quantum physics. I have described the world of particles as a garden of Eden for the reductionists, and there is no determined existence. Only we could get information of particles as possibility of existence. So, we may even think information as ultimate reality. Neils Bohr wrote; “There is no quantum world. There is only an abstract physical description. It is wrong to think that the task of physics is to find out how nature *is*. Physics concerns what we can *say* about nature.” Christian von Baeyer wrote in his book “Information; The new language of science” (2003), that there lies information at the bottom of physical reality. Then, what is information? In von Baeyer’s book, he wrote information is a relationship between the parts of physical system. Cultural anthropologist Gregory Bateson defined information as “a difference that makes a difference”(1979). Only when there are some difference in physical system, it could express some information. If physical system had uniform condition in every aspect, it couldn’t express any information. Difference could be considered as some kind of “relationship” between several things or several conditions. For example of information used in physics, entropy is a kind of information which expresses a system’s complexity. Shannon’s equation of information is equal to special case of Boltzmann’s equation of entropy.

Information is not a pure objective existence. It is half subjective. It accompanies with

objective existence, but it is always generated within the interaction between subject and object. Famous physicist Richard Feynman mentioned that information is the mediator which connects mind and matter. Australian philosopher, David Chalmers also pays attention to information as a mediator between mind and matter (1996). He claims that information has dual character. One is about subjective experience and the other is about materialistic phenomena. Information is naturally generated from the pattern of similarity and difference which lies in subjective experience, on the other hand, it is expressed as difference in materialistic patterns in objective world. Experience is information from inner world, and physics is information from outer world. Chalmers questions whether information is fundamental and mind and matter are it's products, or mind and matter are fundamental and information is only a mediator.

4. UT, modern science, and a new dualistic model on mind-brain relationship

UT starts from the dual characteristics of God, which are called Sungsang and Hyungsang (1992). Sungsang is a kind of mind-like aspect of God, and Hyungsang is a kind of matter-like aspect of God. They interact through give-and-receive action, which gives God himself eternal foundation of existence. Origin of our universe has dual characteristics, so every existence has dual characteristics as it's fundamental nature. In modern physics, we already know that every atom has dual character. One is called wave-like aspect and the other is called particle-like aspect. They correspond with Sungsang and Hyungsang in UT respectively. It is also pointed out from the perspective of UT that human beings have dual aspects of spirit self and physical self. Spirit self lives forever in spiritual world after his death of physical life. So, in connection with mind-brain relationship, UT is a kind of dualism, and

mind and brain interact through some kind of give-and-receive action.

Professor Schwarz's model is dualistic and he was mainly influence from the ideas of Henry Stapp, who is a quantum physicist interested in the relationship between mind and matter (Schwarz 2002). Schwarz focuses on synapses as a place where quantum mechanics work in correlation with man's attention. Brain science teaches us that signals are transmitted electrically and chemically in our brain. When a neuron is stimulated to some extent, it begins to excite electrically as action potential. Action potential is transferred trough an axon of the neuron to a synapse, where a neuron connects with another neuron and transmits signals chemically. When action potential reaches to synapse terminal, calcium ions flow into the synapse terminal through ion channels and diffuse. The stimulation of calcium ions result in the release of chemical transmitter by probability of almost 50% and stimulate the next neuron (Stapp 2004). As the size of calcium ions and ion channels are very small, quantum mechanics must be adapted in principle. John Eccles, who was a Nobel prize winner as a brain physiologist, also focused on probabilistic nature of synapse transmission and made it theoretical ground of his dualistic mind-brain model (Eccles 1994). Man's attention may influence on releasing chemical transmitters.

In the chapter of "Epistemology" of UT, it is mentioned that a subject of cognition must have interest and prototype. I have already referred to three hard problem in modern brain science, which are 'qualia', 'intentionality', and 'self'. From UT's view, these three lie mainly in spiritual self. Qualia is correspondent with prototype, intentionality with interest of a subject, and self with individual truth body centered upon heart. It is also described in the same chapter about "the encoding of ideas and the ideation of codes". And, codes are stored as neural activities or patterns in the brain. At the same time, from the speech of Reverend

Moon (2006), it is considered that every experience of our physical life is recorded on one's spiritual self and influence the state of one's life in the spiritual world. What is the mechanism which links the codes stored in one's brain and the experience recorded on our spiritual self?

I'd like to propose three candidates for the mechanism which records physical experience to spiritual self. One is coherent oscillation of cortical neurons dependent on various state of brain function. This phenomenon is observed at reticular formation, hippocampus, thalamus, and sensory cortices (Basar, E 2005). The second candidate is a functional cluster of neurons highly integrated on a time scale of hundreds of milliseconds. It is called "dynamic core" by brain scientists, Tononi and Edelman (1998). Dynamic core is a process, and it changes over time dynamically. It is not a thing or a location. The third candidate is "superradiance" of microtubules theoretically predicted by a Japanese scientist Mari Jibu. Microtubule is cytoskeleton of neuron and superradiance is laser-like long-range coherent quantum phenomenon. This quantum phenomenon may also play a role in mind-brain interaction.

Finally, what is the function of a brain in our dualistic model? It could be described in connection with information. When information is expressed physically, it is called codes. In our brain, codes are the time-space patterns of neuronal activities. Every experience of our physical life is transformed to information/codes through our neural systems. Our spiritual self get information from our brain, and it is transformed into ideas. When we think, we manipulate these ideas and make some plans or decisions. After making plans or decisions, our attention is focused on something. Our attention and intention have some kind of power which influence our brain activity. At last, our physical self makes some action according to our intention. Information is a last step of our experience and information is a first step of our action in our brain. On the other hand, idea is a first step of our cognition, and attention is a

last step of our consideration. Thus, our brain plays a role in informationalize our experience and physicalize our intention. These process proceed automatically and subconsciously. Brain is a information-based converter which connects our mind and body. When we reconsider the function of information as a mediator between mind and body, it is coherent with the world view of UT that claims Logos as the cause of both physical world and spiritual world. We could think Logos as a first information of this universe.

Conclusion

In this paper, I proposed a new dualistic model on mind-brain relationship. Eccels's model and Schwartz's model are both dualistic,

but they concern only in the direction of how mind could influence the brain activity. However, I think that the mechanism which brain influences mind should be considered similarly. I also emphasized the role of information which connect mind and body, and stated brain as a information-based converter. All these ideas were arranged in the context of UT. My hope is that this model would be tested scientifically in the future.

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