Structural realism and eternalism can solve the mind-brain problem.

Hiro Inuki

1 Meta problem

Why does the mind exist? This question may seem ridiculous, for without the mind, one cannot think or act. However, brain science appears to explain all human activity purely in physical terms. Thus, the so-called "physical causal closure" is a plausible theory. This fact raises many questions. Does the material brain generate consciousness? But then, doesn't consciousness play a causal role? If so, what exactly is consciousness or qualia? The history of the philosophical mind-brain (mind-body) problem begins with Descartes in the 17th century, yet we have yet to find a plausible solution. All of the various theories on the mind-brain problem have serious flaws. Why is the mind-brain problem still at an impasse?

I think the reason is that the mind-brain problem is being studied in a way that is not coordinated with meta-level metaphysics. Any metaphysical problem must be subordinated to and coordinated with the meta-level metaphysical problem. Meta-level metaphysics, as it relates to the mind-brain problem, includes the following issues.

Meta 1. Space-Time problem (to which the causality is subordinated)
Meta 2. Realism/Anti-Realism

Meta 1 is the fundamental problem of metaphysics. Since all things exist in space-time, the space-time theory affects all metaphysical issues. An important topic of the mind-brain problem is the issue of mental causation. If presentism which affirms the reality of "change" in the world is valid, then causality is a sub-

concept of change, and therefore, the possibility that causal relations are also real is accepted. If, on the other hand, eternalism, which denies the reality of change, is valid, then causality is not real.（But the eternalist does not deny causality altogether). Then the issue of mental causation must also be fundamentally reconsidered.

Furthermore, philosophy of time is directly related not only to the problem of causality but also to the constitutive problem of qualia (so-called "hard problem") which concerns how qualia are generated and annihilated. If we assume eternalism, which denies the reality of change (since nothing is generated or annihilated in the universe), we may be able to eliminate the constitutive problem of qualia itself.

Meta 2 is the question of what is to be "real" and is still controversial in the field of philosophy of science. As will be discussed later, many of the proposed solutions to the mind-brain problem stem from a category confusion between "mind" and "material brain," which makes the mind-brain problem more chaotic. Furthermore, the problem of real also includes the problems of time and space (as is the case in Immanuel Kant's philosophy). Although the mind-brain problem is at an impasse to the point of seeming unsolvable, a solution may be found if it is investigated in conjunction with the meta-problem mentioned above. In particular, I believe that structural realism in the philosophy of science and eternalism in the metaphysics of time can be a sliver bullet to solve the mind-brain problem.

2 Overview of the mind-brain problem

There are many theories about the mind-brain problem, but the most predominant theory is materialism, which ontologically assumes the mind-brain identity theory(or more strictly, the token identity theory).

Anyone know, When brain injure, then mind state change. Then We think mind and brain closely correlate. Descartes proposed substance dualism based on the obvious brain-mind correlation. However, if the mind and the brain are different entities, a difficult problem arises as to how they interact with each other. To avoid this difficulty, Property dualism was proposed in the early 20th century. (Neutral monism is a similar theory,) in which the brain and mind are two properties of one entity. However, most modern philosophers consider the principle of physical causal closure to be true. If physical brain activity alone can explain all human behavior, then even if we assume that an entity has both mental and physical properties, consciousness cannot play a causal role, and therefore, we do not know why mental properties exist.

Thus, in modern times, the predominant position in the philosophy of mind is materialism, i.e., reductionism, which holds that mental properties appear epistemologically different from physical ones, but ontologically reducible to the physical brain. In orthodox materialism, a particular mental state is always

considered to be identical to a particular brain state. This is the mind-brain identity theory.[1]

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1 This is a simplistic explanation, and although there are many theories of materialism, and also dualism. This paper will not examine individual theories. If you would like to know more about the various theories of the mind-brain problem, please refer to Chalmers (2010).

All physical phenomena in the world are scientifically explainable, and mind seems incapable of acting on the physical world. Thus, the majority of philosophers support materialism that assumes the mind-brain identity theory, in which the mental things can be ontologically reduced to the physical things.

Are brain and mind the same thing? Intuitively, however, the brain and the mind seem quite different. When you have a toothache, if you open your own skull and look in a mirror, You can see the brain but not the toothache. Thus, identity theory and reductionism seem unbelievable.

Dualists have criticized materialism using various thought experiments. For example, '*What Is It Like to Be a Bat?*' by Thomas Nagel (1974), '*The Chinese Room Argument*' by John Searle (1980), '*Mary's Room*' by Frank Jackson (1982), '*Inverted Earth*' by Ned Block (1990), '*The Philosophical Zombie*' by David Chalmers (1996). These thought experiments point out that materialism explains nothing about qualia.

It is certainly possible to imagine a situation where I am looking at a red light, while another person, looking at the same light, perceives it as green and believes that the term "red light" refers to "green." The most powerful conceivability argument is the zombie argument proposed by Chalmers, who argued that a zombie-like being whose state of consciousness (qualia) is not correlated with any brain state is conceivable. Suppose, for example, that there is a duplicate of me in another universe distinct from this one, and that my duplicate and I have exactly the same physical structure and the same brain state. The argument is that it is conceivable that I feel pain while my duplicate is a zombie who does not.

Scientifically speaking, it is impossible to conceive of a situation in which the physical state is the same but the mental state is different. Many scholars, accustomed to the scientific method and scientific thinking, cannot think like Chalmers. But philosophical zombies seem to be able to conceive. If zombies are capable of conceiving, then the metaphysical possibility that my duplicate in another universe lacks qualia and yet is capable of saying and doing the same things I do cannot be denied. The zombie argument is a *reductio ad absurdum* that if materialism, which regards consciousness as a "function," is correct, then qualia have no function, i.e., materialism explains nothing about qualia.

It seemed as if materialism had succeeded in thoroughly reducing mental things to physical things ontologically, but in fact it has failed to explain why the mental

things that must be reduced exist in the first place. Therefore, materialism is false —this is Chalmers' contention.

Certainly materialism has major flaws. However, in my opinion, no matter what the mind and the brain must be identical. The scientific explanatory power of the relation between brain activity and conscious experience is so high that if the mind and brain were separate entities, interaction seems impossible. And property dualism, which holds that the mind is a different property of the same entity as the brain, also fails to explain why mental properties exist. If physical causal closure is true, then mental properties would have no function. Property dualism suffers from the same flaws as substance dualism.

I think physical causal closure is true. This raises the possibility of the epiphenomenalism, which regards qualia as mere derivatives of brain activity that do not cause causal effects. The epiphenomenalism says that if the brain is likened to a locomotive, qualia are like the smoke emitted by the locomotive's engine. This is also a difficult theory to believe.

The controversy over the mind-brain problem is caught in a dilemma and is utterly puzzling. In my view, the reason for this dilemma and confusion is that the contemporary mind-brain problem arises from a category mistake regarding "mind and matter." Rethinking these categories would be the first step toward making progress on the mind-brain problem.

3 Category mistake

There are certainly good reasons to separate the mental from the physical. For example, one can see the hand, but not the pain of the hand. Thus one is tempted by naïve dualism. However, the physical "hand" and the mental "hand pain" may actually be in the same level of categories and have no decisive difference.

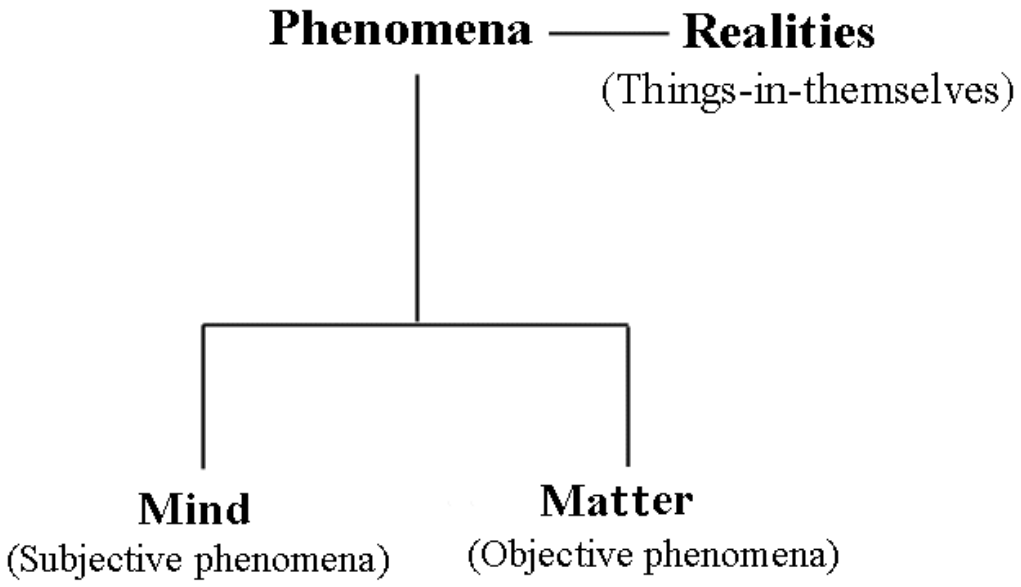
Kant's philosophy should be reconsidered here. In Kant's metaphysics, there is a fundamental distinction between phenomena and things-in-themselves (reality). Phenomena are manifestations of consciousness—in other words, they encompass all the contents of consciousness. Kant argues that phenomena do not perfectly represent reality. For example, when looking at an apple, an ordinary person would think that the same visual image of an apple exists outside of consciousness. This is naïve realism. Kant rejects this realism. He argues that the apple itself (the real apple), which causes the visual perception of the apple, is completely unknowable. Because he denies realism, Kant's philosophy is a kind of idealism, and Kant calls his philosophy "Transcendental Idealism."

I do not subscribe to Kantian idealism, and I am a naturalist. But I believe Kant was right to separate phenomennon from thing-in-itself. We can only infer real things from sense data, and we can never directly experience reality itself.

In the realm of contemporary philosophy of science, various controversies over scientific realism still persist. Among them is structural realism, which originates from Kant's epistemology and was advocated by John Worrall (1989) via Henri Poincaré (1902). This theory can be regarded as a revival of Kantian epistemology I believe that structural realism is one of the theories to solve the puzzle of the mind-brain problem. Since the principle of physical causal closure seems to be true, dualism cannot explain the reason for the existence of the mind. Therefore, the mind and the brain must be identical in some sense. However, the materialist identity theory fails to explain why the mind exists, and I believe that Structural realism can correct the flaws of that materialistic identity theory.

In what follows, Let's reconsider naïve dualism from Kant's epistemology. Many philosophers have classified the subjective things that we experience, such as sensations and thoughts, as "mind," and the objective things that we can share with others, such as the body or a car, as "matter." From Kant's viewpoint, however, these are all subcategories of the category of phenomena. The classification is illustrated below.

Fig 1



Phenomena are, in essence, all the contents of consciousness. Physical things (such as a table or the sun), which are generally opposed to mental things, are also phenomena that can be shared with others. Since all phenomena are originally private as a manifestation of consciousness, mind or qualia, which are subjective phenomena, are even more private than the objective phenomena.

Fig 1 should help you understand the meaning of the category confusion described above. In general, the mind-brain problem is considered to be a

correlation problem between the mental entity, such as qualia, and the material brain, i.e., "mind and matter," which are two different categories. I can call this category mistake as "M-M Correlation," In reality, mind and matter are in the same category of "phenomena," and people just arbitrarily divide their contents into "mind" and "matter."

In short, the mind-brain problem is a struggle against M-M Correlation, which implicitly assumes naïve realism that physical things are real outside of consciousness. There are serious flaws in the various theories of the mind-brain problem, and these flaws are caused by this category mistake.

What the zombie argument exposes is the impossibility of reductionism, which, as can be seen in Fig 1, reductionism attempts to reduce one phenomenon to another, a contradiction in which simultaneously perceived different phenomena are as identical. In fact, matter and qualia are in the same category of phenomena. So what is the correct category understanding? Fig 1 should tell you. The relation between phenomenon and reality is the problem. The true mind-brain problem is not the problem of mind and brain, but the problem of mind and reality. I redefine the mind-brain problem as follows.

> ***The mind-brain problem is the problem of the correlation between phenomenon and reality.***

This definition could be called the P-R Correlation problem.

However, if scientific explanations can account for most phenomena in the world, one will inevitably be tempted by naïve realism. I do not intend to deny realism or advocate idealism. Real things must exist in some sense, the question is how they exist. In the following, I would like to introduce my own approach to solving the mind-brain problem while examining realism.

4 Overview of the Controversy over the realism

There is good reason for the average person to naively believe that material objects are real. When you see a skyscraper in your field of vision and close your eyes, the visual image of the skyscraper disappears. However, when you open your eyes two seconds later, the visual image of the skyscraper reappears. It seems that the regularity of this visual phenomenon cannot be explained without the existence of a skyscraper outside of consciousness. This is the naïve realism. However, philosophically defending that naïve realism is more difficult than one might think. It was Descartes who regarded material and mental things as different entities, but John Locke (1690) reclassified them in terms of the primary and secondary qualities of matter. Locke classified the properties of matter itself, such as shape, number, and size, as primary qualities. and the properties of color, taste,

and heat, which are produced by the action of matter on the human sense organs, as secondary qualities.

In the realism debate, it seems unquestionable that primary qualities exist outside of consciousness, and so called "metaphysical realism" and "scientific realism" are philosophical modifications of naïve realism. However, if we assume that the primary qualities of material objects exist as they are perceived by people, then physical causal closure allows explain human behavior and conscious activity through scientific explanation alone, and we will not know why mental objects exist in the world.

Kant rejected realism through the argument of antinomy. If the passage of time and space are real, then time and space have infinite parts. since the infinity means "Potential Infinite", the "Actual Infinite" is a contradiction. if infinite things are real, then they are contradictory, so the passage of time and space do not belong to the reality (things-in-themselves). According to Kant, time and space are immanent to consciousness as forms of sensibility. This forms the foundation of Kant's transcendental idealism. However, if time and space are not real, then phenomena would not have corresponding reality, and it is unclear how people can experience the regularity of phenomena. Kant attempted to explain the experience of regularity of phenomena by the constructive method of transcendental idealism.

However, I do not think that Kant's idealistic attempt to explain regularity is successful. As aforementioned, Kant's idealism begins by distinguishing phenomena from things-in-themselves. If I see a table, for example, there is no "real table" corresponding to that visual table. The phenomenon of the object, the table, does not represent the object itself. The notion of the thing-in-itself implies that the "real" is unknowable. Kantian philosophy is dualism. It is fundamentally idealism because it denies that phenomena directly correspond to reality, yet it is not far removed from Locke's representationalism and can be considered a kind of realism, unlike George Berkeley, who denied reality outside consciousness.

Although realism has been variously defined by philosophers, I consider the minimal conditions of philosophical realism (including scientific realism) to be the following two.

Condition 1, Metaphysical commitment.
The entities exist objectively and mind-independently.

Condition 2, Epistemological commitment.
It is possible to obtain of significant portion of knowledge about mind-independent reality.

Condition 1 needs no explanation. Condition 2 simply states that when a person perceives a 2-meter-long table as a visual image, the entity outside of

consciousness is the 2-meter-long table, not a 15-centimeter-long cell phone, just like the visual image. In the contemporary debate over metaphysical realism and scientific realism, most philosophiers take the above two theses as requirements for realism. However, structural realism, which has emerged in recent years, revises the above Condition 2 thesis. This theory fundamentally revises realism and may offer a solution to the mind-brain problem.

Structural realism is a type of scientific realism, the theory that only the mathematical structure of the world as described by science is definitely real. The prototype of structural realism dates back to Henri Poincaré in the early 20th century, as mentioned above. Poincaré inherited Kant's distinction between phenomena and things-in-themselves, and argued that one can recognize only relations between phenomena. Similar arguments can be found in the works of Arthur Eddington (1939). And it was John Worrall (1989) who reformulated these ideas as modern scientific realism.

In the history of science, hypotheses to explain phenomena (e.g., ether or phlogiston) are often discarded later. This is called "pessimistic induction." Then we have no reason to accept the realist's claim that our currently successful theories are approximately true. This argument, known as the "pessimistic meta-induction," was formulated by Larry Laudan (1981).

In defense of scientific realism against the pessimistic meta-induction, Worrall argued that although the reality of physical objects is unknowable, only the description of relations among phenomena, that is, the mathematical structure of the world described by physics, can be recognized as real.

Later, James Ladyman, Stephen French, and others proposed their own structural realism and called their position "Ontic Structural Realism (OSR)," and distinguished Worrall's position by calling it "Epistemic Structural Realism (ESR)." In addition to the pessimistic meta-induction motivated by Worrall, there is the problem of the indeterminacy of quantum objects, which is the motivation for Ladyman et al. to argue for an ontological structural realism. For example, an electron may be treated as an individual, but it may also be treated as a non-individual, a "field" in quantum field theory. Then what is a quantum object? Based on this problem of indeterminacy, Ladyman et al. argued for the non-existence of quantum objects and maintained that what is truly real is the mathematical structure that describes them. particle and field are two different metaphysical representations of the same structure. This means the physical structure of the external world is real, but it is reduced to a mathematical structure.

In summary, ESR distinguishes between "realities" that exist independently outside of the phenomena of human consciousness and "scientific theories" that people construct for phenomena, and claims that the mathematical structure of the world described by scientific theories is true while the realities are unknowable.

OSR does not acknowledge the unknowable reality assumed by ESR, but asserts that the mathematical structure of the world as described by scientific theory is the reality. and OSR claims that there are no 'things'—only structures exist, and, in particular, there are no individual entities.

Structural realism is sometimes regarded as an approximation to scientific anti-realism because it is a rather radical claim compared to traditional scientific realism. Modern structural realism, which is based on the Poincaré philosophy as its prototype, can be interpreted as a recursion of Kantian philosophy, going against the previous trend of scientific realism. Of course, structural realists are realists and naturalists, not idealists. They make radical claims only to defend scientific realism.

From the perspective of the philosophy of mind, structural realism can be seen as a form of dualism between "phenomena" and the "physical structure (reality)" of the world. It split from Kant's idealism in that it regards mathematical structures as real outside of human consciousness.

Just to avoid any misunderstanding, structural realism is limited to microscopic objects that cannot be observed directly, such as particles, while OSR does not question the reality of macroscopic objects, which they refer to as "everyday objects," that can be directly observed (French & Ladyman 2003a). However, since macro objects are also composed of micro objects, it is inconsistent to modify the ontology only for micro objects, and the demarcation between micro and macro by French and Ladyman is ill-founded.

Even if we were to deduce OSR's argument to a macro object such as a chair or the sun, nothing ontologically should change. I interpret OSR's denial of the existence of a micro object as a paper-thin denial of a macro object. I believe that OSR claims should be extended to macro objects. This claim of mine might be called "Global Structural Realism (GSR)." Such an assertion may be equated with idealism, However, it is different from idealism because I acknowledge that the physical structure of the external world (the mathematical structure that describes it) is real. Thus, I remain a realist.

I argue for GSR for the logical reason that, in addition to the problems of pessimistic induction and quantum mechanics, it eliminates Zeno's paradox and Kant's first and second antinomy (problem of infinity and infinite division） which Kant based his own idealism. Although most mathematicians and some philosophers have concluded that infinite problems, including Zeno's paradox, can be solved mathematically, there are many scholars who are not satisfied with their mathematical solutions. I am one of them. The problem of infinity differs between mathematics and philosophy. In mathematics, the question is how to calculate the existence of an object assumed to be infinite, whereas in philosophy, the question

is whether or not infinite things actually exist in the real world. Many philosophers consider "Actual Infinite" to be a contradictory concept.

If there were an infinite number of objects in the real world, there would be a contradiction in that there would be a complete set of natural numbers that could be mapped to that infinite number of objects. Zeno's paradox and Kant's infinite division of space asserted in the second antinomy show that if space is real, then it is in fact infinitely divisible and the infinitesimal is tantamount to actual existence, i.e., a contradiction. Hence the logical conclusion that phenomenal space is not real. These are the reasons why I developed the OSR into the GSR.[2]

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2 I will not detail the problem of infinity here, but I wrote about the problem of infinity in Hiro Inuki(2024).

GSR considers real space to be a physical parameter. I think that "size," "length," and "magnitude," which are thought to be properties unique to space, pertain only to human phenomenal experience. This means that physical objects, as things that occupy space, do not exist as mind-independent realities. This is similar to Kant's idealism, which regards space as a form of sensibility, but unlike Kant, I regard space as a physical parameter that is mathematically described and exists as a reality independent of consciousness. And the mathematical structure of material objects, such as energy, quantum fields, and mass within that space, is also real. For example, "a giant orange sun" is not real, but "a physical sun described mathematically" is real. Only by denying the reality of phenomenal space can material objects become abstract mathematical structures (which opens the possibility for a new identity theory, discussed below). Originally, the sun as described by physics is only a numerical value with diameter, mass, and energy as physical parameters. Therefore, GSR is not contrary to science, and unlike Kant, I can still be a scientific realist and avoid what Hilary Putnam (1975) calls the "No-Miracles argument."

GSR should be understood by analogy with computer programs. Any program is translated into machine language, which is written in binary numbers of "0" and "1", and stored in memory. Only when the program is executed by the CPU does the triangle or circle appear on the monitor. The mathematical structure of the real world that represents triangles and circles to human consciousness is analogous to a computer algorithm. Pi (π), parallel (||), right angle (∟), etc. can be considered to exist in the world as algorithms. For reference, John Wheeler (1990) regarded abstract "information" which is neither matter nor energy, as a fundamental reality and described his worldview in terms of "*it from bit,*" Wheeler's argument may be similar to that of OSR and myself.

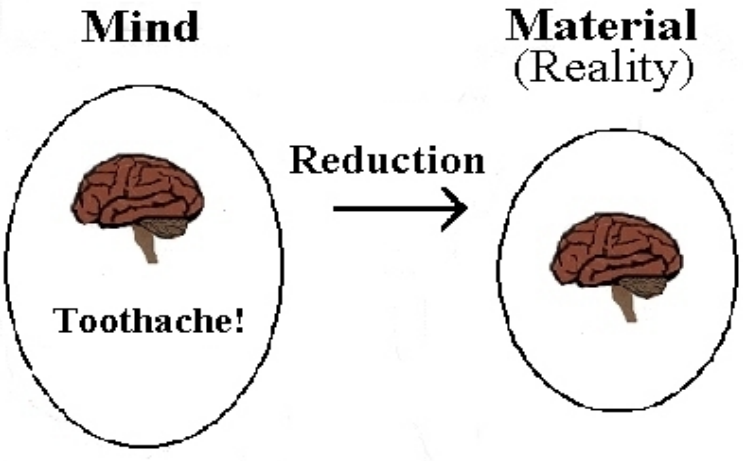
Natural science is essentially, as Poincaré pointed out, a mathematical description of the relation among phenomena that people experience. Of course, such

mathematical descriptions sometimes suggest the existence of theoretical objects such as particles that cannot be experienced by humans. However, the existence of such theoretical objects can only be described mathematically. Whether the object is a particle or the sun, one can never perceive the object itself (thing-in-itself).

It is important to note that drastically scaling back "epistemological commitment (one of the minimum conditions of realism)," does not necessarily make one idealist, but still allows one to be a naturalistic realist. Even if we deny material reality, we can still avoid the so-called "no-miracle argument" because we acknowledge that the mathematical structure of the world exists independently of human cognition.

There is many criticism of structural realism. Although the controversy surrounding realism is too complex to be detailed in this paper, I believe that structural realism (more precisely, GSR) is true. Assuming structural realism, there should be a possibility of resolving the mind-brain problem. Recall Fig 1 above. Existents can be broadly classified into phenomena and realities, and the phenomena can be classified into subjective phenomena and objective phenomena. Naïve realism is the mistaking of objective phenomena for realities outside of consciousness. Modern mind-brain problems are overwhelmingly dominated by materialism, which assumes naïve realism and attempts to reduce subjective phenomena to objective phenomena ontologically. However, it is a category mistake that tries to reduce one phenomenon to another. Let me illustrate this category mistake in an easy-to-understand manner. Fig 2 below shows a materialistic reductionist view of a toothache, in which we assume that we open our own skull and look at our own brain in a mirror.

Fig 2 Reductionism
(Materialism)



If you look at Fig 2 with Fig 1 in mind, you will see the category mistake of "ontological reduction." Reductionism is an attempt to equate the objective phenomenon of visual images of the brain with reality, and to reduce the subjective phenomenon of toothache to that reality. This method actually, is the assertion that subjective and objective phenomena are one and the same. It is an error to equate an objective phenomenon with the real, a contradiction to say that multiple phenomena that are different are one.

This category mistake is the cause of the chaos of the mind-brain problem. One phenomenon cannot be reduced to another phenomenon in the same category. And materialistic reductionism has not succeeded, because if scientific description alone is the only explanation, then it is possible to conceive of zombies which lacking consciousness.

The greatest mistake of reductionism is to equate matter (objective phenomenon) with reality. The root of the problem is not the relation between phenomenon and phenomenon. It is the relation between phenomenon and reality that must be probe. I mentioned above that naïve realism is simply wrong. But there must be some reality corresponding to the material phenomena that is the reason for the regularity of the phenomena. I believe that it is the reality claimed by structural realism, which has its origin in Kant's philosophy and has emerged in our time via Poincaré. If we assume structural realism, we can deny reductionism and illustrate phenomena and realities as one entity as follows.

Fig 3

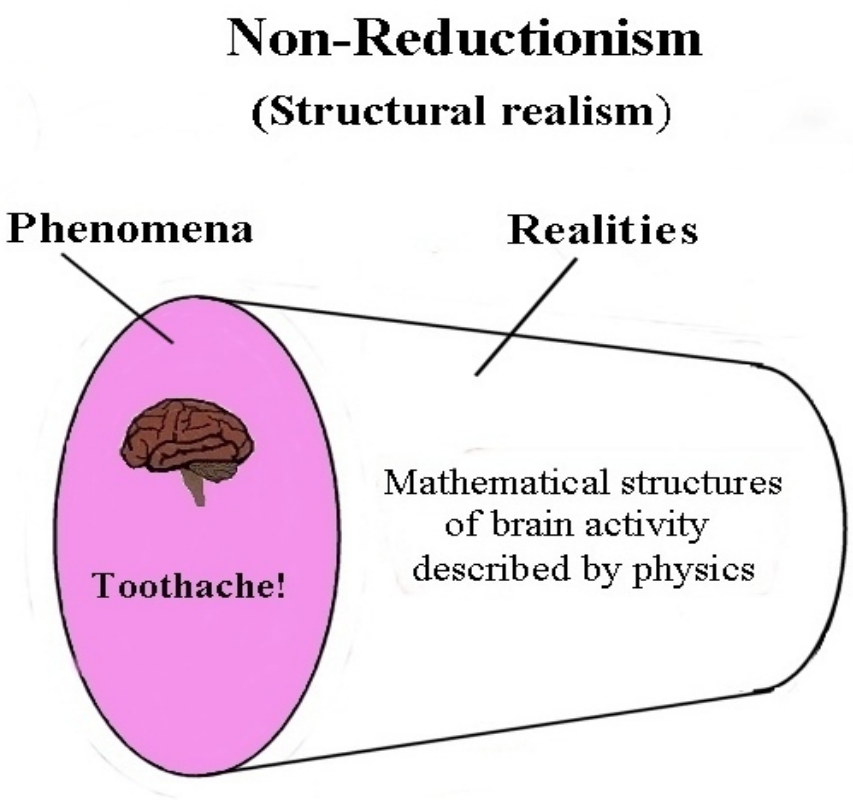


Fig 3 also shows the situation when you open your skull and look at your brain in the mirror when you have a toothache, where entity is represented by a cylindrical shape and the phenomena is represented by a pink surface, the realities are representing the mathematical structure of the brain as described by physics by inside the cylinder, based on the assumption of structural realism. The characteristic of this non-reductionism is that it regards "the real" as the scientific structure of the phenomena (Mind). The essence of this theory is described below.

Essence 1.

All things have a scientific structure.

Essence 2.

Mind's scientific structure is the physical brain.

Essence 3.

The real brain is not material but a mathematical structure described by physics (global structural realism).

This non-reductionism avoids the difficulties of reductionist identity theory. If you look at your brain in a mirror and see a visual image of your brain when you have a toothache, then the toothache and the visual image of the brain are not identical with the real material brain. The reality is that it is a mathematical structure describing the brain. If we assume structural realism, we can avoid the difficulties that existed in the M-M Correlation, which assumes that mental pain and the visual image of the brain are identical with the physical brain. It is not the brain that is identical to phenomena such as toothache, but the mathematical structure of the brain. This is the P-R Correlation. The mind and the brain can be identical by virtue of the fact that the real brain is an abstract mathematical structure. This can be called the "Identity theory of mind and structure."

I may be physicalist. All things in the world have a scientific structure. Phenomena (mind or qualia) also have a scientific structure. The scientific structure of "pain quale" is the physical state of the brain. However, the real brain does not exist as material. If we assume that the material brain is real, it becomes M-M Ccorrelation, and an explanatory gap arises. And the conceivability of zombie cannot be ruled out. But if we assume that the real is not material but an abstract mathematical structure, the problem becomes P-R Correlation, and the identity of the brain with the phenomenon can be explained without difficulty. If we assume that any qualia exists by scientific principle (structure), then zombies should be metaphysically impossible.

5 Problem of mental causation

Even if the above argument can explain the identity of the mind and brain（phenomena and realities） without difficulty, it cannot resolve the problem of mental causation.

Mental things (like pain quale) have a scientific structure in the sense of structural realism, that is, the mathematical structure of the brain, and that scientific structure of the brain is connected to the scientific structure of the physical world, which seems to be the cause of the emergence of qualia. For example, when a person sees a red light at an intersection, the physical traffic light emits light of a specific frequency, which is received by the person's retina, which sends signals to the brain, causing neurons in the brain to form complex firing patterns. The brain's activity causes the person's extremities to operate.

The point is that even if a person seems to stop at an intersection because he experienced a red light quale, if scientific explanations alone fully account for human behavior, the question of why there are qualia in the world remains unresolved. This is the hard problem of consciousness and mental causation.

The problem of mental causation is namely the problem of causality. As I argued opening section, since causation is a sub-concept of time, we must probe the problem of time in order to consider the problem of mental causation.

It is well known that David Hume was skeptical about the reality of causality and regarded it as mental habit or custom. Modern metaphysics of time can be interpreted as denying the reality of "change" and thus also denying the reality of causation, thus affirming Hume's claim. Causation is a sub-concept of temporal change. The phrase "something causes something to happen next" already includes the concept of change. The ordinary person may consider the assertion that change is not real to be bizarre, but in philosophy, the theory that denies the reality of change is called eternalism.

Eternalism acknowledges the reality of "time" as described by theory of relativity, but not the reality of "change" and "flow of time." It is generally believed that time and change are inseparable, but eternalism separates them. And B-theory (which originated by J.M.E. McTaggart) is the epistemological concept of eternalism, and eternalists think time can be explained by B-theory.

The first physicist to explicitly deny the reality of change by interpreting special relativity was Hermann Weyl (1927). Weyl argues that four-dimensional spacetime is an entity, following Minkowski, Weyl regarded four-dimensional spacetime as an entity, and clearly states that "*The objective world simply is, it does not happen.*" Einstein (1952) also later supported the claim that four-dimensional spacetime is an entity. Today, many physicists and philosophers support eternalism.[3]

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3 To name a few examples: Paul Davies (1995), Brian Green (2004), Max Tegmark (2013), Kip Thorne (2010), J.J.C. Smart (1949), W.V.O. Quine (1960), Theodore Sider (2001), Thomas M. Crisp (2007), Simon Prosser (2008).

Eternalism describes the four-dimensional spacetime as an entity in which time and space merge in a block-like diagram. That entity is also called the "Block universe." The block universe contains the concepts of eternalism and B-Theory. eternalism considers that the ancient dinosaurs, the events of 2023 AD present, and the events of 3000 years in the future all exist permanently inside that block universe. Presentism as opposed to eternalism holds that only the present is real, that the past was once real but is not now, and that the future will eventually be real but is not now. This is a theory of time that acknowledges the reality of change and the naïve person's understanding of time, but in contemporary metaphysics of time, there is a considerable preponderance of theorists who support eternalism because of its affinity with special relativity and McTaggart's theory of time.

Eternalism has many advantages. First, it has the advantage of avoiding the problem of the "beginning of time" in Kant's first antinomy. Furthermore, this paper assumes structural realism, but there is a criticism as "*structural realism cannot account for causation* (Jacob Busch 2003)." But if we take eternalism as true, we can avoid that criticism by making causality intrinsic to consciousness.

In addition to the problem of causality in the philosophy of mind, there is the fact that the constitutive problem of qualia can be resolved. Many scholars believe that the brain makes the mind, and describe it as "material brain generate qualia" or "physical processes in the brain give rise to consciousness" or "mind is produced by brain," and the like. Although those expressions assume the theory of "Emergence," the concept of emergence seems no different from that of "magic." Thomas Huxley (1866) expressed the wonder of mental phenomena when he described, "*The appearance of a state of consciousness by the activity of nervous tissue is like Aladdin in the story, who rubs his magic lamp and a magician appears.*" This wonderment has not been entirely resolved in the present day, and has been raised by Chalmers (1994 The Science of Consciousness conference held in Tucson, Arizona.) as "The hard problem of consciousness," in the area of contemporary mind-brain problems.

By the way, there is a theory called panexperientialism (a form of panpsychism), which postulates a kind of rudimentary consciousness in particles and claims that a complex experience of consciousness arises from their combination. However, I interpret that as an irrational explanation, like "if you add four reds and two sweetnesses, you get love." The panexperientialism does not deal well with the constitutive problem.

However, assuming eternalism, there is no need to consider the extreme difficulty of the constitutive problem of qualia because consciousness at each point in time red, pain, love, and so on, is merely permanent at each location in four-dimensional space-time.[4]

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4 In eternalism, neither qualia nor bodies at each point in time ″arose″ from any cause, and even the event of the Big Bang is merely permanent. Many will find this theory hard to believe, but I think this wonder will ultimately be reduced to the *Ultimate Question*, ″why is there something rather than nothing?″

Eternalism denies change and therefore denies the existence of causal relation, including the concepts of generation and annihilation. However, since the four-dimensional spacetime is formed by physical laws, each event in spacetime necessarily exists according to physical laws, and from the human perspective, it is no different from the existence of causal relation. For exmple a train running at 50 meters per second will not be at a point 700 meters ahead two seconds later. And eternalism is not to deny the evolution of the universe starting from the Big Bang, nor is it to deny the theory of evolution in biology.

Causation is not real, but from human's point of view, causation is no different from being real. Causation becomes an immanent concept of consciousness, as Hume regarded it, but nothing changes the findings of natural science. Let us now reconsider the mind-brain problem by combining this causal theory with the aforementioned eternalism.

5 Reverse causality

Let us consider the problem of mental causation by assuming that causation is immanent to consciousness. If we adopt structural realism, we can explain the identity between mind and reality without difficulty, but that alone cannot explain mental causation, so we do not know why mental things exist. Then the identity theory based on structural realism would be analogous to the theory of epiphenomenalism or psycho-physical parallelism. However, assuming eternalism may solve the problem of mental causation.

I believe that the problem of mental causation can be resolved by looking at causation itself retroactively. This is inspired by the ideas of Shozo Ohmori (1982). Ohmori is a phenomenalist, and his philosophy is closer to George Berkeley's idealism. Ohmori denied the realism. Ohmori's causal theory is the opposite of the realist causal theory.

Realists believe that when we perceive a physical object, such as an apple, light from a source reflects off the apple, enters the human eye, travels through the optic nerves, and triggers complex firing patterns in neurons, ultimately producing the visual image of the apple.

By contrast, in Ohmori's causal theory, the process begins with the phenomenon of the visual image of the apple, which then necessitates a brain state as its cause, followed by nerve impulses, the entry of light into the eye, and finally the reflection of light off the apple as successive causal conditions. This Omori

philosophy is similar to Kant's constructive idealism. In Kantian philosophy, the objects of perception, including time and space, are constituted by "apperception" due to the forms of sensibility and understanding.

The realist (materialist) and idealist views of causation are opposites as follows.

Realist View.

Lighting → Apple → Eye → Optic nerve → Brain → Visual image

Idealist View.

Lighting ← Apple ← Eye ← Optic nerve ← Brain ← Visual image

The "→" and "←" are the direction of causation, and the order of causation of the idealist is opposite to the order of causation of the realist. Ohmori's reverse causal sequence can be traced backward in time indefinitely, potentially extending as far as the Big Bang. In short, realists (materialists) consider matter to be fundamental and think that "matter is the cause of the existence of mind," while idealists such as Ohmori consider mind to be fundamental and think that "mind is the cause of the existence of matter."

Ohmori's assertion is an epistemological fact. The reason is that one starts from the phenomenon one is currently experiencing and retroactively seeks the cause of that phenomenon. Furthermore, if we assume eternalism, causality is not real and is an immanent concept of consciousness. Then it is acceptable to look at the direction of causality ordinarily or reversely as Ohmori does. The problem of mental causation can be convert.

Although materialism and idealism are opposing ideas, they can be reconciled by assuming a block universe in which ontologically change is not real. Causality in the block universe is immanent to consciousness. In a block universe without change, the physical structure of the world that gives rise to the aforementioned visual images is actually as follows.

Block Universe View.

Lighting — Apple — Eye — Optic nerve — Brain — Visual image

In the block universe, "→" and "←," which represent the direction of causality, are erased. Each event in the block universe can be connected by causal relation, but the materialists see the causal relation in the common sense direction, while idealists see them in the opposite direction. It follows that materialism and idealism have only epistemological differences, but no ontological differences. Materialism (realism) and idealism's view of the block universe contrast as follows.

Materialism.

The past matter is regarded as the cause of the present mind.

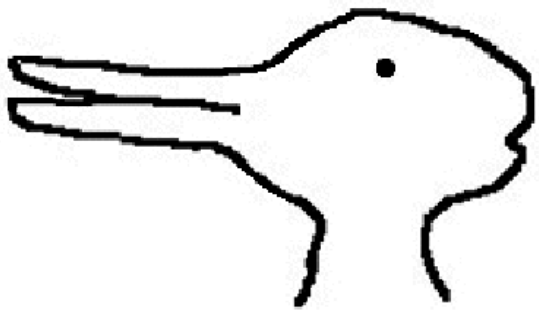
Idealism.

The present mind is regarded as the cause of the past matter.

I assumed structural realism and assumed that the mind and brain (phenomenon and structure), in essence, are identical, but that alone does not resolve the problem of mental causation. However, if we combine structural realism with eternalism and look at the block universe from an idealistic perspective, the reality of objective phenomena such as apples and lighting fixtures can be regarded as the structure of the subjective phenomenon of the visual image. In other words, without mind, there would be no structure (material), which, unlike materialism, can explain the necessity for the existence of mind. Only through this idealistic view can mental causation be explained without difficulty. The block universe permits the idealistic view. And since the mind and brain can be identical according to structural realism, a materialistic view of the block universe can predict future events causally connected to the brain. Even if we adopt idealism epistemologically, it is still compatible with physics. Since eternalism has many supporters among physicists, I see no problem in treating causal relation as immnent to consciousness and considering both "reverse order" and "forward order" views of causal orientation to be correct.

The idealistic argument may seem tremendous, but in fact it is just a different way of looking at the block universe. It accepts the physics explanation in its entirety and just reverses the physical view. It could therefore be interpreted as a kind of physicalism. A theory that reverses the idealistic view of causality can be reconciled with a materialistic identity theory. We can say that both have the same shape, like the following inverted duck-rabbit figure. It is just that when we are looking at the same object and we are looking at one view, we cannot look at the other.

Fig 4 **Duck-Rabbit**



My theory, which combines structural realism and eternalism, is a kind of ontological dualism, since both "phenomena and realities i.e., Mind and structure" are regarded as the fundamental existence of the world. Epistemologically, however, it could be said that idealism and materialism are identical. This is the same as the duck and the rabbit being identical in the Fig 4.When you are looking at one, you simply cannot see the other. Epistemologically, idealism and materialism see the same block universe, only interpreted differently. Many theorists support structural realism and eternalism because of their consistency with physics, so my theory would be acceptable to materialists.

6 Conclusions

I redefined the actual mind-brain problem as a problem of the relation between "phenomena and realities" rather than a problem of the relation between "mind and matter." I also rejected naïve realism and considered only the mathematical structure of the material object described by science is real. In addition, I thought that eternalism was appropriate in the metaphysics of time. If we reconsider the relation between "phenomenon and reality" from these premises, we can conclude that *reality is the structure of phenomenon*.

My method of solving the mind-brain problem consists of the following two theories.

Theory 1.

Assuming structural realism, I regard the reality as the scientific structure of the phenomenon. And I do not regard mind as corresponding to the material brain, but to the mathematical structure of the brain as described scientifically. It explains the identity of mind and brain without difficulty.

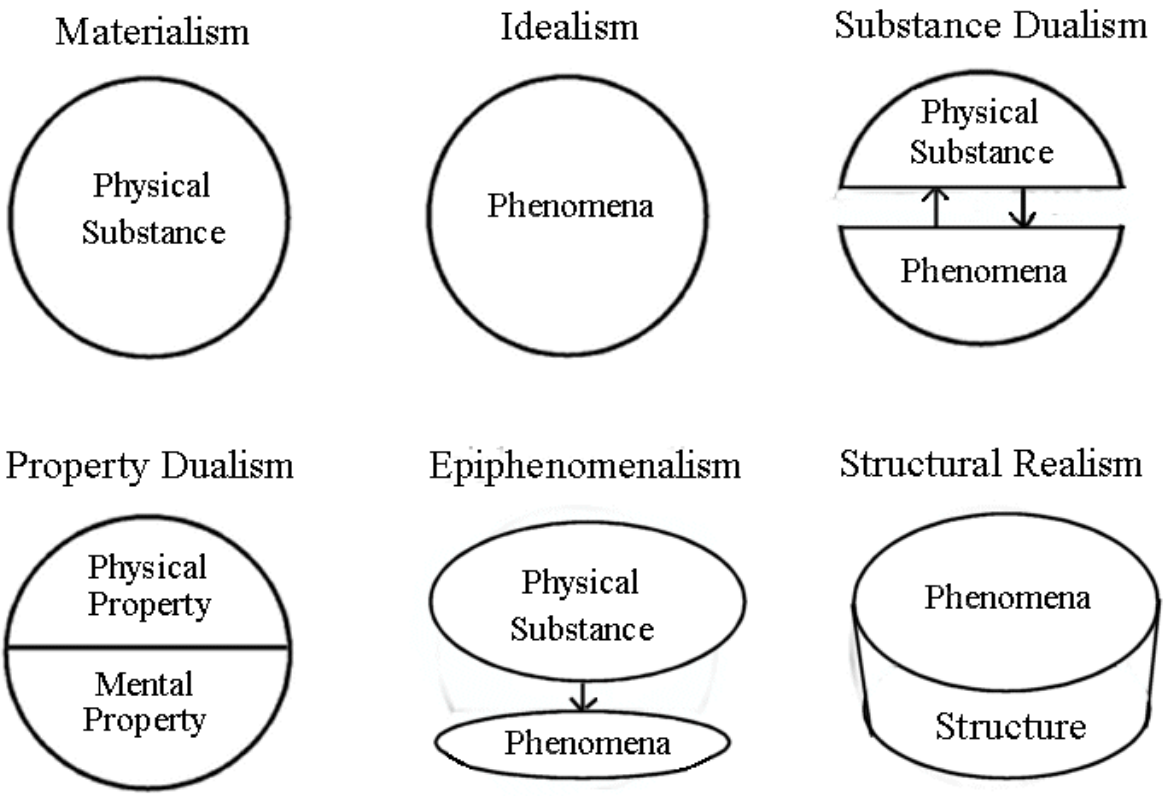
Theory 2.

Assuming eternalism, causality is immnent property of consciousness, and it is possible to view the block universe from either the forward or reverse order. Materialism, which views the block universe in the forward order, "mind exists because there is matter," and idealism, which views the block universe in the reverse order, "matter exists because there is mind," are regarded as merely different ways of viewing the same block universe, thus eliminating the problem of mental causation and the hard problem.

One of the core of my theory is to deny that the mind-brain problem is a problem of the mind-matter relation (M-M Correlation), to redefine it as a problem of the phenomenon-reality relation (P-R Correlation), and to rationally explain the identity of mind and reality on the premise of structural realism. The other part of the core is that idealism and materialism are the same thing, just opposite views of

the same block universe. I believe that this theory can solve the difficulties that each theory of the mind-brain problem has. For your reference, here is a conceptual diagram of each theory of the mind-brain problem.

Fig.5 **What is Entity?**



The impasse in the mind-brain problem is caused by the fact that we do not know why the mind exists, because scientific descriptions alone can explain human behavior, even though the mind and matter seem to be different. Therefore, mind and matter must be identical in some sence. Only structural realism can explain that identity without difficulty. And by combining eternalism, the problem of mental causation can also be resolved.

These are my solutions to the mind-brain problem. Eternalism is the dominant theory in the metaphysics of time, and I would have no major problem assuming it. However, it is true that structural realism is a controversial theory, and furthermore, I assume a global structural realism (GSR), so much criticism is to be expected. However, I believe that only GSR can be a breakthrough for the sticking

point in the mind-brain problem. Global structural realism (GSR) would be the inference to the best explanation of the mind-brain problem.

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