

# Review of: "Darwin, Gödel, Luria, Delbrück: Biomedical, Mathematical, and Metamathematical Perspectives on Attributes and Consequences of Random Somatic Mutations Subject to Selection"

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Potential competing interests: No potential competing interests to declare.

“A foundational notion of modern biological and biomedical research is that mutation is “random,” where random is defined in a relatively precise and technical sense. When the word “mutation” is preceded and characterized by “random,” at least in an evolutionary context, the standard intent to be conveyed is that the frequency of the particular nucleotide substitution is unrelated to the functional, and therefore, evolutionary consequences.” [1]

We agree that the Random Somatic Mutation is not quite random, we mean not equiprobable, since some phenotypic change may have a greater probability to occur than others.

“Such a usage of “random mutation” is reasonable as long as it is clear that it is a different sense of the term from the one that is central in evolutionary theory. Unfortunately, the significance of instances of mutation for which all nucleotide substitutions are not equally probable can be misconstrued as violating the “dogma” of evolution. In fact, such mutations do not necessarily represent a significant challenge to evolutionary theory.” [1]

We agree that one has somatic mutations at various probabilities, we mean that one mutation may have a greater chance to occur than other depending on multiple other factors.

In refereeing to the Theory of Evolution, in 2017 Smarandache introduced the Theory of Neutrosophic Evolution, i.e.: Degree of Evolution, Degree of Indeterminacy or Neutrality (no change), and Degree of Involution as extension of Darwin's Theory of Evolution) [2, 3].

During the process of adaptation of a being (plant, animal, or human), to a new environment or conditions, the being partially evolves, partially devolves (degenerates), and partially is indeterminate i.e. neither evolving nor devolving, therefore unchanged (neutral), or the change is unclear, ambiguous, vague, as in neutrosophic logic.

Thank to adaptation, one therefore has: evolution, involution, and indeterminacy (or neutrality), each one of these three neutrosophic components in some degree. The degrees of evolution/indeterminacy/involution are referred to both: the structure of the being (its body parts), and functionality of the being (functionality of each part, or inter-functionality of the parts among each other, or functionality of the being as a whole). We therefore introduce now for the first time the Neutrosophic Theory of Evolution, Involution, and Indeterminacy (or Neutrality).

## 1. Cormorants Example

Let's take the flightless cormorants (*Nannopterum harrisi*) in Galápagos Islands, their wings and tail have atrophied (hence devolved) due to their no need to fly (for they having no predators on the land), and because their permanent need to dive on near-shore bottom after fish, octopi, eels etc. Their avian breastbone vanished (involution), since no flying muscles to support were needed. But their neck got longer, their legs stronger, and their feet got huge webbed in order to catch fish underwater (evolution). Yet, the flightless cormorants kept several of their ancestors' habits (functionality as a whole): make nests, hatch the eggs etc. (hence neutrality).

## 2. Cosmos Example

The astronauts, in space, for extended period of time get accustomed to low or no gravity (evolution), but they lose bone density (involution). Yet other body parts do not change, or it has not been found out so far (neutrality/indeterminacy).

[1] Neil S. Greenspan, Owen Han, Darwin, Gödel, Luria, Delbrück: Biomedical, Mathematical, and Metamathematical Perspectives on Attributes and Consequences of Random Somatic Mutations Subject to Selection, Qeios, 2023

[2] Florentin Smarandache: Introducing a Theory of Neutrosophic Evolution: Degrees of Evolution, Indeterminacy, and Involution. Progress in Physics, Volume 13 (2017) Issue 2 (April), 130-135,

<http://fs.unm.edu/neutrosophic-evolution-PP-49-13.pdf>

[3] Neutrosophic Evolution as extension of Darwin's Evolution / The Cave Case, Kalendarium Publishing House Oneștilor str., Oradea, Romania, 2017, <https://fs.unm.edu/NeutrosophicEvolution.pdf>

<https://fs.unm.edu/V/NeutrosophicEvolution.mp4>