A New Physical Theory of Precognition

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Introduction

Precognition is the ability to know what is going to happen in future without using deduction or any other conventional means. In this article, I shall recount one of my many precognition experiences and provide a theory for explanation. The theory is based on the transactional interpretation of quantum mechanics, which suggests that information from future can be carried by advanced waves which travel backwards in time. The information is retrieved through resonance and synchronization of microtubule activities in the brain.

My experience

This happened in 1992. I was riding a bicycle in a place called Sha-Tin in Hong Kong. I had an accident that day; the skin of my jaw was broken and required stitching. About an hour before this accident occurred, I already "knew" it. But the funny thing was that I didn't believe it. I had four reasons in my mind: first, I was good at biking; second, there were many friends around me; third, we rode slowly; and fourth, I believed that my future was controlled by me. About 3 minutes before the accident happened, my heart pumped so quickly that I stopped my bicycle. I pressed my heart using my hand. Wong asked me what's wrong with my heart. "I am alright," I answered, "you can keep going." And strangely my friends really continued their journey, leaving me behind. I calmed down myself, and then I continued biking. I increased my speed in order to catch up with them. Suddenly a woman jumped out in front of me, resulting in a severe injury of both of us.

The first thing I want readers to notice is the action "I pressed my heart using my hand". This was not a dream or imagination. This was a real, strong feeling. The second thing, which is also the most mysterious puzzle in my life, is that my "free will" was completely "lost" after I "knew" my fate an hour ago.

An explanation

There are many quantum theories for psi, but my approach is different because I am keeping a more conservative and conventional perspective. To make things clear, I shall list out what I believe and what I don't believe in:

1. I don't believe in parallel universes. I believe in a single universe and unique history as the only reality.

2. I don't believe that consciousness can affect the universe. Like most neuroscientists, I believe that consciousness, free will, qualia, etc. are all generated by neural activities, and are therefore illusions.
3. I believe in classical physicalism. The universe is objectively real, independent of observers. Also, everything can be reduced to physics.
4. I only believe in certain types of psychic phenomena including teleportation and premonition, but I seriously doubt the authenticity of psychokinesis.

I am not going to provide any evidence to support my "Apostles' Creed". I shall simply move on to present my theory.

John Cramer proposed a transactional interpretation of quantum mechanics in 1986. In the relativistic version of Schrodinger equation, both retarded waves (moving forward in time) and advanced waves (moving backwards in time) are admissible solutions. Suppose there is a source emitting an electron which can interact with either detector A or detector B. We can change the description to be: the source actually emits a retarded wave (called the "offer wave") together with the information of the "so-called electron" to both detectors. Each detector replies with an advanced wave (called the "confirmation wave") that travels backwards in time and back to the source. These waves are physically real and have nothing to do with any "observer". The offer and confirmation waves interfere; and the result (the transaction) represents which detector gets the data. This interpretation provides a natural answer for experiments such as delayed choice quantum erasers (Scully & Druhl, 1982) and the controversial Afshar experiment (Afshar et al., 2007).

The transactional interpretation is similar to a philosophical idea called Eternalism, which suggests that future events are already there. Quantum waves do not follow the direction of time. They travel from past to future and back to past. All events (no matter past or future) in the universe are connected with each other and settled down like a standing wave solution. This idea may contradict our common sense about time and causality since most humans can only remember the past but not the future. However, it is possible that both time and causality are illusions.

According to the theory of relativity, people in different frames of reference can perceive different time. In sub-atomic level, almost all processes are time reversible (except the mysterious kaon decay). I believe that ontologically events are connected by mutual interactions, yet the resulting network is non-temporal: consequence and cause are two sides of the same coin. In everyday life, however, people study the temporal relationship between events and call it "causality". While this knowledge is useful for prediction of future outcome and so-called explanation of past experiences, the subjective "causal link" in our brain is merely a simplified picture of the objective "interaction" in the ontological network.

Suppose we have a cup of hot water and a cup of cold water. We mix them up and discover that the temperature evens out. In terms of transactional interpretation, this process is merely a special pattern in the ontological network where the outcome "looks obvious" beforehand. We can imagine that in this case the advanced wave from future is stable with big amplitude. Similarly, in the aforementioned "bicycle event", we can

imagine that the outcome was actually "fixed" and a big advanced wave travelled backwards in time to reach my body (including my brain). But how then could my brain pick up this wave?

Even though all events are ontologically connected, it is not likely that our brain can utilize this connection to obtain any useful information. The first problem is "measurement". We can ignore Heisenberg and go back to Newton's third law (about action-reaction). If you do not brutally beat an atom, you cannot obtain any feedback (data) from it, but the problem is that the atom also changes its path after bearing your fist. The second problem is called "decoherence". Decoherence tries to explain why macroscopic things look independent when they are supposed to entangle with a huge number of other things in the "environment". Perhaps it is due to the fact that we call something "coherent" only if they have a simple pattern. Chaos theory tells us that just three differential equations are sufficient to generate chaos. I am not sure if the constraint about the speed of light is related to the above two problems.

These two problems imply that, firstly, if our brain tries to measure the advanced wave, the wave will be destroyed; and secondly, the information in the advanced wave may be chaotic and impossible to be decoded. I propose a new solution to the above problems. This solution is based on the classical idea of resonance and synchronization.

Recent EEG and fMRI recordings discovered that mental functions such as attention and perception are correlated with synchronization of neural activities across some distant brain areas (Singer, 1999; Fries et al., 2002; Melloni et al., 2007). A "binding hypothesis" has been proposed, suggesting that distributive signals about various features of a single object are being bind together through coherent activities of neurons (Gray, 1999; von der Malsburg, 2001). For example, when we look at an apple, it has a red colour and a curvy shape. The shape and the colour are encoded by different neurons located at different places in the brain, but we perceive the apple as a single object. How can we do this? The hypothesis suggests that the binding of information comes from neural synchrony. To go further, I believe that synchrony may also provide a way to retrieve information from advanced wave.

In order to be synchronized, a connection must exist, but this connection can be very weak and subtle. In 1665, Huygens hanged up two pendulum clocks on the wall and discovered that the two pendulums became synchronised. Please notice that, first, the two clocks were not "entangled" (I mean, they did not form a simple quantum system); second, the two clocks did not tell each other "what time it is" (and in fact this information was irrelevant). They just needed to adjust their relative phases. A small resonance and vibration in the air would be sufficient to do the trick.

In the case of the "bicycle event", my brain already had a lot of possible thoughts beforehand (accident was indeed one possibility albeit unlikely). The advanced wave from future interacted with all microtubules (all possible thoughts) in the brain. The thought of accident and the advanced wave carried the same information; therefore they gradually became resonant, synchronised, and amplified. However, since the advanced

wave also represented a fixed future, this thought had not been (and would never be) taken seriously, hence the consequence fulfilled. This also means that the brain retrieves information from the advanced wave in an indirect way. The brain does not measure and get information out of the wave. It simply adjusts the relative "phases" so that the tiny thought of accident could be synchronised and amplified. Also, it does not need to decode the information. The information is already in the brain and only needs a comparison.

Some people may complain that brain waves are electromagnetic but quantum waves are obviously not. I prefer using a more metaphorical explanation. Perhaps resonance and synchronization depend on the information (or information structure) being carried by the physical entities rather than the entities themselves. For example, if the two clocks do not have a common swinging frequency, they won't be synchronised. This may also be true for chaotic synchronization because in high dimensions chaos do have a structure.

I conjecture that psychic teleportation may also share the same mechanism. My theory predicts that the receiver should already have the tiny thought (as one of the many possible thoughts) in the brain. If the information does not already exist, nothing can be synchronised and amplified. As a result, there is an important difference between "entanglement" (Radin, 2006) and synchronization. For entanglement, the receiver should be able to directly retrieve information from the teleporter. For synchronization, however, the receiver needs to search through his own database so as to get something that matches with the external signal. I think it is not too difficult to design an experiment to test against these two hypotheses. For example, we can ask the teleporter to send a Chinese character or something unfamiliar to the receiver and see what is the result.

Conclusion

It seems that in order to explain my *little* experience, I need a theory *big* enough for explaining the whole universe! I hope readers would enjoy it. I have assumed the presence of advanced waves which travel backwards in time, and the brain is capable of synchronising with and amplifying the information being carried in the advanced waves. My theory is physical, in accordance with the classical perspective of science since Newton's time. However, I welcome anyone who can show me immaterial spirits or psychokinesis.

Further Readings

Ben Goertzel introduced this book to me and I think it is really good:

Radin, D. (2006) Entangled Minds: Extrasensory Experiences in a Quantum Reality (Paperback). Paraview Pocket Books.

An interesting book about synchronization is:

Strogatz, S.H. (2004) Sync: How Order Emerges from Chaos in the Universe, Nature, and Daily Life (Paperback). Hyperion.

A detailed description about the transactional interpretation of quantum mechanics can be found in:

http://www.npl.washington.edu/TI/

An introduction about decoherence can be found in:

http://www.decoherence.de/

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