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Representation and the Internal World: A Perspective from Evolutionary Mind

Wei Zhang

Department of Psychology, Institute of Education, China University of Geosciences, Wuhan, China

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Email: zhangweipsy@163.com

Abstract

From the perspective of phenomenology and phylogenetic evolution, this manuscript reports a critical study of the core position of representation in the mind. The development of mind can be divided into three stages: body, unconsciousness, and consciousness. In this complex evolutionary process, the organism gradually has a relatively independent internal world, and it can use representation to simulate the interaction between itself and the world. Accordingly, its ways to deal with the world's "challenges" have become more flexible and diverse. In addition, the internal world can go beyond the simple "replication" and "simulation" to some extent, and construct people or things unlike the real world (even nonexistent people or things). On one hand, it provides soil for human creative activities; on the other hand, it provides a hotbed for human beings to get out of the real world and immerse themselves in various fantasies. Human beings live in the world under the "resulting force" of the internal loop and the external loop.

Keywords: *Representation; Phenomenology; Cognitive Science; Phylogenetic Evolution; Consciousness; Body; Internal Loop*

Introduction

Representation is a core concept in the first-generation cognitive science. Whether cognitivism or connectionism, its core assumption contains representation and calculation, i.e., to understand and grasp the world through intermediaries (e.g., symbol and neural network). Therefore, representation is also the main carrier of human knowledge (Dreyfus, 2002; Ye et al., 2018).

However, the epistemology of representativism has also encountered challenges in various aspects. According to some phenomenologists (e.g., Martin Heidegger and Maurice Merleau-Ponty) and classical pragmatism philosophers (e.g., John Dewey), understanding the world through representation is based on a theoretical attitude of bystanders, where reflection plays an absolute leading role. In fact, the relationship between man and the world is not first manifested as a theoretical attitude of reflection, but in a practical relationship of prereflective interaction. In other words, compared with theoretical research, practical attitude has priority (Chen, 2014; Guignon, 2013).

This view of practical superiority can be summarized as follows: First, the real person is the person in a specific space–time background, i.e., what Heidegger (1962) called "being-in-the-world" or "Dasein." Dasein is always "thrown into the world," unable to choose to be in a specific background, hinged with the world. In this connection, Dasein does not have a clear line with the world. Second, in dealing with the world,

people understand the world and themselves. On one hand, the basic state of existence is a state of *concern*, i.e., busy with "having to do with something, producing something, attending to something and looking after it, making use of something, giving something up and letting it go, undertaking, accomplishing, evincing, interrogating, considering, discussing, determining....." (Heidegger, 1962, p. 83). In this interaction, the world has opened itself to a certain side (i.e., Abschattung). On the other hand, while dealing with the world, there is a self-understanding without reflection and inner perception. For example, when a hunter pursues his/her prey in the forest, he/she skillfully avoids the thorns in the way, flexibly crosses the streams in the forest, and carefully avoids the dangerous poisonous snakes and beasts This series of intentional or unintentional activities show that when hunters "immerse" in hunting activities, they have already "known" their own abilities in advance (Chen, 2017). Third, when problems exist in the prereflective interaction, the "nonobjectified" part of the original background enters the foreground, and the cognitive forms of reflection and representation gradually emerge. Dreyfus (1991) rearranged the transition situation from "readiness-to-hand" to "presence-at-hand" described by Heidegger, namely conspicuousness (i.e., the appliance fails, its unavailability is exposed and becomes "eyesore"), obstinacy (i.e., the short-term collapse of "taking part in the world." At this time, the subject and object are not completely separated and are still present in the specific background) and obtrusiveness (the overall collapse of response activities, the concept of isolated object and subject is gradually conceived). In brief, the way of understanding the world through representation is only a derivative form. In the words of Merleau-Ponty (2012), "I can, therefore I am" precedes "I think, therefore I am."

This idea of "interaction before reflection" also affects some researchers of the second-generation cognitive science. In the second-generation cognitive science, there are "radicals" (or "strong") approaches and "moderate" (or "weak") approaches about representation: The former thinks that representation is unnecessary, and all cognitive activities are the interaction between organism and environment. The latter advocates the existence of representation, but this process is limited by physical activities, rather than the objective processing of abstract symbols (Ye et al., 2018, 2019). This manuscript is more in favor of the position of "moderate" approaches, i.e., representation exists, especially when we use concepts to refer to objects at the level of reflection. For example, when an individual reads the "cup" in a book, he uses the concept of "cup" to refer to the real cup. Similarly, representation plays an essential role in the transmission and learning of various knowledge and skills. For example, in the five stages of skill learning summarized by Dreyfus (2002) (i.e., novice, advanced beginner, competence, proficiency, and expertise), the first four stages are inseparable from the role of representation.

This means that human beings have two ways of "knowing" the world: direct interaction and representation. So, where does this ability come from? Do other living organisms, such as chimpanzees, have this ability? At this point, phylogenetic evolution provides a perspective for the solution.

Mind from a Phylogenetic Perspective

Comprehending the mind from a phylogenetic perspective is promising because the mind does not manifest naturally but instead evolves through the interaction between organisms and the world. Thus, a phylogenetic perspective can reveal a process 'from zero to one' of mind.[1] However, phylogenesis is not analogous to a type of Whig history that moves from victory to victory; instead, this process has multiple branches (Pinker, 2007; Rose, 2005). In fact, as there is no perfect fit, the core issue of adaption is preservation rather than optimization. "As long as a living being does not disintegrate, but maintains its autonomous integrity, it is adapted because it is able to carry on its structural coupling with its environment" (Thompson, 2007, p. 204). It can be said that "fish, amphibia, reptiles, and birds survive today because they are fully 'fit' for their environment and lifestyles – at least as fit and as 'evolved' as humans are" (Rose, 2005, p.44). However, the production of a complex mind indeed creates an abundant 'adaptive toolbox,' by which organisms can interact more smoothly with the environment. In other words, the mind evolved as an adaptation strategy. To understand the mind, it must be understood in its interaction with the environment. To borrow Dobzhansky's words, nothing in mind "makes sense except in the light of evolution" (see Rose, 2005). During the phylogenetic process, three stages can be delineated based on these vital nodes: body,

unconsciousness[2], and consciousness.

Stage 1: Body

In the early stages of phyletic evolution, organisms did not have a nervous system; they dealt with the world directly using only the body. This pattern dates back to the simplest living entities: single cells. Single cells represent rudimentary functions in more complex organisms, as they must be self-sufficient and complete multiple survival missions. In contrast, multicellularity is constituted by cooperated single cells. Based on the same fundamental principle, more complex structures are produced (e.g., tissues, organs, systems, and organisms) (Damasio, 2010; Rose, 2005). Damasio (2010) offered the following analogy: The cytoskeleton serves as a body frame; the cytoplasm can be treated as organs inside the body and their milieu interne; organelles (e.g., mitochondria) functions as visceras; the nucleus operates as the brain; and the cytomembrane is akin to skin (p. 23).

So, how do single cells interact with the world? Taking paramecium as a typical example, if a stimulus from the external world is beneficial, then the paramecium will move towards it; if the stimulus is harmful, the paramecium will move away from it. In addition, "these movement patterns, of approach and avoidance … are the action blueprints of all living organisms, from those of the lowly amoeba to our complex humanoid interactions with the world and each other. In this way, they are a compass that guides us through life" (Levine, 2015, p. 25). In a manner of speaking, single cells respond to the environment with 'the whole body' to realize coordination.

Notably, this type of 'behavior' cannot be regarded solely as a passive and mechanical reaction; instead, organisms are actively open to the world and coevolve with it (see Figure 1). In the embodied-enactive approach of Varela, Thompson, and their colleagues, a living cell is deemed as an autopoietic system. They considered a cell to be an open system far from thermodynamic equilibrium, which continually exchanges matter and energy with its exterior to maintain itself (Thompson, 2007; Varela et al., 1991). During this process, the cell actively produces meaning. For instance, if we simply consider sucrose, it is just a chemical substance; as a nutrient, however, sucrose can be valuable for a cell. During the metabolism using sucrose, cells "shape the physicochemical environment into a milieu (Umwelt)." From this inalienable system–environment coupling, meaning emerges (Thompson, 2007, pp. 74–75). In Heidegger's words, living cells have already understood the whole significance of "self–world" while dealing with the world.

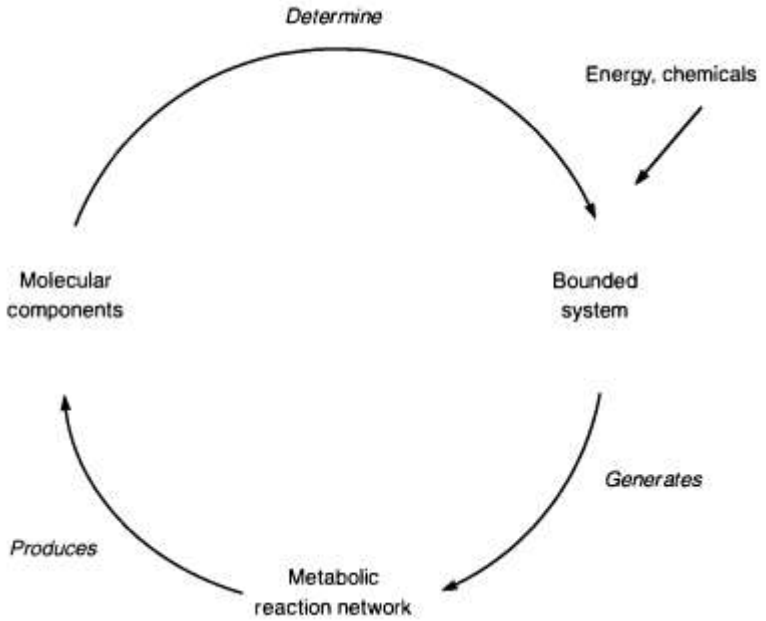


Figure 1. The basic autopoietic organization (Thompson, 2007, p. 45)

For more complex organisms, the same is true for interactions with the environment. In other words, as Merleau-Ponty (1963) mentioned, "behavior" is not a mechanical activity, it should be regarded as a type of "dialogue." In this process, an organism's "aptitude" in response to the environment is actually an answer to the latter's question (see Figure 2). Behavior does not exist in the body alone, just like conversation does not exist in individual speakers (or their brains), or jazz improvisation does not exist in individual instruments or soloists (Thompson, 2007). Behavior is not a type of information processing, but a type of meaning construction. In this sense, it is more appropriate to use "action" to refer to this type of intentional activities than "behavior" (Ye et al., 2019).

An autopoietic system also produces and maintains a dynamic boundary when coupling with its environment; therefore, the inside and outside are relatively distinct (Thompson, 2007; Varela et al., 1991). While establishing a boundary, this system can enhance the internal management and maintain stability. Such stability of an internal world can be described as homeostasis, so that various parameters (e.g., amounts of oxygen and carbon dioxide, temperature, and pH) stay within certain limits. Otherwise, life cannot effectively survive, because "toward the extremes of the homeostatic range, the viability of living tissue declines, and the risk of disease and death increases; within a certain sector of the range, however, living tissues flourish, and their function becomes more efficient and economic" (Damasio, 2010, p. 34). Therefore, single cells possess "an unminded and unconscious will to live and manage life suitably enough, for as long as certain genes allow them" (Damasio, 2010, p. 41). As the environment changes continually, boundary establishment seems particularly important in surmounting various challenges.

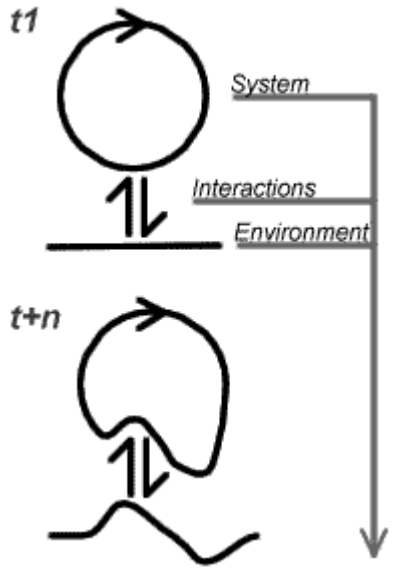


Figure 2. system-environment coupling[3]

Overall, while dealing with the world, a living cell accomplishes two tasks: (1) realizing dynamic coordination with the environment (this meaning-making action includes an understanding of the world and causes the world to appear); and (2) creating a boundary to distinguish inside and outside, thus keeping the internal world relatively stable. In other words, this action also involves an understanding of the cell itself. In fact, these two tasks exist in the whole process of species evolution, and they are the tasks that all life must complete.

Stage 2: Unconsciousness or Nonconsciousness

Throughout the course of evolution, organisms containing more complex nervous systems—even brains—emerged gradually (Rose, 2005), accompanied by an unconscious mind. The emergence of the nervous system benefits from the structural and functional differentiation of multicellular organisms. Its origin

can be seen in coelenterates: The receptor cells are responsible for accepting the changes in the external environment, while the effector cells impose the organism's "response plan" on the external environment. Neurons are in between, responsible for integrating information from many receptor cells, transforming and issuing instructions to various effector cells. On this basis, a large number of neurons are connected with each other to form a more complex neural network. The more critical step is the emergence of the brain, which is relatively separated from the internal organs, moved to the front of the organism, and developed into the center of neural capacity, laying the foundation for the production of the mind. The brains of early vertebrates differentiated into forebrain, midbrain, and hindbrain, while those of later vertebrates further evolved into five parts: telencephalon, diencephalon, mesencephalon, metencephalon, and myelencephalon (Rose, 2005). From the current research, the unconscious mind may be the first to appear in reptiles.

An important function of the unconscious mind is to form maps or representations, which stem from bodily changes from the internal and external stimuli. Damasio (2010) classified three types of maps: (1) interoceptive maps, which reflect the functional conditions of body tissues (e.g., the degree of contraction, distension of smooth musculature, and parameters of internal environment); (2) proprioceptive maps, derived from specific body components (e.g., joints, striated musculature, and some viscera); and (3) exteroceptive maps, which originate in any object or event probed by a sensory channel (e.g., the retina, cochlea, and mechanoreceptors of the skin) (p. 52).

Accordingly, representations afford organisms several advantages. On one hand, representations can help organisms more effectively realize the stability of their internal world. As described above, homeostasis is an important condition for organisms to remain alive. With the brain as the "data processing center," the organism can transmit various physiological parameters from the internal environment to the brain structure. By integrating these information processing into representation, the brain can timely and effectively understand the state of the internal world. In other words, the nonconscious mind can "detect and measure departures from the homeostatic range and thus act as sensors for the degree of internal need" (Damasio, 2010, p. 50). On the other hand, representations can be useful to more precisely feel and know objects and events in the external world. For example, when a dangerous object appears, organisms can detect it via different sensory pathways (e.g., visual, auditory, and olfactory) and then present its location and motion curve in the mind (Damasio, 2010, p. 34). Organisms can therefore either escape or overcome this danger. In view of this, Damasio (2010) pointed out that representation opens "the way for our ability to know not only the very inner world but also the world around us" (p.90). However, this conclusion is not accurate, and it can be replaced by another expression: In the direct interaction without relying on representation, the organism has understood the world and itself. After having representation, the organism has the ability to "objectify" the internal environment and the external world, so the ways of understanding are more diverse.

So, what is special about this unconscious mind (the second stage), which produces representation, compared to the body (the first stage), which has no representation? The answer is that, thanks to representation, the organism has one or even more mediators between receiving environmental stimulation and responding, rather than directly "responding" to the environment. This indirectness enables the organisms to keep a distance from the world, so that there is more "room" for adjustment, leading to the possibility of more diverse and more efficient action response. The wider the intermediate state, the more indirect the "stimulus–response" relationship, and the richer the internality of life (Jonas, 2001; Li et al., 2016); in other words, the more diverse the forms of "dialogue" between the organisms and the world. However, although representation helps to grasp the changes in the internal and external world more accurately, the reactions based on the unconscious mind are almost automatic and lack flexibility. As a result, more "thoughtful" coping activities and more "flexible" coordinated reactions reach a new peak after the emergence of consciousness.

Stage 3: Consciousness

A highly developed brain endows organisms with consciousness, which is a milestone of phyletic evolution. Compared with the unconscious mind, a key feature of consciousness is awareness. Its emergence provides many conveniences for adapting to the environment. First, awareness means that organisms can not

only deal with the outside world, but also "know" this interactive process. This feature can be exemplified by a metaphor of light: "More objects of our past than ever before can be clearly seen, first separately, then at once; more objects of our future, and more objects in our surroundings are brightly lit. Under the growing light of consciousness, more gets to be known each day, more finely, and at the same time" (Damasio, 1999, p. 135). On the basis of awareness, organisms can evaluate unconscious and automatic processes and then make modifications, as necessary. For instance, when an individual plays a game, "the player [can] discover if the strategy is correct and, in case it is not, [then] correct the strategy. Moreover, consciousness allows the player to represent the context of the game and decide if he or she should stop playing it or wonder about the possible value of the situation for the player or for the examiner" (p. 302). In other words, "the conscious component extends the reach and efficacy of the nonconscious system" (p. 302).

Second, consciousness provides what Zahavi (2009, 2011) calls "the minimal self," with a type of "I know I am/do..." The important feature of the former is to be able to have a direct familiarity with oneself in the level of prereflection. Furthermore, some organisms can grasp themselves in the way of objectification, i.e., produce self-representation. In the stage of the emergence of unconscious and the most primary consciousness, although the organism can monitor the parameters of the body, it can also play an agency role in dealing with the world, and every action is permeated with its own "familiar", but the concept of "I" is lacking. This situation has been changed after having self-consciousness. Research shows that when chimpanzees were given a mirror, they protested and roared at it as if it was another chimpanzee. However, in the next two or three days, they became familiar with the mirror, and their behavior changed a lot: They began to accept the image in the mirror. Ten days later, they were able to recognize the red mark the researchers had put on their forehead. This type of evidence indicates that they know that the mirror image in the mirror belongs to "I" (Gallup, 1977, 1982). In addition, research on mirror self-recognition has shown that apes, dolphins, elephants, magpies, and children between 18 and 24 months of age have the capacity for self-recognition; they can recognize themselves in a mirror without explicit training or guidance. This capacity can be considered as a primitive form of self-awareness, and it supports more advanced functions (Reiss et al., 2017). In contrast, other animals, such as dogs, do not have this ability, even though they seem to have primitive consciousness. In adolescents and adults, this sense of self is more common (e.g., "This is 'my' book;" "'I' drank a cup of tea today;" "You are disturbing 'me'"). Thus, "consciousness [allows] the organism to become cognizant of its own plight. The organism no longer [has] mere feelings that [can] be felt; it [has] feelings that [can] be known, in a particular context" (Damasio, 2010, p.124). Additionally, the mind "comes to be known thanks to the narrow window of consciousness" (p. 125).

Lastly, highly developed consciousness lays a foundation for more advanced capabilities, such as decision making, plan formulation, delay of gratification, and language. Consider language as an example: It allows people to describe the world and themselves more precisely. On one hand, language can play the role of "alternative action" (Levenson, 2005; Wallin, 2007), while achieving the accuracy of nonverbal communication such as gestures, emotions, and sounds. On the other hand, the emergence of language provided human beings more accurate tools to describe the world and themselves, and the function of representation was further developed. Upon transferring telling into writing, the accumulation and spread of knowledge effectively reached the peak. "The amount of knowledge accumulated ceases to be limited by people's ability to remember what has been told to them." Thus, "if a person is worried about ethics, he/she is not limited to the advice of the pastor of the Elm Street Baptist Church; he/she may go to Confucius, Aristotle, Jesus, Spinoza, and many others whose reflections on ethical problems are on record. If he/she is worried about love, he/she can get insights not only from his mother or best friend but from Sappho, Ovid, Propertius, Shakespeare, Donne, Edna St. Vincent Millay, or any of a thousand others who knew something about it and wrote down what they knew" (Hayakawa et al., 1978, pp. 11–12). Conversely, other animals (e.g., dogs and chimpanzees) cannot accomplish these tasks without language.

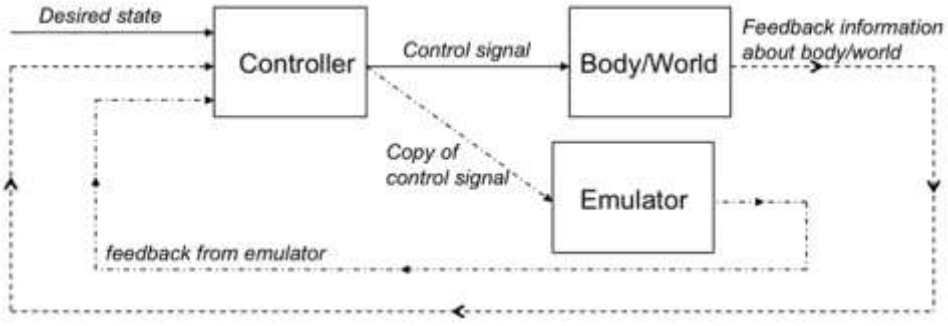
In brief, the three stages of evolutionary mind can be categorized as follows: body, unconsciousness, and consciousness, although the demarcation point between the body and unconscious and between the unconscious and consciousness remains unclear (Velmans, 2009). Body reflects a type of direct interaction

(with no representation); the unconscious mind functions based on representations or maps (with representation but no awareness); and consciousness allows organisms to be aware of these processes and make more choices (with representation and awareness). Clearly, organisms gradually hold an internal space for pondering through which they can create a distance with the world and obtain more freedom for regulation. In this way, organisms can create a distance from the world and dialogue with the world in more diverse forms. This diversity and richness are particularly obvious after the emergence of consciousness. Therefore, phyletic evolution seems to demonstrate a process of increasing subjectivity and intrinsic richness. Furthermore, during this evolutionary process, the more primitive 'mind' is not abandoned; rather, it operates as the foundation of a more advanced mind. Thus, these three regulating modes coexist and work together in higher animals such as human beings.

Internal Loop and External Loop

After considering the three stages of the evolution of the mind, we are here to reexamine how people deal with the world and the role of representation in it.

First of all, the mind is a relatively independent internal world. During phylogenetic evolution, the gradual complication and differentiation of the internal world enable the organism to form representation, and "move" the interaction between itself and the world (in the reflective level, it can be divided into three parts: the interaction between the world, itself, and the two parts) to the internal world. To achieve the effect of "alternative action," it is possible to better interact with the world. Rodríguez and Garzón used an emulator to represent the simulation, thus dividing the cognitive system into two subloops (see Figure 3): (1) controller–body/world loop; (2) controller–emulator loop. In this manuscript, it is called external loop and internal loop. Among them, the feedback speed of the internal loop is faster, and as an offline cognitive process, it plays an important role in predicting and correcting the external loop (Rodríguez et al., 2010). In the object relations theory of psychoanalysis, these two types of loops are respectively implied in the real relationship between the individual and others and the internal object relations (Alvarez, 2018; Blatt et al., 1997). Similarly, what Beebe and Lachmann called the expectation of interaction is rooted in the operation of internal loop, affecting the real interaction with others to a great extent (Beebe et al., 2002). In Damasio (2018), this type of simulation is known "as-if body loop," and its physiological basis is the mirror neuron of animal and the mirror nervous system of human. Notably, this type of representation is not an objective representation completely independent of the environment, but an "incomplete representation" in the coupling with the world (Li et al., 2006; Rodríguez et al., 2010). In terms of phenomenology, it is the "Abschattung" under a certain perspective.



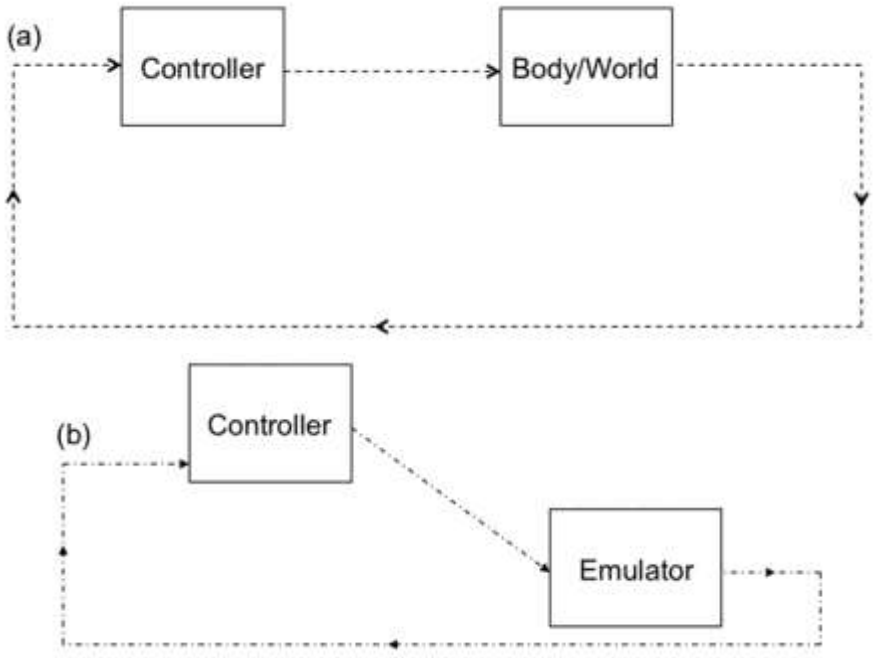


Figure 3. Interaction between human and the world and its internal simulation: (a) controller–body/world loop; (b) controller–emulator loop (Rodríguez & Garzón, 2010, p. 403)

Secondly, people maintain a relative boundary during interaction with the environment. The origin of this boundary in the evolution of germline is the cell membrane of living cells, which distinguishes the internal environment from the external world of cells and helps to achieve homeostasis. At the same time, it also has permeability, allowing the input and output of information. In humans, boundaries are based on the body and can contract and expand. Under different conditions, the permeability will change. In other words, the mind is neither completely closed as Descartes imagined—everyone hides in his own small room and obtains information about the outside world through the "theater" (Dennett, 1991; Stolorow et al., 2002), nor is it completely open as Sartre (2003) said—I and the other can understand the "transparent" consciousness to the same extent. The actual situation lies between the two, i.e., between the fully closed and fully open dynamic changes, but cannot reach either end of the two. In some special moments (e.g., the moment of meeting in interpersonal interaction described by BCPSG (2010)), the degree of openness of the mind becomes larger; in other moments (e.g., alone meditation), the mind tends to be more closed. Sucharov (2007) used the metaphor of "window" to describe this process, which is similar to our point of view.

Specifically, in the prereflective practice, the external loop and internal loop operate at the same time, and the two are highly consistent. It can be said that at this time, people have a unity of body–mind, reflecting the characteristics of "unity of knowledge and action." In this case, the internal loop runs fast and is silent in the background, so that it is easy to be ignored. At the reflective level, the inconsistency of internal and external circuits is easier to see. For example, when James, who is sitting opposite me, is deep in thought, it seems that nothing has happened from the outside, but this does not mean that he has no thinking activities. In fact, his inner world may be "flying in the sky." If I want to prove this, I just need to go over and ask James, and then he can tell me frankly. He might say that he had just thought of a friend, drinking with him, talking about his life, and so on. In the same way, I can think without expression, while the onlookers cannot understand my thinking. However, I do know that I have memories of the past, reflections on the present, and plans for the future. I can also share them. Therefore, it can be said that there is indeed a "private space" for thinking. Gergen (2009) denies that the mind is a private space, because it is unnecessary to assume such a potential or behind "thing," which will aggravate the alienation between people. Obviously, this view is untenable. At this point, he took more account of the prereflective interaction and lacked in-depth exploration of the internal world in the reflective level.

Finally, due to the accumulation of experience during phylogenetic evolution and ontogeny, human's internal world is constantly enriched. At this time, people can not only simulate the "external reality" in the internal world, but also construct the parts inconsistent with the external reality (although it is impossible to conform to the "mirror of nature"), even things that do not exist and are impossible in reality, such as unicorns and square circle (Zahavi, 2003). This is reflected in the normal people who are well adapted and the clients who are not well adapted, which is manifested in the illusion of breaking away from reality and entering the level of consciousness in varying degrees. For example, many schizophrenic clients will produce all types of illusions without external stimulation. A common type is auditory hallucination, in which a voice different from one's own thoughts appears in one's mind. Although bystanders may find it puzzling, such hallucinations are very real to the client (American Psychiatric Association, 2013). Of course, the hallucinations of schizophrenia are often passive and are not controlled by the client himself/herself. In other cases, fantasy can also be active, such as individuals obtaining pleasure through various sexual fantasies (Kahr, 2008), and avoid unpleasant events in reality through fantasy (Blackman, 2004). This part of the content is one of the important themes of psychoanalysis (Mitchell, 1988). In a word, through the temporary "decoupling" with the external world (Li et al., 2006), the internal loop can be "disconnected" from the external loop.

In this sense, the internal world goes beyond the simulation of reality and can exist not only as the representation of the intermediary. This "transcendence" of reality is also the source of creativity. For example, in the invention and creation of man-made objects such as electric lights, trains, and computers, these man-made objects do not exist in reality first, but have the structure of idea first, and then have the production in reality. At this time, the structure of idea or thinking plays the role of representation. As the intermediary of human interaction with the world, it is again restricted by the external world. Take the manufacture of electric lamps as an example: When the manufacturer designs the object according to the electric lamp in the concept and finds that it cannot operate or play the function effectively, a common choice is to modify this concept. Then, according to the revised concept, the producer transforms or remakes the object. If this improvement does not achieve the desired effect, a similar "modification manufacturing" process can continue until the "product" is completed. In human artistic creation, there are similar processes, such as changing "ideas" such as unicorns and aliens into images in literature and film and television works.

Conclusion

From the perspective of phenomenology and phylogenetic evolution, this manuscript reports a critical study of the core position of representation in the mind. The results show that human beings have a relatively independent internal world, and can use representation to simulate their interaction with the world. However, because people are always embedded in the specific space–time background and are coupled with the world, the mind is not a "mirror of nature," and the representation of the world is not an objective "copy", but a "Abschattung" from a specific perspective, which is an "incomplete representation." In a prereflective practical activity, the representation in the internal loop is silent as the background; when the practice activity breaks, the role of representation in the reflection level is highlighted: at this time, people and the world can open a distance, use the representation to achieve an "alternative action" effect, so the way to deal with the world becomes rich and diverse. This is particularly evident in phylogenetic evolution: from a single-celled organism that only relies on the direct interaction (no representation) between the body and world, it has gradually developed into a complex organism with unconscious mind (with representation and no awareness) and conscious activities (with representation and awareness), and the way to deal with the world's challenges has become more flexible. In addition, the internal world can go beyond the simple "replication" and "simulation" to some extent, and construct people or things unlike the real world (even nonexistent people or things). On one hand, it provides soil for human creative activities; on the other hand, it provides a hotbed for human beings to get out of the real world and immerse themselves in various fantasies. Therefore, human beings live in the world under the "resulting force" of the internal loop and external loop.

Notes:

1. In contrast, ontogenesis cannot reveal this process 'from zero to one,' because infants, even before birth, have many capacities rather than being a 'blank slate.'

2. For convenience, the term unconsciousness refers to the unconscious in this manuscript.

3. Retrieved from http://supergoodtech.com/tomquick/phd/autopoiesis.html

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