

# COHERENCE

ROBERT E. ULANOWICZ  
University of Florida/ University of Maryland,  
United States of America

*Semiotic scaffolding operates by assuring performance through semiotic interaction with cue elements that are characteristically present in dynamic situations.*<sup>1</sup>

It was Jesper Hoffmeyer who introduced me to the concept of semiotic scaffolding. As matters developed, this notion became highly instrumental in resolving a difficulty I was having with my own narrative of ecological dynamics.

In my description of ecosystem behavior, the dynamics of autocatalysis, or indirect mutualism, is central to the creation of enduring configurations of processes and their attendant structures (Ulanowicz 1997). Causal loops of material transfers abound in ecosystems, but the problem with such feedbacks is that the time of mass transit around these cycles was often quite long – on the order of days to months. Far too much time elapses between an action and its reward to reinforce a behavior effectively.

As I wrestled with the problem, several physicist colleagues introduced me to the phenomenon of ‘coherence domains’ in condensed matter physics. For example, an aggregation of water molecules is able to maintain its identity as a coherent group, because simultaneity is keyed by the very rapid propagation of information at the speed of the phase velocity in the quantum vacuum, which is very fast in comparison to the propagation of columbic forces (Brizhik *et al.* 2009). I have my doubts whether the quantum

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<sup>1</sup> Hoffmeyer, Jesper 2007. Semiotic scaffolding of living systems. In: Barbieri, Marcello (ed.), *Introduction to Biosemiotics: The New Biological Synthesis*. Dordrecht: Springer, 149–166 (p. 154).

vacuum is relevant at the scale of an ecosystem, but the picture of the order of ecosystem processes being maintained by the rapid transmission of information certainly seemed plausible.

Of course, the prime candidate for rapid communication is semiosis, which can occur virtually at the speed of light in many cases. It also stood to reason that signs could be objects of autocatalytic selection within the ecosystem. Whence, circuits of resource feedbacks could progressively become supported by a scaffolding of semiotic signals. Rewards could propagate around the autocatalytic loop much faster than the actual exchange of material. The elements of semiotic scaffolding could thereby become locked into the role of anticipatory controls in the sense of Robert Rosen (1985).

In conclusion, Jesper's work on semiotic scaffolding, in conjunction with my own on indirect mutualisms, provides a very plausible scenario for the maintenance of order in ecosystems.

### References

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