Young Jae Lih, 2016

“Time is what keeps everything from happening at once.”
— John Archibald Wheeler[1]

When I saw them for the first time, the two old individuals were staring at each other for quite a while. Half an hour passed and P and J had not said anything, but stayed in silence, just looking into each other’s face very focused, fascinated with one another. This strange encounter between them happened because of the peculiar ability that each had. P could remember everything. For him, every moment in the past and the sensations experienced at the time were as vivid and real as the here and now. He could remember all the exact details and the exact time when he performed a specific activity. He could easily remember what time in the morning he woke up last Monday, how the weather was when he opened the curtains last month, how much coffee he had put into the coffeepot, or the specific amount of water he had boiled either that same morning or five years ago. He could also remember all the words on the newspaper that he read while drinking coffee, as well as all the objects that were on the table. Often, people came to see him and asked him to recall many numbers or sentences to test his memory, and he never made any mistakes. If P was the person with an exceptional memory, J was his antithesis. He didn’t have any memories except from his very early childhood. His capacity to remember was limited to only a few seconds. His perception was reduced to very small fragments of unknown origin. He had always been terrified, because he found himself surrounded by strangers in strange places at all times. He could recollect neither his family nor his acquaintances, and he couldn’t have a normal conversation with people, since he’d forget when he was talking. It was not surprising, then, that as a result of his “memory shortage” J had a permanently puzzled and naive look on his face.

Their encounter, however, was not as simple as the silence between them. Of course, J continued to be socially awkward. He was confused, wondering why was he there and if he had ever met P before. However, he eventually stopped wondering about that. Because, again, he discovered that the person in front of him was frightened, and J started thinking seriously about the identity of this stranger and why was he there. As soon as P saw J, he automatically recalled all the people he had met in the past, as well as all the conversations with them and all the impressions he had had. There was a big contrast between P and J and their reactions to each other. On the one hand, P was able to capture each movement of J, however small: he noticed the slightest change and related it to the corresponding memories in his mind. He could even perceive minute expressions on J's face, and the light that shaped them. On the other, he was also confused by J, who stared at him for a long time. Still, it wasn't that easy for P to place J in his memory. For P, J wasn't just one individual, but rather the experience of a huge group of people formed by different individuals and their distinctive features.

Although this story might seem like pure fiction, people like P and J really do exist in real life. The Russian psychologist Alexander Romanovich Luria had a patient with hyperthymesia—the ability to remember absolutely everything—known as the "mnemonist" Solomon Shereshevsky.[2] The neurologist Oliver Sacks had a patient with anterograde amnesia, Jimmy G., known as the "Lost Mariner" because he lost his ability to form new memories after a sailing accident.[3]

Time seems to play a key role in this memory game. How does time flow affect and how is it perceived by those who have a severe memory disorder? According to the special theory of relativity presented by Albert Einstein in 1905, "time delay" is a phenomenon that can be experienced by a person who travels relatively faster than another. This theory suggests that time is relative, in opposition to a concept of absolute space and time. For instance, let's imagine that here is a person sitting on a chair and there is another one who keeps moving around quickly. After some time has passed, they meet each other again. For the person who was moving, the clock went slower than for the one who was sitting still. When applying the theory of relativity to these patients' cases, it appears J appears had neither past nor future. It is, instead, as if he was just stuck in the moment. In other words, his perception is that he cannot remember anything except the present moment, and he might find that time goes faster for no reason. In real life, Jimmy G. couldn't recognise his brother, who visited him after a twenty-year absence. He insisted that his brother was not a middle-aged person who looked like his father, but a much younger man who had just entered university. On the contrary, for Solomon Shereshevsky, the person who could memorise everything, time would be something that went very slowly. He had become a sort of axis, as time existed for him as a very condensed memory mass. Memories were assembled in a thin layer and had to be arranged chronologically, but at the same time this was hindered by continuous inputs of new information. So, he had trouble establishing structures to link the information he perceived from the outside with the abstract context of memory. As time went on, he lost his ability to recognise and relate words properly; for example, he confused a word that he had just heard with one that he had heard a long time ago. He spent the last years of his life in a mental hospital.

The origin of the word "memory" comes either from the thirteenth-century Latin word "*memoria*," which means "memory, remembrance, faculty of remembering," or from the Anglo-French word "*memorie*," which means "recollection (of someone or something); awareness, consciousness." Thus, memory is the human ability to store specific experiences of the past, which become part of a person's framework of understanding. This is done "consciously," so almost all of our knowledge is based on memory that is placed in a specific time in the past. And, even more interestingly, the knowledge that we perceive consciously is also based on memory. So, how can humans perceive the information from the outside as such, then memorise it, and finally store it in their brains? First we need to see how human sensations are elaborated, so then we can be sure of how much information we can perceive.

In 1942, Selig Hecht, Simon Shlaer, and Maurice Henri Pirenne of Columbia University devised an experiment to figure out the degree of response that people had to minimal visual energy in a dark space. They installed a light source in such a way that it fell onto the participants' retinas, where the rods and cones used for sight are concentrated. The participants were first adapted to the dark space for half an hour; then, the participants were asked to react to the signal of a flickering light that lasted one-millisecond. When the number of photons emitted decreased to a certain point, the scientists were able to figure out the minimum amount of visual energy needed for sight as well as the ability of the participants to identify the emitted photons individually. As a result, unless the signal was more frequent, a minimum of nine photons scattered across the retina could be perceived. If we consider that the average retina contains 350 optic rods, the results imply that these nerve cells can react to even a single photon. But when the intensity of the light is reduced to just a single photon, the participants weren't able to react any longer. This means that, actually, the noise that is filtered as part of the visual process does not take place in the optical nerves but in the brain, which has major restrictions when it comes to identifying visual stimuli. In general, we have always assumed that visual stimuli come in consistently, but there are variations in responses to them that are caused by the specific characteristics of an organism. Finally, the results of the experiment show that the critical point relates to how much of these fluctuating stimuli are perceived by the brain. And this physical variability determines the variations between the stimuli and the response.[4]

The human visual sensory organ is sensitive enough to detect a single photon, but this doesn't mean that we can memorise that amount of information. In its traditional sense or definition, memory has always been interpreted as a “storage space” for our thoughts and experiences. Thus, it is not really surprising that we often focus on the aspect of quantity when we want to represent memory: that is, the amount of things we are able to remember or memorise. This idea of memory as a skill was also found in the mnemonic technique of the ancient Greeks. It was conceived 2,500 years ago by Simonides of Ceos, and it is known as the “memory palace.” This device had such relevance that it was included as a subject in the *Rhetorica ad Herennium,* written in 82–86 BCE.

This, along with the use of imagination, became the central praxis of memory. We just had to visualise an imaginary palace that we could virtually visit and in which we’d arrange images at specific places. Still, mastering this technique required both a detailed and a focused visual ability to be able to build the layers of memory, which requires putting artificially visualised objects in different spots in the imagined palace. In Rome, senators were not allowed to have notes when delivering a speech, so having a trained memory was necessary. This mnemonic tradition continued throughout the Middle Ages in Europe. Monks and theologists often used this technique for remembering passages from the Bible or related books. Since paper was so valuable and printing was still quite rudimentary, having good memory skills was an essential condition for any cultivated person. Memory was treated as a tangible object that was represented by past experience. This concept of memory was also developed around a narrative structure originally borrowed from literary or theatrical visual traditions that created imagined places. According to this Greek context, memory means something that is embodied and organised around images from lived experience, which can be associated with and used as a referent anytime. Therefore, it is not surprising that this definition of memory was accepted in the philosophical tradition of empiricism, putting emphasis on knowledge acquired by direct and sensory experience. This goes back to Aristotle and was later adopted by Thomas Aquinas. Indeed, recent research on memory shows there is a strong correlation between spatial memory and the possibility of developing Alzheimer's disease. Researchers conducted an experiment with a group of people who had the APOE4 gene, which usually occurs in people with Alzheimer's three times more often than in people without. To conduct their experiment, the researchers put a certain object in different places in a virtual maze, which required the use of the participants' spatial memory to locate. The results showed that the people in the APOE4 group had less activity in grid cells of the entorhinal cortex, an area of the brain that controls our perception of space. Instead, the hippocampus—the memory centre, which is located near the entorhinal cortex—was activated. The APOE4 group also proved to have different tactics than the control group for trying to find their way in the virtual maze, so scientists concluded that determined behaviour patterns in our use of spatial memory can help to predict memory disorders such as Alzheimer's.[5]

The problem of this perspective that sees memory as a storage space for images from the past is that it becomes very vague. The image produced in our minds during the perception process and the corresponding *idea* of the image produced in the imagination both relate to a specific image that corresponds to an object.

The empiricist John Locke simply described memory as the "storehouse" of the mind,[6] and David Hume, another empiricist philosopher, also inherited this notion of memory from the Greeks. Building on this, Hume classified the representation of memory into two different categories: that of the idea and that of the impression. "Vivacity" was the main criteria he used to classify impressions that were different from others. Although he didn't classify them strictly by "idea image" and "memory image," he remarked that memory images are stronger than "imagination images," but are weaker than "impression images." Bertrand Russell, who also came from an empirical background, made a clear distinction between images from the imagination and images from memory. He described imagination images and memory images as the same, but in the case of the memory images, he identified that their contents relate specifically to feelings or beliefs in the past.[7] This approach that distinguishes represented images according to different types of mental status became the foundation for studying the mind in contemporary philosophy and psychology from a general point of view.

According to Hume, though, what we experience is only the representation of an idea, so what we are truly able to perceive, then, are the representations of our ideas. Empiricism thus grew to become quite sceptical about the physical world. Thomas Reid, an opponent of Hume, aggressively attacked this representational theory of memory. He pointed out that the same reasons empiricism became sceptical about the physical world meant it ended up being sceptical about the past. That is, if we assume that the act of remembering is a conscious act, then our concept of the past should also be based on the idea that it is reproduced at the present moment. Thus, for Reid, memory is how we remember the past in the present time. Finally, following his argument, it is also true that what we can recall is only the present sensation, so there is no reason that we can be sure about the past, which should be same as we remember it.

What, then, does memory mean for Reid? According to him:

> Memory is what gives us immediate knowledge of things past. The senses inform us about things only as they exist in the present moment, and if this information were not preserved by memory it would vanish instantly, leaving us as ignorant as if it had never been. . . .
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> . . .
>
> Memory implies a conception of past time and a belief that some time has passed; for it is impossible that a man should now clearly remember x without

> believing that some stretch of time, large or small, has passed between the time when x happened and now; and I think it is impossible to show how we could acquire a notion of duration if we had no memory.[8]

In Reid's view, memory has a direct correlation with the past. To him, memory means the direct knowledge of the past. Therefore, he disagreed with the opinion that the person who remembers something is remembering the memory of the present. Rather, the one who is remembering should not to be in the present but in the past instead. He insists on the idea that our memory has a specific duration at the midpoint from past to present, and this is infinitely continuous. Reid continues:

> It is essential to anything that is remembered that it be something that is past, and we can't think of something as past without thinking of some duration, large or small, between it and the present. So as soon as we remember something we must have both a notion of and a belief in duration. . . . Duration, having only one dimension, has fewer modifications; but these are clearly understood, and their relations admit of measure, proportion, and demonstrative reasoning. . . . Duration and extension [which equals geometrical dimension] are not discrete but continuous quantity. Their parts are perfectly alike but divisible without end.[9]

But, is it time that we perceive? Do we really perceive time as a continuous and simultaneous system? If not, how can we say that time is continuous outside of all consciousness? Isn't there a limit to the human ability to perceive time?

According to a recent experiment on the human auditory sensory organ, humans can detect a 0.1% difference of frequency in audible bandwidth (20–20,000 Hz).[10] That means the difference between 13,000 Hz (0.07692 millisecond per cycle) and 13,020 Hz (0.07680 millisecond per cycle), or 0.00012 milliseconds. This amount of time is the same it would take to travel thirty-five metres at the speed of light. This shows the limitations of the human sensory system, as we saw in the previously described experiment on vision; however, it also implies that all the information we perceive is discrete signals from tiny fragments. Moreover, even though we are able to sense a very small amount of time, how can we perceive these tiny fragments as part of a continuous flow of time? How can I be sure that my visual perception of the world is not continuous? For instance, it seems that technically we cannot sense an object that moves or changes rapidly within thirty-five metres at the speed of light for 0.00012 milliseconds. Would pictures taken by a camera show the same moment that I have experienced in the past? Should I admit that I am surrounded by very subtle signals that even my brain cannot recognise, but know that it is nevertheless undeniable that the visual information that surrounds me continuously enters my nervous system? Actually, it does so in discrete chunks. But why don't I perceive these stimuli as scattered pieces of information? Why is it a common belief that time exists continuously? When describing his "Intelligent Machinery," otherwise known as a Turing machine, Alan Turing explained that it consisted of:

> an unlimited memory capacity obtained in the form of an infinite tape marked out into squares, on each of which a symbol could be printed. At any moment there is one symbol in the machine; it is called the scanned symbol. The machine can alter the scanned symbol, and its behavior is in part determined by that symbol, but the symbols on the tape elsewhere do not affect the behavior of the machine. However, the tape can be moved back and forth through the machine, this being one of the elementary operations of the machine. Any symbol on the tape may therefore eventually have an innings.[11]

As this quote reveals, it appears to be essential to construct a linear conception of time to be able to perceive a continuous framework that is part of different moments, although this linear structure is acknowledged at different intervals of time. On the matter of how we relate our experiences with continuously changing time, D. H. Mellor provides an example that uses the hour and second hands from a clock to illustrate the concept of temporal order. The hour hand suggests that there is a relationship that is established between two different positions, but we are not able to sense the movement. Instead, we can see the second hand. That means that we continuously see the second hand's regular position. Therefore, the fact that we can perceive *x* influences our perception of *y*. In other words, we perceive two different images, but they don't need to be matched exactly chronologically, as their causal relationship remains the same. The chronological order that we perceive consists of a corresponding temporal sequence. Thus, Meller insists on the idea that the temporal sequences of an event are expressed in our brain at arbitrary times.

The common point of view establishes that analogy seeks the functional similarities or the inner relevance from a complex phenomenon between two or more objects that look different. Comparison in causal relationships is actually part of an analogy process; thus we construct the outside world through analogy based on the information samples from our memory. Consequently, we perceive the world continuously. Instead of posing the question of "What is it?," we should ask, "What would it be?," as this allows to distinguish things continuously. But let's go back to the question "What would it be?" This is a question that relates to time to solve the continuous perception problem of causal relationships. However, we can also approach the question in a more meaningful way. Actually, this is the precise question that we ask when we process abstract information. Conversely, the continuous perception of time suggests that we use this rational ability for abstraction. Humans use memory as an ingredient to make analogies and construct an abstract language.

In the summer of 2012, I was with R in the Thar Desert in India. He is a tanned, muscular Indian man who does not look like a man in his fifties. R is uneducated; he didn't even finish elementary school, and his main job these days is takig foreign tourists to the desert on one- or two-day camping excursions. When I met him, he was staying in the village because it was off-season, and in the Thar Desert the temperature can go up to fifty degrees during the summer. But it provided a good opportunity for me to suggest to him a real trip from one place to another, and not to the usual camping site, so he accepted my proposition. The next day, we headed west to a city called Jaisalmer, crossing the desert with his camels for a period of ten days. We often took breaks to avoid the hottest times of day and to give the camels a rest. One day, I saw a small rabbit jumping out from a bush. Guided by my curiosity, I tried to approach the rabbit, but these wild rabbits from the desert are unbelievably fast and the desert rose up as a never-ending arid place, so finally I gave up chasing the rabbit. R also noticed the rabbit after packing up everything. He said that it was perfect, as we were running out of food, so we needed to hunt something for dinner. I could see R's chest through his unbuttoned fake Armani shirt when he picked up a stone and threw it. Strangely, the stone flew to the right even though the rabbit was to his left. Frightened by R's big gesture, the rabbit made a quick escape. The stone drew a curved line. It made a big circle and traced an arch while the stone's shadow drew a straight line on the flat surface—they beautifully but also geometrically made a point of contact, and the rabbit and the stone met on their paths at same time. We had rabbit for dinner.

“Experiment” became a keyword in the scientific revolution of the seventeenth century. Mathematics was the central tool in the formulation of the hypotheses of philosophers René Descartes, Baruch Spinoza, and Gottfried Wilhelm Leibniz. They considered mathematics as the core of natural sciences and believed that scientific result was a proof derived from the analogy of the “first principles,” or an axiomatic system. However, using only mathematics was not enough to develop a modern science. This fundamental approach to science would soon undergo a big change, led by Isaac Newton. He was a genius of experiment design. At a time when many competing theories were trying to develop their own mathematical reasoning, he realised the necessity of having a practical test to judge which one of these theories was right. He didn’t just suggest this methodological necessity, but he also planned the experiments. Newton’s main strength was his ability to visualise the inherent importance of scientific experimentation. The experiment was a way to prove but also to construct a theory. That is why his new approach was called “experimental philosophy.” In this sense, Newton’s experimental methodology was positioned in fundamental and significant contrast with the Scholastic philosophy of Descartes.

Although Newton’s science was at the forefront of the eighteenth-century trend, it didn’t lead in only one direction. Indeed, Newton had influence on two distinct schools of thought. Some scientists were influenced by the *Prinicipia*, which is a very mathematical and precise mechanical work, while other experiments were affected by optical science, including Newton’s concepts of contemplation as the main experience and imagination of “power.” When I recall my experience as an engineer, I recognise that I my perception of the natural world was changed considerably over time. When I was a junior engineer, I used to get stuck looking for the exact method and trying to find the best theory. But as time passed, I was able to deal with more complex systems as I became more aware of the wide range of possibilities, not only at a theoretical level but also in limited situations. Rather than just seeing the superficial functional calculation of a mathematical law, such as Ohm's law or linear Laplace transform, it is more important to see the natural phenomenon as a spontaneous stream of energy. So far, my experiences have made me realise that it is more important to feel instinctive uncomfortableness than to know the exact calculation. Both mechanical force and speed exist as physical forms, but electrical forces and speed (current and voltage) exist as abstract forms. Multiples of force and speed equal power; multiples of voltage and current become electrical power. These physical and electrical powers are only perceptual differences of physical quantity. Newton's *lex secunda*, F = ma, explains that force equals the multiplication of mass and acceleration, but it also has a connotation of a causal relationship, as when the force, *F*, is the reason applied to an object that has a mass, *m*, with its response giving *a* as a result.

Newton's science is important in terms of not only its methodological contribution but also its construction of a universal image of science. Before Newton, all the pseudoknowledge about the natural world had been segregated and was not accepted as part of society or culture. These scattered threads of knowledge came together to become a specific field as a science that had a singular perception and praxis under the notion of Newton's science. Besides being useful for science's own field, it also became a good model for other fields as well. It is ironic that Newton, who was the last alchemist, started modern science.

As in science, experimenting is also important in the arts. The painter and photographer László Moholy-Nagy insisted that without experiments, there are no discoveries, and without discoveries, there is no regeneration. While he compared science and art in terms of methodological differences, he said that art was part of an extended sensual experience within a non-verbal domain. Thus, art has a great number of components that cannot be verbalised, but only approached intuitively. For example, Moholy-Nagy describes product design as being a contact point between intuition and science—in other words, form and function. This analysis provides more information effectively and stimulates new techniques in the unconscious transubstantiation of such information. Also it can remove repetitive elements and produce inner security for new solutions.[12] Therefore, it is not really strange that the work of the Bauhaus, where Moholy-Nagy worked, has two different sides. On the one hand, the Bauhaus represents functional and simplified modernism, but on the other hand, it implies the experiential forms that are constructed by accumulated experiments and specific details. Either way, what can I say when I look at the Bauhaus works? They are just a few straight lines, an incomprehensible arrangement, but in the end, well-composed figures with limited colors. Here, my sensibilities are enriched.

This abstract language builds what we would call the "sixth sense." Besides, this abstract process that categorises and acknowledges essential information as part of a procedure of analogy encourages what we could call an "intentional forgetting." The abstraction process is tangled with the memory process. The intuition constructed by the abstraction process is an essential part of human perception. Thus, although intuition is one of the most fundamental and primitive senses, it is also one of our most sophisticated abilities, as it has developed separate from physical sensation.

In the process of learning how to play an instrument, the learning curve known as "post-practice improvement"[13] illustrates how we construct knowledge. When I learned how to play the piano, I used to play the same score over and over again. Then, when I made a mistake, I could correct it in only a few days, regardless of how well I remembered the piece or how many times I had repeated it. My piano teacher used to make a big mark with a red pen on the spot I made a mistake. Despite this, I would immediately make the same mistake again. My eyes would read the score as I played, and soon I would come across the big red circle. My ears remembered the sound that my teacher had just played, and I expected to play in the same way she did. And my mind also remembered that I made a mistake more than twenty times on the same spot. I touched the wrong key. Then I became really frustrated, so I stopped practising. After a few days, I played again and, surprisingly, I did it perfectly. But I could no longer remember how many times I made the mistake, or my teacher's demonstration, or where the red spot was.

Even during the memorising process, we forget many things. Only things that are not forgotten remain in the consciousness and exist as continuous memory. Forgotten information becomes a sort of index abstracted from our unconscious, and we can recover consciously most of the information that is forgotten by remembering the fact that we forgot something. Forgetting seems to be a part of the memorising process. This intentional forgetting works as a sort of filter or frame to refine the information, so that some is stored as memory in our consciousness and the other is stored unconsciously once it is forgotten. This means we have intentionally selected the information, and this exists through our consciousness but the unconscious is where it goes after being dismissed. The repetitive information from an analogy process focuses only on similarities and accumulated intentions.

Before the nineteenth century, people had only limited resources for gathering information. But nowadays we have access to loads of information, and people focus on developing the skills for managing the increasing amount of data. We are continuously exposed to outside stimuli, so we become more passive towards these. Indeed, the trend shows that everybody knows more but understands less. What we need is to focus more on the abstract part of memory as a communication skill between consciousness and the unconscious, rather than the visual part of memory. One patient of Alexander Romanovich Luria, a soldier named Lev Zasetsky, was wounded in the head at the Battle of Smolensk in 1943. Once he recovered he found himself in a frightening world:

> During the night I suddenly woke up and felt a kind of pressure in my stomach. Something was stirring in my stomach but it wasn't that I had to urinate—it was something else. But what? I just couldn't work it out. Meanwhile the pressure in my stomach was getting stronger every minute. Suddenly I realised I had to go to the toilet but couldn't work out how. I knew what organ got rid of urine, but this pressure was on a different orifice, except that I'd forgotten what it was for. . . . Often I even forget where my forearm or buttocks are and have to think what these two words refer to. I know what the word shoulder means and that the word forearm is closely related to it. But I always forget where my forearm is located. Is it near my neck or my hands?[14]

Zasetsky couldn't read or memorise his own written text. All he could do was write notes when he recalled his thoughts from his memory. It was a terribly painful and enduring process. Usually, he couldn't recollect or write anything, and, when he could, it was only a few sentences each time. However, he was very patient and strong-willed and would write down more than three thousand notes over twenty years. The reason he was obsessed with this process was because he wanted to reconstruct and arrange his lost memories. Dr. Luria predicted the possibility of his success was extremely low. Certainly this was right, when looking at the different parts of his brain, as they were severely damaged. But his life wasn't like his damaged brain. Although his memories from his consciousness had not actually left him, he used his forgotten memories to communicate with himself in an abstract way. And through the stories he reconstructed, Zasetsky was able to reunderstand and recompose the meaning of his life. This proves that memory is active and not passive. It is based in the past, but is possible to build a future by linking consciousness and the unconscious. In this sense, it is ironic that the man mentioned at the beginning of this essay who could remember everything ended up not recognising reality anymore, and the person who had lost all of his memory was able to reconstruct his own life.

*"Remembrance is neither what happened nor what did not happen but, rather, their potentialization, their becoming possible once again."*[15]

Any kind of machine involves a physical and a chemical composition, regardless of its mechanism. Mankind has significantly improved the precision and flexibility of tools, evolving from the very primitive gadgets of centuries ago to microcomputer technology in recent years. Yet, just as Henri Bergson and David Chalmers predicted,[16] even if some day humans have been completely analysed physically and chemically, it still won't be possible to identically clone them. Against reductionism, they argue that the tools of neuroscience cannot provide a full account of conscious experience, although they have much to offer. It is true that both in neuroscience and psychology scientists have progressed consistently at a theoretical level. But, unfortunately, what this research has proven is more about the physical and the chemical functions of the brain rather than its mental mechanism. It doesn't show how the objective physical processes and the subjective mental processes can interact with each other. This is because consciousness as an object of observation, and as an observer, is connected.

Coincidentally, the theory that outlines the importance of the relationship between the observer and the object of observation can be found in modern quantum physics. According to Erwin Schrödinger's well-known thought experiment about a cat in a box, an object doesn't exist until an observer observes it. That means that object and observer exist as a pair. Wouldn't this be a clue to prove the manifestation of human consciousness? I find that there is a coherent relationship between the premise of quantum physics that states that the observer exists with its object of observation and the structural coupling in neuroscience that provides for the basis of human cognition. Structural coupling establishes that there is a history of recurrent interactions that led to the structural correspondence between two systems. To return to the observer's problem, we could then assume that humans' continuous consciousness is artificial, since it perceives the outside world continuously. To the question "Does the universe exist if we're not looking?," physicist John Wheeler answers that because no observers or substances have been found yet, the cosmos is made of "huge clouds of uncertainty," and that as such an event is "a vast arena containing realms where the past is not yet the past."

In 2007, an experiment was conducted that showed that the interaction between the observer and the object observed could be influenced by time. Scientists set the experiment so they could take a picture of photons as they went through a miniscule slit, to figure out if they appeared as particles or waves. Theoretically, the image of the photon could randomly be either. The particles had to "decide" what to do when they had to diverge. It turns out that what the *observer* decided at that point is what determined how the particle would behave when it diverged.[17] This means that the past is created in the present. If that is true, does it mean that the present is created in the future? Past, present, and future are entangled, as Spinoza said in the seventeenth century. I find that the empirical argument about time and the argument of the observer and the object observed in quantum physics are the same. Our memories don't come from the outside world; rather, they come from the inside, and from our own consciousness in the future.

*In the end, I listen to Bach. If I have learnt anything from him, it would be focus. This reminds me that when I see a tree, or that I can feel myself observing the tree, I am conscious myself that I am observing my consciousness, this practice is futile.*

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