Survival of Bodily Death
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Feedback and Systemic Memory: Implications for Survival

Gary Schwartz

Gary Schwartz researches frontier medicine and the evidence for survival at the University of Arizona. This was his first time participating in this conference at Esalen. During his dynamic presentation to the group he explained a controversial "big idea" about the nature of the universe that has implications not only for the survival question but for several other scientific fields as well. Called the "systemic memory hypothesis," this idea is described in his book The Living Energy Universe (co-authored with Linda Russek), which was published in 1999 by Hampton Roads Press. Schwartz's open, curious, and trans-disciplinary approach to a variety of controversial topics came across during his presentation. This orientation has led him to study not only the survival hypothesis (his emphasis is on the evidence for mediumship) but also such surprising things as the increasing reports that heart transplant patients often remember their donor's behaviors and habits. How could such strange phenomena be possible?

Light Remembers: Can Photons and Electrons Store Memory and Information?

Schwartz started his presentation by describing Einstein's famous thought experiment that he first entertained when he was a little boy. As a young child, Einstein imagined himself riding on a light beam. He realized that other light beams could never catch up with him. Wild ideas like this, of course, led to major revolutions in our scientific understanding of light, time, and space. Taking a cue from Einstein, Schwartz has imagined himself not as a light beam but as an electron involved in an interactive and relational circuit. His own curiosity has led him to imagine an electron's route through ongoing feedback loops.

This thought experiment (among others) has led Schwartz to hypothesize that the recurrently interactive behavior of photons and electrons enables them to store information. In fact, as Schwartz explains in his book, it may be the case that all recurrent relationships involving the ongoing feedback between two entities creates an emergent pattern that stores memory and information. This means that any two things (whether electrons, strands of DNA, cells, or even people) that enter into and maintain an ongoing and recurrent relationship are storing a living and distributed memory of their own interaction history. According to Schwartz's hypothesis, all recurrent, feedback-based relationships bring forth naturally a systemic-level memory. The troubling conundrum of "where is memory stored?" (a conundrum that has stumped mainstream science for years) is explained by virtue of the fact that all dynamic and recurrent relationships store information and memory about the history of their interaction. Thus, in a broad sense Schwartz thinks that just as there is a law regarding the conservation of energy (the First Law of Thermodynamics that states that energy can neither be created nor destroyed), there may be an equivalent law concerning the conservation of information and memory in the universe.

To take an example, Schwartz pointed out that when two laser beams are pointed at a 90-degree angle to each other and then shot through a vacuum, the emitted photons will cross each other's paths. The result is a momentary increase or decrease in the crossing wave pattern (amplification or cancellation). But, importantly, after the photons cross each other's path, they continue onward as if they had been largely unaffected. Put in other words, they are "remembering" the integrity of their own past. Schwartz said that if photons lacked a type of memory-integrity, they would blur our vision and make cell phones inoperable (among other things).

Mainstream science assumes that light is merely dead stuff and that what has happened in the past is gone once and for all. Yet Schwartz described to the conference participants an "epiphany" (also described in his book) that suggests otherwise. In brief, Schwartz once dramatically realized that all of our images are carried by light

out into deep space. The photons that carry the image of my face to your eyes also keep on traveling out into deep space forever. The "energy-information" carried by photons is eternal in some sense.

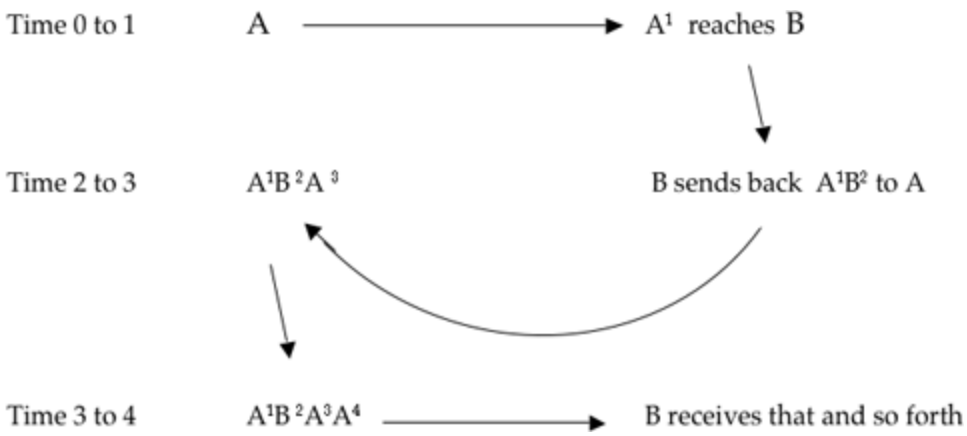
These ongoing reflections about the nature of light and photons have led Schwartz to ponder deeply questions like: How and where is information stored? Is memory static and material? Or could it be dynamically patterned?

Systems Thinking: How Feedback Loops Store Information and Memory

To help explain these questions, Schwartz described his background in feedback and systems theory. During his graduate school days at Harvard, Schwartz was influenced by Norbert Wiener's Cybernetics (1948/1961) and then later by James G. Miller's Living Systems (1978). In the early 1980s while at Yale University Schwartz taught a class called Human Psychobiology and Systems Theory. It was at this time that the idea of systemic memory first popped into his mind. Inspired by the ambitious and trans-disciplinary approach of Miller's book Living Systems (which describes the universal pattern in all "functional" systems), Schwartz realized that all dynamic systems store the memory-information of the relationships that comprise them.

To get this maverick idea across, Schwartz described briefly some common examples where feedback is apparent, such as when you turn a microphone and point it at the speaker it is connected to. The noise the microphone picks up cycles and cycles until you hear a shrill "woo" noise. Or, to take another example, if you point a video camera at a TV that is broadcasting the image of the video camera, you will see a TV with a video camera inside of a tiny box with a TV with video camera inside of a tiny box . . . and so forth infinitely.

The Steps in a Feedback Circuit Over Time



In this diagram some information is transmitted from A at time zero and reaches B at time 1. B receives that signal at time 2 and then transmits new information back to A. A receives that new (or updated) information at time 3 and then adds to it and sends a new signal back to B, and so forth.

Recurrent and continuously updated information about the state of A and the state of B is central to this feedback process. In the process of sharing information and energy, A and B are constantly updating their knowledge and memory of each other. The overall state of their relationship (stored in their shared memory of each other) is thus evolving through time. They are accruing a history. In this sense, the past comes alive and is constantly re-interpreted in the present. There is a continuous remembering and updating of new information. This makes the information about the state of A and B dynamic, not static.

To take a more concrete example, when you have a conversation with someone, you are always responding to the history of that conversation in the current moment. A conversation is constantly modified along the way by the two participants in it. Thus, what might be called a living conversation is the dynamic summation of a

collectively held memory between its two (or more) participants. Schwartz said this is an example of positive feedback (which is different from other examples that involve negative feedback).

Schwartz noted that J.G. Miller defined "a system" as a set of inter-connected and inter-active parts from which novel holistic properties may emerge. Thus, in Schwartz's slight embellishment on this definition, the shared memory of a system's interactional history is one example of an emergent property. If memory is an emergent pattern-based and dynamic property, then it is no wonder that scientists have not found it by looking for it in the "stuff" of matter, neurons, or traces, etc.

Other systems and complexity theorists influenced by Miller's work have speculated that these novel emergent properties are a central and perhaps necessary by-product of continuous feedback loops like the ones Schwartz has been studying. In the field of evolutionary theory, for example, cutting-edge complexity theorists have postulated that the growing complexity and richness apparent in the evolution of matter, life, and mind has developed specifically because of recursive and amplified feedback loops. Organisms in relationship to each other and to various environments spontaneously generate extremely intricate and complex amplifying feedback dynamics. It is in the midst of these dynamics that crucial information—the "difference that makes a difference" (to use Gregory Bateson's phrase)—can be amplified by these recurrent feedback loops. This amplification speeds up the evolutionary record of Darwinian natural selection and provides "punctuation" moments (as recognized by S. J. Gould and Niles Eldredge). Simultaneously, complex feedback dynamics can also cancel out unnecessary and unhelpful information—the elimination of the unfit. On this note, Frank Poletti pointed out that the theme of emergent properties stemming from complicated, inter-linked, and recursive feedback loops has been central to the CTR's Evolutionary Theory conference. (More information on this can be found at the www.esalenctr.org/index.cfm website. See in particular the presentation by Terrence Deacon given during the 2003 Evolutionary Theory conference.)

Can Molecules Receive, Incorporate, and Distribute Information?

Schwartz's systemic memory hypothesis suggests that processes that involve continuous feedback and the constant exchange of information between any two "things" are going on all the time and everywhere. To cite a controversial example, Schwartz mentioned that he has worn the same watch on his wrist for 20 years or more. If his hypothesis is true, then the electrons in his skin have been constantly interacting with the electrons in the metal that make up his watch. Information has been moving back-and-forth all the time conveying the current state (and thus the shared history) from one side to the other. In this way, Schwartz thinks the systemic memory hypothesis predicts that the atoms that are comprised of those electrons are storing information about the history of the environment they are embedded in. Schwartz has speculated that this ongoing process of energy-information exchange may be what underlies the practice of psychometry. This is the ability of talented psychics to "pick up" information about a person just by "tuning into" one of that person's belongings—like a watch that has been worn for 20 years. Perhaps these psychics have learned to access this systemic memory-information stored in electron feedback patterns.

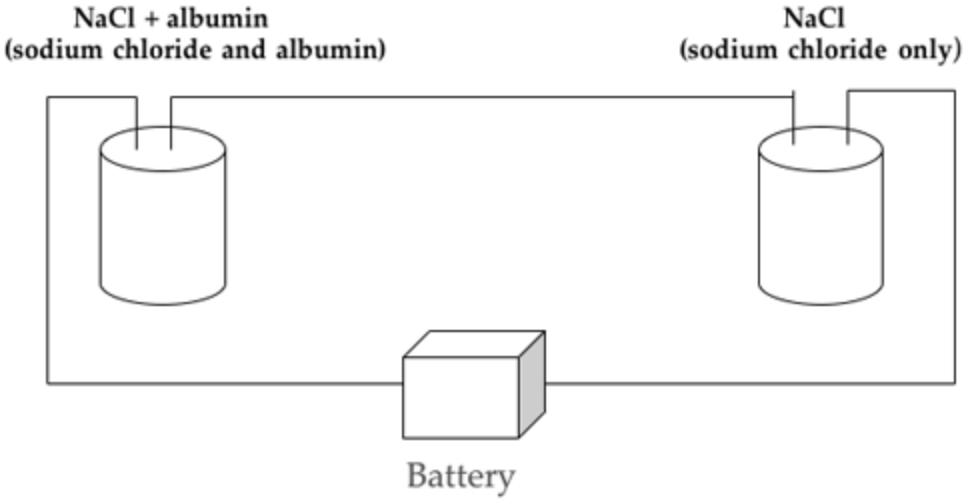
Citing an example from the molecular-chemical level, Schwartz also has hypothesized that continuous feedback is occurring between hydrogen and oxygen atoms that comprise water molecules. Is it possible that this continuous feedback and resulting systemic memory in water is responsible for the remarkable effects of homeopathic remedies and tinctures? Such remedies seem to be storing crucial information that becomes quickly distributed throughout a person's body upon ingesting it. Could it be that the continuous feedback process at the chemical level amplifies the key information stored in the homeopathic tincture, and thus brings health and healing to a person's body and immune system? Schwartz thinks the systemic memory hypothesis may be a clue to explaining the "miraculous" effects of this "alternative" medicine.

To help illustrate very concretely how such a process might work at the electro-chemical level, Schwartz described in detail an experiment that was published by B.L. Reid titled, "The Ability of an Electric Current to Carry Information for Crystal Growth Patterns." (Published in 1987 in Journal of Bio Physics, 15 (2): 33-35.)

Schwartz found out about this experiment in the early 1990s, and with his graduate students he repeated it successfully in his own lab in Arizona. As the title of Reid's paper implies, the experiment tests the nature of crystal growth patterns. Before the experiment is conducted, a solution of sodium chloride produces simple square-like crystals when dried. While another solution with albumin added to it produces more complex fern-like crystals when dried.

To set up the experiment, two beakers containing these slightly different solutions are connected via a gold and stainless steel wire and are then hooked up to a battery. The experiment is then conducted by running a continuous electric current through both solutions via the connecting wire. After this is done for an hour or so, the solution with sodium chloride only produces crystals that look more like the ones produced with albumin in the solution. So, it seems that the electric current must be carrying information from one beaker to the other via the continuous circulating feedback. This implies that aggregates of electrons can carry information and memory that is then received and stored by other molecules or solutions.

Diagram of feedback loop between two beakers of solution



Schwartz pointed out that for this experiment to be "successful" it is crucial to get the right ratios in the solutions. (See Appendix B of The Living Energy Universe for a more extensive description of this experiment, including a discussion of experimental controls and alternative hypotheses that were considered to explain the observed phenomenon.)

Other Applications and the Survival Hypothesis

Schwartz noted that the neural network theory of consciousness is based on a similar idea of continuous recurrent feedback within the brain, where there are at least 100 billion neurons with which to form inconceivably rich and complex networks of feedback. Computer modeling is only beginning to portray the effects of such mind-boggling levels of complexity in the brain.

Another fascinating area where the systemic memory hypothesis is being investigated is cellular memory. James G. Miller thought that all cells have memory because they are arranged in complex feedback loops. In this manner, Schwartz thinks it is possible that the cells in a transplanted heart can carry the memory-information of the donor. This intriguing phenomenon is explored by Claire Sylvia in her book A Change of Heart (Little,Brown,1997).

As he concluded his presentation, Schwartz connected the systemic memory hypothesis to the issue of soul survival. He pointed out that even after the circulating feedback between any given A and B stops, the history of that circulation may "survive" and remain as living information in the universe. Thus, from a much broader

perspective, the survival hypothesis that is postulated at the level of human souls may really be only a "high-level" phenomenon that is ultimately rooted in a much more systemic and universal process of distributed and living memory. Not only do human souls survive in this paradigm, all information does!