“Development of Unification Medical Science from the Viewpoint of Brain Science ~ how is cognition accomplished?”

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<Summary>

Eastern medicine and western medicine have progressed respectively, and seem to be unified to integrated medicine or holistic medicine, including alternative medicine and complement medical treatment. However, the approach to the aspect of spirituality seems to be the most important in medical science. In order to form the mind, the diencephalon and the right brain play indispensable roles. Then, how is cognition accomplished?

According to Unification Thought, there are the three stages of cognition, which are the sensory stage, the understanding stage, and the rational stage. Cognition is accomplished by collation of memory and information through the give-and-receive action between mind and brain.

From the viewpoint of brain science, there are physiological processes corresponding to the three stages of cognition. Particularly, in the understanding stage of cognition, Hippocampus and Amygdala play remarkable roles to manage cognition and memory, and the mechanism, which moves the cognitive function of the cerebral cortex aggressively, is in the limbic system centered on these Hippocampus and Amygdala. In addition, the resonance function of the right brain is important to develop higher integration of brain functioning and associated higher cognitive capabilities. “The rational stage of cognition” must be raised up to the highest dimension, that is, “the spiritual stage of cognition”.

<Introduction>

Unification medical science is the medicine of true love, true life and true lineage, which is based on Unification Thought by Reverend Sun Myung Moon (1920~), that is, “Godism”. The purpose of Unification medical science is to achieve the goal of one world family and to realize all everlasting ideal world of God’s love, through solving fundamentally all the numerous and difficult problems that afflict human health.

Recently, eastern medicine and western medicine have progressed respectively and seem to be unified to integrated medicine or holistic medicine, including alternative medicine and complement medical treatment. However, the approach to the aspect of spirituality (or the divine natures) seems to be the most important in medical science, because our first responsibility is to resemble God in the divine natures to become God’s children. Unification Thought proposes Heart, Logos and Creativity as the most important divine natures. In

particular, Heart (or Shimjung), which is the emotional impulse to obtain joy through true love, is a core of the divine natures and causes the mind. In other words, the mind arises from Heart, and is formed through the give-and-receive action between the spirit mind (i.e., mind of the spirit self) and the physical mind (i.e., mind of the physical self) (UT, 186). In order to form the mind, the diencephalon and the right brain play indispensable roles (Suzuki, 2006). Then, how is cognition accomplished? And what is the relationship between mind and cognition? Thus, I would like to state cognition from the viewpoint of brain science, particularly, memory.

<Main subject>

How is cognition accomplished? According to Unification Thought, cognition is the judgment of human subject on all things, which are the objects of joy, beauty, and dominion. In this connection, cognition (i.e., judgment) involves “experience”, and judgment is carried out through the function of “reason”. Therefore, experience and reason are both necessary. Thus, in Unification Epistemology, experience and reason are both indispensable, and cognition takes place through the unified operation of the two. Also, since the human being and all things are in the relationship of subject and object, we can know all things perfectly (UT, 318).

In addition, cognition is always accompanied by judgment, and judgment can be regarded as a kind of a measuring act. For measurement, standards (criteria) are necessary, which are the ideas within the human mind that serve as the standards of cognition. These ideas are called “memories”. Each memory is an image within the mind, and it is an internal object. Cognition takes place as an image within the mind (internal image, that is, memory) and an image coming from the external object (external image, that is, information) are collated (UT, 319). Then, more concretely, what exactly is cognition?

There are the three stages of cognition, which are the sensory stage, the understanding stage, and the rational stage (UT, 333-337). According to cerebral physiology, there are physiological processes corresponding to the three stages of cognition.

Firstly, the information about sight, hearing, taste, smell, touch, and so on, is the transmitted through peripheral nerves to the sensory area of visual sense, auditory sense, gustatory sense, olfactory sense, and tactile sense (somatic sensory), respectively. The physiological process that takes place in the sensory area corresponds to the sensory stage of cognition.

Secondly, the information from the sensory area is gathered in the parietal association area, where it is understood and judged. This mechanism means the understanding stage of cognition.

In recent brain science, it is well known that Hippocampus, which is in the limbic system, first plays a role in the initial processing of the information to be memorized, and Amygdala

has the feature of the value judgment. Then, the memory is thought to be stored in the cerebral cortex (temporal lobe) for a long time. Accordingly, Hippocampus and Amygdala are charged with a valuable role which manages cognition and memory, and the mechanism, which moves the cognitive function of the cerebral cortex aggressively, is in the limbic system centered on these Hippocampus and Amygdala (Matsuzawa et.al., 1990). That is to say, in cognition, such memory (stored knowledge) is collated with the information of an object in the external world coming through the sense organs, and is judged (Goudet-Perrot, 1970).

Thirdly, based on this understanding and judgment, thinking is made in the frontal association area, and creative activities are carried out. This corresponds to the rational stage of cognition.

In this stage, “working memory” is important, which was referred to as “short-term memory”. This is the cognitive system that allows us to keep active a limited amount of information for a brief period of time (Baddeley, 1986; Atkinson and Shiffrin, 1968; Shallice, 1988).

Then, how can the mind, which is held to be a product or function of the brain and reflect the objective world, make rational cognition (i.e., abstraction, judgment, inference)? And, moreover, how can it direct practice? Here, I would like to state the relationship between mind and cognition.

According to Unification Thought, all things have dual characteristics since they are created in the likeness of the dual characteristics of God. The human being is a dual being of mind and body; and cells, tissues, and organs making up the human body are united beings of mental and physical elements as well. Furthermore, all human actions and operations are dual, which mean that psychological and physiological actions are always at work in parallel. Therefore, psychological and physiological processes in cognitive action are always at work in parallel. This means that cognitive action occurs through the give-and-receive action between mind and brain (UT, 447). In other words, cognition and practice can never be made based only on the physiological processes of the brain. This is because cognitive action takes place through the give-and-receive action between mind and brain.

By the way, memory refers to the ideas and concepts possessed in advance by the subject at the time of cognition, and can be called “prototype” as well in Unification Thought. The prototype, which is the mental image within the subject, is made of the following two elements; the image of the attributes of the cells and tissues (that is, “protoimage”) and the image of relation, which are reflected in the “protoconsciousness” (UT, 321-322). Then, what is the “protoconsciousness”?

According to Unification Thought, protoconsciousness is the cosmic consciousness

which has permeated the cells and tissues of living things (UT, 323). This means that cells have purposeful consciousness and perform certain functions on the basis of information contained in them. In fact, a continuous repetition of the transmission of information from the cytoplasm to the nucleus and the response to it from the nucleus is made in a cell, whereby the cell exists and multiplies. Accordingly, we can find autonomy even in a single cell (Ueda et.al., 1990; Freeman, 1991; Nakagaki & Ueda, 1996). The autonomy of a cell is none other than "protoconsciousness". Consequently, there is always a conscious process behind a physiological process (UT, 341-344).

In addition, from the viewpoint of brain science, an idea comes into being through cognition and is stored in a specific area of the brain as memory, encoded as a particular pattern of combinations of neurons. In order to recall a particular memory thus encoded, consciousness decodes the code and understands it as an idea. That is, in the storage and the recollection of memory, the "encoding of ideas" and the "ideation of codes" seem to be carried out (Gazzaniga & Ledoux, 1978). The mutual conversion of an idea and a code provides support for the assertion that cognition is carried out through give-and-receive action between psychological and physiological processes.

Furthermore, many scientific views can be cited that arguably support the concepts of the cognitive (image) function from the aspects of the memory. Some researches indicate that long-term memories are not stored in one specific place, but are stored throughout the brain as associative images. The best research to date on this has been done by Karl Pribram (1919~) who is a neurosurgeon. He noticed that when brain-injured patients had large sections of their brain removed, they didn't suffer a loss of any specific memories. He believed that the brain acted as a holographic instrument able to take bits of information and constructed the whole from these fragments of memory.

A hologram is created by splitting a laser beam into two separate beams. One beam is bounced off an object, and the other serves as a reference beam. An interference pattern is created, which bears little resemblance to the object, however, it contains all the information necessary to recreate the image of the object. The hologram is a Fourier transform of the image space: it is a recording of the frequency information rather than the space-time information recorded by conventional photographic techniques.

Here, the most remarkable feature to Pribram was the idea that a photographic plate containing a laser image could be broken in two, and each half would contain the complete image of the object, but with less resolution. This was identical to the way that memory in the brain seemed to be operating. Regardless of how many times the photographic plate was broken; each piece contained the information necessary to reconstruct the entire image. Thus,

he formulated the revolutionary holographic theory of the brain function (Pribram, 1969; 1977), and hypothesized that the neurons, axons, and dendrites of the brain created wave-like patterns that cause an interference pattern (Pribram, 1969). This means that there may be a hyper-dimensional transformer or transfer function that connects us to another dimension beyond those of our cognition.

In addition, Roger Sperry (1913~1994), who was a psychobiologist and received the Nobel Prize in 1981, discovered that the two cerebral hemispheres of the brain had distinct functions. The left is involved in reasoning, language, writing, and reading, while the right is more involved in nonverbal processes, such as art, music, and creative behavior. He found that the human brain has specialized functions on the right and left, and that the two sides can operate practically independently (Sperry, 1981). In other words, the left brain, which is conscious and logical, uses a linguistic circuit for the communication of the information, takes in information slowly and likes repetition. However, the right brain, which is subconscious and intuitive, uses a different circuit and communicates information by the image, takes in information quickly and requires no repetition. The right brain can create mental images from information gotten from the cells of the body which is the basis for spiritual sensory perception. Having a photographic memory allows immediate access to information stored in the memory.

However, although the right and left brain hemispheres function as opposites, they also complement and integrate each other by Corpus Callosum (Shichida, 1997).

As to the right brain ability, Makoto Shichida (1929~) emphasizes that the following three major functions of the right brain are important. Firstly, a right-brain function has a "high-speed, high-capacity memory" mechanism. Secondly, a right-brain function is the combination of memory with imagination to produce structures which transcend our personal experience and knowledge. Thirdly, a right-brain function is the production of waves which resonate with the universe. Brainwaves come in four varieties of respectively Beta, Alpha, Theta and Delta waves. The important thing is that the universe broadcasts at 7.5 Hz, just at the border between Alpha and Theta brainwaves. Through meditation people can maintain their brainwaves on the same frequency as the universe. In theory, they can thus make themselves receptive to the power of the universe. With repeated practice and training with images, one's perceptions may become sharper. One may develop stronger intuition and even more advanced cognitive capabilities such as the ability to see through solid objects, telepathy, ESP and so on (Shichida, 1993; 1994; 1997).

In the end, how is spiritual cognition as the highest stage accomplished? And, what is needed to achieve the highest medical goal of unification world? The answer is that we have to perfect our spiritual selves, because the spirit self, in the relationship between the spirit self and

the physical self of a human being, is the more important of the two. When the physical body returns to the earth, the physical mind ceases to exist, but the mind, which is formed through the interaction of the spirit mind and the physical mind, remains within the spirit self (DP, 63-64). Our spirit self should perfect itself by gradually growing through the three orderly stages in conjunction with our physical self, centering on the spirit mind, in accordance with the principle of creation. When our spirit self and our physical self establish the four position foundation by performing a perfect give-and-receive action centering on God, thus forming a united body, the spirit self becomes a divine spirit, that is, a divine nature is completed. At this level, the spirit self can recognize (feel and perceive) everything in the invisible world.

According to Speeches of Reverend Sun Myung Moon, "You have the responsibility of perfecting your spiritual selves within your physical bodies based on the finite life you live in the tangible, physical world. This doesn't mean, however, that the perfection of a spiritual self happens automatically. Only on the basis of your having achieved complete unity between your mind and body during your earthly life by expressing true love through actions your spiritual self fully mature (Moon, 2006)."

<Conclusion>

Heart is a core of the divine natures. The mind arises from Heart, and is formed through the give-and-receive action between the spirit mind and the physical mind. On the other hand, cognition is accomplished by collation of memory and information through the give-and-receive action between mind and brain. That is to say, Hippocampus and Amygdala play indispensable roles in order to manage cognition and memory, and the mechanism, which moves the cognitive function of the cerebral cortex aggressively, is in the limbic system centered on these Hippocampus and Amygdala.

In particular, the resonance function in the right brain is important to develop higher integration of brain functioning and associated higher cognitive capabilities. Then, "the rational stage of cognition" must be raised up to the highest dimension, that is, "the spiritual stage of cognition (tentative name)". For its purpose, the spirit self must become a divine spirit and complete spirituality (divine natures) by performing a perfect give-and-receive action between the spirit self and the physical self, centering on God' s love.

Consequently, only when centered on God's true love, the human being will understand the purpose of creation of all things, obtain true knowledge of them, and accomplish true cognition. (Thank you very much for your attention.)

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