

THE BUTTERFLY EFFECT

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Abstract. *The concept of The Butterfly Effect can be used in a philosophical way to prove that we don't really have the free will that we think we have. People are not totally responsible for the actions they do, and the God could be interpreted as something, that most of us could never imagine or comprehend.*

Key words: *decision, free will, life, meaning.*

Introduction

The butterfly effect is based on the notion that everything in the universe is deeply interconnected, such that one small action or occurrence can influence a much larger complex system [1]. The most used example is a butterfly flapping its wings, could lead to some big changes or disasters in the world, like a tornado. Have you ever thought why do we always hear, mostly in the movies where time travelling is involved, that if someone changes the past, the present will not be the same? How can a chair moved by 2cm be such a big influence for the future? We all heard these things, but most of us never actually thought, why? And the answer is pretty simple, because of the butterfly effect.

Understanding the Butterfly Effect

The term "butterfly effect" was proposed in the 1960s by Edward Lorenz, a meteorology professor at the MIT, who was studying weather patterns [2]. This name for the concept was chosen after Lorenz suggested that the flap of a butterfly's wings might ultimately cause a tornado [3].

Edward Lorenz, simulated weather patterns by entering some numbers into a computer program and then left his office while the machine ran. When he returned, he noticed a result that wasn't expected at all. The computer model was based on 12 variables, representing things like temperature and wind speed, whose values could be depicted on graphs as lines rising and falling over time. On this day, Lorenz was repeating the simulation, but he had rounded off one variable from .506127 to .506. That tiny change drastically transformed the pattern his program produced, over two months of simulated weather. The result led Lorenz to a thought about the way nature works: small changes can have large consequences [3].

The variety of fields where the butterfly effect can be used is shocking. This effect is used in physics, biology, psychology, sociology, economy, music, astrology and now, it could even be used in philosophy.

The butterfly effect has been used in environmental studies to study the effects of disturbances such as wildfires, deforestation, and climate change [4]. By understanding how small changes can lead to large and unpredictable outcomes, researchers can develop more effective strategies for managing complex systems. In physics, the Butterfly Effect is often used to describe the behavior of complex systems such as the weather, where small changes in initial conditions can lead to large-scale changes in the outcome of the system over time. The butterfly effect has even been used in music, with bands such as Metallica and Napalm Death incorporating the concept into their lyrics. The butterfly effect has been used to explain a wide range of phenomena, from the behavior of the stock market to the formation of galaxies. It is also frequently cited in discussions of climate change, where small changes in the Earth's climate system can have large and unpredictable consequences.

The butterfly effect has been used to describe the spread of viruses to the behavior of crowds. In the case of viruses, a single infected individual can spread the disease to many others, leading to an epidemic. Similarly, the actions of a small group of people can influence the behavior of a larger crowd, leading to unexpected outcomes.

An example of the butterfly effect is the pinball machine: the ball's movements are precisely governed by laws of gravitational rolling and elastic collisions, both fully understood, yet the final outcome is unpredictable [5].

There are a lot of people that have heard about this concept, but most of them do not understand it properly. According to General Stanley McChrystal: "In popular culture, the term "butterfly effect" is almost always misused. It has become synonymous with "leverage"—the idea of a small thing that has a big impact, with the implication that, like a lever, it can be manipulated to a desired end. This misses the point of Lorenz's insight. The reality is that small things in a complex system may have no effect or a massive one, and it is virtually impossible to know which will turn out to be the case". In 1950, Alan Turing stated that the displacement of a single electron by a billionth of a centimetre at one moment might make the difference between a man being killed by an avalanche a year later, or escaping [6].

The butterfly effect is related to another phenomenon, the black swan. Black swans are events that are 'outliers', seemingly random but with life-changing impact on our world. The key understanding of black swans, similar to the butterfly effect, is that it is impossible to predict these events, even though they are ultimately consequential [1].

The Butterfly Effect: A Fresh Look at an Old Concept

When someone hears about this concept, they think that if they will make a small act, for example, a spontaneous protest anti-communism, there will be an impact, and more people will join them and in the end, they will get rid of communism, big and predictable final, but The Butterfly Effect doesn't work like this. There are billions and billions of alive beings on earth, and all of them alter the future by their actions. If you erase all the alive beings and leave only one, a butterfly, it might create a tornado, if you think it's impossible, just imagine that a butterfly in Brazil flaps its wings in a certain way, and that slight change in air pressure sets off a chain of reactions. Those reactions could include changes in wind patterns, which in turn affect weather patterns in North America. These changes could eventually build up to create the conditions for a tornado to form in a specific location.

But what if, we have 2 butterflies, A and B, the butterfly B cancels the wind pattern the other one created, so we see the annihilation of an event, but in there is also possible that there will be 2 tornados in the end, we can't determine what will be the outcome. Now we return to the present moment, when, every second, all the alive beings on earth, start a new chain of reactions with their actions, a lot of chains are at different steps, some of them will end soon, and we can easily see that with so many chains of reactions, the most of them have a common point, some of them annihilate each other, some of them just boost the process or just alternate the direction of the chain. It is impossible to determine what will happen in the future, because it is impossible to determine all the chains of effects that exist, their start and the intersections that affected them. This is the beauty of the butterfly effect; nobody can predict the future. When discussing about the future, I'm not talking about the future like 2 or 10 years from this moment, the future I'm talking about is 20 or more years from this moment. Now, we have a lot of ways to determine what will happen in the next years. The most basic example is economics, based on present, the experts can determine what possible outcome will be more likely to happen in the future. But it's not working for the distant future. For the year 2050 we will find much less information than for 2025, also for 2100 much less information and predictions than for 2050. It also works backwards, there is much more information for the 1900s than for the 1500s. But this is just a simple and fun observation. The future is unpredictable because no one know how the present chains of effects will affect the future. And even if we will try to imagine how we will live in 25 years, there is a big probability that the reality will be completely different.

The philosophy of the Butterfly Effect

Let me tell you what is this all about, imagine for a second, that what I said earlier, is wrong, not all the information, but the part about all the beings starting a new chain of effects every second. Imagine that the statement is false, and they are not creating a new chain, but instead, their actions and decisions are just a step from another chain. Under all the factors that influenced that being, in a previous chain of actions, it had to choose the only possible way of action in that specific moment. Now imagine us, humans, that we are not doing what we want to do, but we do the only thing that we could do in a specific moment. From this we can say that, all of our actions, are indirectly related to the chains started years, decades or centuries ago. There is only one problem with this theory, do humanity or all other forms of live beings in the universe have free will, or all they do for their entire lives are just the decisions they made, being a part of a chain of relations, the only possible decision there could be. Another interesting thing about this, is that, in order to start a chain of relations, you have to be alive, because a rock can't move and do an action to start anything. So, if all the alive beings are part of a chain of relations, what is the first thing that started the first chain of relations. There is a potential answer to this question, and it's God, but not as a living thing, but as an action. If all actions derived from other actions, can we call God, the first actions in the existence, that created the first chain of relations? The main idea is that every little action of any being on the planet, matters for the future.

Now let's think about this more. For a better understanding of what I'm about to tell you, I'll start with our example with the butterfly. Now you know that there is a possibility that a tornado could form thanks to that butterfly, but that is not the end of the story, the tornado could or could not happen, we have at least 2 possibilities. In dependence of those possibilities, we all make decisions. If there would be a tornado, I'll cancel my plans and I will stay at home safe, but if there's no tornado, I'll go out as planned. So for now, we see that the decision we made was strongly related to that little butterfly. But, here's the question, how do we know, that only some of our decisions are starting with events like previous one and not all of them are the consequence of a chain reaction? For now, I could only think of one answer. All we do, is not what we want to do, but the only possible decision, given all the experiences till that moment, direct or indirect (which I see as any other step of the chain reaction except the ones that are directly connected with us in the present moment).

Now we can think more philosophically and reformulate the question, do we have free will? Or, is what we do the only way possible, created by all the events on the planet before the present moment?

So, if the butterfly effect is true not only theoretically but also practically, can we say that nothing we do will guarantee us free will? That free will maybe does not exist? Even the butterfly that started the tornado, was in the right place at the right time, and he got there because of the circumstances, or the consequences of the chain relations which already happen. Following this thoughts, we can say that the chain relations were always the principal deterministic factor in the Earth's life, but maybe not just on our's planet. Some people could never accept this fact, and we have to understand them. Science destroyed people's beliefs over and over since it was discovered, and nowadays, there are so many things discovered by science, that in comparison with this hypothesis, are nearly impossible for humans to comprehend. This article is not something new, it's just a little part of science, that was proved in different fields, and with that starting point, I tried to implement it in a philosophical concept. Humans always fought for their free will, because as soon as we appeared, we always had limitations, we were always in sort of a cage. When the anarchism period was ending, there were another factors that limited us. But my point is, if what is written in this article will ever be proven by some actual facts, and we will discover that nobody ever had free will, people will panic, the beliefs will fall, the mentality will drastically change, some people won't be able to take the fact, that nothing has a meaning, and we are just a consequence. As a new theory, to refresh our minds and to open up to something new, maybe a new school of thought, this article is doing a good job.

Philosophy is a very important field, because it reminds us that we are humans, and at the same time, that there is a meaning in our lives. One meaning would be to search the answers to the most important questions ever asked, where did we come from and what is our purpose. The concept I wrote this article on, is the answer to both questions, in my perspective, we come from the collision of the chain of actions that were on earth before we appeared, and we have no purpose, because we appeared as a consequence but not as a final result. Or, maybe we appeared to be the part that unites the chains, the ones before us and the ones after us, who knows, but one thing is certain, people won't like these answers. In the end, I propose to think a little bit again, and reformulate our initial question, so the question is, what started the chain relations, what was the first thing? The Big Bang? God? We don't know and we will not know soon, but at least, the realization that based on physics we could demonstrate theoretically that there is no alive beings which have free will, is pretty disturbing and terrifying.

Conclusions

In conclusion, the butterfly effect is a powerful concept that describes how small changes in one system can have significant and unpredictable impacts on another system over time. This concept can be used in a variety of areas, but most importantly, it can be used to search the answer to some of the most important questions for humanity, for example if people do or don't have free will. This effect, along with the chaos theory and black swan theory, could be the key to understand some of the most important things in the universe, but for this, we have to fully understand our tools and how they work.

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