

The Principle of Minimal Stimulus in the Dynamics of the Living Organism

*Clinical practice has already demonstrated the importance of small stimuli rather than big ones to strengthen the abilities of self-regulation and self-repair of living organisms. We show how Eva Reich's butterfly touch massage depends crucially on "phase" information rather than energy exchange, as is consistent with quantum coherence of living organisms. **Dr Margherita Tosi and Dr Emilio Del Giudice***

Introduction

The relation between the stimulus received by a living organism and its subsequent response is a key element in our understanding of the deep dynamics of an organism. Conventional therapies, both medical and psychological, are based – even though not always consciously – on the opinion that the response of a living organism should be proportional to the stimulus. We can easily observe this by looking at the attitude of conventional medicine on the action of electromagnetic fields on living organisms. This action is usually neglected, as the intensity of the fields is normally below minimal standard levels (the so called thermal threshold for a system at thermodynamic equilibrium). In the same way, behaviourist psychologists ignore "subtle feelings". The usual procedure is to "get going": forcing the body into hard work, which is believed to be necessary to obtain some results.

There are nevertheless therapies showing that very small stimuli are sufficient for re-organizing an organism, while bigger stimuli have less or even no effect; as for example the butterfly touch therapy developed in the past 50 years by Eva Reich [1]. Despite appearing heretical, they are more in agreement with the pillars of classical physiology than conventional psychology and medicine.

In fact, around mid-19th century, classical physiology was able to establish a universal relation between the stimulus and the response valid for all living organisms, both animal and vegetable. That is Weber and Fechner's law [2], which states that response is proportional not to the stimulus but to the logarithm of the stimulus. Figure 1 is the graph of the function $\log S/S_0$ for the expression $R = C \log S/S_0$, where R is the response, S the stimulus, C a constant, and S_0 is a particular value of the stimulus to which the response is nil.

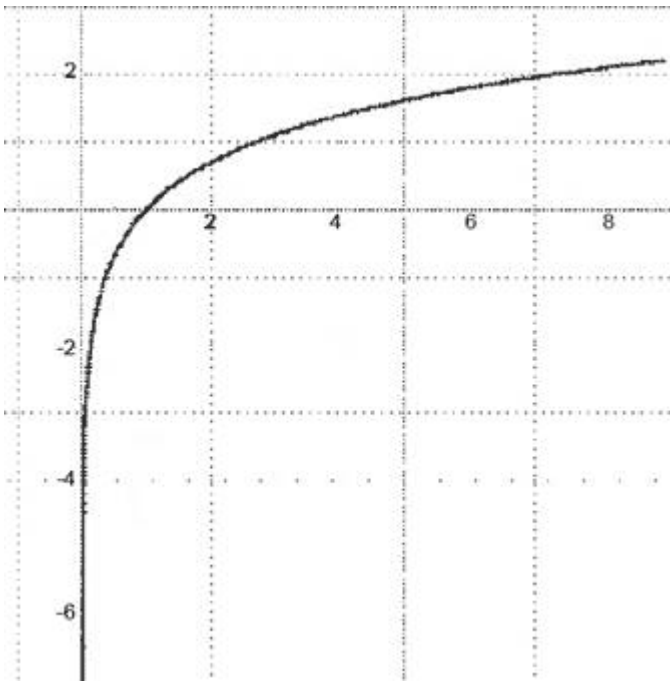


Figure 1: Graph of the log function $R = C \log S/S_0$, vertical axis R , horizontal axis $\log S/S_0$

The graph in Fig. 1 shows that when S is larger than S_0 the response is positive. The response turns towards the outside: If our knee is hit by a hammer, we will react with a kick. The response grows much more slowly than the stimulus; that is very useful for protecting the organism from stimuli that are too big. Nevertheless, it is amazing to see the results of what happens when the stimulus S is smaller than the threshold stimulus S_0 . In this case the response grows as S decreases, but in the negative direction; it is a response turned towards the inside. In other words, the organism acts on itself, it re-structures and re-organizes itself, even more as the entity becomes smaller. Here we have a rational basis for the formulation of the principle of minimal stimulus: the smaller the stimulus, the bigger the power of the organism to re-form and re-organize itself; which is the aim of every therapy. Obviously, the type of re-organization depends on the nature of the stimulus: that is why we have to investigate it in each and every case.

Psychodynamic approach of Wilhelm and Eva Reich

In the first part of the 20th century a big scientific revolution took place; it began with the works of Sigmund Freud, who tried to understand the laws of deep unconscious, the mysterious part of the organism called E_s that gives rise to instincts, emotions and dreams and forms a permanent structure, the character, which runs the whole behaviour of a subject. What is the origin of the subject's unconscious and personality? Freud was convinced of the intrinsic unity of reality and believed consequently that E_s emerged ultimately from the world of atoms and molecules, normally the preserve of physicists.

Freud, however, thought that the physics of his time could not understand the emergence of an emotional sphere from the molecular structure of a body. Each incursion of that inadequate physics into the newly born psychodynamic science would cause the suppression of the deepest and most genuine intuitions of the revolution in progress, in favour of a vulgarly mechanist point of view. The real problem, in fact, was not to justify the discoveries of the new psychodynamic science with a physical science seen as a holy book which did not need any further progress. The problem was

actually the opposite: would the day come when physics would be so advanced as to be able to include the psychodynamic field? The field of psychodynamic science then would not need to learn from physics, but instead the physicists would have to learn from the revolution started by Freud, in order to overcome the limitations they had in understanding reality, which prevented them from seeing how matter, at a certain stage of its development, enables a psyche to emerge.

Freud was deeply into the academic world, and refused to carry on this mission of educating the physicists, which was far too difficult in the climate of his time. Despite his dialogues with Einstein on the nature of war, he suggested that his followers should ignore physics. The wisdom of this recommendation may be better understood if we consider the destiny of those currents of psychology or unconventional therapies which, in search of an academic and institutional recognition, tried to find a common ground with conventional physics, chemistry and biology based on the vision of matter as a simple aggregation of independent atoms. Consequently, therapeutic trends based on intuitions connected to the holistic function of the organism were not accepted by conventional science and had to content themselves with a minor role, subordinate to the institutional world. They became complementary medicines of institutional medicine, regarded as the sole owner of the truth: *extra institutionem nulla salus* (no good outside institutions).

Fortunately, there are people in the world not afraid to step out of line, and by so doing, change the future. Theoretical physicist Wolfgang Pauli, one of the founders of quantum physics, accepted the dialogue with the world of psychodynamics, in this case with Carl Gustav Jung [3].

As shall be made clear later, quantum physics considers reality not as a simple aggregation of atoms but adds to it a series of relations not necessarily localizable in space and time whose set forms the quantum vacuum, a basis, not separable in localizable entities, which interacts with all the objects localizable in space and time. It gives matter a holistic behaviour as it can correlate the movements of separate bodies, according to Blaise Pascal: "The whole is superior to the sum of the parts."

In the dialogue between Pauli and Jung, some seeds for future developments emerged. The first one is that the psyche, which may not become incarnate in any particular material body, might, on the contrary be the set of resonant relations between the different parts of the organism established through the quantum vacuum; in this way, the psyche ensures a unitary behaviour of the organism and becomes the way of being of organic matter. These resonant relations do not require an energy flux, but rather, according to Prigogine's intuition [4], a concentration of internal energy already present in the subject, which implies a diminution of its entropy. Therefore, the movement of the organism is not only a movement from the outside that requires a consistent amount of energy; it is rather a movement from the inside based on the re-organization of internal energy and triggered by stimuli of the informative kind. The rational basis of the principle of minimal stimulus begins to emerge.

Following this line of thought, it is useful to mention the work of an almost unknown pioneer, Ervin Bauer, a biologist born in Hungary during the Austro-Hungarian Empire, who attended Driesch's vitalistic school in Germany and emigrated to Soviet Russia as he was involved in the Hungarian Soviet Republic in 1919. He finally disappeared in Stalin's prisons in 1937. In 1935 he wrote an essay on theoretical biology, which disappeared after his death and was found in the 1980s [5]. In it, he tried to define the laws of a living organism and kept as a central idea the same intuition we discussed above.

A second and deeper suggestion has something to do with the extra-temporal nature of quantum vacuum, which is able to connect events localized in different spaces and times. Jung had the intuition that this result of quantum physics would allow a completely different phenomenology from the one based on events localizable in space and time connected by the principle of causality. In this dynamics, on the contrary, a collective process is established, which involves events localized in different spaces and times that consequently become synchronic events. A fascinating perspective opens, which allows us to find a rational basis to many intuitions produced in the framework of psychodynamic science, from Anne Ancelin Schützenberger's psychogenealogy [6] to Bert Hellinger's familiar constellations [7]. In all these tendencies we can observe in different ways the presence, in the psychic dynamics of people living here and now, of psychic experiences in different times.

The theme of physical basis in the dynamics of E_s was taken up with greater vigour by Wilhelm Reich, whose thinking went through three phases. In the first phase, which covers the period 1920s and the beginning of the 1930s, and represented in the essay "Character Analysis" [8], he moves forward in the field started by Freud, as he was one of his main assistants. He concentrated on dynamics and functional aspects of character structure, on how psychic structures gave rise to correspondent somatic structures, whose set is the "armour" which makes the character rigid. The correlation between physical and psychic structures became the centre of Reich's research and suggested an alternative way to intervene on psychic structures even through an intervention on physical structures. This perspective was followed in the second period, which covers the 1930s and led to the formulation of the so-called vegetotherapy. Vegetotherapy states that the living organism is fundamentally characterized by a "pulsation" originating in the breathing rhythm of the whole organism [9]. This pulsation provides unity and harmony to the organism. The psychic disturbance that corresponds to neurosis comes from an alteration of the pulsation in which the inspiration phase, corresponding to the process of energy charge, plays a dominant role compared to the expiration phase, corresponding to energy discharge, to which the possibility of feeling pleasure is associated. According to Freud's theories, neurosis is seen as a consequence of the suppression of pleasure, but Reich goes beyond, as he starts searching for physical ways in which this process occurs. Investigation on the dynamics of this process marks the beginning of the third period of Reich's research, which stretches from the late 1930s to his death in 1957. In this period, Reich tries to find the organic basis of the living pulsation and traces it back to a particular form of energy he calls orgone. In Reich's thought, it still seems unclear whether the orgone is a form of energy like the others, for example gravitational or electromagnetic energy, or if it is, as we will discuss below, a way of being of the energy, an electromagnetic interaction between the different parts of an organism, when they manage to synchronize their individual oscillations. Besides this, Reich deeply investigated the dynamics of the orgone in ill organisms and in this field he succeeded in tracing cancer physical disease back to an energy deformation produced by the suppression of the principle of pleasure [10].

Vegetotherapy was based on the effort of loosening the armour by the execution of physical exercises involving exchanges of great quantities of energy. In the orgone phase, on the contrary, the intensity of the energy supply is not as important as the coincidence between the pulsations of the stimulus and of the organism. When this coincidence occurs, and consequently a relation of resonance is established, the oscillation of the organism amplifies, and becomes dominant over the spurious oscillations that disturb the dynamics and finally removes them.

This is more likely to occur when the stimulus is smaller, below the limits at which the organism becomes alert. In case of big stimuli, on the other hand, like the ones associated with the practice of vegetotherapy, there is always the possibility that the mechanisms of the alert organism are triggered; producing stress and a new energy blockage replaces the old one. The discovery of the principle of minimal stimulus, mainly due to Eva Reich, Wilhelm's daughter, marks a fundamental step forward in psychodynamics.

Institutional therapies are based on the discovery of symptoms, which are the deviations – both physical and psychological – of the organism from a “healthy state”, defined on the basis of the statistics of the organisms that are supposed not to be ill, and their subsequent repression through the use of specific chemicals (drugs) or specific psychological interventions.

Eva Reich's approach, as well as other alternative therapeutic approaches, although very different one from the other, nevertheless agree on the natural power of living organisms for self-repair, which strictly depends on the organism following the rhythm of its own natural pulsation.

The organism suffers and gets ill when its capacity of self-repair is obstructed by some perturbation that affects its natural rhythms and its capacity to adapt to the mutations required by the environment. In order to overcome this difficulty, the organism is put in contact with other natural rhythms in the environment. The principle of minimal stimulus plays an essential role here.

Minimal stimulus must obviously have an intrinsic rhythm that can resonate with the rhythm of the organism in conditions of healthiness. Its action determines the growth by resonance of the capacity of self-repair of the organism; all this occurs without the explicit knowledge of the pathological “organization”, so that at a certain point it would collapse. What we have explained so far may sound like fantasy, but it proves to be consistently effective in a number of therapeutic practices, including Eva Reich's gentle touch.

Eva Reich's gentle touch is part of these therapeutic practices, in which the resonant contact between the pulsations is obtained through tactile contact. The touch is not a mean of applying force or transmitting energy; it is the minimal entity needed to transmit pulsations from an organism to another; it is not the energy that is transmitted, but rather the oscillation rhythm, as an orchestra director would do with his musicians. In the same way in which a director turns a chaotic noise into a symphony, a mother's calm and regular breathing turns her baby's desperate cry into a quiet and peaceful rhythm.

One of the most important events in a subject's life can be his resonant emotional connection to a positive experience that happened on the day he was born, as suggested by the minimal stimulus of gentle touch proposed by Eva Reich. Through this gentle touch (butterfly massage) the resonant bridge is established between the new born and his mother, more in general his genealogy, mediator of the relations with the entire human race.

The living organism in the light of quantum physics

Our experience has recognized two types of movement so far: the first is the one generated by an external cause, which manifests itself as a force and requires an external energy flux and/or impulse, while the second is the movement coming from the internal part of the subject: self-movement or spontaneous movement.

Let us illustrate these kinds of movement with an example. Imagine a car whose tank contains just a few decilitres of fuel and a hungry cat that has not eaten anything in the last few days. The hungry cat would use all the energy it has left to look for something to eat, whereas the car cannot use the last drops of fuel in its tank to look for the nearest petrol station: it can reach the station only if it is pushed or drawn there by an external subject. That is the difference between the inert and the living states of matter.

Classical physics, founded by Galileo and Newton in the 17th century, only concentrated on the description of the inert state of matter. Through the formulation of the principle of inertia, it conceives the whole of matter as inert, marking a great departure from magical currents of Renaissance thought which had their most complete formulation by Giordano Bruno and Paracelsus. Quantum physics, born at the beginning of the 20th century, re-establishes the possibility of contact with Renaissance thought and even with the Romantic tradition, which had taken the theme of self-movement.

The vitalistic tradition of biology, particularly present in 19th-century Germany, owes its birth to the Romantic tradition [11]. The vitalistic tradition tried to focus its attention on self-movement as a characteristic of the living organism. However, it was obstructed on its way by the influence of the thought of classical physics over biology. We can mention for example the importance of personalities like von Helmholtz, the main exponent of Berlin Medical School, or the figure of the “microbe hunters” like Robert Koch. Freud tried to protect his new-born school from the influence of this “physicalist” current in biology [12].

To get back now to quantum physics, it recognizes the essential role played by spontaneous fluctuations of all physical objects that cannot avoid fluctuating. While the ancients’ nature was characterized by *horror vacui* (fear of emptiness), the nature of quantum physics is characterized by *horror quietis* (fear of resting).

Every object is characterized both by fluctuations induced from the outside through energy supply, and spontaneous fluctuations from within. We qualify the state of minimal energy of the object as the fundamental state of the object, or, in the jargon of physics, “vacuum”. Vacuum is then the set of spontaneous fluctuations of the object. These spontaneous fluctuations prevent the object from being “closed”, as it communicates with the environment through these fluctuations. A closer examination, which requires the use of the mathematical formalism of the Quantum Theory of Fields [13], shows that the fluctuations of the oscillation rhythm of the objects, which is called “phase” in the jargon of physics, spread in the environment in the form of potentials of particular fields, called “gauge fields” in the theory; the clearest example is the electromagnetic field, which governs the interactions between atoms and molecules. The phase, distinct from the energy, can travel faster than light. This produces a violation of causality in Einstein’s sense. As a result, the interactions based on energy transmission obey the causality principle (no effect occurs before the arrival of the cause), while interactions based on the transmission of the phase, as they are mediated by a messenger that can travel at an infinite speed or even go back in time, do not follow the causality principle and may connect different subjects in different spaces and times. We can find here the rational basis to understand the origin of synchronic phenomena intuited by Jung.

There are two possibilities: the first one is when the fluctuations of the bodies and the vacuum remain reciprocally unsynchronized, leading to a great indeterminacy of the whole oscillation rhythm, which cannot assume a definite value and averages to a negligible level. In this case, the

bodies keep their individuality, so that it is still possible to determine accurately their atomic structure; the spontaneous oscillation does not play an essential role in this case and the whole dynamics – like in classical physics – is consigned to the dynamics of force and energy. Self-movement disappears and all that remains is the movement from the outside of bodies that are considered inert. That is the world described by conventional molecular biology, which is at the base of institutional medicine.

There is a second possibility. Under appropriate conditions, the fluctuations of matter and vacuum can be synchronized, thus starting a collective dance reminiscent of the orgasm intuited by Reich. This state of the matter is called “coherent” by physicists. In this state, the number of components remains undetermined, while the oscillation rhythm acquires a more precise definition. This result is the expression of a principle of uncertainty, valid in quantum physics, which states that the uncertainties of the number of oscillators in a physical system and of their phase are in an inverse relation. It is clear that, in order to reduce the uncertainty of the oscillation rhythm of a physical system and make it more coherent, we have to amplify the uncertainty of the number of the participants in the collective dance as much as possible. Therefore, we have to avoid closing the system, which would keep the number of components constant; on the contrary, we need to open it as much as possible on the outside by amplifying the number of the potential participants to the collective dance enormously. Here lies the main problem.

In order to participate in the collective dance, the oscillatory rhythms of the would-be participants and their frequencies need to be the same. But absolute equality does not exist in nature; the possibility that two frequencies are absolutely equal, not even slightly different, is nil. How can these objects resonate? They could never do that in solitude, as they need a friendly environment, full of fluctuations at a very low frequency, with a diffuse noise that would let two physical objects get into resonance, or, as Reich would say, into an orgasm, by stealing from the environment the tiny oscillations that fill the gap, and make the partner’s oscillation frequencies equal.

A great number of small oscillations are much more useful than a single oscillation of equal amplitude to facilitate the achievement of the condition of resonance between the components. The onset of coherence in a physical system opens the possibility of its self-movement. A coherent system is in fact able to concentrate its energy from the whole of its degrees of freedom to a small number of them. In this way, the energy does not have its directionality diluted in a great number of possibilities connected to the great number of degrees of freedom, but acquires its directionality through the elimination of the “useless” agitation of its molecules. When the energy is distributed onto a great number of degrees of freedom, the variable called entropy by physicists has a great value, which gets lower when the energy is concentrated on a few degrees of freedom. The energy that has a great entropic value can produce little external work, but if we lower the entropy, the physical system acquires the capacity of accomplishing external work, as long as the system is open to the environment. In a physical system, acquiring coherence is equal to acquiring the capacity of self-movement [14]. The role of coherence in the dynamics of life has been stressed over the years by Mae-wan Ho [15].

We can finally put forward the hypothesis that Wilhelm Reich’s orgone is the form assumed by the energy of the organism in a condition of coherence. In this case, the disappearance of the orgone becomes the consequence of the loss of coherence of the organism, with a subsequent loss of self-movement and a tendency towards the state of inert matter.

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