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Rich evidence: anticipation research in progress

Mihai Nadin ^{a b}

^a Institute for Research in Anticipatory Systems, University of Texas at Dallas, Richardson, TX, USA

^b Hanse Institute for Advanced Studies, Delmenhorst, Germany

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GUEST EDITORIAL

Rich evidence: anticipation research in progress

Mihai Nadin^{a,b*}

^a*Institute for Research in Anticipatory Systems, University of Texas at Dallas, Richardson, TX, USA;* ^b*Hanse Institute for Advanced Studies, Delmenhorst, Germany*

This journal remains a reference impossible to ignore for all those who are interested in the subject of anticipation. Robert Rosen had many reasons for entrusting much of his writing to the *International Journal of General Systems* (IJGS), not the least of which was his respect for George Klir, its Editor-in-Chief. In the first article in this issue focused on anticipation, one of Rosen's students presents details pertaining to the manuscripts that Rosen submitted, in October 1972, for the Journal's first volume (1974). For researchers submitting articles concerning anticipation, the stakes are high. We walk in the footsteps of one of the founders of the discipline.

This issue on anticipation should serve as an indication of the Journal's continuous interest in the subject. Having reviewed recent submissions on anticipation, originating from a variety of perspectives, I was encouraged to engage researchers who I know to be dedicated to various aspects of the subject. Over 1 year ago, 10 authors replied to my invitation to contribute new work. The journey started. As a consequence of the editorial process, judicious as ever, some authors eventually withdrew. Their ideas and concepts needed more time. Science can never be rushed; it is not a deadline endeavour.

Some time ago (at TED 2005), arguing in favour of quantum computation, David Deutsch observed that matter, energy, and rich evidence make up the universe. At some other time, I will argue with him regarding the main hypothesis (the multiverse) he advocates. At this juncture, I will only appropriate his observation regarding rich evidence as a prerequisite for formulating scientific theories. Indeed, there was rich evidence of Newton's mechanics, gravity in particular, and no less evidence for what became today's domain of life sciences. The same can be said about the rich evidence pertinent to anticipation. One word of caution: within my understanding of *anticipation as always expressed in action*, and of anticipatory processes as the unity of deterministic and non-deterministic processes, anticipation is not necessarily successful all the time – it can fail. Successful and unsuccessful anticipations are part of the rich evidence we need to consider. In our context of existence, we encounter successful and failed anticipations as they pertain to extreme events (devastating when anticipation fails), to political and economic processes, to art, to science, to health (or its failure). Rich evidence of course, but of a nature quite different from that of predominantly deterministic processes (characteristic of physical phenomena).

*Email: nadin@utdallas.edu

The articles published herein speak for themselves. Rosen's most talented student, Dr Alois Louie, works in his mentor's tradition. The author provides a representation, inspired by Rosen's (M, R)-systems, of entailment characteristic of anticipatory systems. The simple examples he mentions (e.g. withdrawal reflex and perspiration) convincingly lead from the abstraction of the argument to concreteness. The entire approach is based on the foundation of relational biology. As demanding as mathematical category theory – also Rosen's choice – is, it is also extremely gratifying. The level of abstraction it makes possible corresponds to the nature of the processes integrated in the expression of anticipation. It is possible that continuous interest within the scientific community for anticipation-grounded research will lead to new mathematics or to other representations from which further research can benefit. It is in this spirit that Dr Lev Goldfarb's Evolving Transformation System is associated (in my text) with the need to capture anticipation expression in forms adequate for better understanding its process condition.

Years ago (in 2004), at the Hanse Institute for Advanced Studies (Hanse Wissenschaftskolleg, Delmenhorst, Germany), Franz Mechsner organized a two-day colloquium that brought psychologists, cognitive scientists, computer scientists, and practicing physicians to Delmenhorst. Anticipation was, undoubtedly, the focus, although it was often confused with prediction and forecast. Participants suggested a variety of perspectives. Moreover, they brought a very decisive experimental inclination with them. My own presentation at that time was purely theoretical (*Anticipation – a spooky computation*). Probably the only accomplishment to which I can lay claim was to introduce Rosen's work on anticipation to them. Mechsner's article, Anticipation and Ontology, is indicative of the need to keep the dialogue open among disciplines where the notion of anticipation – although not yet well defined – was adopted long ago. The benefits of cross-pollination are well known. Mechsner emphasizes the goal-directedness and purposefulness of mental activity. Scott Kelso's experiments (1984) in bimanual coordination inspired Mechsner to advance new hypotheses. Allow me to mention that as the final editing phase began, Dr Mechsner had to fight illness. (He was on medical leave from Northumbria University, where he teaches.) Mention is not made in order to ingratiate him to the reader, rather to express respect for his dedication. In Delmenhorst, Joachim Hoffmann, Mario Wiesendanger, Günther Knoblich, Victor Smetacek, Martina Rieger, Thomas Schack, Theodor Kalveram, and Jan Restat contributed ideas that I wish I had assembled at that time. Taking note of how our concepts change over time, as research goes in-depth, is not just of documentary interest.

In conceiving this issue, I committed to identifying those places where anticipation work, in whichever form and shape, addresses some of the many issues of our time. Again, it was Rosen who saw the need to integrate the questions of his time into his theory. Marie-Hélène Caillol directs a Web presence (www.europe2020.org) on political anticipation. She is also the author of *A Manual of Political Anticipation* (Anticipolis Editions 2010). After consulting some colleagues, and eventually the Editor-in-Chief, I chose to integrate a Report from her. It can be described as 'What we do, how we do it, what our methodology is.' The European Union, whose many crises have inspired predictions of doom, has financed quite a number of projects structured around the notion of anticipation (the best known being *MindRACES*, Pezzulo *et al.*). The Web presence of political anticipation is yet another example of asking serious questions about the future. Some might see the European slant as a shortcoming. On the other hand, the Report published in this issue could stimulate real-time, web-based anticipation applications. I for one would consider a good knowledge aggregation that integrates real-time sensor data on issues such

as extreme events (earthquakes, hurricanes, tornados, floods, disease, pandemics, etc.) to be a good model (scientific and commercial).

In this vein, my own text reports on the scientific investigations performed at the antÉ – Institute for Research in Anticipatory Systems. These investigations combine the search for a more adequate mathematics with well-defined experimental aspects, integrating medical, computational, and cognitive competence. It was argued (Elsasser, Rosen and Nadin) that the expectations involved in experiments within the deterministic realm – reproducibility, in the first place – are inconsistent with the nature of anticipation. There is uniqueness (the idiographic aspect) to be represented and interpreted, not the generality of law (the nomothetic). This does not make anticipation cause-free, but rather suggests a different understanding of causality. The *AnticipationScope* presented in my text is an experimental environment for quantifying the expression of anticipation in action. Further work, in progress, in identifying how anticipation undergirds performance already builds on the results shared in this article.

The issue you are reading is, in the final analysis, an invitation to more contributions in the area of anticipation research. The authors who did not make the cut for this volume are, as far as I know, still at work on their respective contributions. I encourage them, as I encourage all those active in anticipation research, to consider IJGS for publication.