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PHYSICS OF PREDETERMINED EVENTS
Complementarity States of Choice-Chance Mechanics

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RUNNING HEADER: PHYSICS OF PREDETERMINED EVENTS

ABSTRACT

We find that the deterministic application of choice-chance mechanics, as applied in the Tempt Destiny experiment, is also reflected in the construct of the double-slit experiment and that the complementary results obtained by this treatment mirror that of Niels Bohr's principle of complementarity as well as reveal Einstein's hidden variables. Whereas the double-slit experiment serves to reveal the deterministic and indeterministic behavioral characteristics of our physical world, the Tempt Destiny experiment serves to reveal the deterministic and indeterministic behavioral characteristics of our actions. The unifying factor shared by both experiments is that they are of the same construct yielding similar results from the same energy. Given that, we seek to establish if the fundamental states of energy, i.e, certainty and probability, are indeed predetermined. Over the span of ten years, the Tempt Destiny experimental model of pairing choice and chance events has statistically obtained consistent results of absolute value. The evidence clearly infers that the fundamental mechanics of energy is a complement of two mutually exclusive mechanisms that bring into being – as opposed to revealing – the predetermined state of an event as either certain or probable, although not both simultaneously.

Keywords: Niels Bohr; principle of complementarity; wave-particle duality; uncertainty principle; wave function collapse; entanglement; Albert Einstein; EPR; hidden variables; quantum mechanics; double-slit experiment; tempt destiny experiment; choice-chance mechanics; theory of everything; unification theory.

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I. INTRODUCTION

In 1927, Niels Bohr proposed the principle of complementarity [1] to explain the behavior of wave-particle duality [2] of light as observed in the double-slit experiment [3] (also referred to as Young's experiment). Complementarity took into account de Broglie-Schrödinger wavefunction duality and Werner Heisenberg's uncertainty principle [4] to describe the overall theory of quantum mechanics [5]. Thus the principle of complementarity postulates the notion that quantum particles portray both deterministic point particle behavior and indeterministic wave-like behavior that complement each other, and since both states are mutually exclusive, they are not concurrent.

The empirical evidence obtained by the double-slit experiment served to form the core understanding of the principle of complementarity which reveals that nature at the microscopic level is fundamentally indeterministic which would appear to be at odds with the macroscopic deterministic behavior of classical mechanics [6]. Based on this evidence, we can assume that the contradictory characteristic behaviors exhibited are indicative of each domain. This assumption does not, however, address the causal event that takes place prior to each observed state, only the properties generated by it. It is apparent by the behavior of these two domains that we have two distinctive effectual states, one being deterministic and one being indeterministic. This would imply that their are two distinctive causal events involved, not one. As the two domains suggest, the notion that energy is a singleton in structure, i.e., "E = property value", is an assumption not founded on empirical evidence of the existence of two contrasting physical domains of energy. Therefore, we need to go deeper into our understanding of what nature has revealed and ask, *"Which energy, causes the state which causes the property value?"* In order to answer this question, we need to identify the underlying universal thread that exists between both domains of energy. We know their must be such a thread due to the fact that microscopic non-living energy is the foundation for the macroscopic world we live in, as exhibited in Fig. 1. We name this underlying thread by its mathematical function, as choice-chance mechanics. For this principle to be true, the behavioral characteristics of both physical domains would need to be inclusive as one complete hierarchal system, as exhibited in Fig. 2. If such a physical system is true, then it would also be true of the behaviors of living beings formed from it. That is to say, our very own actions cannot violate the fundamental actions of the physical system of our own existence.

Whereas the double-slit experiment served to reveal the deterministic and indeterministic behavior characteristics of our physical world, the Tempt Destiny experiment serves to reveal the deterministic and indeterministic behavior characteristics of our actions. Before we discuss the details of the Tempt Destiny

experiment, from which choice-chance mechanics was derived from, we feel it is necessary to first show how it applies to quantum mechanics by means of the double-slit experiment. As we will elucidate, we can apply this principle to the double-slit experiment because both experiments are of the same construct.

Measurement Problem: In quantum mechanics, we find that there is a prevalent problem pertaining to the interpretation of the double-slit experiment. In the double-slit experiment, it is generally understood that the act of observation or measurement collapses the electron wave function when a detector is placed by one of the double slits. This process is commonly referred to as wave function collapse [7]. The problem with this perception is that it prevents us from truly understanding what the double-slit experiment has actually revealed. For if we understand that the very act of observation is by definition, the recording or receiving of knowledge of events either by scientific instruments or by an activity of a living being, then we can conclude that observation is in essence an after-the-effect act, as such, it cannot be the cause of itself. In other words, the event of observation, as defined, cannot take place prior to the existence of the event of itself. The same can be said of measurement, for measuring is also an after-the-effect act and thus cannot take place prior to the existence of the thing that is being measured. Therefore, it is apparent that both observation and measurement cannot possibly be the cause of the wave function collapse for such an act would be in contradiction of itself and a violation of temporal precedence.

The Hidden Variables: In order for the mind to make an observation and or measurement, selection (choice) from random external stimuli (chance) must first take place [8]. This fundamental mechanism of pairing the variables of choice and chance provides the state of an event which we can then observe and measure, and subsequently, form a perception of its property. We describe this physical interaction as choice-chance mechanics, an analogy of which is echoed by a statement made by Werner Heisenberg that, "...all observation is *a selection from a complete domain of possibilities*, and a limitation of future possibilities." [9]. Here he clearly defines our understanding of choice-chance mechanics in that observation (effectual state) is derived (cause) out of a selection (choice) from a complete domain of possibilities (chance), and his comment of, "limitation of future possibilities", can be understood to infer the finite act of that selection. However, he further states that, "Physics should *only* describe the formal relationship between observations." Here in lies the heart of the conundrum we face. In an era of post-positivism [10], the general consensus is that events of certainty, otherwise known as predetermined events, cannot exist because *our* perception and observation is fallible. This mindset of a fundamental physical system created by the effects of the system, instead of the cause, implies the presumption that the universe exists only after we perceive it. By focusing on effects without addressing the cause, we are then restricted to a world of statistical probabilities. Such an approach is fundamentally illogical, for it implies that only probabilities exist which in turn infers that probabilities are no longer probable, they are in effect, certain, thereby canceling itself out. Albert Einstein, did not like the uncertainty of quantum mechanics and proposed that there were "hidden variables" [11] that made quantum theory incomplete and that these variables would enable a more deterministic description of reality. When we apply a deterministic approach to address the wave

function collapse, we find that the proverbial “hidden variables” suggested by Einstein are the variables of direct and indirect choice, not observation, which are at play here.

Events of Choice: The principle of choice-chance mechanics allows us to understand that the single and double slits utilized in the double-slit experiment are fundamentally choice mechanisms. As exhibited from the empirical evidence obtained in the Tempt Destiny experiment in Figs. 4-1, 4-2, we find that choice events are moments of energy with focal properties, in that, a direct choice is focused, i.e., certain, and an indirect choice is not focused, i.e., probabilistic. When we apply this understanding to the use of a single slit as a *restrictive* direct choice mechanism to measure the behavior of electrons, it is therefore necessary that we obtain the causal effect of a single particle pattern. When we choose to use a double-slit as a *non-restrictive* indirect choice mechanism, it is therefore necessary that we obtain the causal effect of a wave-like interference pattern if the element being observed is indeterministic, and the causal effect of a double particle pattern if the element being observed is deterministic, and therefore certain to go through one slit or the other at a time. Empirical evidence of direct choice behavior is clearly observed when a detector is placed at one or both of the two slits to determine which slit an electron travels through. It is therefore necessary, that the electrons behave like particles of matter, not waves, due to the restrictive direct choice mechanism in place. More importantly, the wave function collapse shows us that even though both the direct and indirect choice mechanisms of a detector and double-slits are physically present at the same time, direct choice takes precedence over indirect choice and that only one choice can occur at a time. It is apparent that indeterministic behavior is absent of selection and that when the fundamental interaction of choice takes place, the system is then complete, thereby collapsing into a state that can then be measured. Thus, we can conclude that the wave function collapse is not an attribute of observation, but is a phenomenon generated by the restriction caused by a direct choice mechanism.

Quantum Entanglement: Although the application of choice-chance mechanics enables us to reconcile the wave function collapse, we have not addressed quantum entanglement [12]. Here we find non-local interaction between two or more objects that are linked in such a way that by measuring one object in the system simultaneously affects the other objects in the system. This phenomenon is known as instantaneous action at a distance [13] which suggests that all objects in the particle wavefunction system are entangled with one another regardless of the space between each object. In addition, quantum entanglement infers that energy at the atomic and sub-atomic levels is fundamentally indeterministic until measured, a property known as superposition [14]. Only after a measurement is made, do we know the property of the quantum pair system. This of course presupposes the notion of a measurement being taken after an effect, as opposed to the “measurement” (choice mechanism) being the cause of the effect.

As previously stated, the act of measuring an indeterministic system is in essence, an act of choice, for such a system does not consist of any one particular state, i.e., spin up or spin down, to measure from until a direct or indirect choice is made. When a choice is

made, then, and only then, can we know the property of the chance state, as seen in Figs. 3-1, and 3-2. The dichotomy of choice inherently predetermines the behavior of a chance state, in that, once a direct choice or a indirect choice is made to one particle in a quantum pair system, the chance state is simultaneously given regardless of locality because choice predetermines the subsequent chance state prior to the observation of its property. With this knowledge of the dichotomy of fundamental interactions, we can then predict, with precision, the outcome of an event when we know which choice has been made, or in the case of the Tempt Destiny experiment, the certainty or probability of the completion of the TD event regardless of locality. As demonstrated by the double-slit experiment, only a direct choice can be certain, and since choice is a finite act, only one of the two predetermined chance states can take place at a time.

II. METHODS

Choice-Chance Methodology: We will now address how events of choice and chance are constructed in a method to obtain evidence of absolute value without ambiguity of interpretation. Up to this point we have addressed how choice-chance mechanics relates to our understanding of the results of the double-slit experiment as they apply to the particles of light in the quantum domain, and to a limited extent, particles of matter. In mathematical terms, both the double-slit experiment and the Tempt Destiny experiment pair mutually exclusive variables where chance Y is a function of choice X in a construct otherwise known as ordered pairs which addresses three key requirements to establish causation [15], that being: temporal precedence, covariation of the cause and effect, and no plausible alternative explanations.

Temporal Precedence: In order to establish temporal precedence we need to show the cause taking place before the effect. This attribute is inherent with ordered pairs which are built from two elements in order. When there are two ordered pairs (a, b) = (c, d), they can only be true if a = c, and b = d. The construct of choice-chance mechanics has the first ordered pair consisting of the dichotomy of direct and indirect choices only one of which can be made at a time (a), the choice made is then paired with chance, i.e., potentials (b), this interaction gives us the type of choice being made. The second pair consists of the execution of the choice (c) which then obtains the chance state of certainty or probability of the choice made (d).

The double-slit experiment selects physical particles of light and matter by means of a direct choice mechanism of a single slit or detector, and an indirect choice mechanism of a double-slit (a). This selection process is then paired with the property superposition, e.g., the chance event that particles will go through each slit (b), which in turn executes

the choice made (c), thus revealing the deterministic (single or double particle pattern) or indeterministic (wave-like interference pattern) chance state of the particles (d).

In comparison, the Tempt Destiny experiment uses direct and indirect choices from an annual public event to obtain a selection (a). The choice is then paired with an event of chance (b), which in turn executes the choice made (c), to obtain the certain or probable completion of the event (d).

Covariation of the Cause and Effect: As previously discussed in the "Events of Choice" section, the double-slit experiment establishes a causal relationship of using a single or double slit choice mechanism with particles of light and matter. Whether an event is a direct choice of hydrogen bonding with oxygen to form H_2O, or a direct choice of creating artwork for a specific outcome which affects the completion of the artwork, the context of an event is irrelevant to mutually exclusive states of energy. Furthermore, we know that locality is a not an issue since choice predetermines the chance state of an event. With this understanding, we can then evaluate the events of the Tempt Destiny billboard phenomenon by establishing its cause-effect relationship as necessary and or sufficient causes.

THE CAUSE – Create, but not finish, a painting to be reproduced on a billboard in support of the chosen football team winning the SB game.

THE EFFECT – Should the football team win the SB game, then the unfinished painting can be completed by painting the football silver to represent the SB trophy won by the team.

Necessary causes: Choosing to create a TD billboard in support of a SB victory (X) is the necessary cause to complete the billboard painting should a SB victory happen (Y). Therefore, the presence of a choice made (X) does not imply that the team chosen will also win their championship game (Y) as indicated in columns (a) and (b) of the results in Table 1.

Sufficient causes: Choosing to create a TD billboard in support of a SB victory (X) is sufficient cause to complete the billboard painting should a SB victory happen (Y). The presence of SB victories (Y) does not imply the presence of a TD billboard (X) as exhibited in Table 3.

The sole purpose of the artwork created is in support of a SB victory. Only when the team completes its season by winning the SB game can the artwork then be completed. The unfinished painting concept eliminates ambiguity of inference of just simply having any artwork, or photograph for that matter, appear on a billboard of this nature and why these unique billboards are called Tempt Destiny billboards. The discernible connection between the billboard event and the subsequent victories are direct in that the effect completes the cause. It is obvious that billboards cannot win SB games, as such, *no correlation is being implied* in this regard.

No Plausible Alternative Explanations: The plausible alternative explanation being addressed by the Tempt Destiny experiment is whether the identified phenomenon can be discerned as predetermined. Although the double-slit experiment's alternate explanations of the wave function collapse have been previously addressed, the question still remains as to the validity of reconciling the variables of choice with chance made by living beings. As stated perviously, our very own actions cannot violate the actions of the physical system of our own existence. In this regard, the Tempt Destiny experiment would also need to share the same variables and obtain empirical evidence of absolute value to validate the function of this fundamental interaction as an extension of a dichotomous physical system.

It is important to note that there were two billboard events prior to the beginning of the annual Tempt Destiny experiment which began in 2000. These billboard events revealed the choice-chance mechanism we have incorporated as the construct of this experiment. The first Tempt Destiny (TD) billboard was displayed in January of 1987, 10 days prior to SB XXI. The second TD billboard was displayed prior to the beginning of the SB XXV season from August, 1990 - February, 1991. Both events were made by direct choice and then paired with the same chance event to determine when or if the choice made would come to fruition. By repeating the steps taken before, it will become apparent how the experiment addresses validity concerns and any plausible alternate explanations.

As defined, a phenomenon is as a rare or extremely unusual or extraordinary occurrence observed through the senses rather than by intuition or reasoning. In order to obtain irrefutable evidence from an experiment of this significance, we need the phenomenon of interest to be a *virgin instrument of measure*, in that we can verify all occurrences in perpetuity. Thus, we can infer, without ambiguity, what the experiment has revealed.

Methodology Validity: When a choice is made; subjectivity is inherent. Additional influences such as the manner of when, where, or how the choice is made are inescapable factors that contribute to a selection. A similar notion can be said of particles in the double-slit experiment, in that, when a double slit is present particles of light and matter do not exclusively go through only one slit, they chose to go through one slit or the other to form a double-slit pattern, or split into both slits to form an

interference pattern. This imparts that when a direct choice or indirect choice is paired with chance all initial motives and outside influences are negated because both variables are independent of each other. This understanding is substantiated by the lack of ambiguity in the results as seen in Fig. 4-1. The inherent advantage to this method is that threats of internal or external validity [16] are neutralized by design because both factors of choice and chance are mutually exclusive, and as such, each cannot control or influence the other. External influences, and fallible human perception, naturally contribute to choice and chance events independently, but when paired, such influences cancel each other out. In this way, concerns of the conclusion or inference possibly being wrong are addressed before the treatment even begins.

III. TEMPT DESTINY EXPERIMENT

Sampling: Instead of probabilistic sample methods, nonprobability sampling [16] is utilized in this experiment by combining a form of heterogeneity sampling and snowball sampling methods at a web site to obtain votes from participants. We announced the program availability online at numerous fan forums and created an opt-in email list from this activity to send out newsletters. Fans are free to vote, or not vote, for their team of choice twenty-four hours each day, seven days a week, for the entire twelve month period of this annual event. Either way, the measure of choice is true regardless of degree of participation. The basis of this experiment is after all, a matter of choice.

Prediction: Due to the fact that choice is inherently finite, and thus not subjective to "frequentist" assumption that events are required to be infinite in order to be considered certain [18], we can predict outcomes of certainty and probability using the same phenomenon of interest without compromising or affecting the integrity of previous or subsequent results by distinguishing the difference of the choice made. As postulated, when a direct choice is paired with chance the results are then certain. And when an indirect choice is paired with chance the results are then probable.

The SB XLIV game in 2010 marked the first time we included two different types of Tempt Destiny billboards, one of choice and one of chance. If the team *directly* chosen by fans online, i.e., team with the most overall votes, does not go on to compete in the SB game (i.e., choice billboard), then *indirectly,* we will chose to do the TD billboard for the team that chances to have the most votes of the two competing SB teams (i.e., chance billboard). In this way we can predict and measure the outcome of each distinct choice, that of certainty with the TD billboard of choice, and that of probability with the TD billboard of chance. We will validate, from actual results observed to date, the following hypotheses by applying mathematical analysis with parameters pertinent to the experimental conditions.

CERTAINTY HYPOTHESIS - The null hypothesis of the certainty experiment is:

H_O: *It is probable that when a TD billboard of choice is created and the team depicted goes on to win the SB game, the artwork can then be completed.*

which will be tested against the alternative:

H_A: *It is certain that when a TD billboard of choice is created and the team depicted goes on to win the SB game, the artwork can then be completed.*

PROBABILITY HYPOTHESIS - The null hypothesis of the probability experiment is:

H_O: *It is certain that when a TD billboard of chance is created and the team depicted goes on to win the SB game, the artwork can then be completed.*

which will be tested against the alternative:

H_A: *It is probable that when a TD billboard of chance is created and the team depicted goes on to win the SB game, the artwork can then be completed.*

IV. RESULTS

To clearly evaluate the observed results in an objective manner and come to an unambiguous conclusion, we use coordinates to map the events that have taken place in order to measure the linear dependence between the two variables of *X* choice and *Y* chance. In Fig. 1-1 & 1-2, we assign a number matching each team choice set with each team chance set as points on the *X and Y axis* in order to determine the coordinates derived from the results of each annual experiment. As noted in Table 1, we list the results in the columns headed by the attributes of choice and chance. We have also identified in the headings the domain and co-domain denoted as *X* and *Y*, the

associated class of choice and chance, and their sets a, b, c, d. The identities of these sets are as follows:

a = 32-element set consisting of votes for each football team = X Choice

b = 32-element set of chances that the football team selected also wins its conference championship game = Y Chance

c = 1-element set, artwork is created for the TD billboard supporting the team selected = X Choice

d = 1-element set, chance that a SB victory takes place in order to complete the artwork = Y Chance

Results of Stage I (a, b) - In order for a direct choice to be executed, both choice and chance events need to pair with each other, as exhibited in Table 1 and in Fig. 4-1. In stage one, the direct choices *X* made by football fans online are determined by which team receives the most votes as noted in the second column of Table 1. After which, the direct choice is paired with the chance *Y* of that team also winning its championship game as noted in the third column. As exhibited in the graph of Fig. 4-1, when the paring event of stage one happened on 1-20-08, with the NYG team winning their championship game, the experiment could then advanced onto stage two. Also shown, are the results of direct choices that yielded no pairing events (+, -) signifying that unless a direct choice is certain (+, +), the dichotomy of that choice is incomplete and thus void. Should the pairing of a direct choice not take place, then by default, we choose the team that chances to have the most votes of the two competing SB teams as our indirect choice. In so doing, we are able to evaluate if indirect choices are indeed probable as events in Table 3 would suggest. As denoted in Quadrant II of Fig. 4-1 & 4-2 as (-, +), such a choice is inherently probable, and so too is the outcome. Therefore, by discerning the distinction between the probability of a indirect choice (-, +) from the certainty of a direct choice (+, +), we are able to conduct this experiment to be inclusive of both choices without compromise of integrity or ambiguity of inference since they are mutually exclusive, and therefore, cannot be made simultaneously. With the inclusion of both choice events, beginning with the 2009 season for SB XLIV, we can predict the outcome of Stage II.

Results of Stage II (c, d) - In stage two, the catalyst *X* of the choice made is the creation of the TD billboard. The catalyst is then paired with the chance *Y* event of completing the artwork should the team featured on the billboard also win the SB game. The results of direct choice events are exhibited in Table 1, and the results of indirect

choice events are exhibited in Table 2. The graph in Fig. 4-2**,** shows when the TD Billboard of Choice happened on 2-3-08, that the completion of the artwork was certain thereby yielding the following results of (+, +) = (+, +). Also shown in Fig. 4-1 & 4-2, are the results of the first TD Billboard of Chance created for SB XLIV which occurred on 2-7-10. Even though another SB victory occurred, the graphs show that the indirect choice event was probable yielding the following positive results of (-, +) = (-, +). A SB game loss would have yielded the negative results of (-, +) = (-, -), indicating that the indirect choice event was not probable.

Symmetrical with respect to X-axis: The Fig. of 4-1 & 4-2, show that the cartesian graph is symmetrical with respect to the *X-axis (Y = 0)* [19]. Note that for every point *(X, Y)* on the graph, the point *(X, -Y)* is also on the graph, thus showing that the dichotomies used as the construct of TD experimental design are of absolute value as clearly defined in the Pearson product-moment correlation coefficient [20] range from +1 and –1 inclusive.

V. CONCLUSIONS

TD Experiment: As observed, the ten annual online Tempt Destiny experiments to date have obtained results that are either certain or probable without compromise of a degree to either axiom. The results clearly show that the pairing of choice with chance, either directly or indirectly, are complementary in that certainty and probability are the symmetrical results generated by this dichotomy. The construct of the Tempt Destiny experiment also shows us that the design consists of four axes consisting of the causal axis set of choice X and chance Y and the effectual axis set of certainty $Y = X$ and probability $Y = -X$. The empirical evidence clearly show that the type of choice made predetermines the outcome of the chance state. The coordinates of Figs. 4-1, and 4-2, show that the direct choice state of completing the NYG billboard painting was certain, and that the indirect choice state of the NOS billboard painting was probable. Even though the outcomes of both chance states were the same, the choices were not. What we have observed is a virgin instrument of measure obtain the same results from two mutually exclusive choice events independent of locality.

Double-slit Experiment: The principle of choice-chance mechanics exhibited in the double-slit experiment clearly demonstrates that the effectual states of certainty and probability exist in both domains when the causal events of direct and indirect choices are made. Essentially, indirect choice is non-restrictive which allows for probable events to occur in both classical and quantum domains as exhibited in Figs. 3-1, 3-2. This explains why in the double-slit experiment electrons exhibit their inherent non-restrictive

wave-like behavior when the choice mechanism of the two slits are present, and why particles of matter, given the same freedom, exhibit their inherent non-restrictive behavior of going through both slits instead of exclusively traveling through one slit. With this insight, the wave function collapse can be understood as corresponding to a physical process and not a change in our knowledge of that process [21]. This physical process corresponds with the notion of *complementarity* selection bringing into existence the measured property, as opposed to reveling it. In other words, choice-chance mechanics describes the fundamental interaction of energy which is inherently contextual, in that, predetermined chance states are irredeemably relative to the selection of possibilities.

Basketball Demonstration: Further evidence of choice-chance mechanics can be seen in the highly-efficient and highly-visible sport of basketball. The dichotomy of choice is clearly demonstrated when a player specifically chooses to throw the basketball into the loop to score points. As seen in Fig. 5., with each throw the player is restricted – by the principle of choice-chance mechanics – to making only one of two possible choices, one being a direct choice of throwing the basketball directly into the net (*certain outcome),* the other being an indirect choice of bouncing the basketball off the backboard or rim into the net (*probable outcome).* Some would say that skill or ability is the reason why a player made the shot. If this were the case, then skill or ability would also apply to when the player misses. As with the case of observation, skill or ability is a measurement of, not the cause of, a choice event. When a player attempts to make a direct choice of throwing the basketball into the net, and then misses, we know from the unequivocal evidence exhibited in Table 1 and Fig. 4-1, that the choice made was indirect due to the fact that a direct choice cannot take place unless both events of choice and chance pair (+, +). Obviously both choices can score points, however, only a direct throw into the net can be considered as certain, whereas, an indirect throw off the backboard can only be considered as probable. Thus, the preexisting chance state of a basketball throw towards the net can be either certain or probable, just not both simultaneously.

Evolution of Choice-Chance Events: When we understand the fundamental interactions of choice-chance mechanics, we can see how it functions as a deterministic hierarchal system of complementary choice events. As exhibited in Fig. 2, elementary particles bond to form the chance state we know as nucleons. Nucleons then serve as building materials, i.e. possibilities, for the next level of weaker energy known as nuclei – which in turn provide the choice elements for the next chance state known as atoms, and so on and so forth. We can compare this evolution of energy to the construction of a building. First, a foundation (elementary particles-nuclei) must exist in order to build upon to support additional structural components such as flooring (atoms-compounds), walls and ceiling (cells-organisms), and a roof of a building (population-biosphere). With each successive generation of the hierarchy of evolution [22], each choice event draws from the previous chance state. Take for example, the chance state that contains the stable molecules of hydrogen and oxygen. These molecules serve to provide the ingredients, hence the possibility for, the choice event of molecular compounds to occur which gives us the property of the chance state we know as H_2O.

Big Bang Theory: The Big Bang Theory [23] puts forth the notion that the universe was once a highly condensed and extremely hot state that expanded rapidly and cooled by expanding into its current diluted state. It is conceivable that should the fundamental mechanism of choice were to ever cease to exist at the high energy level of elementary particles, that the uncertainty behavior between position and momentum of all particles would then become certain and thus collapse into non-existence. Conversely, the opposite of such an event would be the moment of a fundamental interaction of selection (choice +) of possibilities (chance -), such as which, would generate a state of time in space we know as energy. The results of such an event would be akin to an electrostatic discharge, or in this case, the Big Bang.

Principle of Choice-Chance Mechanics: Evidence clearly infers that energy is a dichotomy of two complementary interactions that bring into being, as opposed to revealing, the predetermined state of an event. Choice-chance mechanics does not describe the resulting measured properties of these interactions, such as matter and the four forces of nature, or the events created by living beings. Rather, it describes the fundamental interaction of selection of possibilities which bring into being finite energy states of time in space common to both microscopic and macroscopic domains. In Fig. 1, we see that the indeterministic behavior of non-living microscopic states serve as the foundation for the deterministic behavior of living macroscopic states, together both sub-systems complement each other to form one deterministic system as exhibited in Fig. 2. We define this dichotomy of fundamental interaction by the mechanical function of selection as energy of choice $^{(a+)}$, i.e., direct energy E^{+}, and energy of chance $^{(a-)}$ i.e., indirect energy E^{-}, whereas direct energy predicts a state of certainty $^{(d+)}$ and indirect energy predicts a state of probability $^{(d-)}$. Choice gives us a finite value of energy, i.e., momentum or act, relative of time (when). Chance represents possibilities, i.e, potentials, in space which gives us the position of the predetermined state of energy in time (where):

$$(a)\ \frac{\text{Energy}^{+/-}}{\text{Choice}}\quad (b)\ \frac{\text{Space}}{\text{Chance}}\quad (c)\ \frac{\text{Time}}{\text{When}}\quad (d)\ \frac{\text{State}^{+/-}}{\text{Where}}$$

Therefore, we define choice-chance mechanics as an ordered quadruplet of a complete state-space system [24] consisting of the positive value of choice (denoted c^{+}), and the negative value of chance (denoted as c^{-}) which interact to form predetermined energy-space-time-states of certainty and probability (denoted as $E^{+/-}$):

$$(c^{+}, c^{-}) = E^{+/-}$$

In light of the empirical evidence obtained, it is self-evident that there are only two types of choices in nature and when we know which choice is made we can then predict the chance state of that choice. Thus we can postulate the following:

Energy is a dichotomy consisting of two complementary choice-chance interactions from which all states are predetermined to be either certain or probable, although not both simultaneously.

In Conclusion, the goal was to understand the true characteristics of the TD billboard phenomenon. Although this goal has been addressed, the results now leave us open to revelations and implications that are well beyond the scope of this paper. With the application of quantum computer technology, quantum chemistry, etc., the predictive nature and universal application of choice-chance mechanics can aid in development of these technologies and foster other discoveries yet to come. That being said, we can deduce that what has been revealed by the Tempt Destiny experiment is that we live in a finite world of choice because we also live in a world of infinite chance.

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Direct Choice Results (Table 1)

Stage I - Choice Event Stage II - Chance State

Season	*X Choice - a*	*Y Chance - b*	*X Choice - c*	*Y Chance - d*
2000	+ STL Fans	– STL Team	–	–
2001	+ MIA Fans	– MIA Team	–	–
2002	+ BUF Fans	– BUF Team	–	–
2003	+ BUF Fans	– BUF Team	–	–
2004	+ MIN Fans	– MIN Team	–	–
2005	+ MIN Fans	– MIN Team	–	–
2006	+ MIN Fans	– MIN Team	–	–
2007	**+ NYG Fans**	**+ NYG Team**	**+ Billboard**	**+ SB Victory**
2008	+ PHI Fans	– PHI Team	–	–
2009	+ MIN Fans	– MIN Team	–	–
2010	Pending			

Indirect Choice Results (Table 2)

Stage I - Choice Event Stage II - Chance State

Season	X Choice - a	Y Chance - b	X Choice - c	Y Chance - d
2009	**- NOS Fans**	**+ NOS Team**	**- Billboard**	**+ SB Victory**
2010	**Pending**			

Seasons without a TD Billboard (Table 3)

Season	SB Team with most votes	Win	Lose
2000	**NYG**	**–**	**X**
2001	**STL**	**–**	**X**
2002	**OAK**	**–**	**X**
2003	**CAR**	**–**	**X**
2004	**PHI**	**–**	**X**
2005	**PIT**	**X**	**–**
2006	**CHI**	**–**	**X**
2008	**PIT**	**X**	**–**

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Fig. 1 Choice-Chance Mechanics

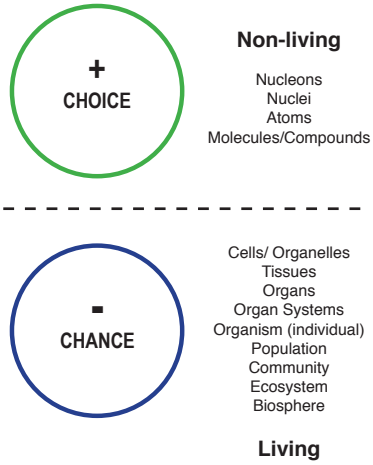

Figure 1 Indeterministic behavior of non-living microscopic states serves as the foundation for the deterministic behavior of living macroscopic states.

As each level of indeterministic energy becomes weaker, the structures built become larger and more complex thus evolving into deterministic states of energy. Together, both sub-systems form one complete deterministic system as exhibited in Figure 2.

Fig. 2 Choice-Chance Hierarchical Structure

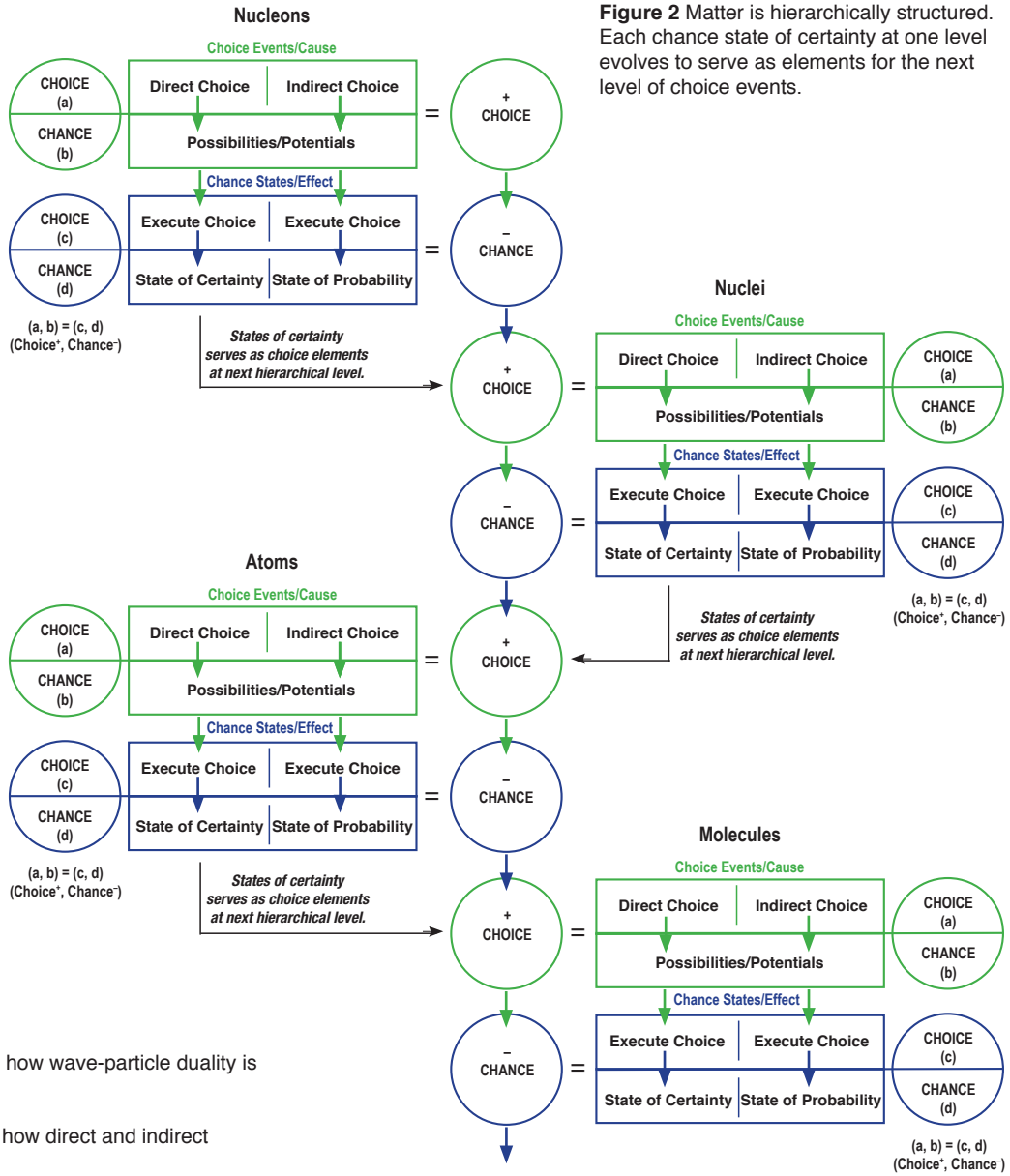

Figure 2 Matter is hierarchically structured. Each chance state of certainty at one level evolves to serve as elements for the next level of choice events.

Figure 3-1 Choice-chance mechanics shows how wave-particle duality is revealed in the double-slit experiment.

Figure 3-2 Tempt Destiny experiment shows how direct and indirect choices predetermine chance states.

Fig. 3-1 Double-slit Experiment

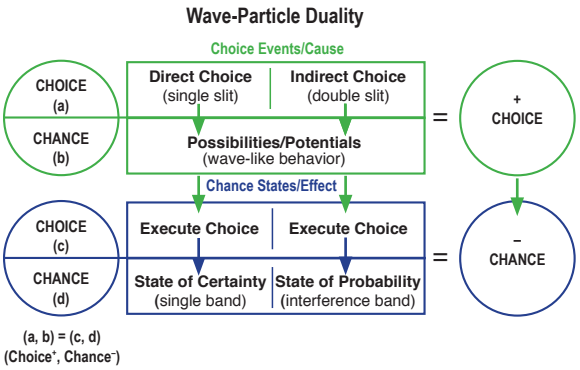

Fig. 3-2 Tempt Destiny Experiment

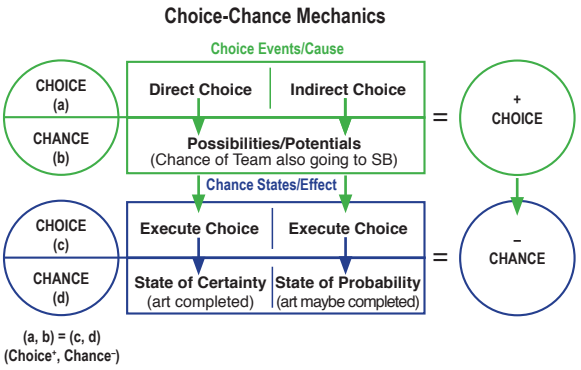

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Fig. 4-1 Tempt Destiny Experiment - Stage I, Choice Event

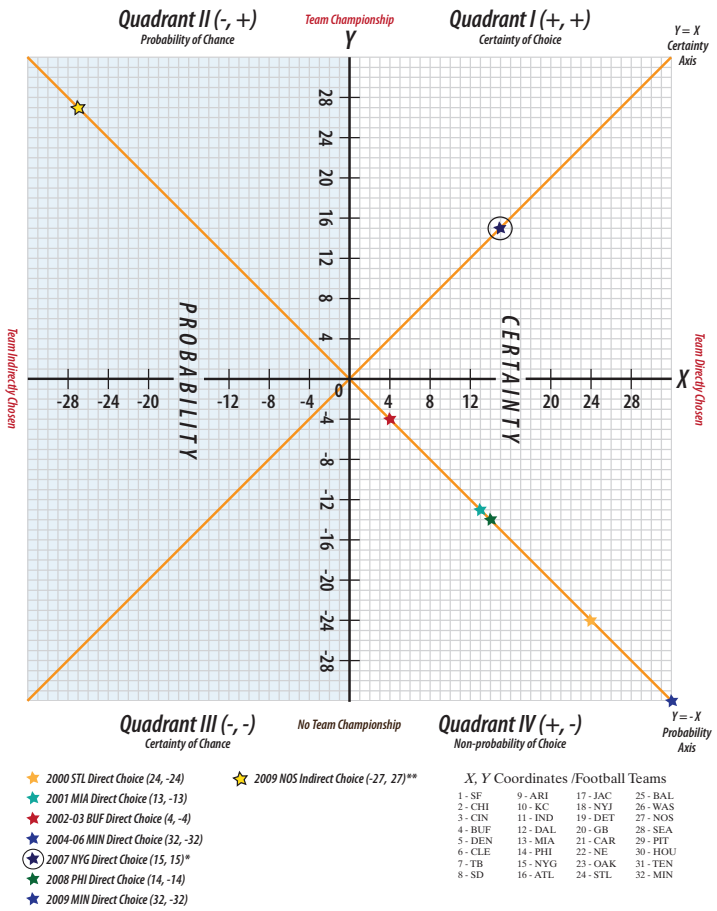


Fig. 4-2 Tempt Destiny Experiment - Stage II, Chance State

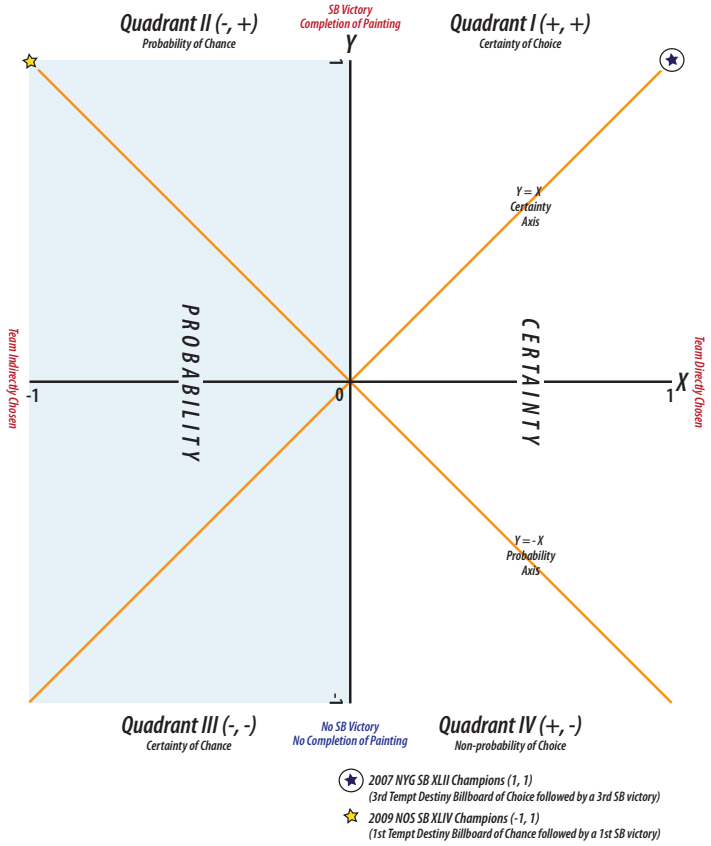


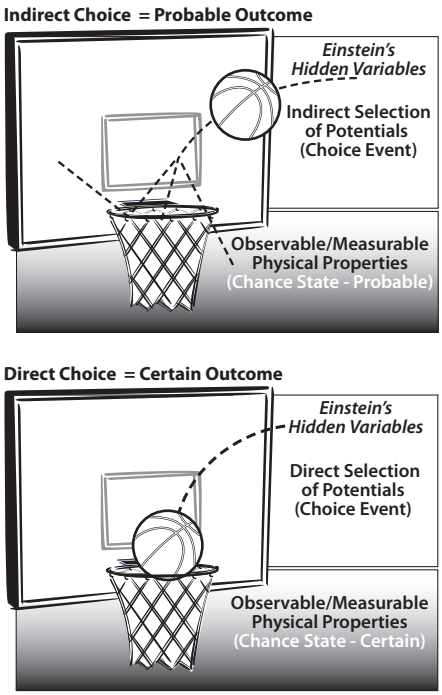
Figure 4-1 Exhibited are coordinates of direct and indirect choices X paired with a chance event Y to form the choice made

*Event triggered the 3rd Tempt Destiny Billboard of Choice. **Event triggered the 1st Tempt Destiny Billboard of Chance.

Figure 4-2 Exhibited are coordinates of the execution of direct and indirect choices X paired with the chance event Y to determine completion of the painting.

Figure 5 As exhibited, the sport of basketball clearly demonstrates the two types of choices and their predetermined outcomes.

Fig. 5



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