



## Psychosomatology: the medical paradigm of tomorrow

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The pendulum of truth and knowledge has always been swinging back and forth between opposing ideas, and any given prevailing pattern of research is considered the epistemological “truth” of the time in which it is applied. Looking at medical science through a historical magnifying glass, the pendulum has been swinging between a synthetic–integrative approach and an analytic–reductionistic approach. Going as far back as the ancient Greek philosophers, we find for example Aristotle who contrasted the two approaches with a set of well-known formulations:

Proteron kat auto, isteron pros eimas — the first in itself is the last for us  
Isteron kat auto, proteron pros eimas — the last in itself is the first for us  
vs.

Proteron kat auto, proteron pros eimas — the first in itself is the first for us  
Isteron kat auto, isteron pros eimas — the last in itself is the last for us

He himself subscribed to the latter, the synthetic–integrative approach, and supported the notion that the face value of an observation or an experience is only a sign for something else, a hidden, deeper meaning.

We then take a large step forward in time to the 16th century, where Descartes’ assumption that the “analytical” or “elementaristic” method was easily accepted as a reaction to the medieval view, where everything was left in the hands of God, and illness was the result of sin. As knowledge and science had taken a more prominent role in everyday life, it was no longer possible to explain life, death, sickness and health in terms of religion. God was no longer the only possible explanation for everything. In light of that, it is understandable that the world was ready to reduce an incomprehensible reality to the beautiful simplicity of a Euclidean mathematical linear system. When Descartes stated

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that “it is wise to split each difficulty under examination into as many separate parts as possible and convenient, in order to better solve it” and “analysis is the means to establishing the truth of the first principle of all knowledge”, the world was ready! However, the resulting reductionistic biomedical model of today is not altogether Descartes’ fault. Rather, it is an adaptation, a conglomerate of various bits and pieces of his philosophy with key components missing. Descartes was a deeply religious man, and with his architectural metaphor<sup>1</sup> and statements such as ‘*cogito ergo sum*’ he established the nonseparability between body and mind. He also acknowledges the role of past experience and memory in shaping our behavior, a view that clearly blurs any sharp distinctions between mind and body.<sup>2</sup>

Moving forward through history some more, we find the French physiologist Claude Bernard, whose views were in clear contrast to those of his compatriot Louis Pasteur and his view that we could find the answers about diseases on the cellular level. Claude Bernard was the first scientist to recognize that the relative stability of the internal environment of the human organism is a condition of life in all higher organisms.<sup>3</sup> Nonetheless, during the century preceding the recent millenium shift, science became “local” and concerned with reductionistic particularities. Today it has become generally accepted that a human being is a “unit”, and that the separation of body, mind and soul is an arbitrary simplification. However, the acceptance of the complexity and interaction of the emotional, spiritual and material world is still more or less superficial. In medical practice, the biomechanical model still prevails.

This strictly reductionistic model considers and treats the patient as a machine with mechanical damage. Symptoms are seen as reflections or expressions of such a damage. It is worth noting that psychiatric and psychological models are not very different from the medical, since they also focus on the concept of disease being the lack of health. Medical research and practice still dwell somewhere between the clear-cut infection paradigm and the semi-integrative paradigm of psychosocial approach of occupational medicine. Similarly, psychiatry and psychology is oscillating between a straightforward “label it by the manual and fix it” approach and evidence based cognitive behavioral research. Medical science must broaden its scope to include the integrative, synthetic scientific approach. However, it is equally important to remember that analytic and synthetic are not

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<sup>1</sup> “Throughout my writings I have made it clear that my method imitates that of an architect. When an architect wants to build a house which is stable on ground where there is sandy topsoil over underlying rock or clay, he begins by digging out a set of trenches from which he removes the sand, and anything resting on or mixed in with the sand, so he can lay his foundation on firm soil. In the same way, I begin by taking everything out that was doubtful and throwing it out, like sand” (In Replies, 1643).

<sup>2</sup> “Is it really so easy to free ourselves from all the errors which we have soaked up since our infancy? Can we really too careful in carrying out a project which everyone agrees should be performed? ...[most] people, although verbally admitting that we should escape from preconceived notions, never do so in fact, because...they reckon that nothing they have once accepted as true should be considered as a preconceived opinion” (In Replies, 1643).

<sup>3</sup> “We really must learn, then, that if we break up a living organism by analyzing its different parts, it is only for the ease in experimental analysis, and by no means in order to conceive them separately. Indeed, when we wish to ascribe to a certain physiological quality its value and true significance, we must always refer to this whole, and draw our final conclusion in relation to its effects in the whole” (Bernard, 1857).

mutually exclusive, but rather interdependent. As a result of more recent scientific developments, a recent paradigm shift has been noticed in physics, neuroscience, neuro-philosophy and medicine towards this notion of integrating the analytic and synthetic. One significant aspect of this paradigm shift is the emphasis placed upon systemic approaches, where holism and nonseparability are fundamental theoretical frameworks.

Just what holism and nonseparability are supposed to be has not always been made clear, though, and each of these notions has been understood in different ways. Holism is most commonly seen as the thesis that the whole is more than the sum of its parts, while according to the theory of nonseparability the state of the whole is not constituted by states of its parts. According to methodological holism, an understanding of a certain kind of complex system is best sought at the level of principles governing the behavior of the whole system, and not at the level of the structure and behavior of its component parts—or *proteron cat hauto, proteron pros hemas*. Meanwhile, methodological reductionism states that an understanding of a complex system is best sought at the level of the structure and behavior of its component parts—or *proteron cat hauto, histeron pros hemas*. This seems to capture much of what is at stake in debates about holism in social and biological science. In social science, societies are the complex systems, composed of individuals; while in biology, the complex systems are organisms, composed of cells, and ultimately of proteins, DNA and other molecules. A methodological individualist maintains that the right way to approach the study of an organism is to investigate the behavior of its' individual components. A methodological holist, on the other hand, believes that such an investigation will fail to shed much light on the nature and development of the organism as a whole. Methodological reductionists favor an approach to (say) condensed matter physics which seeks to understand the behavior of a solid or liquid by applying quantum mechanics (say) to its component molecules, atoms, ions or electrons. Methodological holists think this approach is misguided. As Legget, a condensed matter physicist, put it “the most important advances in this area come about by the emergence of qualitatively new concepts at the intermediate or macroscopic levels—concepts which, one hopes, will be compatible with one’s information about the microscopic constituents, but which are in no sense logically dependent on it”. The holistic thesis most closely related to that of nonseparability, is one specific variety of metaphysical holism. The metaphysical holist believes that the nature of some wholes is not determined by that of their parts. One may distinguish three varieties of metaphysical holism: ontological, nomological and property holism.

### **1. Ontological holism: some objects are not wholly composed of basic physical parts**

**Nomological Holism:** Some objects obey laws that are not determined by fundamental physical laws governing the structure and behavior of their basic physical parts.

**Property Holism:** Some objects have properties that are not determined by physical properties of their basic physical parts.

What is at issue here is the extent to which the properties of the whole are determined by the properties of its parts: property holism denies such determination, and thereby comes very close to a thesis of nonseparability.

The thesis of nonseparability can be illuminated effectively by looking at modern quantum physics, where string theory has emerged as a candidate for unifying much of fundamental physics, including quantum mechanics and general. At the turn of the 21st century, string theory (or its descendant, M-theory) has emerged as a speculative candidate for unifying much of fundamental physics, including quantum mechanics and general relativity. It is an ambitious research program in the framework of quantum field theory. String theory states that all fundamental particles can be considered to be excitations of underlying nonpoint-like entities in a multidimensional space. The particles' intrinsic charge, mass and spin may then arise as nonseparable features of the world at the deepest level. Existing string theories proceed by quantizing classical theories of basic entities that are extended in one or more dimensions of a space that has six or seven tiny compact dimensions in addition to the three spatial dimensions of ordinary geometry. If these additional dimensions are appropriately considered spatial, then it is natural to extend the concepts of spatial and spatiotemporal separability to encompass them. In that case, processes involving classical strings would count as (spatiotemporally) nonseparable, even though all particles and their properties conform to spatial separability. Metaphorically, one could say that all processes are represented in everything and everything is represented in all processes—there is God in all and everything since nothing can be separated and nondependent from the rest (a timeless and spaceless all).

The notion of holism and nonseparability is also evident in the recent rapid development in neuroscience. Some of the advances in this area, specifically the ongoing research into the nature of consciousness, action and knowledge, as well as empirical findings about brain structure and function, suggest that both biological and artificial neural networks function as vector-to-vector transformers. Given that the neurons' activity depends partly upon their total input, and total input depends partly on synaptic weights (e.g., presynaptic neurotransmitter release rate, number and efficacy of postsynaptic receptors, availability of enzymes in synaptic cleft, etc.), the capacity of biological networks to change their synaptic weights make them plastic vector-to-vector transformers. The anatomical organization of the cerebellum provides a clear example of a network amenable to this "computational" integrative interpretation. A variety of studies (behavioral, neuropsychological, single-cell electrophysiological) implicate integration and fine motor coordination of every (brain) activity.

The study of pain perception–sensation is often the starting place for an analysis or theory of consciousness. However, the neurobiological uniqueness of pain transmission suggests that pain perception–sensation vector system is an atypical event of consciousness and therefore should not be considered as a prototype of process of consciousness. David Chalmers has argued that any possible brain-process account of consciousness will leave open an 'explanatory gap' between the brain process and properties of the conscious experience. This is because no brain-process theory can answer the "hard" question: Why should that particular brain process give rise to conscious experience? The fact that the hard question remains unanswered shows that we will probably never get a complete explanation of consciousness at the level of neural mechanisms. Chalmers [3] offers a conceptual argument, based on our ability to imagine creatures possessing brains like ours but wholly lacking in conscious experience. But the more we learn about how the brain

produces conscious experience the harder it becomes to imagine a universe consisting of creatures with brain processes like ours but lacking consciousness!

As modern physics and other “hard” sciences have shifted much of their theoretical focus toward the nonseparabilistic school of thought, it is important that modern psychosomatic medicine brings medical science further into this realm. Much of the theoretical, scientific and clinical work in psychosomatic medicine is already attuned to the notion of holism, but it is important to go one step further and apply the notion of the inherent nonseparability of the human organism to psychosomatic theory. In this context, it is of essence to note that a process may be nonseparable even though it involves objects without proper parts. It is this particular aspect of nonseparability that firmly places psychosomatic scientific theory in its realm.

Psychosomatic scientific theory has evolved through the decades and is today a synthesis of several theoretical frameworks. Among the building blocks of psychosomatic scientific theory, we find the psychoanalytic theories (from Sigmund Freud and Jaques Lacan to Joyce MacDougall, Luis Chiozza and Irene Matthis) and the biosemiotic theories based upon the thoughts of Charles Sanders Peirce and Jesper Hoffmeyer. In the past few decades, it has evolved rapidly, from being not very highly regarded in the 1930s, reaching heights of popularity in the 1950s and losing scientific credibility in the 1960s, to the development of a number of biopsychosocial models in the 1970s. In the 1980s, Cheren [4] put forth a comprehensive anthology of psychosomatic medicine, where numerous scientists contributed to bridging the gap between earlier psychoanalytic thought and the more recent interdisciplinary fields of medicine. In a more recent anthology, Friedman et al. [10] compiled material from the foremost scientists in the field of stress research. Through their studies on stress and PTSD, they have formulated theories describing the nonseparable relationship between the various systems involved in all processes of the human organism. Today, psychosomatic medicine is still mostly noted in research, but it has become an important aspect of modern clinical medicine where we can trace it in for example the interdisciplinary fields such as neuroendocrinology or psychoimmunology.

The thesis of psychosomatology has evolved from the above research as the theoretical foundation of modern psychosomatic medicine—one could say that psychosomatic medicine is the practical application of psychosomatology. Psychosomatology is the integrative study of the relationship between all the communication and memory systems of the human organism. A balanced interaction between the different memory and communication systems of the human organism is necessary for the preservation of health, and disturbances in this communication underlies the developments of disease. There is continuous ongoing exchange of information between and within each of these systems, and all memory and communication systems of the human organism are always active at all time. In every single cell of every human organism, the sum total of the whole life experience of every living organism since the beginning of time is preserved. The genetic code of the human body can be likened to an enormous library where all the accumulated life information is collected. Peptides and electromagnetic impulses can be seen as the biochemical alphabet that is the foundation for the relatively simple language used within a system. Each system is also part of an interactive, interconnected communication system. The exchange between each system

goes on continuously but less directly, that is, there is a great deal of interpretation required—thus, the neuropeptides and hormones. However, it is not until the biochemical alphabet builds a sentence with meaning, and the sentences become part of a context, that they also become expressions of the human being and all her functions. The “pure” biochemistry behind each condition or occurrence is meaningless if it is not perceived and interpreted in a meaningful way by the individual (organism) within which it occurs. The biopsychological language—from the letters (chemistry and electromagnetic impulses) and simple phrases (fundamental biological processes) to complete stories (complex psycho-physiological functions, meaningful exchanges of information)—can be disrupted and misinterpreted for various reasons and on different levels.

The psychosomatology paradigm rests upon a theoretical model that describes the interaction between the various systems of the human organism, the environment and genetic predispositions. Hypothetically, if at the moment of conception, the DNA combined within the homozygote carries no “negative” memories, the pregnancy proceeds optimally and subsequently the individual lives a “perfect life” with the optimal balance of stimuli, he or she will live the full genetic life expectancy of about 130 years. Although quite a few yogurt-drinking individuals seem to have come close in remote areas of Russia, it is, of course, rare.

At the moment of birth, the infant is already blessed with biological predispositions inherited from previous generations. These predispositions underlie the innate reaction patterns of the organism. Throughout life, those predispositions interact with each other and external stimuli, evolving into reaction patterns specific to the individual. These are then carried on to the next generation, together with everything that came before. Our yogurt-drinking friends above most likely lived lives that were close to the optimal central column of the figure, lives that allowed them to grow in a narrow spiral up towards death at the noble age of 120 years or more. Most of us, however, start experiencing life-events early on that push us toward the corners of life, where anxiety, aggression, pain and depression abide. The perception of those events, or insults, determines how far out in the corners we go, and how far we must travel to come back to the optimal center of growth.

Modern integrative psychosomatic medicine applies this model to diagnostic, treatment and preventive approaches in health-care. In integrative psychosomatic medicine, every patient is to be treated and diagnosed as an individual (fr. latin: in-dividare—not possible to break into smaller parts). This means that all the various bits and pieces of the total experience of the individual human organism are considered nonseparable and equally valued and taken into consideration in prevention, diagnosis and treatment. In order to enable this, it is necessary to develop a “new” scientific language to follow from the adaptation of the new paradigm in medicine.

As human beings, we are able to perceive ourselves as both object and subject, which is reflected not only in our culture and language, but in how we view the human organism. When we become painfully aware of being separate from others (mother being the first one as always!), we end up experiencing two bodies—the *lived* body, the one that in a sense has a life of its own regardless of how we feel about it, and the *perceived* body, an abstraction created by our individual perceptions of the *lived* body. This division between *lived* and *perceived* body is the result of consciousness, and thus nothing new.

What is new is the tendency in modern medicine to only take in to consideration and value the *lived* body, while reducing the *perceived* body to being nothing more than the irrational experiences of somatizers. Psychosomatic medicine must strive to put the *perceived* body on equal terms with the *lived* body in all aspects of health- and preventive care. The task of modern integrative psychosomatic medicine is to bring back into full reality what Plato and his contemporaries viewed as self-evident: “Doctors cannot cure diseases if they do not treat the whole organism—a part cannot be healthy if the whole is sick” [1–31].

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### **Further reading**

### **Internet Resources**

James Schombert's (U. of Oregon/Physics) page on Quantum Mechanics.  
David Fidler's page on quantum nonlocality.  
Peter Mandik's 'Philosophy and the neurosciences' site.  
Valerie Hardcastle's 'Mind/Brain Resources' site.