

# **The brain as an expression of the mind**

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This paper is a philosophical examination of the idea that the brain is an expression of the mind, as opposed to the cerebral physiological view that the mind is an expression of the brain. Using examples of psychosomatic diseases, neurosis, brain development and regeneration, brain evolution, and brainless protozoa, it traces the process by which the brain develops into an expression of cognitive will.

## **Psychosomatic and Neurological Disorders**

The phenomenon of salivation at the mere thought of sour pickled plums or a racing heart when extremely nervous is a common experience. The workings of the mind in the form of emotion are immediately manifested in physical activity. Physiologically, the effects of emotion on the body are known to include not only heart rate and fluid secretion, but also respiration, muscles, blood pressure, blood flow, endocrine secretion, brain waves, and many other physical activities. We may express our daily feelings of anxiety, nervousness, anger, worry, and repression through physical expressions such as "my heart is pounding," "my stomach is boiling," "I am suffocating," and "nothing goes down my throat." In other words, the body's functions are not merely the unique functions of the body alone but are greatly influenced by the various emotions, imagination, and other activities of the mind. The body also sensitively reflects the state of mind. The body is an expression of the mind.

Moreover, the brain is the body organ that mediates between the mind and the body. Psychosomatic illness, a symptom of stress or disharmony in human relations that manifests itself as physical illness, is another phenomenon in which the state of the mind manifests itself in the state of the body through the brain. Especially in modern society, many physical diseases are caused by social and psychological factors, and temperamental and functional disorders of the body are often caused by disharmony of the mind.

For example, in today's complex society, there is a lot of competition and struggle, and human

relationships are lackluster and bleak, so it is often perceived as an environment that is uncomfortable for individuals, which causes stress and oppresses the minds of modern people. People are also surrounded by many stressors, such as stress at work and home, stress in relationships and living environments, and techno-stress caused by computers and other factors. Of course, it is not that the workplace, home, relationships, living environment, and machines themselves are immediately stressful, but when each person's mind receives them with a sense of discomfort, they become stressful. And this disharmony causes many unstable states of mind, such as anxiety, dissatisfaction, worry, frustration, anguish, and loss of purpose in life. Moreover, these conditions manifest themselves as physical ailments such as abdominal pain, headaches, stomach ulcers, colitis, asthma, hypertension, arrhythmia, angina pectoris, myocardial infarction, allergic symptoms, and many others. If these physical diseases are manifestations of mental disharmony, then, again, the body is an expression of the mind.

Coronary artery disease, such as angina pectoris and myocardial infarction, is one of the psychosomatic diseases that are often observed in talented businessmen and is caused by stress from their obsession and anxiety about their social performance and status. In today's highly competitive society, these people are capable businessmen who work energetically and achieve more than others, but they are also constantly pressed for time, tense, and frustrated. They are also more competitive than others and constantly seek accolades for their work. Once they find themselves in disharmony with their workplace or social environment, this disharmony and tension manifests itself as a physical reaction.

In addition, various transitions in the life ladder and troubles in daily life, such as marriage, divorce, hospitalization for illness, independence of children, moving or separation, death of a spouse or family member, change of workplace, promotion, transfer, job change, unemployment, retirement, entrance to school, graduation, employment, as well as disputes at work or home and conflicts with neighbors, can cause stress and illness. These are also the result of life's various events. These are also psychosomatic illnesses that occur when the mind fails to adjust to the various events of life, illustrating the deep connection between mind and body.

Stress is, to all intents and purposes, a reaction of the mind in relation to the self and the environment. Therefore, if the mind can become aware of the given environment, reinterpret it, and reposition itself, the manifestation of physical illness can be prevented. When the mind is not aware of or cannot reinterpret the environment, the unconscious acts and the disease appears as a physical illness. Stress is a highly mental phenomenon that is caused by the interaction between the subject and the environment. If this mental phenomenon also manifests itself as physical illness, we must consider that

the mind and body are deeply connected and that the mind rather drives the body. Moreover, it is certain that the brain, a physical organ, mediates the deep connection between mind and body.

Not only stress but also disharmony and disorders in relationships in general, such as the mother-child relationship during infancy, often cause psychosomatic disorders. For example, disorders in the mother-child relationship during infancy, such as overprotection or over-interference of the mother toward the child in infancy, and vice versa, indifference or abuse, may induce bronchial asthma, eating disorders, neurosis, etc. in the child. When a mother makes her child the object of her narcissism or, conversely, completely neglects him or her, a conflict arises between mother and child when the child tries to become independent, and this psychological conflict can cause psychosomatic disorders. The mother-child relationship is the basis and starting point of the human relationship, but the invisible mental disharmony of this relationship disorder is expressed in the visible form of physical abnormalities.

When encountering strong anguish or fear, the unconscious mental struggle against it may be converted into physical symptoms such as fainting, convulsions, motor paralysis, loss of standing, loss of walking, loss of voice, loss of sight, loss of hearing, deafness, and deaf-mute. Such symptoms, called neurosis (hysteria), are unconscious self-protective reactions to intense distress and fear, but this is another manifestation of the mind's control over physiological functions, a phenomenon that cannot be explained in terms of brain physiology or mechanics.

A living organism is a being that sustains itself through constant interaction between the subject and the environment. Mind is the ability to integrate and interpret this relationship between subject and environment. This function is present in most animals from the primitive to the most complex stages. In humans, in particular, interpersonal relationships, groups, societies, and cultures are included in the environment, forming highly complex relationships. Many psychogenic diseases are caused by the inability of individuals to adapt to and control the changes and complexities of their environment. When this interaction becomes inharmonious, it manifests itself as psychosomatic illnesses and neuroses.

In this case, the relationship between the subject and the environment is just a relationship, not a visible one. It is the function of the mind that gives meaning to this relationship. From the viewpoint of brain physiology, it is possible to explain that the workings of the mind somehow affect the central nervous system, which in turn affects the autonomic nervous system and the motor nervous system, resulting in various physical diseases. Psychosomatic and neurological disorders are phenomena in which the effects of the mind affect the cranial nervous system and manifest themselves as physical

symptoms, which clearly shows that the brain and body are expressions of the mind.

## **Mind and Illness**

It is also well known empirically that, as the saying goes, "sickness begins with the mind," and that the state of mind can affect the state of the body, making illnesses better or worse. Cancer, infectious diseases, and other illnesses are more likely to occur during periods of high stress or depression, or after emotional trauma or spousal bereavement. On the other hand, the patient's mental attitude may lead to spontaneous regression of cancer or physical symptoms may be improved by various mental exercises. Recent research in psychoneuroimmunology has also provided academic support for our rule of thumb. It has focused on the close interaction between the cranial nervous system and the immune system and has clarified to a considerable extent how the state of mind affects the immune system via the cranial nervous system, which in turn alters the physical condition, creating or improving disease.

In humans, the fact that placebos (fake drugs) often have a therapeutic effect also expresses the deep connection between the mind, brain, and body. For example, patients experiencing pain may find relief not from painkillers, but from injections of saline solution, and those suffering from insomnia may experience symptom relief not from sleeping pills, but from receiving lactose. Furthermore, placebos are commonly utilized for various bodily symptoms and can yield significant effects. In these cases, the placebo effect may work better when administered by a trusted physician compared to one not trusted, and it may be more effective for patients who are easily convinced compared to those who are skeptical. Additionally, even with the same placebo, differences in shape or color can lead to effectiveness for some patients but not for others. Nevertheless, in any case, the placebo effect operates through the power of the mind's belief in the efficacy of the treatment, which acts on the brain's neural pathways, alleviating the patient's tension, eliciting the body's healing mechanisms, and thereby producing actual therapeutic effects. The placebo effect is unique to developed human brains and does not work in animals, emphasizing its distinctly human and psychological nature, which underscores the deep connection between the mind, brain, and body.

On the other hand, there are biofeedback devices that enable visual and auditory capture of various physiological and physical activities, such as heart rate, vasoconstriction, body temperature, brain waves, stomach acid secretion, cell activity, and muscle tension, using oscilloscopes and loudspeakers. Training with these devices enables anyone to control these physical activities, which are usually thought of as voluntary and uncontrollable, with relative ease. For example, if a subject is made to believe that he

or she is listening to his or her heartbeat, when in fact it is slower, the brain activity receives the information that he or she is calm, and this information is transmitted to the physical activity, so that the heart beats more slowly, and the subject becomes regains composure and anxiety is reduced. When given biological information about one's body, one can use this information to control one's bodily functions. This is another example of the mind influencing brain activity, which in turn affects the body.

Considering this phenomenon of the mind-controlling the various functions of the body, we should say that the brain is in one aspect an expression of the mind. The actions of the mind, such as thinking, feeling, imagining, and motivating, in turn, stimulate the material activities of the brain, which in turn affect the body. Mechanistic brain physiology cannot fully explain this. The mind can be said to be an expression of the brain, as brain physiology says, but at the same time, it can also be said that the brain is an expression of the mind. This is why the brain produces the phenomena of the mind, and at the same time, the mind can control the physiological activity of the brain.

### **The brain as an expression of the mind**

The phenomenon of the mind controlling the physiological activity of the brain is not so unique when one thinks about it. We constantly will something and move our bodies. The mind's work of will controls the body through the brain. Just like an autopilot airplane that is remotely controlled by radio waves, our bodies are driven by invisible waves of the mind.

People today, for example, decide what to do based on information obtained from television. In this case, the information itself is not a tangible substance. However, this invisible information moves people through their brains. In the same way, our bodies are driven by something invisible called the mind through the brain. Just as a television receiver acts as a go-between for radio waves and people, the brain is a tool that mediates between the mind and the body. Because the mind controls the brain, we can constantly select only the necessary information from the myriad of sensory information received by the brain and erase the rest. Conversely, by directing our attention to one thing, we can, in an instant, direct and control many material activities in the brain in that direction. This is why strong mental stress can distort perception, sometimes blocking it, or why strong hypnotic suggestions can make us feel no pain.

The brain is an expression of the mind and an instrument of the mind. Living organisms constantly maintain themselves in the interaction between the subject and the environment. Animals, in particular, are more open to their environment and have more freedom, so they must always make appropriate

choices between different behaviors. The mind, interpreting this relationship between subject and environment, selects appropriate bodily actions, using the brain as an instrument of choice.

Indeed, on the one hand, the mind is a representation of the brain and a reflection of brain activity. but in the way the instrument performs its function or the way the instrument plays music. The will to move is expressed as an instrument called a foot, and the instrument called a foot naturally expresses the will to move. Just like that, the will to choose is expressed as a tool called the brain, which naturally expresses the will to choose. What makes the brain express the mind is also the mind.

To explain the mind as a function of the brain, brain physiologists are exploring how the various parts of the brain and their interactions enable mental processes such as perception, memory, thought, language, and emotion. However, the fact that the brain performs so many functions itself indicates that the brain is rather an expression of the mind. Behind the brain's ability to transmit orderly decisions to the body as a whole through the complex interactions and division of roles among its various parts, we must consider the integrative power that controls and operates the brain itself. This integrating force is nothing other than the function of the mind. The integrating power of the mind is expressed as the brain, and the integrating power of the brain is expressed by the mind.

## **Brain Development and Regeneration**

The phenomenon of the effects of the mind on the brain can be seen in the process of brain development and brain regeneration.

The myriad neurons (neurons) that make up the brain extend their projections to form a network of connections to function as the brain. The developing brain of a child is particularly suited for the extension of projections to create a network of neurons. But at this time, without external stimuli and the willingness to actively perceive them, the neuronal network will not develop. Brain function, whether perceptual or linguistic, can only develop when the brain is stimulated externally in infancy and appropriate learning efforts are made. This is why infants often try to grasp the shape of objects by touching them with their hands. Infants perceive with their hands. As Kant said, the hand is the outer brain of man. Moreover, at this time, subjectivity and active nature play a major role. The proactive and active willingness to use the hands and eyes to recognize things has a great influence on the formation of the brain's neuronal network. In fact, experiments have shown that the brains of animals that are given abundant stimuli and are more active in receiving them develop better. Curiosity nurtures the brain, and an active mind develops the brain.

This is seen not only in brain development in children but also in adults, where brain function is restored by rehabilitation of patients who have suffered brain injury. The reason why the original function is restored by rehabilitation after a brain injury such as stroke or encephalitis is that a new network of neurons is regenerated by external stimuli. Not only stroke and encephalitis, but also aphasia patients can regain their speech and blind people can regain their eyesight through strong-willed rehabilitation and focused training. The brain has a great regenerative capacity. Mammalian brain cells are said to have no regenerative capacity, but they have the potential to self-organize to a great extent.

Furthermore, it is well known that the brain, especially in the developing brain of children, has an extremely high degree of plasticity, and even if a part of the brain is damaged, other brain regions can compensate for the function. Thus, even children with only part of the brain stem and frontal lobe, children without a cerebellum, and children who have undergone hemispherectomy surgery can, with hard training, acquire sensory, motor, and language abilities. This is because, with conscious effort and environmental stimuli, the plasticity of the brain is evoked, allowing the rest of the brain to take over.

Well, the action of the mind can be considered a reflection of brain function. However, if we look at the phenomena of brain development, brain regeneration, and brain compensatory nature, we cannot overlook the fact that, on the contrary, also the action of the mind has a profound effect on the brain. The brain expresses the mind sensitively.

## **Evolution of the Brain**

That the brain is an expression of the mind may be understood in another direction, for example, by considering the phenomenon of brain evolution.

Of our brains, the brainstem is responsible for regulating respiration, heartbeat, body temperature, blood pressure, and other functions that sustain life. If we look at this from an evolutionary perspective, its upper part is said to be the brain that developed during the reptilian age. In addition, the various organs of the limbic system, located between the brainstem and the cerebrum, communicate between the cerebral cortex and the brainstem and are responsible for attack, defense, feeding, and reproduction. This part of the brain is said to correspond to the ancient mammalian brain. The neocortex, which covers the limbic system, is responsible for complex and sophisticated mental activities such as perception, memory, and thought, and is said to correspond to the neo-mammalian brain. The forebrain of highly evolved mammals and humans is composed of three parts: the reptilian brain, the ancient mammalian brain, and the neo-mammalian brain. Each part has different properties and roles, but they communicate

and cooperate with each other and work as one. The brain is structured like a house that has been enlarged and remodeled as the family has grown. This clearly shows the long evolutionary process of the animal brain.

Thus, the animal brain evolved and increased, like a house that has been extensively enlarged and remodeled, in order to gain more freedom. The function of the cranial nervous system was nothing less than the function of choice. In other words, like a telephone switchboard, the animal's cranial nervous system was created to serve the function of withholding and waiting for received stimuli, selecting a mode of action in response to them, and transmitting it to specific organs.

This function of selection was also present in protozoa, which did not have brains or nerves. As one can see, the reaction at this stage appears to be almost a mechanical response. But still, it is the result of the most primitive selection. Starting from this most primitive stage, animals developed their nervous systems to increase the selectivity of their physical behavior. In higher animals, sensory and motor nerves, as well as the brain as a mediator center, were formed. Thus, memory and learning became possible, and even thought and language became possible, starting from simple mechanical responses.

Life forms have been entities that sustain themselves in the interaction between subject and environment. Animals, in particular, express this interaction between subject and environment in a variety of physical behaviors. The evolutionary goal of the cranial nervous system was to make this behavior more effective, freer, and more selective. As animals have evolved in more complex directions, the range of activity has become more extensive and the function of choice has become more free. In other words, the ability to withhold responses, evaluate and judge stimuli, and associate them with a number of motor organs has increased. The development of the animal's cranial nervous system has occurred as it attempts to act more freely in response to its environment.

The function of consciousness appears along with this capacity of the organism to choose, to seek more and more freedom. Consciousness appears above all as an action of memory and foresight, because in order to choose actions, past experiences must be preserved and plans must be made for the future. Consciousness in this sense has developed remarkably, especially in the direction of animals, in an attempt to select more free and diverse actions. And in the course of life evolution, many conscious actions have been differentiated, such as sensation, perception, recognition, judgment, thought, will, and emotion. For this differentiation and development of consciousness, animals required more complex cranial nervous systems.



## From Protozoa to Vertebrates

This conscious action as a function of choice is already seen in unicellular organisms that do not yet have a cranial nervous system but only use chemicals and changes in electrical potentials to transmit stimuli.

The amoeba appears to be a mere mass of protoplasm, but even so, when it encounters something inappropriate for its survival, it engages in an escape behavior with its entire body, and conversely, when it encounters something appropriate, it extends protrusions from the protoplasm and takes them into its body. This reaction is as if the amoeba itself has a will as if it is trying to discern whether something outside is an enemy or not. Here, the action of choice, or consciousness, is already rudimentary.

The same unicellular species, the aphid, when exposed to water with an acid that it does not like, runs away to avoid it, and when it encounters food, it immediately catches it and eats it. Although they do not have a cranial nervous system, they can perceive and judge what is edible and what is poisonous. It is as if they even have feelings of like or dislike toward food and poison.

Furthermore, in ciliates, which are unicellular organisms with somewhat more complex structures, there are thread-like structures in the protoplasm of the body that transmit stimuli. These are created by changes in the protoplasm and are not nervous tissue. Nevertheless, ciliates are able to select their behavior and live freely with only this very simple stimulus-transmitting mechanism.

Although unicellular animals do not have a cranial nervous system, they still choose several different modes of behavior and have a reasonable degree of freedom. Even without a cranial nervous system, there is primordial consciousness and a mind. The action of the mind and consciousness cannot be determined solely as a reflection of brain function. Rather, we must consider that the will to choose and live freely, the action that we call consciousness or mind, is trying to express itself by all possible means, whether it be chemicals, changes in potentials, protoplasmic structures, neurons, or brain centers.

In multicellular animals, neurons were formed to transmit stimuli, which were then organized to form a nervous system that was more efficient in its behavior. For example, *C-elegans*, a relatively simple multicellular animal, uses 302 nerve cells to perform complex behaviors, such as escape and approach, and also has simple memory.

Multicellular animals, even luminal animals, such as hydras, have a reticular nervous system, in which excitation is transmitted in all directions simultaneously. Although typical, their feeding behavior is complex and sophisticated. In the jellyfish, the same luminal animal, the tendency toward centralization is further developed, with longer neuromasts and bundles of neuromasts, which allow for faster and more

complex behavior and autonomous, continuous swimming movements. In echinoderms such as sea urchins and starfish, the number of neural units increases, the sensory organs become more specialized, they can sense environmental changes more finely, and their behavior becomes more directional and well-coordinated. However, echinoderms, like luminal animals, are radial in their system, and their nervous systems could not evolve any further.

It was not until the emergence of left-right hominids that they were able to adapt to their environment through more centralized nervous systems and quick actions. For example, in annelids such as gobies and worms, each body segment has its own ganglion, each of which functions independently and can be precisely localized to a stimulus source. Furthermore, in mollusks and arthropods, some ganglia are controlled by higher centers or brains, and behavior is more complex and varied, ensuring freedom of action. For example, in mollusk gastropods, such as shellfish, habituation and conditioning become possible, as well as the ability to learn mazes and modify behavior. In cephalopods, such as octopi, the brain is the most highly developed in this species, exhibiting a remarkable variety of behaviors and excellent learning abilities. Arthropods, especially insects, also have excellent sensory and motor organs, a well-developed cranial nervous system linking them, and excellent learning abilities. Ants and bees, in particular, show the most advanced behavior of these species.

Furthermore, in the evolutionary lineage of vertebrates that progressed from fish, amphibians, reptiles, birds, mammals, primates, and humans, the cranial nervous system developed to an extreme degree, allowing for more advanced recognition, judgment, learning, and memory-based behavior than in previous animal groups. Using their acute sensory organs, they were able to accurately perceive stimuli from the outside world, compare and integrate them with their memories of past experiences, and take appropriate action through their superior motor organs. Thus, they became more proactive in their approach to the environment and their freedom of action increased dramatically.

In particular, the mammalian stage required advanced integration of many senses, including sight, smell, hearing, touch, and taste, which led to the development of association areas in the cerebral cortex and an abnormal increase in brain weight. Among other things, this growth was explosive in primates and humans, and in humans, it enabled the use of advanced language and sophisticated tools.

### **The brain as an expression of cognitive will**

Thus, cranial neural mechanisms have become more complex over the long history of life evolution. Why do cranial neural mechanisms evolve in a certain direction and become irreversibly more complex?

Neither mechanistic evolution nor physiology can fully explain this.

Neo-Darwinism and other mechanistic evolutionary theories explain life evolution in terms of the principles of mutation, natural selection, and survival of the fittest, but they cannot explain the entire evolution of cranial nervous systems in a certain direction. Even if one only glances at the process of increasing complexity of the cranial nervous system of animals, the process of increasing complexity is an evolution toward a certain direction, and cannot be considered as something that occurs by chance like mutation. In addition, there has not been any variation in the natural environment that can explain each and every one of these cranial nervous system evolutionary processes. Even in the absence of natural environmental variation, the complexity of the animal cranial nervous system mechanism has evolved only in a single step.

Animals with more complex and differentiated cranial nervous systems would have been able to produce more offspring in a given natural environment because they were able to behave in ways that were advantageous to their survival. However, this is not a result of selection by the natural environment, but rather the animal actively overcame the constraints of its natural environment by developing its cranial nervous system. Furthermore, nature has not necessarily destroyed all animals at lower evolutionary stages. Animals with simpler cranial nervous systems have survived through a wide variety of changes in the natural environment. If we can think in such a way, then the evolution of the cranial nervous system of this animal should be seen as having evolved with a purpose in a certain direction, regardless of the principles of natural selection and survival of the fittest.

Physiology indeed observes that the complexity of cranial nerve organs and the complexity of mental functions parallel each other. Hence, one might consider that the mind is nothing but the product of brain activity. However, physiology hardly attempts to explain why these cranial nerve organs have evolved and become complex. Generally, physiology mainly considers only the material and dynamic factors in explaining biological phenomena. Even when explaining the function of the brain, it meticulously analyzes its constituents such as nerve cells and the exchange of substances or information therein, and concludes that such functions reflect mental activities. However, it keeps its eyes closed to why such a complex mechanism as the brain emerged. To adequately explain why the brain emerged and why it evolved toward greater complexity, one must consider the morphogenic and purposive factors.

Suppose we want to describe the behavior of a certain young man writing a love letter to a certain woman. In this case, physiology tries to explain the behavior by the skeletal and muscular movements of the young man's hands and arms, the movements of the motor nerves that give commands to them, and

the exchange of substances and information between neurons in the cerebral cortex and limbic system that give commands to those motor nerves. However, such material and power factor explanations alone do not sufficiently explain the behavior of writing love letters. Before that, one would have to consider, above all, the will of a young man to write a letter to a woman because he likes her. Rather, it is precisely because such a will toward a purpose was at work that the brain mechanism worked and the skeleton and muscles of the hands and arms moved.

The life phenomenon of brain evolution is also limited by the mechanistic explanation of physiology, and we will inevitably have to consider the self-forming ability of the brain to move toward a certain goal. Life forms, especially those that have evolved in the direction of animals, have generally tried to survive by sensing the external environment better, judging it more accurately, and working on it by more effective means, in order to survive. Animals have been driven by powerful internal tendencies with such orientations. It is for this reason that animal nervous systems and brains have become more complex and evolved. In this respect, in the evolution of the brain, as in psychosomatic diseases, the relationship between the living entity and the environment, or the action of the mind, is acting on the substance called the brain. The brain also evolves through interaction with the environment. The brain is a substance, but it is a substance with a mind.

When considering the evolution of the brain, we must also consider life as a purpose-seeking entity. It is not because of the brain that perception, recognition, memory, judgment, emotion, and thought are possible. It is because we perceive, recognize, remember, judge, think, and try to exercise our emotions that we create a brain, which then becomes more sophisticated. The will to perceive and judge creates the brain. The workings of the mind, which in the primordial stage were only simple choices, differentiate and develop into more sophisticated sensation, perception, recognition, judgment, memory, thought, and emotion as they become more sophisticated. This creates complexity and division of labor in each of the brain's mechanisms. In this sense, the brain is an instrument of the mind. Behind the evolution of the brain, we must consider that life is oriented toward betterment and that the universe's self-forming forces are at work to make it more orderly.

**(Source: Michinori Kobayashi, [Life and the Universe], [Philosophy of Life] Collection 1, Minerva Shobo, 2016, Chapter 6, 4)**