THE EXPLANATORY GAP AND CODE-DUALITY: Reconsidering The Mind-Body Dualism

Introduction

> "Without consciousness the mind-body problem would be much less interesting. With consciousness it seems hopeless." (Nagel, 1974, p. 436)

Many philosophers, since Descartes, have tried to explain the explanatory gap between mind and body. They have aimed to reveal the way that mind and body interact with each other and close the gap which Descartes (1996) gave rise to. Against most of them, I believe that this knowledge is close to us and there is no philosophical puzzlement to deal with at the first place. Because the explanatory gap arises from the fact that each living being is captive of its subjectivity so that we cannot reach the objective knowledge of the way mind and body interact with each other. The embodiment of each living system necessarily separates them from their surroundings and forces them to construct their peculiar phenomenal worlds against the objectified noumenal world. On the bases of the idea of code-dualiy firstly I will justify the claim that each living system is bound to subjectivity. Afterwards, I will show that we are cognitively closed to explain the explanatory gap because each one of us, as necessarily being a subject in our phenomenal worlds, cannot directly have any knowledge of the noumenal world itself with a naked eye, meaning without a subjective point of view.

1- The Idea of Code-Duality

In order to raise the right question at the right place, firstly we need to talk about the notion of phenomenal and noumeneal worlds (Kant, 2013). Kant distinguishes the world into two categories in terms of the existence of a subject. If there is no subject, there is the noumenal world, the world itself, that is free from any subjective point of view. On the other hand, if there is a subject who experiences, the world that the subject having experiences is the phenomenal world. The noumenal world in a way shows itself to each observer through a different phenomenal window that is constructed by the observer's subjective point of view. Hence, phenomenal worlds are bound to subjectivity. For each living system, there is a distinct and peculiar phenomenal world. For instance, the phenomenal world of a bat and a human being is clearly different. Because they comprehend the noumenal world differently on the basis of their distinct biological structures. In this way, they attach their subjectivity to the noumenal world and

create their own peculiar phenomenal worlds where they can act onto. At this point, the right question arises, how life emerges in the first place?

According to the idea of code-duality, life emerges from having self-reference, meaning "the ability to select and respond to differences in their surroundings" (Hoffmeyer et al., 1991, p. 126). If we assume the noumenal world as a big, inclusive system that is consisted of sub-systems that are living or not, what distinguishes a living system from a non-living system is its ability to process information. The systems that can have information about their environments and that can give proper responses to their surrounding on the basis of the information they have, are the systems that are living. This is how we and all biological creatures came to existence. Hoffmeyer and Emmeche states that "for a system to be living, it must create itself, i.e. it must contain the distinctions necessary for its own identification as a system. Self-reference is the fundament on which life evolves, the most basal requirement" (Hoffmeyer et al., 1991, p. 126). For instance, thanks to evolutionary theory we know that life at first emerged in protocells after they started to select the information outside of their membrane and responded in a way by selecting what they need or not to have inside of their systems. It was the self-reference that made it happen, that distinguished a living system from an oil molecule, a non-living system. If so, how exactly a living system show self-reference? The answer is through code-duality.

Code-duality is "the ability of a system to represent itself in two different codes, one digital and one analog" (Hoffmeyer et al., 1991, p. 126). For the ability to select and respond to differences, a system must represent itself in this dual fashion. By a digital code, a living system represents itself within its system. By an analog code, a living system represents itself within the noumenal world. The reason of why a system needs these dualist representation is that by being the subset of a much bigger system, i.e. the noumenal world, it has a limited memory. It cannot code all the differences that are going on in the noumenal world. Hoffmeyer and Emmeche exemplify this fact as in following, "at the quantum level even a raindrop would exhaust the computer capacity of the whole world if a complete enumeration of the potential differences it contains should be calculated and memorized" (Hoffmeyer et al., 1991, p. 123). For this reason, a system must represent the differences in its surrounding within its system in a way that is different from the world itself, that is the digital code. Also, secondly, in order to respond the selected differences that form informations, a system must represent itself outside of its sytem, in

the noumenal world. The system "has to interfere with the physical surroundings and thus must share with these surroundings the properties of physical extension and continuity" (Hoffmeyer et al., 1991, p. 127). Thereby, it needs to represent itself outside of itself in an other way, that is the analog code.

If we look at from another point of view what happens is that, the noumenal world itself is a continuous f(x) function where its domain and range is defined as all reel numbers. If we assume that a raindrop is defined as in the domain between [0, 1] of f(x), there are infinitely many reel numbers between 0 and 1. A system as being the subset of f(x), cannot represent all the reel numbers. Because of this, it represents f(x) function not as a continuous function but as a discrete one, for example by only representing the numbers that are the product of 0,01. Because of this the system necessarily loses some informations about its surrounding. It constructs a phenomenal world that is in a way some portion of the reality itself on the basis of the way it represents f(x) function. In the idea of code-duality, this discrete representation of the noumenal world corresponds to the digital code. With a digital code, a system can form an information about its environment and choose how it will response. As Hoffmeyer and Emmeche state, "the trick of digital codes in the human sphere is to translate 'reality' to a form in which its content can be freely manipulated so as to test the universe of possibilities" (Hoffmeyer et al., 1991, p. 134). However, in order to realize their manipulations a system must also have to interfere with the noumenal world itself. What it has to do is to represent its response against the represented discrete part of the f(x) function through its embodiment, in a way that can correspond to the f(x) function itself. For instance, if we take the represented discrete part of the f(x) function as a h(x) function where its domain and range is defined as only integers, it can be corresponded to the f(x) function by taking its domain as all the reel numbers but its range as only integers. This type of representation of a system in the noumenal world is called analog code. As Hoffmeyer and Emmeche beautifully summarize, "the chain of events, which sets life from non-life, i.e. the unending chain of responses to selected differences, thus needs at least two codes: one code for action (behaviour) and one code for memory – the first of these codes necessarily must be analog, and the second very probably must be digital" (Hoffmeyer et al., 1991, p. 127).

While a system represent itself with a digital code within its system and with an analog code outside of its system, it bounds subjectivity to the objectified world outside of itself. Firstly,

while representing the reality as a digital code, a system makes this procedure on the basis of the way it represents f(x) function. For example, humans represent f(x) function in a binary way through the action potentials of their receptive cells. When Mary sees a red apple, what happens is that she represent a wavelength, that is between 622 and 780 nm, with its photoreceptor L-cone that can detect a wavelength between approximately 450 and 650 nm. Consequently, each wavelenght between 622 and 780 nm would be corresponded to seeing a red colour in the eyes of a human, rather than having a distinct phenomenal experience for each wavelenght. Moreover, Mary cannot represent at all the wavelenghts that are bigger than 650 nm as a colour. Secondly, while a system represents itself in the real world with an analog code, it responds the represented discrete part of the f(x) function on the bases of its embodiment. For example, after waking up as an insect like Gregor Samsa (Kafka, 2015), a human cannot suddenly start to represent itself in the noumenal world with its previous analog code through its new embodiment. Because, its analog code is formed as a response to its digital code while she was human. The h(x) function of a human cannot be corresponded to the f(x) function in a proper way after its embodiement changed. The digital code of a homo sapiens can only be realized through an appropriate body. Thus, the embodiement of a system prevents the representation of a digital code and an analog code of a system from being free from subjectivity.

If we sum up, the systems that are able to self-refere to themselves, are also subjects against the objectified world outside of their systems. When a system starts to select the differences in its surrounding, it constructs a phenomenal world for itself by the representations that are made from the differences that are picked out from the noumenal world. These representations are made through the embodiement of a system. For example, because humans and bats have different biological embodiements, they as being a system select the differences in the noumenal world differently from each other and would have distinct representations. Consequently they construct their own peculiar phenomenal worlds. A system that can self-refere, bounds its subjectivity to the noumenal world that is free from it in the first place.

2- Cognitive Closure: The Epistemological Gap

> "Somehow, we feel, the water of the physical brain is turned into the wine of consciousness, but we draw a total blank on the nature of this conversion." (McGinn, 1989, p. 349)

After the discussions we have had until now, we know that there is a bridge between a subject and the objectified world. Subjectivity emerges within the noumenal, objectified world itself by a system's ability to self-refere to itself through its embodiement. However, what we do not know is that how this bridge is constructed. Can we build this bridge through argumentation and in a way give a recipe for it? As Fred Dretske states "if you can't make one, you don't know how it works" (Dretske, 1994, p. 468) and I do not believe that we can make one. We do not fully understand and know how the first person, subjective point of view emerges within the third person, objective point of view. The reason is not because there is a metaphysical gap between them, rather because there is a cognitive closure on human mind that is resulted from the digital redescription of the noumenal world.

As I have stated in the section 1, a living system, as being the subset of the noumenal world, cannot represent all the differences in its surrounding. Because it has a limited memory, it cannot represent the 'reality' as it is within its system. It must represent it in a representational way that is discrete, i.e. h(x), as compared to continuous 'reality', i.e. f(x), on the bases of its body. However, while a system constructs its phenomeal world in this way, it loses the information that makes the difference between its phenomenal world and the noumenal world itself. Because of this it cannot grasp what is really going on in the 'real' world. It projects itself to the noumenal world through its phenomenal world, which does not fully correspond to the 'reality' itself. Its embodiment leaves it but no choice to be subjective and the captive of its phenomenal world. As a result, subjective constraint causes cognitive closure on a system.

Cognitive closure is a living system's inability to comprehend all the differences that lies beyond its representational power. Colin McGinn explains the term as in following, "a type of mind M is cognitively closed with respect to a property P (or theory T) if and only if the concept-forming procedures of M's disposal cannot extend to a grasp of P (or an understanding of T)" (McGinn, 1989, p. 350). From a code-duality perspective, if we say that M is the information processing of a living system and P is the susbstance itself in the noumenal world where it is free from subjectivity, we can say that M is cognitively closed with respect to P (or theory T) if and only if M cannot select the necessary differences in the noumenal world that are related to P in order to represent it as a digital code within its system. From this definition, we can state that there are two kinds of cognitive closure. If we take M as a variable, meaning for each living

system there is a different information processing due to their distinct embodiments, and assume P is constant for each one of them, it can be said that for each living system their cognitive closure in respect to P is relative. This is called relative cognitive closure (McGinn, 1989). For example, homo sapiens and Nagel's bats (Nagel, 1974) are relatively cognitively closed compared to each other. In a similar situation, as being living systems, they select the differences in their surroundings through their distinct embodiments and they would end up with different informations to process. A homo sapien cannot select the necessary differences in the noumenal world that are related to P as the same as a bat does. Because of that, though the echolocatory experience is not cognitively closed to a bat, it is cognitively closed to a homo sapiens. On the other hand, P as being a substance itself cannot be represented within a living system as it is in the noumenal world. No mind M can processes all the informations that are supposed to be derived from the observed differences that are related to P. Because in the first place they cannot select all the differences. They have a limited memory as being a sub-set of the noumenal world itself. Because of the way they are defined, meaning they come to existence within their bodies that are made of substance that belongs to the noumenal world itself, they cannot represent the 'real' world as it is in a digital code. This is called absolute cognitive closure. As we have said in the section 1, "at the quantum level even a raindrop would exhaust the computer capacity of the whole world if a complete enumeration of the potential differences it contains should be calculated and memorized" (Hoffmeyer et al., 1991, p. 123). Because of that, only a system that is bigger than the noumenal world itself can represent the world as it is. However, then it would mean that the noumenal world that we have called 'real', is nothing but a simulation. This is an other possible way looking at the issue but I will not deal with this in this paper. I assume the noumenal world as the reality itself. Colin McGinn sums up as in following, "a problem is absolutely cognitively closed if no possible mind could resolve it; a problem is relatively closed if minds of some sorts can in principle solve it while minds of other sorts cannot" (McGinn, 1989, p. 360).

In the case of how the water of the physical brain is turned into the wine of consciousness, the explanation is absolutely cognitively closed to our minds. When we look at a brain itself with a naked eye, we just see a bunch of wrinkles that are made of carbon based structures. When we look at it with tools like microscope in an indirect way, we see gray matter, neurons, dendrites,

axons, how an action potential occurs and also when we measure the temporal and the spatial activity of a brain, we observe that which region of it is activated and when it is activated while performing a certain task. However, we really do not know how consciousness, i.e. the phenomenal consciousness, arises from these carbon based materials and their interactions. The reason is, as we have talked, we are unable to represent the 'real' world as it is because of the way we are embodied. All of the observations that we have made in both direct and indirect ways are nothing but the representation of the differences between substances that made a brain as it is. We cannot observe the brain itself, we just can see the shadow of it that cast on our phenomenal worlds. Because of that we also cannot fully understand the phenomena of consciousness.

You can think of observing a brain like looking at a photo. As you know for each photo there is a resolution that determines the photo's quality. The photos that have high resolution can be seen clearly, on the contrary the photos that have low resolution cannot. In our case, if we think of a brain in our phenomenal worlds as a photo of the brain itself in the noumenal world, and the observation that are related to it as seeing a photo, we can say that a brain has a low resolution while looking with a naked eye. We just see a bunch of wrinkles that are made of blood and meat. As we have started to use our tools such as microscope, fMRI, MEG etc., we can have a photo with a more higher resolution. This time we can see neural structures, neurons, axons, how the action potential occurs, sodium and potassium ions, and also DNA, Adenine, Guanine, their structures. It is just a beautiful clear photo. It looks like we have made progress and it is just a matter of time to solve the puzzle of consciousness, meaning there is no conceptual constraint that prevents us if we have enough time. However, it is not the case. If we remember that a photo is in a way the representation of a reality that is taken pictures of and the reality itself is noumenal with respect to a digital camera, the difference between a high and a low resolution is just a degree of representation. A digital camera that is embodied in a way that it can represent more, would take photos that have higher resolution. On the other hand, the ones that are embodied in a way that cannot represent as that much, would take photos that have low resolution compared to the higher ones. In the future, there will be more clear photos with higher resolutions that will reveal the way of brain works, however there will not be any photo that can reveal it fully. Because, in our scenario, a digital camera cannot represent a thing whose picture is taken as it is, in a photo. It cannot have that much memory. It will approximate to do that, but it will not

be able to do it fully. The things themselves that are taken photos are absolutely cognitively closed to a digital camera, as we are cognitively closed to the noumenal world itself.

We are inclined to think that there is an ontological gap between mind and body. Because we confuse the fact that we are cognitively closed to the explanation of their relation with the assumption that they are based on two distinct substances. When we cannot explain their relation in a unified physical domain, we tend towards to come up with the idea of contingency to justify our limited understaing of the issue. For instance, Saul Kripke thinks that "… the correspondence between a brain state and a mental state seems to have a certain obvious element of contingency" (Chalmers, 2002, p. 333), meaning mental states are not identical to brain states. There might have been a possible zombie world where there is C-fiber stimulation but no mental state of pain. Against this claim, Colin McGinn states that "the reason we feel the tug of contingency, pulling consciousness loose from its physical moorings, may be that we do not and cannot grasp the nature of the property that intelligibly links them" (McGinn, 1989, p. 364). If we would not have been cognitively closed to how exactly brain states cause mental states, we could show that mental states are identical to brain states and C-fiber stimulation is necessarily cause mental state of pain. In a certain degree we can understand how these relation holds as we have discussed so far, however we do not fully understand it so that we can make one.

In order to give an idea about what we cannot make, while building an artificial intelligence, I want to briefly talk about "the halting problem". The halting problem is the question that for a given computer program and an input whether a system will run forever or stop after at a certain point. It is proven by Alan Turing that the answer is undecidable (Turing, 1937). There cannot be any Turing machine, i.e. computer program, that can decide when a program will stop or not for all possible computations. Roger Penrose, in its paper of Setting the scene: The claim and the issues (Penrose, 1992), exemplifies the problem as in following; if we ask a computer that has infinite memory to find an even number that is the sum of two even numbers and is bigger than seven by counting from one, the program will start to compute and stop after it reaches the number eight, which is both bigger than seven and the sum of two even numbers such as six and two. However, if we ask the computer to find an odd number that is the sum of two even numbers and is bigger than seven by counting from one, it will start to compute again but this time it will not stop or halt. Because there is no odd number that is the sum of two

even numbers. It will run forever and will not give any answer at all while thinking the next number might be the answer. On the other hand, if I ask you the same question, you might start to count as like a computer program, but after a point intuitively you will answer that there is no such a number without needing to count forever and checking all the numbers. According to Penrose, this difference shows that there is an aspect of human mind that is incomputable so that we cannot duplicate it in a machine's software. I think, the reason is we are absolutely cognitively closed to the incompitable aspect of human mind. It is not something that can be represented so that can be understood. It cannot be explained by the science we have that bases on computable methods. We are like a "Humean mind" (McGinn, 1989), that try to understand causation. The explanation of it lies in the noumenal world itself that we have no access into.

Colin McGinn clarifies that, "it is not that the correct science is compelled to postulate miracles de re; it is rather that the correct science lies in the dark part of the world for us" (McGinn, 1989, p. 362). Meaning, it is not the case that the water of the physical brain is miraculously turned into the wine of consciousness or the first person point of view is emerged within an objectified world from nowhere. Everything that exists is bound to the causal closure of the physical domain. There is no ontological gap at all within the reality itself. It is just we are cognitively closed the reality itself, i.e. the noumenal world, so that we cannot understand what is and how is happening behind the scenes, i.e. the phenomenal world. As Colin McGinn agrees with me:

> "What creates the philosophical puzzlement is the assumption that the problem must somehow be scientific but that any science we can come up with will represent things as utterly miraculous. And the solution is to recognize that the sense of miracle comes from us and not from the world. There is, in reality, nothing mysterious about how the brain generates consciousness. There is no metaphysical problem." (McGinn, 1989, p. 363)

In conclusion, we will not ever be able to turn the water of the physical brain into the wine of consciousness. The reason is neither it is something miraculous or there is an ontological gap between them. What happens is that, we are cognitively closed to fully understand how it occurs. There is an epistemological gap between our first person point of view and the objectified world because of the way we are embodied. We are captive of our subjectivity so that we cannot just get rid of the phenomenal world of ours and look directly to the noumenal world, that is to say the reality itself. At this point, what we need to do is to be aware of, again, that we are not at

the center of the universe. The reality does not come into existence in the way we perceive it. We are just a system that is composed of physical substance that can self-refere, meaning that can select and respond the differences in its surrounding as far as our embodiments allow us. As Colin McGinn points out:

> "… the limits of our minds are just not the limits of reality. It is deplorably anthropocentric to insist that reality be constrained by what the human can conceive." (McGinn, 1989, P. 366)

It does not mean that we should just stop investigating the issue. The fact that we will not ever fully understand how it occurs and cannot make one, does not mean that we will not understand it at all. It just means that we need to be aware of that there is no miracles going on, or there is nothing outside of the physical domain. If we stay on the right track without turning to the dead ends such as dualism, though we will not reach the end we will make progress as we move on. After all, isn't it "philosophy means to be on the way" (Jaspers, 1954, p. 12)?

Conclusion

I do not believe that we can ever fully understand and explain the explanatory gap between mind and body. However, I believe that if we have enough time and realize that there is no ontological gap that leaves us no choice but believe mind-body dualism or miracles, at some point we will fulfil our potential by reaching the end of our representational power of our systems and we will be aware of that there is no philosophical puzzlement at all. There is no metaphysical problem or an ontological gap. We will just face the ugly truth that our minds have limits and we are absolutely cognitively closed to the noumenal word where the interaction occurs. Luckily, we have a long way to go before reaching the limits of our systems so that we will have many times to believe that we understood the explanatory gap while admiring the 'zombie' (Chalmers, 2002) robots that we have made.

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