MIND OVER MATTER – FRANZ SENEKOWITSCH

About the importance of quantum physics for the new medicine

The intrinsic function of such complex systems as biological organisms is far from fully understood and therefore difficult to grasp. In life sciences, physicochemical paradigms of the 19th century are often used for modeling. Most biologists and physicians are little familiar with newer concepts that have revolutionized in particular the physics of the 20th century of our worldview. In addition to the particularly far-reaching implications of quantum physics, these include the notions of nonlinear dynamics (deterministic chaos, complex systems ...) and information theory. Since many of the associated effects are altered or even destroyed by external influences, they are difficult to access for examination or measurement and can usually only be observed indirectly in the living organism. Nevertheless, they have already had a major impact on our model of biological processes and will probably continue to do so even more.

Fractals, nonlinearity and complexity

Almond bread and others determined the similarity of many natural forms with the newly discovered fractal geometry structures. Also in the organism, the growth and form of many systems obey rather fractal patterns; such as the branching of the vascular and nervous systems or the tree-like structure from the bronchi to the pulmonary alveoli.

The formation and development of such patterns are examined in physics, etc. in nonlinear dynamics ("chaos theory"). Even nonlinear systems, where quantum effects play no role, often show surprising properties, such as a fundamental unpredictability. A slightly different cause can eventually lead to completely different effects; the statement: even a butterfly wing could trigger a whirlwind, also became known. Already simple systems also show astonishingly complex behavior.

This complexity in particular leads to the emergence and stabilization of structures in many systems. Changing the boundary conditions of such a system (referred to as "control parameters") new quality patterns at certain critical points can occur. The body also makes use of such mechanisms, since many subsystems operate near these critical points. Thus, the adaptation of the organism to environmental influences and changes in the internal environment with minimal changes in the control parameters (= energy input) is achieved. The diverse interactions of such a networked set of rules do not allow a more detailed investigation of the individual cause-effect chains and are therefore inadequately accessible to a classical reductionist analysis. Rather, the system as a whole shows a new characteristic behavior, which also includes the reactions to external disturbances.

Complex dynamic systems

Often such phenomena are better described with models of cybernetics or systems theory. The physicists and chemists of the nineteenth and early twentieth centuries used to think of molecular processes as if they were close to the thermodynamic equilibrium of a test tube. After such a reaction, the equilibrium state in the system and within the environment quickly recovers. However, organisms only reach this state upon death, so living systems can exist only far from the thermodynamic equilibrium. For this, they must be open systems that rely on constant external energy supply. *Prigogine*, *Fröhlich* and others have investigated such "dissipative systems" and found surprising characteristics. Thus, for example spontaneously structures that are stable to many external influences can develop, which is due to the mentioned complex behavior of networked nonlinear systems.

The physicist Haken also points out in his theory of synergetics that larger systems can "force" their subsystems into entirely new behaviors that cannot be explained solely by the properties of the individual parts (He even speaks of "enslavement" of the subsystems by the "higher order").

The cardiovascular system is a non-linear subsystem of the body whose qualitative and quantitative behavior (Heart-rate variability) is analyzed in the cardio test for diagnostic purposes in order to draw conclusions about the regulatory processes in the body. Because this subsystem is influenced in its behavior as explained by the overall system. Comprehensive studies in cardiology specialist literature already exist on this topic - new is the nonlinear analysis approach and the conclusion on the overall regulation.

Information

The orders that appear in the structures and patterns described above necessitate a new concept that, in addition to the classical concepts of matter and energy, is used to describe nature: *Information*. Biological organisms can be understood as systems that change and structure the density of information in relation to the environment. Their internal regulatory mechanisms and environmental factors acting on them are to be seen as information flows in this model. It is often less the energetic strength of a signal that determines its effect, but its informational content.

Information can be conveyed in many ways, but in the technical field one usually thinks of a signal that is transported by electrical currents or electromagnetic waves. In the organism, numerous structures may favor or suppress certain parts of the electromagnetic spectrum. Both the cells and larger units (tissue) stand out in their electrical and / or magnetic properties from their environment. Therefore, resonance phenomena are to be expected at certain wavelengths corresponding to the respective object size. For the short-wave photons of visible light, however, mechanisms at the atomic or molecular level are needed to be selective.

An often mentioned example from the physics is the laser: By energy supply from the outside many electrons of the atoms in an energetically are excited, metastable state far from the thermodynamic equilibrium. If a single photon (light quantum) has the appropriate wavelength, then its excitation is sufficient to cause an electron to fall back into its ground state, in which case a photon of the same wavelength is additionally emitted. Thereafter, both photons are available to excite further emission processes. The appropriate frequency is amplified by a cascade millions of times, while another has hardly any impact on the system. It can be assumed that there are similar electronic information filtering and amplification mechanisms in the body. This puts the theory of *biophotons* rediscovered by *Popp* and others, according to which light quanta serve to transmit information at the cellular level, back on the spotlight.

These approaches also make the effects of weakest electromagnetic signals on living tissue more understandable. Even our senses often provide astonishing and partially misunderstood information processing - such as the understanding of a quiet conversation, which should actually sink in the loud background noise.

Quantum physics and the microscopic level

Molecular processes and information transmission via electromagnetic waves relate to the statements of quantum physics. Here the expectations of "common sense" are finally thrown over the pile, and the separation between particles (material structures) and the waves acting on them (information and energy) makes little sense at the microscopic level. Both are quantum objects that behave either as particles or as waves depending on the question of an experiment. The more one attempts to "approach" atoms or molecules experimentally, the more they lose their particle character and dissolve into the vibrational structure of the electron shell. If you want to observe an electron of an atom as a particle, you have to tear it out of the shell and destroy the entire system (ionization).

Another peculiarity of quantum physics are strange nonlocal effects. Two quantum objects (atoms / molecules / photons ...), which were once connected to a physical system, even after their separation still have a solid, ghostly form of connection - the entanglement, which transcends light (beyond the space postulated by relativity theory Borders) and is based on no physical interaction. This so-called *Einstein-Podolsky-Paradox* was so disturbing to Einstein and other physicists at the time that they spoke of a violation of causality (the cause-and-effect

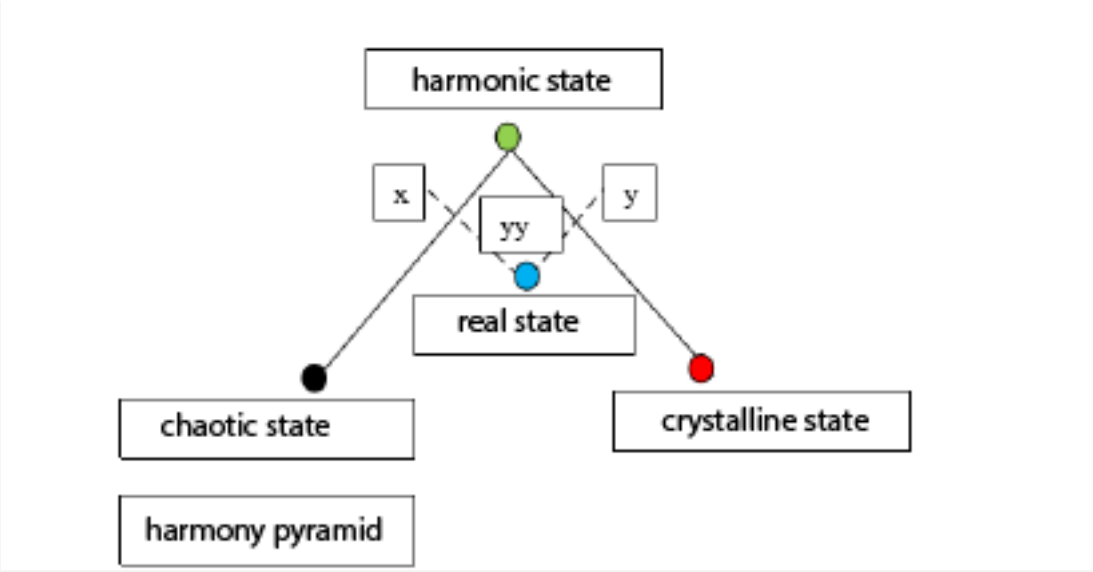
principle). Despite their doubts, the experiment, which was confirmed in a more recent form by Zeilinger and others, provides the paradoxical effect.

By means of electromagnetic oscillations and fields, which must be regarded as quanta (photons) at this level, the nuclei and electron shells of the atoms and molecules interact with each other. In the wave pattern, therefore, oscillation patterns interact by means of exchanging vibrations. Forms order over larger distances, arise meso and macroscopic structures such as solid or tissue. But even in liquids larger structures can form; such as e.g. the water molecules are arranged differently between the tissue cells due to the electromagnetic properties of embedded ions and molecules and the adjacent cells than in headwater. *Pischinger* and others consider the extracellular fluid (interstitium) as an important system of regulation of the body, which is essential for the function of constantly exchanging with its matter, energy and information cells. Again, currents and electromagnetic waves seem to play a central role in the control and information exchange. In the electrodermal test (e.g., with the B.E.A.T. Biomonitor), response to this system is examined for small voltage pulses, allowing conclusions to be drawn about the microscopic state and regulability of the interstitium. The measured values are conducted from the skin surface of the patient into the computer using the 128 pins (electrodes) and stored there for the subsequent evaluation. The statistical distribution of the measured values is compared with 3 ideal distributions. This happens in the so-called Hilbertian ("undeniably-dimensional") space. The reference distribution is:
Gaussian distribution: measurements from an ideally chaotic system

Delta distribution: measurements from an ideal crystalline system

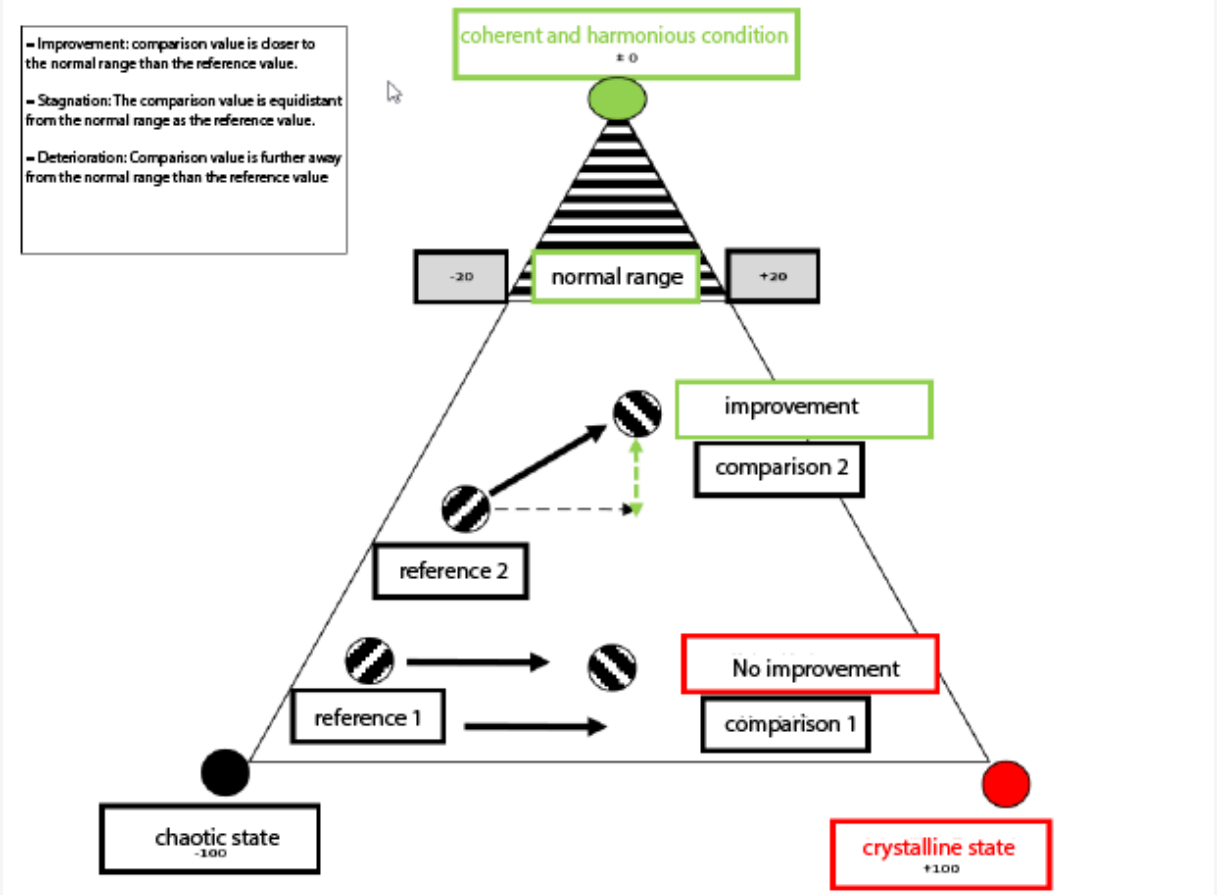
Logarithmic Normal Distribution: measurements from an ideally coherent system

No real system will fully correspond to these ideal distributions, but will always be between these ideal distributions. Therefore, the probability distribution from a real system is always between the 3 typical distributions. The graphic representation takes place in the form of the "harmony pyramid". How far the patient is from the perfect state of harmony is calculated in Hilbert`s space. In Hilbert space, there is a generalized measure of distance that can be used to measure "distance" between two mathematical functions, even if they consist of an infinite number of elements or factors. The coordinate system is formed by the three ideal distributions, which are condensed into points in Hilbert's space. The Hilbert space and the special coordinate for assessing the degree of harmony or coherence looks like a pyramid. So we are talking about a "harmony pyramid". The green point at the top of the pyramid is the ideal harmonic state, which can be described by the logarithmic normal distribution. The green in the lower left corner of the harmony pyramid is a black dot. This corresponds to the ideal chaotic state, which can be represented by the Gaussian distribution. In the lower right corner is a red dot; this is the ideal crystal state that finds its equivalent in the delta distribution. Inside the harmony pyramid is a blue dot; This is the state of a real person, which can be calculated quantitatively from a real measurement.



The experiment

The experiment I conducted on 19 October 2012 as part of the symposium "NaturKulturMedizin" (Graz, City Hall) was intend to show whether the information field formed by one group of test persons could influence the physiological systems of another test subject. The experimenter gave two thought contents of opposite valence (1 positive and 1 negative content). By non-invasive real-time measurements of the skin's electrical conductivity on the subject with the high-performance system B.E.A.T. Biomonitor (manufacturer BIREGS GmbH/Germany) should present a possible change in qualitative, quantitative and correlative (positive - negative content) in a simply modeled design. Similar to the experiments of W. Tiller (William A. Tiller, Ph.D., Professor Emeritus, Stanford University, Dept. of Materials Science and Engineering), the mediated subject-influenced oscillators (**i**ntention **i**mprinted **e**lectrical **d**evice - **IIED**) used the The subject in our "Graz Experiment", without intermediate storage (**IIED**), was directly exposed to the information field generated by the group.



Evaluation of the measured values with the aid of the harmony pyramid

Measurements of skin dermal conductivity showed a marked "pathologization" of the measurement distribution for negatively-populated information (e.g., "subject is ugly"). This deviation from the initial reference value can be considered as a measure of the decline in the autonomic regulatory capacity and thus as an increase in the individual stress level. In mental transmission of positive-occupation information (for example, "subject is lovable and beautiful") not only did it not deteriorate, but also it markedly improved the ability to regulate.

Although, of course, it is clear that the meaningfulness of this experiment is very limited due to the lack of a statistical basis, the result should make us think and make the concept of thought-hygiene appear in a new light.