

The Universal Determinism Dichotomy (UDD)

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The Universal Determinism Dichotomy (UDD) states that all effects arise from one of two categories of causation: either Physicodynamic Determinism, or Choice Determinism. “Chance and necessity” (mass/energy interactions) comprise the Physicodynamic Determinism category of causation. Chance, however, is generally not regarded as a true cause of any effect. It is merely a probabilistic *description* of what might happen as a result of complex, poorly understood, interactive Necessity (physical law-like determinism).

The classic cause-and-effect chains involving initial conditions, the effects of force fields and the laws of motion are aspects of Physicodynamic Determinism (PD). Although the physical world seems ruled by physical cause-and-effect determinism, a seemingly independent phenomenon, *contingency*, is also frequently observed. Contingency¹⁻¹¹ means that events can occur in multiple ways despite the monotonous/redundant constraints of physical law, constant initial condition constraints, and set probability bounds.

But, there are two kinds of Contingency: 1) Chance Contingency and 2) Choice Contingency.

Chance Contingency

Chance Contingency is what we seem to observe in statistically describable quantum events and in the molecular collisions of heat agitation. Uncertainty is high as to what will happen despite known macroscopic causal chains.

We sometimes appeal to yet-to-be-discovered laws when trying to explain what appears to be chance phenomena. Most theorists, however, attempt to reduce Chance Contingency to unknown and/or very complex physical causation, as summarized by Peale.¹² Thus Chance Contingency as a true cause may be only “apparent.”

Sproul argues effectively that chance is not a cause of anything. Chance is nothing more than a statistical *description* of unknown or complex physical causation. Chance, therefore, cannot have any physical effects, since it is not a physical cause.¹³

Even if chance were a true cause of effects, one thing is for certain: Chance Contingency is unchosen and undirected toward any goal. No predilection towards pragmatic benefits exists with Chance Contingency. Only the most naïve “function” arises by chance. No deliberate selection from among options occurs with Chance Contingency. Whatever naïve function that might arise spontaneously from chance can only be called “function” if some agent decides to make use of it. The physics definition of “work,” for example, is not “intuitive work” unless it is valued, pursued and applied toward some goal, usually by human agents.

Naturalistic metaphysics presupposes that Chance and Necessity are sufficient to explain all aspects of reality. All things are viewed as being ultimately physical, or at least physically caused, including mind. Because of mass/energy inter-conversions, the following are included within the physicydynamic definition of physicality: spontaneous energy transductions, force-field influences, and quantum causation.

In recent years, physicalistic philosophy has come under increasing scrutiny, even from within the scientific community.^{1-8,14-43} Incorporation of metaphysical

materialism into the very definition of science has been called into question, especially since the scientific method itself is non-physical. Other problems with philosophic physicalism include:

- 1) Physicality seems to have had a beginning in time, along with time itself. This raises questions of what caused the effect of physicality, including the time dimension.
- 2) The laws of physics themselves are mathematical (abstract, conceptual and formal rather than physical).
- 3) Life is formally organized within even the simplest cell, not just self-ordered as we see in Prigogine's "dissipative structures" of chaos theory.
- 4) All known life is cybernetic. Subcellular processes are all meticulously programmed and processed by very sophisticated mechanisms, never observed to arise from Chance and/or Necessity.
- 5) Representationalism, a purely formal phenomenon, is employed within living cells. Various Material Symbol Systems are used to communicate messages, program complex computations, and to regulate homeostasis.

Prescription and its Processing are products of Decision Theory, not Stochastic Theory. Stochastic Theory is merely descriptive. Only Decision Theory is known to be able to prescribe sophisticated function, and process it.

This brings us to the second kind of contingency, Choice Contingency:

Choice Contingency

Programming and Prescription are invariably a function of Choice-Contingent Causation and Control (CCCC).⁴⁴ Other published terms for CCCC include simply "Choice Causation (CC) and "Choice Determinism (CD)."²⁸ CD is distinguished from law-like physicydynamic and physicochemical determinism in two major ways: First, CD is never automatic or spontaneous in inanimate nature. CD empirically does not, and logically cannot, arise from mere chance (probabilistic descriptions) and/or necessity (natural law).⁴⁵ Second, CD can only arise from purposeful choices that steer or direct behavioral outcomes toward the goal of some

desired function.

CD is not always pragmatically wise, however. Bad purposeful choices can be made, with predictable results! But CD is normally exercised under the desire and belief that purposeful choices will yield more beneficial results than random events, as valued by some agent.

Only “agents” are known to value anything. Only agents are known to pursue attainment and fulfillment of such value. Agents alone pursue functionality and usefulness, not inanimate environments.

The steering of events towards non-trivial functional success requires *Choice Contingency*, not just Chance Contingency. *Purposeful choices* must be made in pursuit of non-trivial utility. Prescription and its Processing are both impossible without Choice Contingency.

In addition, the physical interactions that are militated by cause-and-effect law are not programmable. Programming requires freedom from law. The configurable switch-settings needed to integrate circuits, for example, must be freely selectable. If the laws of physics and chemistry forced those switch-settings into the same position every time, by law, programming creativity and ingenious computational function would become impossible. Conversely, no programming would be needed if ingenious function happened by law.

Prescription of Function (PoF) exists in the abstract prior to its instantiation into physicality. Such instantiation is often two-step. First, the instructions are recorded and stored in a physical medium for easy access and processing by physical machinery. Second, those instantiated instructions must be processed into physically-realized functionality. Programs must be conceptually, and then physically, processed. Computer-like component parts must first be engineered and manufactured according to recorded instructions. Next, they must be conceptually organized and assembled in a certain functionally-integrated way into three-dimensional space. Formal computation must be performed by formally integrated circuits and configurable switch-settings that serve as true *logic gates*. Logic theory is formal, not physical, even though the configurable switches of the processors are physical.

Open vs. Closed must be purposefully chosen,^{1,19} not just statistically described as a measure of combinatorial uncertainty.⁴⁷ Complexity theory is probabilistic and descriptive, not causative. It cannot actualize prescription, or its processing, of yet-to-be realized physical function. Selection of computational successes can only be realized after they exist. Evolution cannot pursue potential function or any goal. Evolution “in order to” is a scientifically bogus concept that has no place in peer-reviewed literature.

Physically instantiated formal instructions employ electromagnetic flux in computers. Energy expenditure is required in a physical world to realize and experience the benefits of computation. Formal prescription of function, however, precedes instantiation into physicality. Formal prescription itself is nonphysical. The setting of each configurable switch requires energy, of course. But the decision of which way to push the switch knob is formal, not physical. It is choice-determined, not chance-determined, and not physical law-determined.

Chance and necessity, mass and energy can constrain. But, they cannot control or steer toward desired functionality. Nature is blind to function. The notion of function is formal, not physical.

Formal, non-physical Choice Determinism *can* be instantiated into physicality, however, using configurable switch-settings, material symbol systems, and integration of well-designed and engineered physical parts into holistic physical machines. But, we must never confuse the instantiation of formal controls into physicality with physicality itself. Under no circumstances can

Physicodynamic Determinism generate Choice Determinism. The Universal Determinism Dichotomy is fundamental, absolute and legitimately universal.

References:

1. Abel DL. Constraints vs. Controls: Progressing from description to prescription in systems theory. *Open Cybernetics and Systemics Journal*. 2010;4:14-27 Open Access at <http://benthamopen.com/contents/pdf/TOCSJ/TOCSJ-14-14.pdf> [Last accessed: October, 2017]
2. Abel DL. The Formalism > Physicality (F > P) Principle. In: Abel DL, ed. *In the First Gene: The birth of Programming, Messaging and Formal Control*. New York, New York: Ed. LongView Press-Academic, 2011: Biological Research Division; 2011:447-492 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
3. Abel DL. What is ProtoBioCybernetics? In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, N.Y.: LongView Press-Academic: Biolog. Res. Div.; 2011:1-18 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
4. Abel DL. The three fundamental categories of reality. In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, N.Y.: LongView Press-Academic: Biolog. Res. Div.; 2011:19-54 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
5. Abel DL. The Cybernetic Cut and Configurable Switch (CS) Bridge. In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, N.Y.: LongView Press--Academic, Biol. Res. Div.; 2011:55-74 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
6. Abel DL. What utility does order, pattern or complexity prescribe? In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, N.Y.: LongView Press--Academic, Biol. Res. Div.; 2011:75-116 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
7. Abel DL. Moving 'far from equilibrium' in a prebitotic environment: The role of Maxwell's Demon in life origin. In: Seckbach J, Gordon R, eds. *Genesis - In the Beginning: Precursors of Life, Chemical Models and Early Biological Evolution*. Dordrecht: Springer; 2012:219-236 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
8. Abel DL. Is life unique? *Life*. 2012;2(1):106-134 Open access at <http://www.mdpi.com/2075-1729/2072/2071/2106> [Last accessed March, 2015] Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
9. Abel DL, Trevors JT. Three subsets of sequence complexity and their relevance to biopolymeric information. *Theoretical Biology and Medical Modeling*. 2005;2:29-45.
10. Abel DL, Trevors JT. More than metaphor: Genomes are objective sign systems. *Journal of BioSemiotics*. 2006;1(2):253-267 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
11. Abel DL, Trevors JT. Self-Organization vs. Self-Ordering events in life-origin models. *Physics of Life Reviews*. 2006;3:211-228 Also available from <http://lifeorigin.academia.edu/DrDavidLabel>.
12. Pearle J. *Causation*. Cambridge: Cambridge University Press; 2000.
13. Sproul RC. *Not a Chance: the Myth of Chance in Modern Science and Cosmology*. Grand Rapids, MI: Baker Books; 1994

14. Nagel T. *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature Is Almost Certainly False*. New York, N.Y.: Oxford University Press; 2012.
15. Nagel T. Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False *Mind*. 2013;122(486):582-585.
16. Abel DL. Is Life Reducible to Complexity? In: Palyi G, Zucchi C, Caglioti L, eds. *Fundamentals of Life*. Paris: Elsevier; 2002:57-72.
17. Abel DL. Complexity, self-organization, and emergence at the edge of chaos in life-origin models. *Journal of the Washington Academy of Sciences*. 2007;93(4):1-20 <http://lifeorigin.academia.edu/DrDavidLAbel> [Last accessed: March, 2015].
18. Abel DL. The capabilities of chaos and complexity. Society for Chaos Theory: Society for Complexity in Psychology and the Life Sciences; Aug 8-10, 2008; International Conference at Virginia Commonwealth University, Richmond, VA.
19. Abel DL. The 'Cybernetic Cut': Progressing from Description to Prescription in Systems Theory. *The Open Cybernetics and Systemics Journal*. 2008;2:252-262 Open Access Also available from <http://lifeorigin.academia.edu/DrDavidLAbel> [Last accessed March, 2015]
20. Abel DL. The GS (Genetic Selection) Principle. *Frontiers in Bioscience*. 2009;14(January 1):2959-2969 Open access at <http://www.bioscience.org/2009/v2914/af/3426/fulltext.htm> [Last Accessed March, 2015] Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
21. Abel DL. The capabilities of chaos and complexity. *Int. J. Mol. Sci*. 2009;10(Special Issue on Life Origin):247-291 Open access at <http://mdpi.com/1422-0067/1410/1421/1247> [last accessed: March, 2015] Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
22. Abel DL. The biosemiosis of prescriptive information. *Semiotica*. 2009;2009(174):1-19 Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
23. Abel DL. The Universal Plausibility Metric (UPM) & Principle (UPP). *Theor Biol Med Model*. 2009;6(1):27 Open access at <http://www.tbiomed.com/content/26/21/27> [Last accessed: March, 2015] Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
24. Abel DL. Linear Digital Material Symbol Systems (MSS). In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, N.Y.: LongView Press--Academic, Biol. Res. Div.; 2011:135-160 Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
25. Abel DL. The Genetic Selection (GS) Principle. In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, N.Y.: LongView Press--Academic; 2011:161-188 Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
26. Abel DL. The Birth of Protocells. In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, N.Y.: LongView Press--Academic, Biol. Res. Div.; 2011:189-230 Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
27. Abel DL. Examining specific life-origin models for plausibility. In: Abel DL, ed. *The First Gene: The Birth of Programming, Messaging and Formal Control*: LongView Press Academic; 2011:231-272 Also available from <http://lifeorigin.academia.edu/DrDavidLAbel>.
28. Abel DL. *Primordial Prescription: The Most Plaguing Problem of Life Origin Science*. New York, N.Y.: LongView Press Academic; 2015.
29. Behe M. Experimental Evolution, Loss-of-Function Mutations, and "The First Rule of Adaptive Evolution". *The Quarterly Review of Biology*. 2010;85(4 December).

30. Behe MJ. *Darwin's Black Box*. New York: Simon & Shuster: The Free Press; 1996.
31. Behe MJ. Experimental evolution, loss-of-function mutations, and "the first rule of adaptive evolution". *Q Rev Biol*. Dec 2010;85(4):419-445.
32. Behe MJ. Getting there first: An evolutionary rate advantage for adaptive loss-of-function mutations. In: Marks II RJ, Behe MJ, Dembski WA, Gordon BL, Sanford JC, eds. *Biological Information: New Perspectives*. Cornell Conference Proceedings: World Scientific; 2013:450-473.
33. Behe MJ, Dembski W, Meyer SC. *Science and Evidence for Design in the Universe*. San Francisco, CA: Ignatius Press; 2000.
34. Gordon B, Dembski W, eds. *The Nature of Nature: Examining the Role of Naturalism in Science* Intercollegiate Studies Institute; 2011.
35. Gordon BL. Biological Information and Self-Organizational Complexity Theory: Introductory Comments. In: Marks II RJ, Behe MJ, Dembski WA, Gordon BL, Sanford JC, eds. *Biological Information: New Perspectives*. Cornell Conference Proceedings: World Scientific; 2013:509-512.
36. Dembski W. *The Design Inference: Eliminating Chance Through Small Probabilities*. Cambridge: Cambridge University Press; 1998.
37. Dembski W, Kushiner JM, eds. *Signs of Intelligence*. Grand Rapids, MI: Brazos Press; 2001.
38. Dembski WA. *No Free Lunch*. New York: Rowman and Littlefield; 2002.
39. Dembski WA. *The Design Revolution: Answering the Toughest Questions About Intelligent Design*. Downers Grove, IL: Intervarsity Press; 2004.
40. Dembski WA, Ewert W, Marks II RJ. A general theory of information cost incurred by successful search. In: Marks II RJ, Behe MJ, Dembski WA, Gordon BL, Sanford JC, eds. *Biological Information: New Perspectives*. Cornell University Proceedings: World Scientific; 2013:26-65.
41. Dembski WA, Wells J. *The Design of Life: Discovering Signs of Intelligence in Biological Systems*. Dallas: Foundation for Thought and Ethics; 2008.
42. Meyer SC. *Signature in the Cell*. New York: Harper Collins; Reprint edition Harper One (2010); 2009.
43. Meyer SC. *Darwin's Doubt*. New York, NY: Harper Collins; 2013.
44. Abel DL, ed *The First Gene: The Birth of Programming, Messaging and Formal Control*. New York, NY: LongView Press-Academic; 2011.
45. Resnik MD. *Choices: An Introduction to Decision Theory*. Minneapolis, Minn: University of Minnesota Press; 1987.
46. Sieb RA. The emergence of consciousness. *Med Hypotheses*. 2004;63(5):900-904.
47. Shannon C. Part I and II: A mathematical theory of communication. *The Bell System Technical Journal*. 1948;XXVII(3 July):379-423.