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# Compatibilism Through the Lenses of Social Science, Moral Philosophy, Theology, and Quantum Physics

## Abstract

In the essay *Historical Inevitability*, social theorist and philosopher Isaiah Berlin asserts that if historians believe our world is deterministic, that is, events are bounded by predictable chains of causality, that moral implications are profound. He comments that in a deterministic framework, humans lack free will due to the causal arrangement of events that already occurs before one exists, which frees mankind from any moral responsibility and makes any judgment of "right" and "wrong" meaningless. In what follows, I argue that cause-and-effect historical research can imply a softer probabilistic version of determinism rather than hard determinism suggested by Berlin, and this model further amplifies our free will rather than the opposite case. I also contend that the assignment of moral responsibility to an individual is a spectrum depending on how much control one believes one possesses, even in the context of determinism and the lack of free will. From discussing Berlin's work, I expand the discourse to other ideas of compatibilism – the compatibility between free will and determinism – in theology and interpretations of quantum mechanics. I argue that predestination due to omniscience can allow free will and moral responsibility. I introduce recent research on the possible quantum effects in biochemical processes of decision-making and the implications of two different interpretations of quantum mechanics in free will and determinism. In particular, I argue how in quantum mechanics, the Copenhagen interpretation supports indeterminism and the lack of free will while the many-worlds interpretation supports both determinism and free will. Overall, this article explores the ideas of compatibilism in philosophy, theology, and physics.

## I. The Compatibility of Cause-and-Effect Historical Research, Probabilistic Determinism, and Free Will

Social theorist and philosopher Isaiah Berlin emphasizes multiple times throughout his essay *Historical Inevitability* that social scientists are heavily inclined to find strict and exact patterns in historical events, politics, societies, and human behaviors. Thus, he claims that the pursuit of "the theory of everything" from historians implies hard determinism, and deprives humans of the ability to make free conscious decisions, which goes against his libertarian ideals, though he does not refute determinism:

> How great a degree – how wide the realm of possibility, of alternatives freely choosable – will depend on one's reading of nature and history; but it will never be nothing at all. And yet it is this, it seems to me, that is virtually denied by those historians and sociologists, steeped in metaphysical or scientific determinism, who think it right to say that in (what they are fond of calling) 'the last analysis', everything – or so much of it as makes no difference – boils down to the effects of class, or race, or civilisation, or social structure (Berlin 119).

Berlin makes apt and insightful observations about the incompatibility of hard determinism and free will, which is not the focus of this paper. However, I refute his premise that cause-and-effect historical research solely implies a hard deterministic world that only allows the existence of a singular chain of causally connected events. I will offer an alternative interpretation: scholarly approaches of cause-and-effect to history, politics, psychology, sociology, or any other social science are consistent with probabilistic determinism, which focuses on the probabilistic tendencies of human actions, social environments, institutional structures, and more in influencing events. In other words, within this softer version of determinism, some tendencies are more naturally probable than others, which prompts the most likely outcomes. It follows that if humans are ignorant of these probabilistic distributions of causality and their time-dependent evolution, they are forced to follow a singular path that has the highest natural chance to happen. Throughout human history, mankind has not adequately assessed the chance behaviors of their social, political, and psychological actions, which led to consequences with a predetermined greatest probability dictated by nature. As a result, cause-and-effect historical and sociological research is attempting to shed light on the probabilistic nature of actions and consequences to escape from a hard deterministic world that leads to an inevitable fate. The knowledge of probabilistic

tendencies in social science allows humans to avoid actions favored by nature that can lead to undesirable consequences, and instead select less naturally probable pathways that might pave the way for more advantageous outcomes. This knowledge is the key to unlocking visions of multiple futures where humans have the freedom to pursue the futures they favor, which makes this theory of probabilistic determinism compatible with free will.

As an example, humans were naturally inclined to fight against each other in World War II because of a variety of factors including the rise of extreme nationalistic ideologies, the competition for global political dominance, and the lack of negotiations between nations. It appears on the surface that by researching the intricate entanglement of reasons behind World War II, the war was predestined to happen. The lack of knowledge that humans are naturally predisposed to certain characteristics which lead to certain events with the highest probability of happening denied the likelihood of avoiding the war. That absence of cause-and-effect knowledge in social science enslaved humans in a hard deterministic world where World War II had a one hundred percent chance of occurring. The point of historical research is to defy this hard deterministic reality arising from human ignorance to avoid past mistakes, and provide humans more authority in their decision-making, which is Berlin's liberal desire. Decades of research on why World War II was "inevitable" will allow humans to avoid another large-scale international conflict. This shows that causal analysis in social science provides humans valuable insights to actively choose a course of action that might be less likely to occur without the inttervention of cause-and-effect knowledge.

## II. The Implications of Illusive Free Will in Assigning Moral Responsibility

The central theme of *Historical Inevitability* is, if we consider hard determinism to be true, that the concept of moral responsibility is nonsensical. From a historian's perspective, Berlin questions that determinism denies him and his colleagues the right to offer moral judgments on historical figures whose actions are merely products of a predefined chain of causality, not within their capacity of free will. This point is comprehensively conveyed in the following lines, which I consider the primary thesis of Berlin's essay:

> Our sense of guilt and of sin, our pangs of remorse and self-condemnation, are automatically dissolved; the tension, the fear of failure and frustration, disappear as we become aware of the elements of a larger 'organic whole' of which we are variously described as limbs or members, or reflections, or emanations, or finite expressions; our sense of freedom and

> independence, our belief in an area, however circumscribed, in which we can choose to act as we please, falls from us; in its place, we are provided with a sense of membership in an ordered system, each with a unique position sacred to himself alone. [...] The growth of knowledge brings with it relief from moral burdens, for if powers beyond and above us are at work, it is wild presumption to claim responsibility for their activity or blame ourselves for failing in it (Berlin 128).

Berlin is reluctant to accept determinism because he believes that subjective experiences and emotions mark the distinction between individuals. Especially, as a libertarian, he cannot accept that humans do not bear any responsibility for their own actions and consequences. I would like to argue that even if hard determinism is true and incompatible with free will, the latter of which is also claimed by Berlin throughout the essay, moral responsibility can still exist. Can man still be subject to ethical evaluations? This question cannot be answered with a yes-no response because moral responsibility is not simply black and white. The assignment of moral responsibility to others is more precisely a spectrum depending on how much control one has, or in the context of determinism and compatibilism, to what extent one *believes* one has free will, albeit illusive. *Believing* in the presence of free will does not make free will a true concept. However, how much a person thinks he has control over his actions reflects his intrinsic moral nature, which is independent of whether he actually possesses free will.

To further illustrate the spectrum of illusive free will and moral responsibility, consider these three following cases:

a) John is born with a brain disorder that sometimes causes hallucinations. He knows he has this medical condition, but he has no idea when hallucinations occur. Once, a hallucination convinces him that his neighbor is an alien, and if he does not kill his neighbor immediately, his neighbor's army will invade the neighborhood. He then kills his neighbor during the hallucination to protect his community out of goodwill. Under normal circumstances, he would have never killed the neighbor.

b) John drinks twice the amount of alcohol he normally does, and he is aware of his alcohol tolerance, but gets carried away at the party. His intoxication causes him to kill his neighbor during a driving accident.

c) John kills his neighbor, a successful millionaire, to steal money. He is in perfect health. There are no other factors, except for his materialistic greed that prompts the murder. He thinks thoroughly about his murder scheme, and escapes to another country before the murder is discovered.

In scenario (a), John has no knowledge about when and how his hallucinations happen, so he has no control over the false logic of his neighbor being an alien that instigates the murder. The murder originates from a positive sense of morality that urges him to protect his neighborhood from invaders. Therefore, he should not be held responsible for his murder. In scenario (b), John also has no control over his impaired physical and mental states during driving which causes his neighbor's death. However, he is aware that he would get drunk, and thus his reckless driving may cause accidents, but he still chooses to drink. It is important to note that the mere existence of other outcomes does not imply that the consequence is avoidable. However, even when his decision might be deterministic instead of free-willed, he holds some responsibility for his illusive authority over his drinking choices, relative to John in scenario (a). Once again, it is reasonable to judge John's deplorable morals in (b), and acknowledge John's inherently good intentions in (a), both of which are independent of whether John controls his actions. In scenario (c), John believes he has full conscious volition when he carries out his crime. He is aware his actions may result in negative consequences, and he carefully plans how to avoid these outcomes. He does not act on an impulse caused by a mental disorder or excessive level of alcohol. Again, despite this, determinism states that he would still carry the murder if this scenario is repeated infinite times because his materialistic greed can be determined by a variety of factors such as genetics and childhood education, which are not within his control. Nevertheless, his actions are executed with more freedom, albeit illusive, than in the previous two cases, so he is subjected to the greatest ethical responsibility among the three. The issue of whether he has free will or not is independent of our rights to evaluate his intrinsic malevolence and wrongdoing. These three examples illustrate that the relative degree of illusive free will dictates the inherent morals one possesses, thus leading to the different extents of moral responsibility.

Incompatibilists have rejected this notion of consistency between determinism and moral responsibility on the following grounds:

> When I am said to have done something of my own free will it is implied that I could have acted otherwise; and it is only when it is believed that I could have acted otherwise that I am held morally responsible for what I have done. [...] But if human behavior is entirely governed by causal laws, it is not clear how any action that is done could ever have been avoided (Ayer 271).

In other words, if determinism is true, then an agent could not have acted otherwise, so he is freed from any moral responsibility. The premise that "a person is morally responsible for what he has done

only if he could have done otherwise," the Principle of Alternative Possibilities, was challenged by philosopher Harry Frankfurt's thought experiment:

> Suppose someone — Black, let us say — wants Jones to perform a certain action. [...] So he waits until Jones is about to make up his mind about what to do, and he does nothing unless it is clear to him that Jones is going to decide to do something other than what he wants him to do. If it does become clear that Jones is going to decide to do something else, Black takes effective steps to ensure that Jones decides to do, and that he does, what he wants him to do. [...] Now suppose that Black never has to show his hand because Jones, for reasons of his own, decides to perform and does perform the very action Black wants him to perform (Frankfurt 835–836).

In this Frankfurt case, it is logically sound to conclude that Jones bears moral responsibility because he actively makes the decision. Simultaneously, he does not possess the ability to act otherwise because Black denies the existence of other outcomes, or in other words, the outcome is already predetermined. For clarity, Frankfurt devised this scenario to illustrate the compatibility of determinism with free will *and* moral responsibility. Meanwhile, I only wish to argue how moral responsibility arises from the illusion of free will in the context of determinism. In the Frankfurt case, Jones is subjected to ethical judgment because he performs the actions under the false premise that he has free choices. On the other hand, if Jones suffers from a genetic psychological issue and acts accordingly to the hallucinations like John in scenario (a) that negate his illusive sense of self-control, then he would not hold responsibility for the same actions as Jones in Frankfurt's thought experiment. I decide to introduce Frankfurt's groundbreaking thought experiment to lay out the historical background of philosophical discourse that complements my aforementioned views in the second section, that illusive free will, under the postulation of determinism, does not negate moral responsibility.

## III. The Possibility of Free Will and Moral Responsibility in Theological Foreknowledge and Predestination

After arguing the compatibility of probabilistic determinism with free will as well as determinism with moral responsibility as a response to Berlin's *Historical Inevitability*, I will proceed to another relevant compatibilism issue: does the foreknowledge of an omniscient deity imply that humans cannot act otherwise to change their predestined future, and thus would humans lack free will? I will rephrase the scenario in a different light for my argument that omniscience and free will do not necessarily contradict each other. Suppose that

God possesses the power to observe our universe in its entirety from the very beginning to the very end from a perspective that is independent of both the spatial and temporal dimensions of our world. Many would argue that regardless of the existence of deliberate choices, we are led toward a singular fate already observed by Him, so our free will is merely an illusion. However, from God's perspective on a different plane of spacetime, "fate" is not a meaningful concept; every event that ever happened and will happen in our universe is simultaneous for Him because His position is unassociated with our time dimension. This view was maintained by Saint Augustine, one of the most prominent pioneers in Western philosophy and theology:

> For not in our fashion does He look forward to what is future, nor at what is present, nor back upon what is past; [...] so that of those things which emerge in time, the future, indeed, are not yet, and the present are now, and the past no longer are; but all of these are by Him comprehended in His stable and eternal presence. [...] nor does His present knowledge differ from that which it ever was or shall be, for those variations of time, past, present, and future, though they alter our knowledge, do not affect His (Augustine 197).

God's independence of our timeline and foreknowledge of our future (not His) is consistent with His absolute omniscience. Indeed, because of His omnipotence, He certainly has the full capacity to construct our past, present, and future according to His own will, but He also has the choice to do otherwise and entrusts humans to act on our volition. Human's free will is one of Christianity's core beliefs, as it makes the moral endeavor of man to return to the Garden of Eden a worthy pursuit:

> This day I call the heavens and the earth as witnesses against you that I have set before you life and death, blessings and curses. Now *choose* life, so that you and your children may live and that you may love the Lord your God, listen to his voice, and hold fast to him (Deuteronomy 30:19–20).

In this case, God can choose to act as an independent observer who views our universe's spacetime chronicle as if it was a film. He possesses the power to direct, rearrange, and create the events of the film as He likes, but He might also choose not to. Thus, humans can have the freedom to act on their own will, overcome their immoral desires, and pursue a virtuous life. In fact, these moral endeavors pave the way for the predestinations dictated by humans themselves, and only observed by Him. One question arises: Why does He allow the existence of immoral humans, which goes against His infallible quality as the omnipotent and omniscient? Moreover, in the Bible, it is explicitly stated that humans were

created in the image and likeness of God, and this is one of the cornerstones of Christianity (Genesis 1:27). Once again, just because He has the power to cleanse the human world with immoral deeds does not necessarily imply that He would do so. From the standpoint of Christianity, The Story of Eden and the Fall of Man in the Bible strongly suggest that by virtue of allowing humans to have free will, He already accepts that some mortals would oppose His will, disobey His teachings, and become corrupted. This freedom of conscious volition assigns the moral responsibility to the actions of humans, thus laying the rational foundation for Judgment Day. Eventually, His observations of our universe's film do not necessarily dictate our free will, decisions, consequences, and fates, but they only serve for Him to choose those who voluntarily atone for their sins to enjoy immortal life in the infallible Garden of Eden.

The compatibility of God's independence from our spacetime dimensions with our free will can be further intuitively explained through the analogy of theologian Edwin Abbott's *Flatland*:

> Consider intelligent and conscious creatures called Flatlanders who are restricted to a two-dimensional world titled Flatland. It is worthwhile to note that the notion of "flatness" is only meaningful for higher-dimensional beings, the Spacelanders, like us. Flatlanders have no ability to transcend dimensions nor the awareness that higher dimensions exist. Imagine that a sphere gradually lands upon and passes through Flatland. Flatlanders would only perceive a circle expanding from and then collapsing into non-existence (Adapted from Abbott 3–5).

If I assume that the movement of the sphere and the scientific knowledge of the Flatlanders are equivalent to our understanding of the macroscopic world, then Flatlanders possess the ability to predict the physical behaviors of the sphere at any time, given the initial conditions, based on well-defined physics equations. It follows that Spacelanders can have foreknowledge of what Flatlanders will experience, yet Spacelanders do not necessarily have any causal connection to Flatlanders if they choose not to interfere with Flatland. By replacing Flatlanders with humans in four-dimensional spacetime and Spacelanders with God in higher dimensions, independent from our world, this demonstrates that God's foreknowledge does not necessitate events of our world if He chooses to not intervene. Therefore, theological predestination as a result of omniscient foreknowledge does not necessarily encompass any causality between God's will and our experiences if He decides to distinguish himself from our spatial and temporal dimensions. This idea is different from the incompatibility of hard determinism with free will that many philosophers insist: that if events are

inevitable results of a chain of causal activities that occur before one is born, which is not within the control of the person, free will does not exist. Incompatibilists who use an equivalent version of this reasoning to argue for the inconsistency of theological predestination and free will have assumed a false postulation that God's foreknowledge has direct causality and dependence on our decision-making faculties. Ultimately, it is possible hat while God's omnipotence allows Him to access any section of our universe's chronicle film of spacetime, He also has the power to *not* choose and alter what to watch; instead, He can entrust humans, through free will, full authority over the film's content.

## IV. Determinism and Free Will in the Interpretations of Quantum Mechanics

a) Motivations

Free will requires two fundamental features: the possibility of alternate choices and the actual existence of conscious volition. From a purely scientific standpoint, the mathematics of macroscopic physic s– differential equations – appears to negate the likelihood of other choices, thus inhibiting free will. This concept is popularly expressed as the omniscience of Laplace's demon which, in theory, can perfectly predict the evolution of the universe and every being encompassed in that world if it knows the position and momentum of every single particle in that universe. Berlin frequently laments that the adoption of Laplacian determinism in history and sociology implies a rejection of free will and ethical responsibility, which leads to his overall skepticism of whether the scientific approach of cause-and-effect can be translated into issues of social science. I argue that for free will to exist, alternative choices must exist. It follows that in physics, quantum mechanics needs to play a role in facilitating the autonomy of decision-making because of its indeterminate nature.

Quantum mechanics is a fundamental physical theory that describes subatomic particles using mathematical concepts called wave functions. In the quantum framework, particles using mathematical concepts called wave functions. In the quantum framework, particles have inherently probabilistic features. For instance, the location and velocity of a particle cannot be exactly determined. Only the probabilities of finding a particle at different locations or measuring different velocities can be calculated. This contrasts classical physical frameworks such as Newtonian mechanics or Einstein's theory of relativity, which can deterministically predict the evolution of physical systems given initial conditions as conceptualized by Laplacian determinism. A growing number of neuroscientific research substantiates the significance of quantum effects in the biological and chemical processes inside the brains – including

nerve terminals, ion channels, reactions to external stimuli, functionings of areas that correlate to subjective emotions, and more (Schwartz *et al.* 1318–1325). More strikingly, empirical neuropsychological data has been shown to be more consistent with quantum theory than classical physics, and the conclusion of the Schwartz *et al.* study seems to be favorable for the possibility of free will arising from quantum mechanics, despite not being conclusive:

> These orthodox quantum equations, applied to human brains in the way suggested by John von Neumann, provide for a causal account of recent neuropsychological data. In this account, brain behavior that appears to be caused by mental effort is actually caused by mental effort: the causal efficacy of mental effort is no illusion. Our willful choices enter neither as redundant nor epiphenomenal effects, but rather as fundamental dynamical elements that have the causal efficacy that the objective data appear to assign to them (Schwartz et al. 1325).

Evidence of quantum indeterminacy playing an essential role in our brains, which are the sources of our decision-making faculties, provides the plausibility for the existence of free will. It is necessary to note where consciousness comes from and whether consciousness is quantum or not are still heavily debated, but it is commonly believed that autonomous conscious volition, if it existed, would most likely originate from quantum neuronal activities inside our brains (Libet 9; Hameroff and Penrose 476). The mere existence of other possibilities in quantum theory is not sufficient but necessary for free will. These ideas motivate me to explore the implications of quantum mechanics, specifically by comparing and contrasting Copenhagen and many-world interpretations of quantum theory, in determinism and free will. This search offers more scientific insight into this philosophical discourse after the metaphysical examinations in previous sections.

b) The Copenhagen Interpretation of Quantum Mechanics

The Copenhagen interpretation was mainly founded by Niels Bohr and Werner Heisenberg, the pioneers of quantum mechanics, alongside the contributions of contemporary physicists. Within this interpretation, the transition from quantum randomness to macroscopic determinism is marked by the collapse of the wave function:

> It is well known that the "reduction of wave packets" always appears in the Copenhagen interpretation when the transition is completed from the possible to the actual. The probability function, which covers a wide range of possibilities, is suddenly reduced to a much narrower range by the fact that the experiment has led to a definite result, that

> actually a certain event has happened. In the formalism this reduction requires that the so-called interference of probabilities, which is the most characteristic phenomenon of quantum theory, is destroyed by the partly undefinable and irreversible interactions of the system with the measuring apparatus and the rest of the world (Heisenberg 94).

The Copenhagen interpretation emphasizes that well-defined macroscopic events arise from the wave function collapse due to the act of "observing" a quantum system, or "measuring" the quantum properties. The well-understood probability theory behind quantum spaces alongside empirical results of wave interferences suggests that reality is probabilistically deterministic because the probability of possible quantum outcomes can be calculated. Yet, the underlying nature of wave function reduction remains elusive and greatly debated among physicists (Heisenberg 82–96). There appears to be inherent randomness to how quantum mechanics "selects" an outcome when the wave distribution collapses, which makes the probabilistic determination of the mathematical description of this theory practically useless. For this reason, I believe that the Copenhagen interpretation depicts a fundamentally indeterminate world. If brain behaviors and consciousness arise from this intrinsically random process, the possibility of alternate choices is satisfied, but our volitional capability is confined by unpredictability we do not control, which negates free will. The philosophical implications of this rejection of both determinism and free will are profound. According to incompatibilist arguments that reject free will based on determinism, macroscopic physics, and differential equations imply that freedom of choice is inhibited by causal chains of past events, which shows that everything happens for a reason, and we have no choice but to pursue this predefined course of action. However, if we accept the Copenhagen interpretation to be representative of our cognitive decision-making processes, we lack conscious volition because of an opposite reason: everything happens for no particular reason and on the inherent whims of natural collapses of the wave functions. Our attempts to systematize historical, sociological, psychological, political, or any other social scientific theories would be invalid because causes and effects are meaningless when nature randomly selects a singular reality out of the given possibilities in quantum mechanics. This irrationality of natural randomness is famously expressed by Albert Einstein in a letter to Max Born:

> Quantum mechanics is very worthy of respect. But an inner voice tells me this is not the genuine article after all. The theory delivers much but it hardly brings us closer to the Old One's secret. In any event, I am convinced that *He* is not playing dice (Einstein 403).

Perhaps, the Copenhagen interpretation is incomplete because we have not understood the tendencies of nature in choosing a singular outcome through the collapse of the wave function once an observation of the quantum system is created. This Copenhagen interpretation is analogous to my idea of probabilistic determinism in Section I in regard to cause-and-effect social scientific research. I earlier argued in Section I that the knowledge of probabilistic tendencies in social science might allow humans to actively choose more desirable outcomes that are less probable in nature without the intervention of such cause-and-effect knowledge. Thus, free will is made possible through gaining insights into the underlying principles of how nature chooses outcomes that might appear random on the surface. This compatibility between probabilistic determinism with free will can be translated into the problem of the Copenhagen principle, where the lack of volitional abilities might be an illusion caused by our ignorance of the wave function collapse. This concept is encapsulated in the de Broglie-Bohm theory, which hypothesizes "hidden variables" behind the unpredictability suggested by the Copenhagen interpretation. In this theory, the dynamics and outcomes of quantum particles are dictated by higher-dimensional guiding waves invisible to us. The results of this theory are consistent with local causality in relativity, the wave-particle duality, and the probabilistic description of quantum mechanics (Bohm 110). While evidence of the hidden guiding waves has not been discovered, and David Bohm specifically stated that he did not expect his formulation to be practical, this provides an alternative explanation that can encourage the Copenhagen interpretation supporters to search for a probabilistically deterministic universe with predictable quantum outcomes that allow free will (Bohm 110).

Nevertheless, the Copenhagen Interpretation has fundamental flaws which are irrelevant to the nature of how a singular quantum outcome is selected: what exactly is an "observation" of a quantum system? How and when does the collapse of the wave function arise between quantum indeterminacy and macroscopic determinism (Weinberg 26)? This so-called "measurement problem" is further posed by Erwin Schrödinger's famous thought experiment:

> A cat is penned up in a steel chamber, along with the following diabolical device (which must be secured against direct interference by the cat): in a Geiger counter there is a tiny bit of radioactive substance, so small, that perhaps in the course of one hour one of the atoms decays, but also, with equal probability, perhaps none; if it happens, the counter tube discharges and through a relay releases a hammer which shatters a small flask of hydrocyanic acid. If one has left

> this entire system to itself for an hour, one would say that the cat still lives if meanwhile no atom has decayed. The first atomic decay would have poisoned it. The q+-function of the entire system would express this by having in it the living and the dead cat (pardon the expression) mixed or smeared out in equal parts (Trimmer 32).

The paradox of a dead-and-alive cat makes it evident that the Copenhagen interpretation is deeply fallacious with regard to its definition of observation. Besides, the idea of quantum observation prompting a single reality is problematic because of a simple issue – the lack of a universal observer. According to Einstein's theory of relativity, the notion of time is unique to a particular observer according to the frame of reference. As a result, the concepts of past, present, and future are not well-defined. If a singular outcome is presently determined by observer A's measurement of a quantum system, it might remain undetermined in the future for observer B. The inconsistency of establishing a valid observation in the Copenhagen interpretation with the relativity of spacetime questions what a singular outcome truly means when possibilities remain true for some while collapsing into one state for others.

c) The Many-Worlds Interpretation of Quantum Mechanics

The flaws of the Copenhagen interpretation motivated Hugh Everett to propose the many-worlds interpretation as an attempt to rectify the measurement problem and provide an alternative theory without the need for the wave function reduction:

> Observation of the near system simply correlates the observer to this system, a purely local process – but a process which also entails automatic correlation with the remote system. Each state of the remote system still exists with the same amplitude in a superposition, but now a superposition for which element contains, in addition to a remote system state and correlated near system state, an observer state which describes an observer who perceives the state of the near system. From the present viewpoint all elements of this superposition are equally "real." Only the observer state has changed, so as to become correlated with the state of the near system and hence naturally with that of the remote system also (Everett 116–117).

Everett boldly proposes that the wave function does not necessarily have to collapse to provide a well-defined macroscopic outcome. Instead, the random distributions remain as different possible realities which continue to

simultaneously occur and diverge to numerous worldlines, all equally valid in existence. When the quantum system is observed, the singular outcome is not chosen by chance, but the observers just happen to be a part of one of the possible universes that diverge from the others. In other words, other versions of the same observers co-exist in the quantum multiverse, and they would observe different singular outcomes although an observer does not have any awareness of other timelines. The number of worldlines corresponds to the probability distributions dictated by the mathematics of quantum mechanics, so the worldlines grow exponentially for every quantum observation and every set of diverging realities created. Consequently, it is worthwhile to examine the philosophical implications of the many-worlds interpretation of determinism and free will if Everett's theory turns out to be the underlying mechanism of decision-making faculties in our brains.

Firstly, the many-worlds interpretation allows compatibility between historical inevitability and randomness in quantum mechanics. The theory essentially is a series of conditional probabilities, implying that the universe we are in is a product of causal chains of past events. In this framework, there is a definitive way to search for cause-and-effect relationships, and current social scientific theories would be valid when they attempt to explain why certain historical events are inevitable, why humans act the way they do, why political institutions are structured in a particular fashion, and so on. Also, from the perspective of Laplacian determinism, an omniscient demon outside the quantum multiverse and independent from our spacetime dimensions could predict the characteristics and evolutions of every possible branch of the multiverse based on the deterministic Schrödinger's wave function. This idea makes the multiverse perfectly deterministic such that every universe is predictable given an initial condition, the root where every world line deviates from. However, the existence of alternate realities proposed by Everett is only necessary but not sufficient for free will. A fundamental question arises: Do we possess the ability to choose which branch of the universe to be a part of, or is the world we are a part of already determined before we are born, which deprives us of our volitional capabilities and frees us from moral responsibility according to classical determinism? My answer is a combination of both clauses.

When we are born, we are attached to a particular sub-branch where prior events are already causally defined, which is consistent with classical determinism. The section of the multiverse that we happened to be a part of right after birth certainly limited our choices to a restricted set of possibilities, which was a consequence of a previous causal chain of events that we have

no authority over. Despite this limitation, the many-worlds interpretation allows the possibility to consciously decide between the possible futures that branch out from the singular world at the moment of our birth. I do not wish to insist that free will exists if the many-worlds theory is true because I think it is equally likely that our conscious volition is illusive when we are confined in a singular worldline toward the future by natural choices or the will of higher forces. Nevertheless, free will is made possible in a quantum multiverse because not only do multiple realities exist, but our ability to act otherwise is demonstrated by the simultaneous and equally valid existence of many versions of ourselves in the worldlines that both spring out from a predefined history before our birth *and* our free decision-making. Therefore, in the context of many-worlds interpretation, I believe that both classical determinism and free will are perfectly compatible, and historical inevitability in one worldline and the pursuit of a desirable future by an individual agent are completely consistent. This inference has ample philosophical implications in previous sections, allowing Berlin to accept cause-and-effect social scientific research while maintaining his libertarian free will beliefs, subjecting humans to moral judgments even within a deterministic world, and permitting conscious volition if omniscient foreknowledge exists.

## V. Summary

Taken altogether, I have argued the compatibility of:

1) Probabilistic determinism with free will in the context of historical research, as a response to Isaiah Berlin's essay *Historical Inevitability* (Section I)

2) Determinism with moral responsibility under the postulation that free will is illusory, as a response to H*istorical Inevitability* (Section II)

3) Theological foreknowledge and predestination with free will and moral responsibility (Section III)

4) Indeterminism with the lack of free will in the Copenhagen interpretation of quantum mechanics (Section IV, Part b)

5) Determinism with free will in the many-worlds interpretation of quantum mechanics (Section IV, Part c)

The expanding body of research in neuroscience suggests that quantum theory might explain the fundamental nature of our decision-making capacities. Thus, it is thought-provoking to philosophize the limits of our scientific understanding: whether, in theory, we can truly understand how and where consciousness arises, and if we can gain omniscience about every single behavior and action of mankind in the future. The relationships

between quantum mechanics and the science of consciousness might hold the key to the most profound wisdom of reality and challenge long-standing beliefs in deterministic philosophy, prevailing ideals of libertarian free will, or even "infallible" knowledge held by sacred theological texts. When Einstein and Bohr debated whether God plays dice or not, they started this pursuit of the absolute "theory of everything" not just in the sense of the Grand Unified Theory in physics but as an all-encompassing wisdom that can explain everything from science to religion.

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