Review of: "Micro- and Macroevolution: A Continuum or Two Distinct Types of Change?"

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Potential competing interests: No potential competing interests to declare.

The paper attempts to distinguish two “discrete levels” in evolution in terms of how “novel” a change can be considered. The rearrangement of existing degrees of freedom is the first level, while the advent of a new degree of freedom, adding at least one extra dimension to a “vector” representing the system, is the second level.

The idea seems worth publishing, with broad possible significance in various domains of evolution.

I have two main remarks:

Firstly, the explanation about the “digital amoeba” (Damoeb) was borrowed without much effort from the initial paper Ref. 25. The detailed recitation does not fit the rest of the paper. It demands a lot of concentration to understand the quite idiosyncratic conventions taken for the “number crunching” of Damoeb. The fact that it runs on Excel is positive for teaching at lower grades, but here is rather a weak point, with a bunch of more friendly softwares and AI out there to use, e.g., Python, Keil Studio/C++, Matlab, etc. I would thus kindly suggest to the authors that they reword the Damoeb story in terms that do not require a sophisticated transposition for the readers.

Secondly, the capability of their concept to thrive in an environment of complex interaction networks is thinly suggested but not affirmed strongly enough. Some complex networks may split the relevance of degrees of freedom into more “local” worlds and make the analogy of sticking all degrees of freedom under a single “meaningful” vector a bit moot.

Thirdly, since the vector increases in size, so must any matrix dealing with this vector in a model employing linear algebra (be it only of local validity). Curiously, in spite of the success of random matrix theory in many branches and most notably with the famous R.E. May 1972 paper ("Will a large system be stable?"), the corresponding topic of “matrix inflation” for possible use in models of micro-evolution as well as macro-evolution has not been much addressed, to the best of our knowledge. The two following papers have, however, explicitly focused on the possible relevance of such schemes for “punctuated” growth, growth with quakes, and stasis, either in an economic or in a biological evolution perspective:

Henri Benisty. (2022). Evolutionary behaviour of ‘inflating’ random real matrices for economy or biology: stasis statistics of vector iterations upon growth. J. Phys. Complex., vol. 3 (2), 025006. doi:10.1088/2632-072x/ac718f.

Henri Benisty. (2023). Growth Quakes and Stasis Using Iterations of Inflating Complex Random Matrices. Entropy, vol. 25 (11), 1507. doi:10.3390/e25111507.

I would kindly suggest to the authors that they consider the insertion of these two references in their interesting paper.

Best regards,

and congratulations for the attempted exhaustive account of the rich area.