



ZOMBIES AND MUSCLE MEMORY: RETHINKING SOMATIC CONSCIOUSNESS AND THE MIND-BODY PROBLEM

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HYIJIN LEE

Graduate School of Humanities and Sociology (Aesthetics), University of Tokyo, Japan

ABSTRACT

In this paper I am going to argue on the existence of somatic consciousness, which has a special importance in resolving the mind-body problem. The discussion will include such issues as the range of somatic consciousness and the possibility of improving such an idea not only by interdisciplinary scientific studies but also through contemporary analytic philosophy of mind.

Key words: consciousness, somaesthetics, mind-body problem, muscle memory, zombie

Introduction

Consciousness has been carefully studied in the field of philosophy of mind. However, its discourse has strongly emphasized the importance of the mind while overlooking or misunderstanding the importance of the body. The reason for this imbalance is the strong traditional tendency to focus on the spiritual mind over the material body in the history of philosophy. Yet, no matter how deeply dogmatic this point-of-view is, we cannot just keep excluding the whole discourse of this tradition in the philosophy of mind. Besides the fact that this view has some clear points in explaining what consciousness is, the outlook of the philosophy of mind is deeply rooted in our common understanding of consciousness in terms of culture, religion, and science. In this paper, I wish to revise the view of those philosophers of mind by adopting in it Richard Shusterman's idea of somatic consciousness [1] rather than simply reject the whole discourse of philosophy of mind.

I believe this alternative attempt opens up a proper place for somatic consciousness within philosophy of mind and also surely enriches our general understanding of consciousness in the discipline of philosophy of mind. Before I scrutinize the reason why somatic consciousness has its importance in the problem of mind and body, let me begin with what the mind-body problem is and how philosophy of mind has inherited insufficient attention to the body.

The Mind-Body Problem

The problems of mind-body and consciousness are the crucial issues in the discourse of philosophy of mind. The mind-body problem was introduced in its modern

form by Descartes and his contemporaries in the 17th century and because of this origination the problem has always brought with it the consideration of dualism. Descartes thought the mind and body were separate so if we make a movement like drinking a cup of coffee, it can be explained by examining the mind because our body is just something that executes the order of our mind. However, if they are indeed totally separate, how can the mind actually exercise its power over the physical world of our body? And how can we explain the relationship between body and mind in this sense? If the body follows the decisions of the mind, it means they should have a certain relation. The mind-body problem has been argued in various schools of philosophy. Roughly we can divide them into monism and dualism. Even though the details of their arguments are slightly different from each other, and some forms of monism seem similar to dualism, it is still possible to draw a line for basic understanding. To put it simply, dualists believe the mind and body are separate entities, but monists believe they cannot be divided because they are one.

Nowadays, dualism has almost lost its validity, while physicalism, which is monistic has taken over in its place. We can say the reason for this is that classical dualism's explanation for the causal relationship between mind and body is often blindly dependant on God. With our realization of scientific understanding and weakening religious belief, people have come to need a better explanation. However, it is not fair to say that for dualism the most primary aspect is only the existence of God, if we were to also consider contemporary dualists. The clearer reason for the falsity of dualism is "some shared set of assumptions about the mental and physical" world [2, p. 6]. Dualism still remains strong in commonplace perception because of its

explanatory convenience. Although dualism is not the main focus of this discussion, it is necessary to review briefly its main views and explain how it made such a strong impact on our intellectual world. Although the details and axis of the separation for dualists are not quite identical, most dualists might be reluctant to embrace “somatic consciousness” because, while “somatic consciousness” is both bodily and mindful consciousness, dualists believe in the division between *body* and *mind*. This dualism includes a tacit hierarchy which sees *mind* higher than *body*, therefore *mind* is more important.

As matter of fact, this mind-body dualism has a very long historical background in philosophy. We have always been interested in what happens to our mind and body after death and how they are different from inert objects. This question attracted ancient philosophers in both the Occident and the Orient, and their task was to figure out what is this thing which moves the body and keeps it alive. Pre-Socratic philosophers, such as Parmenides, the Eleatics and Plato, the major founders of Western thought, are considered as the inventors of the dualistic view on body and mind and although it is not pure dualism in the strictly modern understanding of the term, this platonic scheme was adopted into early Christianity by Plotinus.

Cartesian dualism is considered the first modern attempt to show this problem more clearly. The logic is that we can literally (if we have ability to move our body) touch or hit our body but we cannot physically hit the mind, and in that sense, both cognition and emotion are also untouchable. This statement is very compelling but this strict Cartesian dualism is faced with a two-fold question. If the mind is entirely mental, how does it exercise its power over our physical world? And how does the body undertake its tasks? Schopenhauer is famously quoted as claiming “the world knot”, which surely provides an insightful view of the problem, but not a lucid answer [3, p. 9]. It may even create more complexity in the problem; as, what is the world knot? We do not wish to make such a difficult problem even more knotty. Then, why do we not forget about the mental, spiritual aspect and just put everything into the physical world? In such a way we do not have to worry about this perplexing body-mind problem anymore.

Contemporary Trials to Solve the Body-Mind Problem

Some logically well trained philosophers further developed this thought and established the idea of physicalism. Although there are various views of physicalism, it is hard to say that all physicalists are monists in the

strict sense of the word. For example, Galen Strawson insists that his position is physicalist but his view is commonly classified as property dualism or neutral monism. Physicalists believe everything can be explained as a physical activity or phenomenon, so we can still say it is basically monistic [4–6].¹ This physicalism, especially its revised version, such as emergentism, somehow holds a central place in philosophy of mind but even physicalists still have ardent debates on the body-mind problem. Emergentism is a type of physicalism and therefore it should be monistic, but since emergentism embraces qualia (raw feel, what-it-is-like [7]) which have difficulty in being explained in only physical terms, emergentism is not purely monistic [8]. Paradoxically, physicalism has more validity when it opens possible place for mind, which is not physical, but if physicalism is in line with its own tenet, then it must be able to explain the mind or the body-mind relation only as a physical entity. Once they admit there is no physical entity such as qualia, the physicalists’ answer is just “something near enough”, and it may be enough for the philosophers who have studied *a certain near enough tradition of philosophy* [8].

There can be another simple solution for this. What if there is no relation between the mind and body? Epiphenomenalists believe our mental states are just epiphenomena which are side effects of the physical state of the world and therefore the mind does not have any relation to the body. The problem of epiphenomenalism is that its very concept is contradictory. If epiphenomena do not relate to the physical world, how can we have the idea of epiphenomenalism and how can someone actually explain what epiphenomenalism is in our physical world?

Our use of the terms *body* or *mind* is vague and also our bodily understanding of *body* and *mind* is even more unclear in most of our everyday life. There is no simple answer, or maybe there is no definite answer, to this question because our view of body, mind, and their relation is continuously changing, being revised and influenced by cultural, historical events, scientific discoveries and also some intellectual trend of the era. In all probability, it is not important *whether body and mind are separate (or not) or mind is physical (or not)*. Indeed, we do not have to decide which philosophical tradition is better to solve this problem. The obvious thing is that

¹ Galen Strawson claimed physicalism should entail panpsychism which holds the view that all matter or all objects have a mental aspect and moreover they have a unified center of experience. William James, who built the foundation of pragmatist philosophy of mind, also held a pioneering view of panpsychism [6, 9].

although none of them succeeded in giving a definite answer, they certainly enriched our discourse on *body* and *mind* and *the body-mind problem* and moreover, this problem may even be better left definitively unsolved. The more important thing is not to find a definite answer or to choose a philosophical stance but to take a broad view of the whole discussion of this problem.

The obvious problem which philosophy of mind should deal with is to balance the view on the body-mind problem by careful investigation into the *body* and also providing place for the *body* in its discipline. We can find this bias even in its name – *philosophy of mind*. It is not *philosophy of mind and body* although its central concern is to define the relation between mind and body. The *Body* is used supplementary to explain the mind and it has not been fairly examined. How can philosophers of mind find the right answer to the problem if they have this strongly biased stance on the problem itself? It may be possible but they in fact may have to first deal with their problematic orientation. But it does not mean we should just ignore the whole discourse of philosophy of mind. Although they have problems in their orientation to make it a truly independent discipline of philosophy, we can still use their way of thinking in the process of dealing with the mind-body problem and enrich our understanding of the mind-body problem. What I want to suggest in order to eliminate this deficiency in philosophy of mind is a sufficient investigation into the *body* to make the discourse balanced. That is to say, philosophers of body and mind should be focused on the *body* not as a cold material thing but as something which has conscience, sentience and qualia since just the opposite way of thinking has been dominating philosophy of mind.

Embodied consciousness is also claimed by various scholars such as Mark Johnson, George Lakoff, Alva Noë, and neurologist Antonio Damasio [10–13]. Although they made clear points against dualism and the pointless superiority of mind it is still possible to find a narrow and somewhat biased view in their attempts because it seems like they are reluctant to challenge their own professional orientation and also, unfortunately, they focus on the mostly conceptual or scientific explanation to the body-mind problem. This kind of theoretical approach is also effective because in this way they can show the value of somatic study to many philosophers of mind since they still share the stance that it is more important to win the theoretical debate than to find a better way to improve “body consciousness”. But if the *body* really is important in philosophy, a better philosophical attempt should be its taking into consideration how to improve it in the first place. The thing which

forms “somatic consciousness” and turns it into the truly meaningful somatic consciousness, should not be explained by only theoretical scientific reasoning but also by bodily experience and somatic understanding. In that sense Shusterman’s somatic consciousness actually widens the range of consciousness by emphasizing the *body’s* cultural, educational, and practical dimensions and I believe it can be one of the most proper ways in correctly placing *body* and *consciousness* in our philosophical life.

However, there are two problematic tendencies in Shusterman’s wide and insightful view on body and mind philosophy. The first one is his neglect of the contemporary analytic philosophy of mind. Although he started his career as a hardcore analytic philosopher, it seems that his orientation in research actually goes in the opposite direction². Moreover, in his book *Body Consciousness*, where he presented his philosophy of mind, Shusterman mainly discussed six important body philosophers: three continental philosophers such as Foucault, de Beauvoir, and Merleau-Ponty, charismatic philosopher Wittgenstein, and two important pragmatists William James and John Dewey. One might argue whether Wittgenstein can be considered a hardcore analytic philosopher, although many contemporary analytic philosophers are inspired by his philosophy, but still he is more influential in philosophy of language and not very much in philosophy of mind. It is difficult to see him joining the current mainstream hardcore philosophy of mind if he were still alive.

In that sense William James has more of a chance in this field and actually his interpretation is considered one of the major views in the contemporary philosophy of mind³. However, in Shusterman’s book, his attempt was not focused on those arguments in the contemporary philosophy of mind and it seems as if he ignored their arguments on purpose. It seems that his main concern was to find a link between Damasio’s neurology and James’s philosophy of mind. Indeed, he thinks

² Shusterman did his D.Phil. in Oxford under the supervision of the analytic philosopher J.O. Urmson. Shusterman was also the editor of *Analytic Aesthetics* (1989). The very first academic philosophical education of Shusterman was at the Hebrew University of Jerusalem with the hardcore realist Eddy Zemach. Even before his major philosophy of body and mind book, *Body Consciousness*, Shusterman dealt with the problem while developing his own terminology, “somaesthetics” [14, 15].

³ This James’s view which grew out of his “neutral monism (which could be also considered as a kind of dualism)” [5, 6] is also called “parallelism” or “strong emergentism”. This powerful view can be considered the origin of both David Chalmers’ property dualism [16] and also Richard Shusterman’s anti-dualistic (but which should not be a radical one) pragmatist philosophy of mind [1].

“Damasio offers a scientifically updated version of James’s argument” [1, p. 151]. And it is also hard to find a discourse on the contemporary analytic philosophy of mind in his other texts that relate to philosophy of mind. It seems he is almost reluctant to deal with the contemporary analytic philosophy of mind.

Probably, his tendency started with the academic guilt of being an analytic philosopher who inevitably inherited a narrow and rigid tradition. However, if his philosophy of body and mind – somaesthetics – claims to be “an interdisciplinary field of theory and practice broadly defined as the critical study and meliorative cultivation of the soma,” [17, p. 15] it needs to consider the contemporary views in philosophy of mind as they ultimately are aiming at the same goal.

The second problematic inclination that Shusterman’s somatic consciousness has is that its focus is mainly on the living body or the world in which we live in but not on the dead corpse or in the imaginary world of ghosts because his use of “the term ‘soma’ indicates a living, feeling, sentient body rather than a mere physical body that could be devoid of life and sensation.” [1, p. 1]. Since we should deal with our *embodied world* first, one might argue that it is not a serious problem to omit the dead corpse or ghosts, which only invoke the image of “mere physical body”, or of non practical metaphysics or spiritualism. However, it should not be forgotten that death is a part of life as well as life being a part of death; therefore, when we think about life, the issue of death always comes along with the main issue of life. Indeed, the philosophy of body and mind has a deep relation with our curiosity of what we are going to be after our life ends. Originally, the mind derives from ψυχή which is the ancient Greek notion for soul or spirit and the term was also used to discriminate a dead corpse from a living body. For example, Plato defined death as the separation of the soul from the body, which also provided one of the original roots of dualism.

Since we have already adopted a useful solution to the body-mind problem, it is not just the question of choosing the side of “dualism” or “monism”, it is “somatic consciousness” that can challenge this meaningless fight waged over the centuries, we do not want the major function of the term “somatic consciousness” to be a weapon to defend “monism” or “holism” against “dualism”. It seems that a more useful way to use its open but clear meaning is to actually to try a new project that other concepts could not be able to challenge, which means not only trying to do interdisciplinary research but also in trying to close the gap between philosophical schools.

Is there any way to bridge the gap between practical philosophy and the philosophy of the imaginary world, between a humanistic meliorative view and objective metaphysical realism, and between life and death? Since this question considers a wide range of fields, it is impossible to develop a detailed argument here. However, it is probably not a bad idea to show a possible direction for the next step. What, I am going to attempt is to make a quite extreme mixture of the thoughts of the most powerful living body philosopher Richard Shusterman and the hardcore analytic zombie dualist David Chalmers. However, this attempt may be still asymmetrical because the main goal of this attempt is a revised version of the practical and meliorative thinking of pragmatism of which William James and Richard Shusterman are also a part of. I should also mention that the main reason of my attempt is not just to become a winner of this philosophical debate by claiming that a “better open concept can actively deal with the body-mind problem” but also because of an academic guilt that one does not want to have by choosing one side with non-philosophical favoritism.

Zombies and Somatic Consciousness

The famous philosophical zombie argument which was argued by David Chalmers shows how the body is treated in philosophy of mind, especially in physicalism, which is dominant in recent philosophy of mind. This argument mainly claims that if zombies are conceivable; physicalism is logically flawed because physicalists believe mental states (or mind) can be explained in terms of physical phenomena such as behavior or neural activity, whereas zombies obviously have a certain behavior but they do not have mind [16, 18]. There are various debates, including denial of the argument itself, on this problem [19]. For example, John Searle criticized Chalmers’ dualism because it is “not the current view among the professionals in philosophy, psychology, artificial intelligence, neurobiology, and cognitive science” and “the only substance dualists (...) are those who have a religious commitment to the existence of a soul” [20, p. 414]. According to Searle’s criticism, the zombie argument seems to be an element of old traditional dualism which gets its support only from a kind of religious commitment and moreover, it seems conceivable, one might argue, that this whole zombie scenario was just something roughly coined to attack physicalism.

Although I think “zombies are conceivable”, it seems that there is no good reason for trying to further investigate Chalmers’ dualism. However, it is still interesting

to note why this example gained such attention and how this experiment actually appeals to us. The success of the thought experiment seems to have a more useful goal other than supporting his dualism which I am going to develop here. It is not the most important thing that zombies are conceivable or not. The more important thing is that this idea of zombies is based on the view that without a conscious mind the human body is like a *zombie*. Can we try a slightly different zombie thought experiment which does not use explicit consciousness but the most implicit and also weak consciousness which is the most similar to zombie consciousness? This experiment requires not only our mindful consciousness but also the sense of light or lower consciousness, which is directed toward zero consciousness, like zombie's and, what is the most important, the *imaginative mind* which lets us somatically imagine what it is like to lose consciousness, like in a zombie.

Let us imagine becoming a zombie. We do not have thoughts. We do not have beliefs. We do not have feelings. We do not have consciousness. Suddenly, our legs and arms are moving slowly toward a certain direction. Our brain has not made any orders to move them. Someone must be controlling our bodies. Now, in our imaginary world we have become zombies. When did we get the idea of becoming a zombie? Recall the moment we started thinking about becoming a zombie. Actually, it is difficult to have a clear image of becoming a zombie by eliminating all thoughts or beliefs since thoughts and beliefs are abstract notion. Probably we gain a clearer image of being a zombie by thinking of our body parts executing orders from someone else's mind. It is because we have muscle memory which is analogous to the memory we use for imagining the state of a zombie. It seems as if the zombie appeal was effective not because of metaphysical validity but because of an imaginative quasi-empirical muscle memory. Now, I am going to find the theoretical place for this imaginative muscle memory in Richard Shusterman's artful muscle memory argument which does not yet include the imaginative dimension in it [17]. I wish this could be also a step for a cooperative movement between two opposite philosophical schools, namely *mind centered dualism* and *body centered pragmatism*. By doing this I believe they can eventually reduce any unnecessary hostility and also find applications for each other. However, this cooperative step should be based on a very careful scrutiny which includes respect for their important philosophical claims so that it does not produce another thoughtless melting pot which does not convey their original views.

Empirical Muscle Memory and Imaginative Muscle Memory

Shusterman sees muscle memory as implicit memory and defines "(m)uscle memory (as) a term commonly used in everyday discourse for the sort of embodied implicit memory that unconsciously helps us to perform various motor tasks we have somehow learned through habituation, either through explicit, intentional training or simply as the result of informal, unintentional, or even unconscious learning from repeated prior experience." [17, p. 5]. He analyses muscle memory dividing it into six different forms, in terms of: 1. "continuing personal identity" which is "remembering implicitly who one is", 2. locative identity which "is remembering *where* one is", 3. interpersonality (or intersomaticity) which concerns our being with "other bodies", 4. social institution which "recalls the distinctive social role", 5. "performative memory" which "we perform with effortless spontaneity", 6. trauma which one has from "intense shock or pain" and then he explains "how these problems of muscle memory can be treated by disrupting such memory through heightened, explicit consciousness involving methods of somaesthetic attention and reflection." [17, pp. 6–10].

Shusterman's "six forms of muscle memory" mainly focus on the empirical dimension of muscle memory, since they originated from "prior experience" and because his diagnosis is focused just on the experiential dimension, the treatment he suggests misses the quasi-empirical dimension which is not directly experiential (explicitly and also implicitly) but conceivable in our imagination. The quasi-empirical muscle memory which functions for the zombie thought experiment requires not only experiential memory but also sensual muscle imagination which makes connection between the prior muscle experience and our imagination.

Although his muscle memory and its pathology are focused on experiential muscle memory, in the detail of his argument, we can find a potential claim for sensual imaginative dimension of muscle memory. For example, he noticed "intersomatic" forms of muscle memory whose subjects "include non-human companions like animals." "Intersomatic" forms of muscle memory seem to offer the place of sensual imagination and also sensual imaginative muscle memory. However, since an intersomatic form of muscle memory develops by "ways of being with and reacting to certain other bodies", it requires "the presence of other bodies." So, according to Shusterman's analysis of muscle memory, if the body is something we have never (normally) been with, such as "zombies", or we have not ever experienced "the zombie

state”, there is no way we can have a kind of muscle memory which arises from sensual imagination of the zombie state or of any other non presentational body.

Besides having ontological validity, sensual imaginative form of muscle memory seems to deserve reconsideration for its important practical function which gives metaphorical clues for us to realize and describe what kind of state we are in. This is also the case of the sensual imaginative form of muscle memory which can actually improve our experiential practices. Sometimes we complain about not being able to move our body like we want; then our body is out of control and we feel as if somebody else is controlling our body in an unexplained way. Let us define this state as a quasi-zombie state. There is a good example of this state. To learn swimming it is important not to tense body parts but for a beginner it is hard to let his body relax, so he fails to float on the water. He might feel as if somebody was pulling him down thus hindering him to go forward, but there really is no one who prevents him from advancing. Eventually, he will learn to swim and he will feel that he is really alive. For some people learning to swim is not a difficult task, so some of you may have difficulty in understanding why he should feel “really alive”. Then, think about any other difficult physical work which made you suffer from the inability to control your body. Similar experiences of difficulty in controlling the body frequently occur in the process of learning other kinds of sport and also in our everyday life.

We can even think of various levels of states between this quasi zombie state and the living body state. As I mentioned earlier, you might have stronger zombie-like feeling when you have less control of your body and when you are less conscious of your body. That is to say, if you have less body consciousness, the body becomes more zombie-like, whereas if you have more body consciousness, the body gains vitality. Then it seems like we can actually diminish the zombie-like state and increase the living body state by increasing body consciousness. Besides this particular case, we can also try a more detailed analysis of ontology and pathology of this imaginative muscle memory combined with Shusterman’s analysis of empirical muscle memory. Since I have only a limited space to develop this idea, I will show only a few cases here.

1. The concept is – imaginative muscle memory can be a tool used for learning death. It is impossible to study death by experiencing it or using the report of someone who has experienced it (Although James actually used a case for his study, it cannot be taken too seriously here). Therefore, it seems to be impossible to use muscle

memory to learn what it is like to have a muscle memory of death. However, we can use imaginative muscle memory to learn it by using some death-like experience, such as suspended animation, a coma, and asphyxia.

2. One can have a clearer idea of life by understanding imaginative muscle memory. Since both pain and death have a negative image, it is easy to correlate one with the other, although pain is not part of death or unconsciousness. Indeed, when we are not conscious like zombies we cannot feel any pain. After a serious operation, such as cancer, which requires general anesthesia, the patients realize they are alive for the first time when they feel pain and then when they can actually see the cancer affected part of the body cut off by the surgeon. They feel relieved and are thankful to be able to feel pain again. How can they feel alive suffering from pain which does not have any direct relation with their experience of the painless state during the operation and the dead cancer which they could not see when it was being cut off by the surgeon? At that time somehow they correlate the pain and the dead cancer with the success of the operation and when one makes the connection between those two, it is imaginative muscle memory.

3. We can also apply imaginative muscle memory to various art works. One of them can be a dance. Popping, which is an important break dancing skill, could be a good example for this. When dancers reach a certain level, their movements begin to look like a robots’ or marionettes’. To be able to achieve the difficult skill of popping, they need to control not only their movement and their breathing but also imaginative muscle memory which robots or marionettes might have. This dimension of imaginative muscle memory can be used in meditative practices, such as yoga. For example, one can practice a tree pose or a camel pose better when they use imaginative muscle memory.

I have briefly presented three cases which are only a small part of what the imaginative muscle memory affects and there are various cases with two or three characteristics of the above mentioned cases present all together in one case. Unfortunately, I will leave any further analysis for another time, but at least, I believe, that my current analysis has safely proved there is an imaginative dimension of muscle memory.

Conclusions

Shusterman’s somatic consciousness can be an alternative solution for the mind-body problem, therefore, it has its importance in the problem of mind and body. However, we observed his experiential muscle memory has ontological limitation, which implies that

we need to improve the muscle memory argument as a revised one which has some ontological place for the imaginative sensual form of muscle memory. In the process of doing that I tried a slightly radical combination between healthy somatic pragmatism and imaginative zombie theory.

Indeed, William James – a creative thinker, pragmatist, psychologist and also the father of American physiology – could be the pioneer in this radical cooperative trial since he was a supporter of two extremely opposite parties, body (physical object) centered associationism which inspired James to develop the idea of “the stream of thought” [9, p. 239] and mind centered spiritualism which claims that our behavior is caused by our soul. In his representative work *The Principles of Psychology*, James said,

“[T]he Soul manifests its faculty of Memory, now of Reasoning, now of Volition, or again its Imagination or its Appetite. This is the orthodox ‘spiritualistic’ theory of scholasticism and of common-sense. Another [way] is to seek common elements *in* the divers mental facts rather than a common agent behind them, and to explain them constructively by the various forms of arrangement of these elements, as one explains houses by stones and bricks. The ‘associationist’ schools have thus constructed a *psychology without a soul* by taking discrete ‘ideas’ (...) If we strive rigorously to simplify the phenomena in either of these ways, we soon become aware of inadequacies in our method. Any particular cognition, for example, or recollection, is accounted for on the soul-theory by being referred to the spiritual faculties of Cognition or of Memory” [9, pp. 1–2].

James’s claim is important not only for insightful cooperative thinking between the scholastic spiritualism and constructive associationism, but also for the courage of not abandoning his academic responsibility of studying spiritualism which subject to various criticism on his research subjects such as “mystical experience”, “mental healing”, “telepathy”, or even “haunting”, for which he still found a useful instrument for his body-mind philosophy [21, 22]. I believe his creative and insightful mind could provide a proper guide for human development into the future along with Richard Shusterman’s sharp analysis of our living world. Fertile human development should consider the borderline examples, imaginative thinking and abductions which bring to us new solutions and the potential for the new forms of science.

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Correspondence address

Hyijin Lee
 Graduate School of Humanities and Sociology (Aesthetics)
 University of Tokyo
 7-3-1 Hongo, Bunkyo-ku, Tokyo, Japan, 113-0033
 e-mail: doya80@hotmail.com