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Self-identities and durability of biosystems via their abstracting capacity

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ABSTRACT

Any surviving organism is unique in abstracting and holding its self-identity as experiencing and processing different individual events of a concrete nature. The organism that can survive maintains its self-identity as abstracting its own durability as a class property out of those different individual events to be met and processed. Rather, the organism has the internal propensity of making its own actualization durable while processing the material resources available that are individually distinguishable. Biology is distinctive as compared to physics in availing itself of the synthesis of organization with use of the material act of measurement as a form of abstraction.

1. Introduction

Robustness of material organization to be grasped to the extent beyond the scope of being comprehensible physically is a major challenge confronting the transition from physics to biology at least on the phenomenological level. One pressing agenda in this regard is how one could descriptively make an access to a plain fact of the survival of an organism as an individual and also as a species. This problem would become most acute when the origin of life is focused upon. At issue is a critical scrutiny of the nature of the available trustworthy means that may be competent enough to describe something durable.

One well-known prototype for addressing durability appearing in nature is Galileo's inertia. If one accepts the abstraction of a friction-less sliding movement of a material body on a horizontal plane as Galileo Galilei did, the durability of the sliding movement can be associated with the class property called inertia latent in that material body. There has been no argument against the prevalence and ubiquity of inertia in mechanics. Despite that, it would be a bit too hasty to associate inertia directly with the durability observable in the biological realm.

A major objective of this short article is to propose another descriptive scheme which may be able to refer to durability other than inertia. Its crux will be found in the reappraisal of the notion called conditional probability. Referring to conditional probability enables us to see that the act of measurement necessarily participates in fixing the probability of an event given the observation of another event having occurred by assumption or evidence of whatever sort. Above all, the occurrence of a conditional probability of unity can be associated and synonymous with the availability of a durable agency that can set and identify the condition as such. No conditional probability may be conceivable unless the agency setting the condition, whether the mathematician or whatever else for this matter, is likely. At issue will be whether there could be a likelihood for making the conditional probability to asymptotically approach unity on the material ground alone.

2. Conditional probabilities

When we write the probability of the occurrence of event A under the condition of the occurrence of event B as $P(A|B)$, Kolmogorov's definition of conditional probability will tell us the equality $P(A|B) = P(A \cap B)/P(B)$ in which $P(A \cap B)$ is the joint probability of the product event $A \cap B$ and $P(B)$ is the probability of the occurrence of B (Kolmogorov, 1956). One concrete implication of this definition will be $P(A|A) = 1$ if B happens to be A, since the product event $A \cap A$ is identical to the event A.

Needless to say, the content of $P(A|A) = 1$ would remain simply vacuous as a tautology if the two events of A appearing in the expression belong to the same type. The class property as a type

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remains invulnerable in and of itself unless acted upon otherwise from the outside. Once a type A as a class property is accepted as such, it will remain as it is. Formal logic underlying Kolmogorov's axiomatic theory of probability that has already been established in the mathematical discipline is exclusively about types and is tenseless, thus making any class property appearing there also tenseless.

Nonetheless, there may also be another possibility such that conditional probabilities could be conceivable even if each event is referred to as an individual concrete token, instead of being limited to a type representing a general universal class, under the conditions which may be temporal in their qualification (Ulanowicz, 1999, 2009). In fact, what can be specified there temporally is concrete particulars, rather than types of a general universal character that remains tenseless, because of the participation of the empirical act of measurement. Measurement, whatever it may be, is about the material activity of an abstraction as encountering and processing concrete particulars. Durability imputed to concrete individual events may thus be made envisaged if a class property can be abstracted from them. What is more, the class property conceivable from the participating individual events has the internal propensity for being durable of itself with a probability of unity unless it is forcibly disturbed externally. In particular, a concrete particular event may be seen durable if it happens to equip itself with a class property that is already durable on its own.

Galileo's observation is unique in abstracting the class property called inertia from the temporal succession of a concrete individual material body in movement while keeping it immune to any influences of external origin. The mere tautology $P(A|A) = 1$ will then gain a new empirical implication if an individual event of a concrete nature happens to be associated with a class property occurring with a conditional probability of unity. Once an individual event is associated with a class property, it can be seen as being durable thanks to the very nature intrinsic to the durability of the class property. Despite that, Galileo's inertia is not the only case of durability to be abstracted from concrete particulars.

There could also be one more possibility of abstracting the durability as a class property under the condition of the prior occurrence of an individual event A_1 followed by another individual event A_2 differing from the prior A_1. The underlying premise is such that there should be an intervention of a material agency of internal origin being capable of abstracting the invariable class property while mediating between these two different individual events. Whether such a material agency functioning as a durable token processor could exist at all must totally be an empirical issue. In essence, that is about the empirical likelihood for the occurrence of an agency processing both resource intake and excretion. Put it differently, the equality $P(A_2|A_1) = 1$ implying a conditional probability of unity may apply to such a mediating agency occurring with a probability of unity since the agency can process both A_1 and A_2 on its own behalf in a durable manner. Rather, both the events occur in succession so that they may participate in holding the invariable identity of the concerned material agency.

A simple example of the equality $P(A_2|A_1) = 1$ of empirical relevance is that the material body processing the two different individual events A_1 and A_2 in a successive manner is going to keep the same identity. A possible scheme for keeping the identity is such that its component elements may be exchanged with the different component elements belonging to the same kind in the process. As a matter of fact, any material body to be maintained through the constant exchange of the component elements belonging to the same kind can hold its own class identity. The component elements to be exchanged remain individually different and distinguishable among themselves.

Accordingly, the tautological expression of $P(A|A) = 1$ in terms of the class identity alone can now gain a de novo empirical signification when it is expressed as $P(A_2|A_1) = 1$ in terms of concrete particulars. This expression of the conditional probability in terms of concrete particulars points to the agential activity of abstracting the durability as a class property for its own sake. The two different individual events A_1 and A_2 are concatenated in a successive manner with a probability of unity. This is because the class property, once reached and extracted as such as processing the individual events, remains durable. The equality $P(A_3|A_2) = 1$ will then also hold if the follower A_3 differing from both A_2 and A_1 is taken to belong to the same class by the concerned agency, and ad infinitum in a similar manner.

In particular, what is prerequisite to the holding of a class identity in the face of meeting different individual concrete events in an alternating manner is the participation of an agency that can keep its own identity as processing those different individual events. The sustainable agency being competent in abstracting the durability as a class property from experiencing the different individual events can thus equip itself with the propensity for recruiting those different events on its own behalf. For the agency abstracting the same class property out of the participating different individual events in a durable manner is selected for. It is guaranteed to occur with a probability of unity thanks to the class property that is durable in and of itself unless disturbed forcibly externally.

Inertia is unique in requiring no agency of abstracting a class property of duration from each individual material body other than the physicist overseeing from the outside. In contrast, one more class property of duration grounded upon the occurrence of conditional probabilities explicitly requires the material agency of abstracting the class property from the participating different individual events. Rather, the emergence and evolution of the durable material agency occurring with a conditional probability of unity could eventually be selected for empirically. This could be likely unless the prohibitive stipulations are applied externally in an overwhelming manner as with the case of imposing the condition of thermal equilibrium forcibly.

If an abstraction of the same class property is likely from a temporal sequence of different individual events, the material agency in charge of such an abstraction could be selected for in the end with a probability of unity. That is because of the synthesis of the durability from an abstraction (Matsuno, 2013). As a matter of fact, the basis of such an abstraction is upon the process of measurement since the latter is already an instance of abstraction. A typical example demonstrating the measurement as the form of an abstraction is seen in Everett's relative state formulation of quantum mechanics (Everett, 1957).

A sequence of individual events occurring with a conditional probability of unity one after another comes to uphold the material agency possessing the durability unique to itself. Conversely, the material agency comes to take advantage of the temporal sequence of different individual events for the sake of holding its own identity.

In a nutshell, the robust durability of a material agency processing both resource intake and excretion rests upon the closure of efficient causation in a successive manner indefinitely (Rosen, 1991). Resource intake is a cause of excretion, while at the same time excretion is also a cause of resource intake. That is to say, the input is a cause of the output, while the output is a cause of the input though not in a concurrent manner. This closure is equivalent to saying that excretion anticipates resource intake and resource intake also anticipates excretion. More specifically, the closure as a cycle is a material embodiment of abstraction in the sense that the identity of the cycle remains invulnerable to the exchanges of the component atomic elements of the same kind. Durability as a class property rests upon the instantiation of the closure of a cycle, rather than the other way around. A reflexive loop of the measurement thus makes abstraction of an invariable class property feasible through disregarding the individual