

A Case for Free Will

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Abstract: A proof of free will is argued based on proving three criteria: 1) Fundamentally (sub-atomically) the universe is indeterminate (Ontological Indeterminism), 2) Systemically (above the sub-atomic level) the universe is deterministic (Adequate Determinism), and 3) Human volition can best be explained by neither Indeterminism nor Determinism, but by Self-Determinism.

In presenting this proof of free will I have broken the proof down into three parts. I've taken the liberty of assuming that human epistemological indeterminism is uncontroversial. No one would argue that a human would possess complete knowledge of all causal factors leading to a decision, but it is interesting to ponder the ramifications on free will if humans did.

Before the analysis I will defer to the definition presented by Peter van Inwagen in his paper "How to Think about the Problem of Free Will" which presents free will as defined in two temporal directions of past and future as:

"The free-will thesis is the thesis that we are sometimes in the following position with respect to a contemplated future act: we simultaneously have both the following abilities: the ability to perform that act and the ability to refrain from performing that act. (This entails that we have been in the following position: for something we did do, we were at some point prior to our doing it able to refrain from doing it, able not to do it.)"¹

I have no issues with this putative definition. I would caution researchers and thinkers to be clear on the terms of *determinism* and *indeterminism*. Many times I will see philosophers vacillate between these terms applying to ontological determinism/indeterminism and epistemological determinism/indeterminism. These distinctions are very important.

I've also wrestled with whether or not to replace the term *free will* with the more philosophically neutral term *volition*, but finally decided against it owing to the fact that the term *free will* has become so entrenched in the philosophical debate on the topic.

Criteria 1: Fundamentally (sub-atomically) the Universe is Indeterminate (Ontological Indeterminism).

In order for an agent to have a free choice the universe must also be open-ended and free. In a fully determined, Laplacian universe there is only one unique future that may occur. If determinism held, then nothing could be said to ever have real freedom because only one future is realizable. For this reason I fail to see how many Compatibilists can justify free will when ontological determinism presents no chance of freedom.

¹ Van Inwagen, Peter: "How to Think about the Problem of Free Will", *Journal of Ethics* 12:327-341.

Typically, we use the term *actual* to denote when something has occurred and the term *potential* to denote an unknown future state. It's important to make the distinction of an actualized universe and a potential universe as lying on either side of the boundary of the present. But what is that occurs in the present to cause the potential future paths of the universe to converge into only one actual state? The discoveries of Quantum Mechanics (QM) have had far reaching implications for the ontological indeterminism of the universe as well as saying something about how the universe actualizes from potential states. Before the wave function collapses, the universe is in an indeterminate state; once the wave function collapses, a unique path has been selected or actualized.

There are numerous schools of interpretation of QM. Many physicists and philosophers refuse to believe that the universe is fundamentally indeterminate and thus hold out hope that we will eventually fill in the holes of QM and find the missing mechanisms that return our universe to a fully deterministic, clockwork universe. Unfortunately for them, this just hasn't happened yet. At the other end of the spectrum are those who believe such things as Wheeler's Participatory Universe, which basically says that observers such as humans play a critical role in creating the universe. A more conservative view that has been the most widely held model since the dawn of QM is the Copenhagen Interpretation. Anton Zeilinger succinctly states:

“When investigating various interpretations of quantum mechanics one notices that each interpretation contains an element which escapes a complete and full description. This element is always associated with the stochasticity of the individual event in the quantum measurement process. It appears that the implications of this limit to any description of the world has not been sufficiently appreciated with notable exceptions of, for example, Heisenberg, Pauli and Wheeler. If we assume that a deeper foundation of quantum mechanics is possible, the question arises which features such a philosophical foundation might have. It is suggested that the objective randomness of the individual quantum event is a necessity of a description of the world in view of the significant influence the observer in quantum mechanics has. It is also suggested that the austerity of the Copenhagen interpretation should serve as a guiding principle in a search for deeper understanding.”²

The real take-home message is that the universe does seem to be fundamentally indeterminate and that the mere act of observation actualizes from the potential future state of the universe. What ramifications does this have for free will? Let's begin with a thought experiment:

Suppose you were to create a simple mechanism that required a mobile object to navigate from one side of a container to the other side. There are a series of paths and each time the mobile object arrived at a fork in the path, a “random” choice was made (e.g. a dice roll) as to which path to take. The result is that the mobile object can arrive at any number of exits from the container, which is “freely” chosen (in the sense that you aren't dictating the choices to the mobile object).

² Zeilinger, Anton: “On the Interpretation and Philosophical Foundation of Quantum Mechanics”, Vastakohtien todellisuus, Helsinki Press, 1996.

Simple enough, right? Now let's add a couple of interesting twists to the scenario. First of all, let's suppose you are able to start the process, then jump in a time machine and go forward in time to see where the object will exit, and then return back in time to watch as the object goes about "randomly" choosing the course that leads to the outcome you now know it will take. Does the object still freely choose? Does your knowledge of the outcome affect anything?

I say it does. It would seem that the act of observing a system actualizes its history and thus strips the freedom from it by destroying its potential or freedom. Molinists, for example, fail to see how the very act of God observing the future of the system strips it of its freedom. This is just another way of shifting ontological determinism from the universe to God's mind. I've never seen how freedom remains intact if we are never allowed to deviate from the one unique determined universe in God's mind. Another way to look at it is to say that before I ever had a chance to act or refrain from acting God knew what I would choose and I have no choice but to conform to God's knowledge. The same holds for an atheistic view of a fully determined universe. If the laws of nature "know" what the future evolution of the universe will produce (meaning only one unique future) then how can we have any true freedom to deviate?

Criteria 2: Systemically (above the sub-atomic level) the Universe is Deterministic (Adequate Determinism).

Many philosophers who attempt to tackle the free will problem think it is necessary to incorporate indeterminism into the actual thought process of humans at some level. Bob Doyle, on his Information Philosopher website, states that "Chance exists. If our actions are caused by chance, we lack control. We cannot call that free will because we could not be held morally responsible for random actions."³ But at what level does indeterminism need to reside? What exactly is this randomness contributing to our free will? Doyle's answer is that quantum foam causes noise, as in the Communication Theoretical sense, that gives rise to random thoughts. These random thoughts serve to break the causal chain. I believe this is a weak argument and completely misses the mark in proving that free will exists. The reason is because we typically focus our thoughts on various approaches and outcomes to situations we are contemplating when trying to decide on a course of action. Rarely would we ascribe our rationale to choosing a course of action to random thoughts.

Further clarification will occur in the next section but for the purpose of answering the question of at what level does indeterminism stop, the answer is at the level where systems are stable. Physicists will readily tell you that at our macro level of reality, Newtonian physics is good enough for most every action we observe or propose to predict. The randomness of the QM world stabilizes and for all practical purposes, the universe at the macro level is deterministic. Many scientists and philosophers balk at the Fine-Tuning Argument because of its tautological nature, but the truth is that the universe does appear to operate within very narrow parameters that allow systems to stabilize and evolve along seemingly deterministic lines. Martin Rees presents the following six constants:

N = ratio of the strengths of gravity to that of electromagnetism;

³ Doyle, Bob: "The Information Philosopher" website, http://www.informationphilosopher.com/freedom/standard_argument.html, retrieved 31 Jul 2012.

Epsilon (ϵ) = strength of the force binding nucleons into nuclei;

Omega (ω) = relative importance of gravity and expansion energy in the Universe;

Lambda (λ) = cosmological constant;

Q = ratio of the gravitational energy required to pull a large galaxy apart to the energy equivalent of its mass;

D = number of spatial dimensions in spacetime.⁴

Systems (to include our brains) must operate in a practically determined fashion for there to be logical coherence to the universe. If too much randomness were to reside at the systemic level then we would be left with seemingly random causes operating throughout nature. So how is it then that humans can have free will in such a universe? The answer isn't in random quantum foam causing micro-noise. How would one go about even proving that such a thing generates thoughts? The answer is in self-determined agents.

Criteria 3: Human Volition can best be Explained by neither Indeterminism nor Determinism, but by Self-Determinism.

Self-determinism is defined as "a doctrine that the actions of a self are determined by itself".⁵ Many thinkers on the topic of self-determinism seem to think that it is necessary to either explain how self-determinism breaks the causal chain or else initiates the causal chain altogether. I don't believe that either case is necessary for free will to exist in teleological agents. Instead, I'll be arguing that adequate determinism is necessary for agents to form the necessary systems that lead to more sophisticated, self-referential brains. On this account I agree with Bob Doyle. I also agree with him that QM is not a trivial matter in being a necessary component as far as the universe being fundamentally indeterminate. Where I disagree is when he extrapolates that the importance is in the micro-noise it creates in the brain. The importance, to me, is in showing that the future of the universe is truly one of potential and is thus freely open. Otherwise, determinism would hold completely and the universe would be a giant determined algorithm that is churning out set results. The end state would be front-loaded. Instead, we can say that the universe is truly evolving as it actualizes and there is always a degree of probability associated with the outcomes.

But first, let's describe some of the features necessary to call an agent self-determined. When pinpointing just exactly the dividing line between an agent that possesses free will (such as a human) and an agent that is said to exhibit goal-seeking behavior but not possess volition (such as a thermostat or heat seeking missile) we soon realize that lines can be hard to demarcate. One area of research that is diligently trying to explicate these differences is the field of Artificial Intelligence. How does one go about programming a computer to simulate the human brain and break out of the Halting Problem?

⁴ Rees, Martin: "Just Six Numbers", HarperCollins Publishers, 1999.

⁵ Merriam-Webster; "definition of self-determinism", <http://www.merriam-webster.com/dictionary/self-determinism>, retrieved 31 Jul 2012.

In a very insightful paper by George Chadderdon entitled “Assessing Machine Volition: An Ordinal Scale for Rating Artificial and Natural Systems”⁶ we find a list of attributes that serve to identify agents that possess free will: autonomous behavior, sensory organs, feedback and feedforward loops, memory, teleology (goals, intentions, & desires), motion (animacy), parallel-processing/distributed processing, and self-awareness/self-reflection.

Chadderdon goes on to present an ordinal scale similar to a Turing Test that helps to determine at what level does a natural or artificial system fall on the volitional scale. A synopsis of this scale follows:

Level 0 – Non-Volitional Systems

Level 0.0	Inanimate Object	rocks, utensils, etc.
Level 0.1	Schizoid Automata	clocks, wind-up dolls, etc.
Level 0.2	Reactive Automata	vehicle engines, running motors, etc.

Level 1 – Instinct-Driven Automata

Level 1.0	Value-Driven Automata	thermostats, heat-seeking missiles
Level 1.1	Modal Value-Driven Automata	single-celled organisms, insects, etc.

Level 2 – Contained Self Organism

Level 2.0	Pavlovian Organisms	simple reactive animals that can learn preferences
Level 2.1	Ideational Organisms	animals that can hold items in memory for task behaviors
Level 2.2	Recollective Organisms	animals that remember semantic relationships or gestalt events
Level 2.3	Deliberative Organisms	animals that navigate complex spaces

Level 3 – Extended Self Organisms

Level 3.0	Social Organisms	rats, dogs, cats, horses, etc.
Level 3.1	Manipulative Organisms	monkeys and apes
Level 3.2	Symbolic Organisms	primitive humans
Level 3.3	Cultural Organisms	modern humans

⁶ Chadderdon, George; “Assessing Machine Volition: An Ordinal Scale for Rating Artificial and Natural Systems”, <http://adb.sagepub.com/content/16/4/246.abstract?rss=1>, retrieved 31 Jul 2012.

We see that following an evolutionary progression along the scale gives more and more sophistication in regards to teleology and self-determinism. It's at the Level 2 scale that we see free will beginning to emerge in self-contained systems. At the highest level we encounter what Charles Campbell argued in 1938 as being the truest form of free will: moral temptation. In a moral dilemma we find the Cultural Organism's character grappling with the agent's moral ideal.⁷

Many thinkers on the subject focus on just how an agent breaks the cause-effect chain. But how exactly is the causal chain broken so that humans can be said to possess free will? One attempt to explain this comes from Tim Manning, a Business Architect from the United Kingdom, who explains along these lines of thinking:

“When considering what causes a particular effect, we tend to generate a list of factors and weight these in terms of importance. This has been referred to as *laundry list thinking*. This assumes a linear relationship between cause and effect, with each factor having a fixed relative importance. If only life was that simple. Unfortunately, causes are more often dynamic, rather than static. The relative importance of any one factor may change over time, depending on the feedback loops that exist. It is better to think in terms of influencing factors, rather than causes. This is an important point to remember next time you find yourself using an Ishikawa or fishbone diagram, as part of a quality improvement initiative.”⁸

Unfortunately, this doesn't seem to break the chain. It might confound the trail but one could trace the loops and segues back to prior causes outside of the feedback loop. Cause and effect are necessary to lead up to a decision point. The looping back causes interesting effects that we typically think of as emergent behavior that raises the explanatory power out of mere reductionist explanations. David Deutsch makes this argument by using a copper atom in the nose of a statue of Churchill. A reduction of explanation to mere physics doesn't capture the higher levels of explanation necessary to explain how that particular atom came to be in the statue.⁹ In order to fully explain its presence one would need to invoke explanations of metallurgy, human art, human veneration of famous people and how those venerated people are sometimes memorialized in bronze statues. Similarly, as we progress up Chadderdon's ordinal scale we behold levels of complexity magnify as we gain the ability to store information in memory, think about our own thoughts, and model the future.

The causal chain doesn't need to be broken, it just requires that intention be introduced into the process during the chain at some point. Volition then becomes a part of the causal chain – this can be unconscious volition or conscious volition in higher states of awareness. Many would discount unconscious volition as something other than free will but the unconscious mind can be primed by conscious intentions.

⁷ Campbell, Charles; “In Defense of Free Will”, Inaugural Address, Glasgow University, 1938.

⁸ Manning, Tim; “Design for Services”, <http://design4services.com/concepts/systems-thinking/system-behaviour/>, retrieved 31 Jul 2012.

⁹ Deutsch, David; “The Fabric of Reality”, Penguin, 1997.

Another volitional feature is our attempt to model and predict the truly unknown future. One trait that captures the essence of this is the concept of *feedforward*. Feedforward is a method of learning that emphasizes future goals, behaviors, or success by envisioning or modeling a potential future.¹⁰ To return for a moment to future potential, we are trying to predict the future and make decisions on how we think we can affect the actualization of the universe, even if it's just our small sphere of influence.

Interestingly enough, many experiments in the field of neuroscience have shown that we don't possess as much free will as we might think we are exercising, but this fails to make a case for a fully determined universe. The best known experiment was the Benjamin Libet experiment conducted in the 80's.¹¹ This experiment pointed out that we make unconscious decisions on simple stimulus-response cues microseconds before we consciously act on those stimulus inputs. But what about those more complex decisions that Campbell speaks of? What about moral and ethical dilemmas that we mull over before deciding what course of action to go with?

In order for neuroscientists to really put the nail in the coffin of free will they would need to produce an experiment entailing complex thought of the Level 3.3 range and be able to predict subjects' responses perfectly. One such experiment might go something like this: Each subject is given a test of 50-100 questions of ethical or moral complexity. At the end of each question they are presented four options, three are directed decisions and the fourth is "undecided". The subjects must commit to active decisions on all but two questions of their choice. On the two questions that they choose to deviate they must choose "undecided" on one of them and the other they must choose an alternate response of what they initially decided to choose. These last two questions are a means of introducing two elements of free will that humans sometimes exercise, indecisiveness (which is still a choice) and unorthodox decisions (or going against your better judgment). An example question might look like this:

You just discovered that one of your best friends A is having an affair with the spouse of another one of your best friends B. Do you:

- a) Tell friend A to come clean or else you'll tell friend B.
- b) Tell friend B
- c) Not say anything
- d) Undecided

Some people may unconsciously jump at a response but others may actually employ more sophisticated thinking about this scenario. Thinking that involves grappling with moral outlooks, pondering potential outcomes of the decision, and reflectively thinking about a novel situation that has never been adequately captured in memory for later reference.

¹⁰ Dowrick, Peter & Yuen, JoAnn; "Creating Futures, a unit of the Center on Disability Studies (CDS)/College of Education", <http://www.creating-futures.org/keystosuccess/feedforward/>, retrieved 31 Jul 2012.

¹¹ Libet, B., Gleason, C.A., Wright, E.W. & Pearl, D.K.; "Time of conscious intention to act in relation to onset of cerebral activity (readiness-potential). The unconscious initiation of a freely voluntary act", *Brain*. 106 (3):623-642, 1983.

I seriously doubt a reduction to cause and effect chemistry of the brain can flawlessly predict the explanatory complexity required to navigate such scenarios. This coupled with our inability to adequately model an indeterminate future makes the measurement of effects from volitionally influenced causes an imperfect act.

In summary, the universe must be indeterminate for the future to not be front loaded and fully determined to evolve along only one unique path. Adequate determinism in systems creates consistent cause and effect chains. Agent volitional self-determinism enters the cause and effect chain by coupling and modifying cause and effect chains through loops of feedback and modeling of potential outcomes. A decision is truly then volitional will in a freely open system where outcomes are probabilistic.