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## Review of Lynn Segal, *The Dream of Reality: Heinz von Foerster's Constructivism*

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Constructivism*

**Disciplines**

Communication | Social and Behavioral Sciences

## Nourishing the core

*The Dream of Reality: Heinz von Foerster's Constructivism* by Lynn Segal. New York and London: Norton, 1986. 184 pages. \$22.95 (hard).

A review by Klaus Krippendorff University of Pennsylvania

Our language leads us to believe in a world of objects, things, or events whose properties we need to discover to be certain about what we may do with them. Accordingly, we too are things, living organisms to be sure and endowed with the intelligence to inquire into this world and to derive knowledge from what exists outside of us. In this conception, science is appointed to mediate between the objective reality and our subjective experiences of it, methodically replacing illusions with objectivity and thus accepting objective reality as the ultimate ruler over all our affairs. The constructivism presented in this book refutes this common belief and, turning it inside out, presents the basis of a new way of looking at the world, specifically including us as participants. It asks not what exists and what we may therefore know but how we come to know and bring about our rather stable experiences. These questions are not only central to philosophy but could provide the basis of a radical reformation of all disciplines concerned with knowledge, including communication.

The material for the book stems from many lively lectures by Heinz von Foerster, a biophysicist, who prominently participated with Warren S. McCulloch, Norbert Wiener, W. Ross Ashby, Margaret Mead, and Gregory Bateson, among many others, in the early Macy Foundation conferences on cybernetics and subsequently founded the Biological Computer Laboratory at the University of Illinois, where he is now an emeritus professor. The Mental Research Institute at Palo Alto acquired his publications and tapes of several of his presentations. Instead of transcribing the latter for wider circulation, Lynn Segal, a social worker and family therapist at this institute, rephrased much of von Foerster's technical language, added background material, and provided bridges among the multitude of ideas. Segal thus amicably succeeded in making rather profound insights seductively easy to read and in maintaining von Foerster's oratory flair- one can virtually see von Foerster talk when reading the book.

The book has a foreword by Paul Watzlawick and contains seven chapters, an appendix, notes with references, and an index. In the first chapter, von Foerster suggests the traditional notion of objectivity *to* be a myth in need of exposure. He gives a brief history of objectivity from theology to Newton's spiritless mechanism and, using examples from perception, shows the absurdity of maintaining the belief that people make (process and store) pictures of what objectively exists outside of them when all they have are the images they experience. He plainly reverses the general semanticists' battle cry by claiming that there is no "territory" without a map. We cannot conceive of a reality without an observer.

The second chapter concerns difficulties in language that become obstacles to understanding cognition. One problem arises out of what von Foerster calls representation, the tendency to project properties that emerge in our visual apparatus onto an outside world and the consequent claim to represent them inside our heads. Another problem, nominalization, refers to our tendency to make processes and even such abstractions as information and knowledge into "things" that can be named, traded, and stored. A third, localization of function, reveals our inability to deal with whole systems because of our strong preference to assign different purposes to different areas of the brain-as if the brain were composed of memories for different kinds of things, coding schemes, information processors, and control devices. This inadequate use of computer metaphors significantly impedes our understanding of ourselves.

A fourth problem is that we confuse logic with how the world operates, preferring certainty, which comes from our ability to make infallible deductions, to chance, which arises from our inability to make infallible inductions. Our preference for linear causal explanations turns out to be the result of a logic that neatly separates cause and consequence, stimulus and response, but also explanations and what they claim to explain. Aristotle, who was one of the first philosophers to contemplate causality, distinguished four kinds, of which we tend to recognize only the one that is logically most conclusive.

Paradox arising out of self-referential statements is another problem in language elaborated here. Logicians since Aristotle have feared such statements, as they make logical systems indeterminate. Russell even went so far as to formally exorcise self-reference from the foundations of mathematics by the invention of his theory of logical types. Since scientists seek logical explanations, they have accepted the same rejection of self-referential constructs and are thereby prevented from seeing such everyday experiences. What if self-reference, which is a special case of recursive computation, is indeed a *modus operandi* of the human organism, as von Foerster suggests?

The third chapter applies Humberto Maturana's work on the biology of cognition to scientific observation. It moves the act of drawing distinctions to the foreground of all scientific activity and shows that scientists participate in the phenomena they claim to describe. For communication researchers, it suggests that it is the distinction between senders and receivers that brings communication about. Such distinctions and their experiential consequences are no more objective than other distinctions one may be able to draw.

In the fourth chapter, Segal reviews work on the biology of the human nervous system, and in the fifth he summarizes what von Foerster had to say about computation. The latter contains a particularly useful distinction between trivial and nontrivial machines. Trivial machines are essentially input-governed. We like trivial machines for their predictability and, consistent with our preference for causal explanations, we inappropriately use them as models of human communication and behavior, thereby leaving a sender in control of the process. In contrast, von Foerster pleads for other kinds of models that contain at least some circularity or recursiveness. These models can be equally deterministic in their procedures but are no longer easily analyzable from the outside. The notion implicitly challenges communication researchers who tend to compromise on the complexity of human communication processes by settling on linear models and on naturalistic methods of analysis, both of which tend to "trivialize people." The sixth chapter, on biocomputation, applies these notions to human cognition.

The seventh and final chapter posits the principal thesis of the book: that human cognition essentially is a closed system that is merely perturbed and reacts to this perturbation while maintaining its autopoietic closure. The doubts in an objective reality, the difficulties of language, our knowledge of the human nervous system and of recursive computation all lead to this hypothesis, and this chapter explores some of its ramifications: autopoiesis as a special case of closure, hierarchies vs. heterarchies of values, objects as the eigenvalues (stable computations) in the nervous system. It contains a particularly cogent rejection of solipsism, making use of the principle of relativity that is of particular interest for communication scholars. The principle suggests that a hypothesis which holds for A and B separately should be rejected if it fails to hold for A and B together. Consequently, as soon as *two* "solipsists" start talking to each other, each can no longer maintain to be the center of the universe and relegate the other to the content of a dream. It is through the construction of another human being similar to oneself, through the possibility of dialogue or, as von Foerster suggests, of "community," that reality becomes constituted. Needless to say, this moves human communication into the very core of reality constructions and implicitly assigns communication scholars the responsibility of nourishing this core.

The book is a short one (184 pages). It reads easily, probably largely because Segal, a family therapist with one foot in the social sciences and the other in the practice of therapeutic communication, had to struggle through von Foerster's multifaceted cybernetic insights himself. It clearly presents a challenge to the dominant view of the world and the models we choose to live by. Whether these models are of language, cognition, or society, von Foerster suggests that they are our choice. True to one of cybernetics' ethical imperatives-that choices should always increase the range of options available-the book opens more doors than it closes. Perhaps Segal could have been more critical and have explored the alternative paths behind these doors. But, having gone only as far as he did, in this book he invites readers to venture further into yet-untested constructions of mind.