The 17 UN sustainability goals

Human Systems Sustainability– on Health

New theories addressing solutions

Steen Hildebrandt & Michael Stubberup

shi@steenhildebrandt.dk • michael@synergaia.dk • www.sustainablecocreation.org

Content

Steen Hildebrandt

Michael Stubberup

Steen Hildebrandt, Ph. D., is Professor Emeritus at the Institute of Management, the Aarhus School of Business and Social Studies at the University of Aarhus, Denmark. Michael Stubberup, B.A. and M.A., is founder and CEO for SYNerGAIA and boardmember of Vækstcenteret, Nr. Snede, Denmark. For 15 years the two have collaborated on 'Sustainable Leadership – leading from the heart' and recently completed a three years master program on 'Sustainable CoCreation – practicing Presencing' in collobaration with Arawana Hayashi from Presencing Intitute.

Further work and active networks and dialogs;
Andreas Roepstorff proff. at IMC-InterActingMinds Center, University of Aarhus, Denmark.
Johan Rockström proff. Stockholm Resilence Centre at the University of Stockholm, Sweden.
Peter Senge and Otto Scharmer at Presensing Institute/MIT, Boston, USA.

Human Systems Sustainability– on Health

New theories addressing solutions

”In todays world, there are two relevant communities to which we all belong. We are all members of humanity, and we all belong to the global biosphere. We are members of oikos, the Earth Household, which is the Greek root of the word “ecology” and as such we should behave as the other members of the household behave – the plants, animals, and microorganisms that form the vast network of relationships that we call the web of life.

The outstanding characteristic of the Earth Household is its inherent ability to sustain life. As members of the human community, our behavior should reflect a respect of human dignity and basic human rights. Since human life encompasses biological, cognitive, social and ecological dimensions, human rights should be respected in all four dimensions.”

Fritjof Capra/Pier Luigi Luisi

1. Introduction

In this article we have selected some professional areas which each in their own way contribute to a holistic systemic perspective on humanity and nature. This cumulative knowledge will constitute the basis of an actual cross-disciplinary sustainable paradigm shift.

We must qualify our collective and international ability to see and understand connections and contexts. We could do so by for instance giving priority to interdisciplinary research in sustainability and ecological intelligence

The present paradigm shift is thus about creating a varied language describing personal and social sustainability, i.e. an eco-mindset at the core of an actual vision of humane holistic communities: humanity as a sustainable culture.

The question is which skills, principles, or intelligences that promote and are part of sustainability in terms of human beings individually and in social processes. How do we become better at learning to apply nature’s way of organizing, living, and leading? How do we rediscover nature in ourselves and how do we build societies based on knowledge about respect for life and holistic approaches to the biosphere?

It is quite simply about reestablishing contact to nature in us and to rediscover the contact to nature at large.

"Fortunately, more and more people are beginning to sense that the mounting sustainability crises are interconnected – symptoms of a larger global system that is out of balance. As soon as people understand this, their view of the problems shifts. They start to see the extraordinary opportunities for innovation that can occur when we abandon fearful, reactive mentalities. They start to realize the deep problems we face today are not a result of bad luck or a greedy few. They are the result of a way of thinking whose time has passed."

Peter M. Senge

2. A Paradigm shift in Process – Respecting the Nature of Living Systems

We use several concepts and phrases, e.g. paradigm shift, crisis and turning point. However, the important issue is not the words we use, but what characterizes the present phase of profound change in the World. Our age is characterized by ecological and health-related issues traditionally associated with the concept of sustainability.

Our point of departure is that the individual must embrace values associated with the meaning of their own lives in order to be able to take responsibility for and manage their actions and subsequently participate in the leadership of other people – and ultimately take part in leadership of the world.

The word paradigm originates in the Greek paradeigma, which signifies prototype or pattern. Present day use of the concept stems from this sense of the word – a mind-set or a system of thoughts and connections. The concept of the paradigm is often associated with the American science philosopher Thomas H. Kuhn (1922-96). In the work The Structure of Scientific Revolutions the concept of the paradigm is formulated in this context for the first time. In this book a paradigm is described as a cumulative pattern of conceptions and arguments shared by a group of scientists. A widespread scientific conception is that a paradigm creates patterns and is identified via some basic thoughts and assumptions about science and reality. A paradigm is a comprehensive formation of theories and a general view of the world which is shared by the scientific community and gradually also shared by the public at large.

The Anthropocene

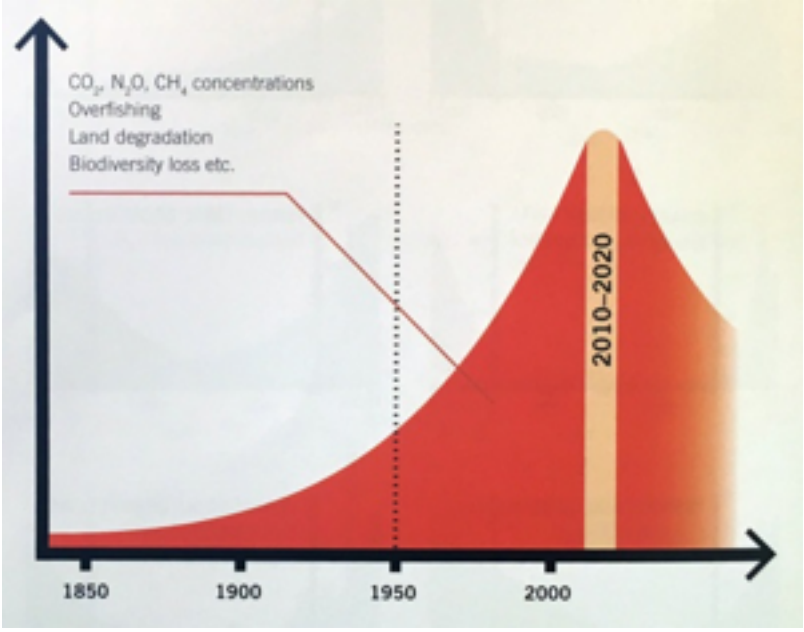
"We humans, Anthropos in ancient Greek, have become such a massive source of global change that we now constitute a geological-size force on the planet, one even more extensive in magnitude and pace than volcanic eruptions, plate tectonics, or erosion. With reckless abandon, we have introduced our own geological epoch, the "Anthropocene"……The writing´s on the wall….humanity`s very survival depends on a deep shift in the way we think about natural resources, energy use, pollution, fairness and sustainability".

Johan Rockström

In terms of the development of the planet, we are living in extraordinary times of great variation, paradoxes, and opportunities. On the one hand we live in inspiring times of intense development culturally, scientifically and technologically. On the other hand the Zeitgeist is brash, aggressive, and challenging, where the ruling paradigm manifests as fragmentation, separation, polarization, and

collapse or in other words: violent and and threatening alterations and imbalances, which neither in the short nor in the long perspective will be sustainable. We feel it personally, socially, societally, and globally. On a daily basis we are confronted by disturbing and chaotic information about war, terror, suffering, and injustice. We see a cohesive network of crises, climate changes, population explosion, increase in inequality, overexploitation of natural resources, stress, economies spinning out of control, loss of biodiversity. We relate to these crises with the mental frameworks and habits that contributed to the making of the crises. Business as usual.

The dynamics of our present situation begin as early as the mid-1800s in the early days of the general quantitative growth paradigm. However, only during the "great acceleration" in the middle of the 20th century does the continuous pressure on nature's processes become so great that we land in the situation described in the Stockholm Resilience Centre model below:



It is decisive that we allow ourselves to see the new larger and more comprehensive picture, the living global reality. Humanity should perceive itself as a having a strong bond with nature and moreover as completely dependent on nature. Humanity is a part of nature, but we have also created a situation where we must take on a still greater responsibility for nature and the development of the planet. The cumulative pressure is now so great that it seems nature's self-organizing ability to adapt is challenged or as recently expressed in theological terms by a priest: the planet is no longer in God's hands, but in humanity's hands.

Hence the transition to the Anthropocene epoch is a wakeup call. The crises we are facing are feedback that tells us that the systems are unbalanced, that we are on many levelse not prepared for the future:

…the educational system in America and around the world is a relic of a bygone era. The curriculum is out of date and out of touch with the realities…much of what we teach and how we teach is dysfunctional and toxic to the future development of the human race.

Jeremy Rifkin

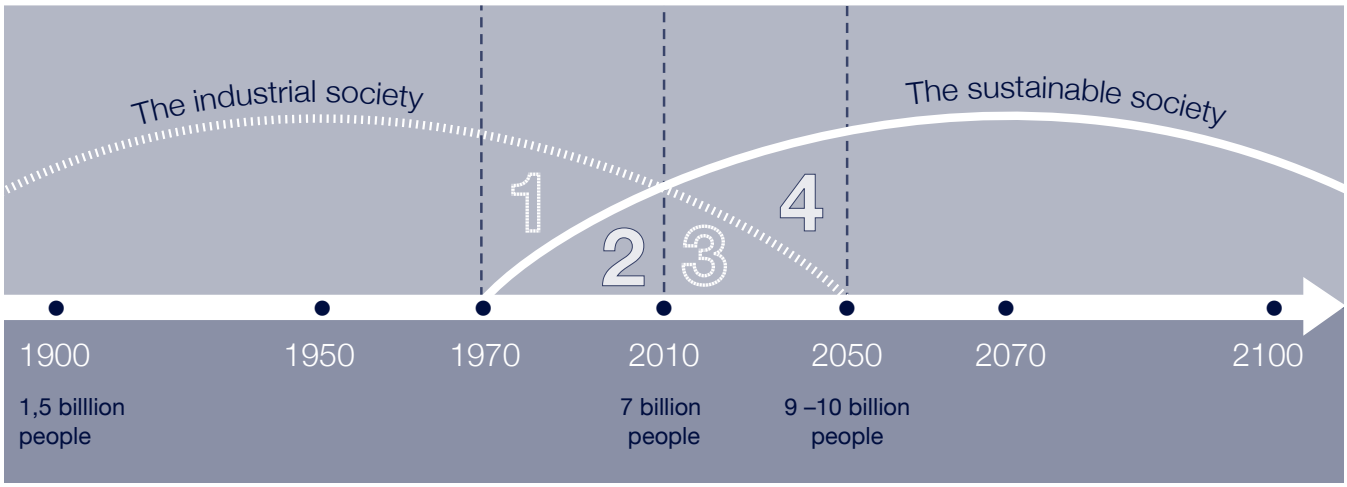
Four preconditions for entering a new paradigm

So, major societal changes occur right now. There are at least four preconditions, which must be fulfilled if a new paradigm is to replace an older: 1) A crisis must occur which the old paradigm cannot solve. 2) The new theory must be able to point to a solution of the problems. 3) The new theory must be operational. 4) The new theory must have ways and means of influencing relevant decision makers and people in power.

In the model (see below) we attempt to illustrate the main view. The figure is a sweeping simplification, where the present is positioned in the middle flanked by two major developmental processes. In the first phase we see the industrial development of the nineteenth and the twentieth centuries. The conception is that the industrial-mind era created our present situation and that the industrial-mind has come to an end and a mind shift is already in the beginning.

The other phase primarily concerns the twenty-first century. In our model the mind shift begins around 1970. About this time the western world was engaged in a comprehensive debate on limits to growth. The debate was among other issues inspired by the initiatives of The Club of Rome. The first world-wide oil crisis also occurs around this time.

We believe that the new phase will be a sustainable era – that the realization that we are now in the Anthropocene epoch creates a new perspective – where the central focus of still more and more decisions will be on life and respect for life in all its forms and representations. Respect for nature and the yet unborn generations.



A paradigm shift in process: In the illustration this period of transition or developmental quantum leap is divided into four sectors that represent a phasing out and a development, respectively. In sections 1 and 2 the focus is on phasing out and developments that have already occurred and which we hence are able to analyse and describe. In sections 3 and 4 the focus is on phase-out and developmental processes that have not yet eventuated.

The greatest alteration or the most significant change of gears in this process of development and learning concerns the shift from being controlled by and focused on external factors to an anchoring of attentive consciousness in the individual human being, in other words to change explicit disposition.

One of the great challenges of our time is to heal the fragmentations perpetrated during the last decades. In many areas there is a profound need to create coherent and systemic – holistic –concepts. Our aspirations should be aiming for this, and we ought to believe that they can be realized. We should believe in human beings and the meaning of inter-human confidence. The sciences of the human psyche, inter-human relations, and the planet demonstrate that we are intimately connected on macro as well as on micro levels.

We know for certain that everything in the world is interconnected. The actions taken by the company, events in the kindergarten, our consumer choices, various political decisions – all these decisions and actions create certain conditioned responses. It is our thoughts and attitudes, emotions, and assessments – or in Peter Senge's concise formulation: it is the mind-set of the past. It is urgent to foster and formulate a new mind-set.

Western science has had a tendency to recognize only objectively measurable data as science. However, recent technological landmarks like, for instance, various types of brain scanners, new neuroscience, and the establishment of a neurophenomenology per se have created an interface, where internal and external sciences focusing on human beings perhaps will become two sides of the same coin.

"Historically, we in the modern, scientifically oriented West have isolated the mind from the body, from nature, and from other minds. Our experience of our body, nature, and other minds has to be constructed privately... We are now experiencing a revolution...that the mind is always embodied in and made possible by sensory-motor activity of the person, that it is interwoven with and co-created by the physical environment that immediately surrounds it, and that it is constituted by way of its interactions with other minds. The mind emerges and exists, from intrinsic self-organizing processes, interacting with other minds."

Daniel Stern

2.1 From Ego to Eco-Consciousness

A number of greatly varied sciences and professions are engaged in elucidating the dynamics between humanity and nature. This applies to areas within biology, psychology, sociology, anthropology, neuro-phenomenology, systems science, and organizational theory, etc. – which, each in their own way, have interesting angles on sustainable organizational processes.

We are surrounded by knowledge and constant reminders of how the universe functions. We are well aware of the types of actions which support increased complexity and order, and the types of activity that lead to chaos and destruction. We are rediscovering how all forms of life depend on each other and the environment, and the precise extent to which every single action entails a series of consequences. We are surrounded by evidence of how difficult it is to create order and useful energy, and how easy it is to waste it in chaos. We have learned that the consequences of our actions might not be immediately apparent, that they might set off chains of events in distant contexts, because in a global

perspective all issues are part of a larger interconnected system. We are aware of these parameters, but we do not have sufficient knowledge about how we transform these insights into actions and new practices – a tremendous challenge for humanity.

The focus is on the development of a more basic framework or understanding of (inter)human sustainability which again reflects on society and the planet at large.

We must develop a serious approach to the fact that emotions, thoughts, assessments, and decisions originate in the mind, and as such are firmly lodged in human beings. We sense, experience, and act on the basis of internal processes, but which criteria constitute the basis of these processes and how does the internal "control system", which we all have, function? Moreover, we need to take a closer look at the ways in which the organic and sustainable mechanisms of our living organisms are optimized and explicated. Otto Scharmer is in his book *Theory U (2007)*, emphasizing the process going from *ego-system-awareness to eco-system-awareness.*

"I think it is now time for social scientists to step out of the shadow and to establish an advanced social sciences methodology that integrates science (third-person view) social transformation (second-person view) and the evolution of self (first-person view) into a coherent framework of consciousness-based action research".

Otto Scharmer

We have enormous insight in and knowledge of the history and the state of the planet, but also of future opportunities and pathways. The challenge is to prioritize sustainability, involving life and self-organizing life processes, as our most important objective.

We must qualify our collective and international ability to see and understand connections and contexts. We could do so by for instance giving priority to interdisciplinary research in sustainability and ecological intelligence. Furthermore we could unite for example the sciences of physics, chemistry, biology, political science, and other professional fields in an attempt to expand our knowledge about the external collective. This approach could be supplemented with medicine, psychology, neuroscience, and other fields to increase our knowledge of the internal aspects of life processes. In practice this could come about by inventing an alternative university of the future, which would differ radically from the constructions and the structures we know today. Only a holistically oriented science of sustainability can give us the comprehensive and sufficient knowledge and tools necessary to help us raise the level of knowledge and intelligence to a point where we can begin to see how our actions influence the individual human being, the social systems, and the planet at large.

A crucial factor in this developmental and descriptive work will be a clarification of shared concepts and language. We must select or engage with some shared foundational references. One of the goals of this article is to make suggestions as to how this might be done.

In the following section we take a look at general definitions or understandings of such basic concepts as for instance nature, eco systems, and culture, and thereby become more conscious of borders and transitions. Further on, we will pinpoint keyaspects of the ongoing paradigm processes.

2.2 Nature, Ecosystems and Culture

From Wikipedia

Nature

Nature, in the broadest sense, is the natural, physical, or material world or universe. "Nature" can refer to the phenomena of the physical world, and also to life in general. The study of nature is a large part of science. Although humans are part of nature, human activity is often understood as a separate category from other natural phenomena.

The word *nature* is derived from the Latin word Natura, or "essential qualities, innate disposition", and in ancient times, literally meant "birth". *Natura* is a Latin translation of the Greek word *physis*, which originally related to the intrinsic characteristics that plants, animals, and other features of the world develop of their own accord.

Ecosystems

An ecosystem is a community of living organisms in conjunction with the non-living components of their environment (things like air, water, and mineral soil), interacting as a system. Ecosystems are defined by the network of interactions among organisms, and between organisms and their environment. Ecosystems are controlled both by external and internal factors. Ecosystems are dynamic entities – invariably, they are subject to periodic disturbances and are in the process of recovering from some past disturbances.

Biodiversity affects ecosystem function, as do processes of disturbances and succession. Ecosystems provide a variety of goods and services upon which people depend; the principles of ecosystem management suggest that rather than managing individual species, natural resources should be managed at the level of the ecosystem itself.

Culture

The Cambridge English Dictionary states that culture is, "the way of life, especially the general customs and beliefs, of a particular group of people at a particular time."

As a defining aspect of what it means to be human, culture is a central concept in anthropology, encompassing the range of phenomena that are transmitted through social learning in human societies.

The modern term "culture" is based on a term used by the ancient Roman orator Cicero in his *Tuscilanae Disputationes*, where he wrote of a cultivation of the soul or *"cultura animi",* using an agricultural metaphor for the development of a philosophical soul, understood teleologically as the highest possible ideal for human development. Samuel Pufendorf took over this metaphor in a modern context, meaning something similar, but no longer assuming that philosophy was man's natural perfection. His use, and that of many writers after him *"refers to all the ways in which human beings overcome their original barbarism, and through artifice, become fully human*".

Philosopher Edward S. Casey describes: "The very word *culture* meant "place tilled" in Middle English, and the same word goes back to Latin *colere,* "to inhabit, care for, worship" and *cultus*, "A cult, especially a religious one." To be cultural, to have culture, is to inhabit a place sufficiently intensive to cultivate it – to be responsible for it, to respond to it, to attend to it caringly".

The Anthropocene

The Anthropocene is a proposed epoch that begins when human activities started to have a significant impact on Earth's geology and ecosystems. Many scientists are now using the term "Anthropocene". It has no agreed start date, but some scientists propose, based on atmospheric evidence, that it may be considered to start with the industrial revolution (late eighteenth century). The human impact on biodiversity forms one of the primary attributes of the Anthropocene. Humankind has entered what is sometimes called the Earth's sixth major extinction.

Ecosystem services

The benefits people obtain from their interaction with nature, including provisioning services (e.g. water, timber), regulating services (e.g. climate regulation) and cultural services (e.g. nature-based recreational and cultural activities). *(Principles for Building Resilience, page. 22)*

In the following I shall introduce a general approach to the understanding and sensibility of the ways in which life and complex systems function:

2.3 Principles of Living Complex Systems – ecosystems

"Living systems ensure balance (homeostasis) and sustainability through varied forms of feedback from within the system itself and from the surroundings and the environment."

Steen Hildebrandt/Michael Stubberup

A living system is an organized pattern or a network of elements which are coordinated, mutually dependent, and function as a totality. You cannot divide the totality into its elements without losing essential synergy, and likewise the parts cannot be understood without a relation to the whole, which again differs from the sum of its parts. Everything is a part of one or more systems. Furthermore, biological and social systems are open systems. This means that their relations to external elements and systems are mutually influential.

Living complex systems are open and chaotic, and they follow a number of basic rules or principles.

The first principle is:

Self-organization
The living system interacts with all the elements and components, which generate its complexity. In this comprehensive communication and feedback a self-organizing flow is created and developed over time.

The second principle is:

Increased complexity
Complex systems tend to move in the direction of still greater complexity. This means that the various elements in the system in time will become increasingly integrated. This indicates that the system's complexity is increased. The continual increase of integration is also identical to the system's harmony and balance.

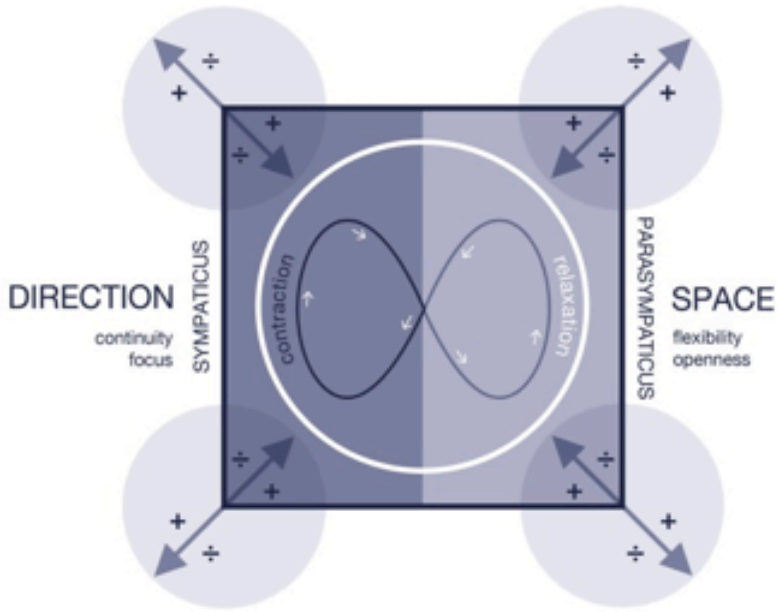
Increased complexity occurs in two basic forms: 1. Balance i.e. a still greater increase in complexity – *integration and harmony* – and 2. Disturbance and imbalance manifested either as *rigidity or chaos.*

The system maximizes complexity by listening to, connecting, and creating coherence between its various components. In this way it creates an integrated sustainable system. When the system is in this condition the third principle applies. The system will then be:

Flexible, adaptable and stable
The system gains stability while progressing towards complexity. The complexity is not achieved via random activities, but it is increased through the balance between the *continuity and the flexibility* of the system. The *continuity* refers to the resources achieved in former conditions. Hence the continuity points to the probability that these conditions will be repeated. Continuity generates consistency, familiarity, and predictability. Conversely, *flexibility* refers to the system's degree of sensitivity to the conditions of its surroundings, i.e. the ability to undergo changes to new modes which involve uncertainty. In this way the ability to bring about new variations affords the system an opportunity to adapt to the surroundings.

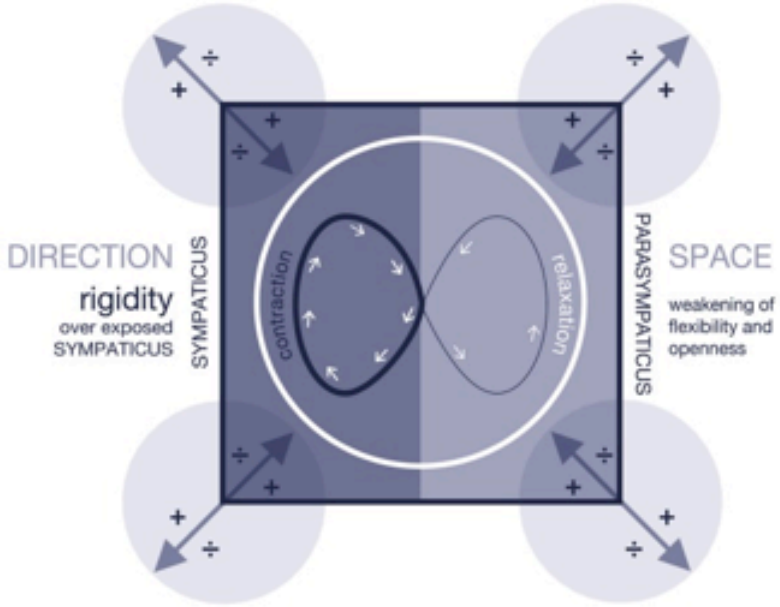
In human beings, balance (homeostasis) and feedback are closely connected to the autonomic nervous system. The organic and complementary rhythm between the sympaticus (continuity) and the parasympaticus (flexibility) ensures integration and harmony.

When the system is in balance, the energy flow of information and communication is organized in a continual interaction between the sympaticus and the parasympaticus.

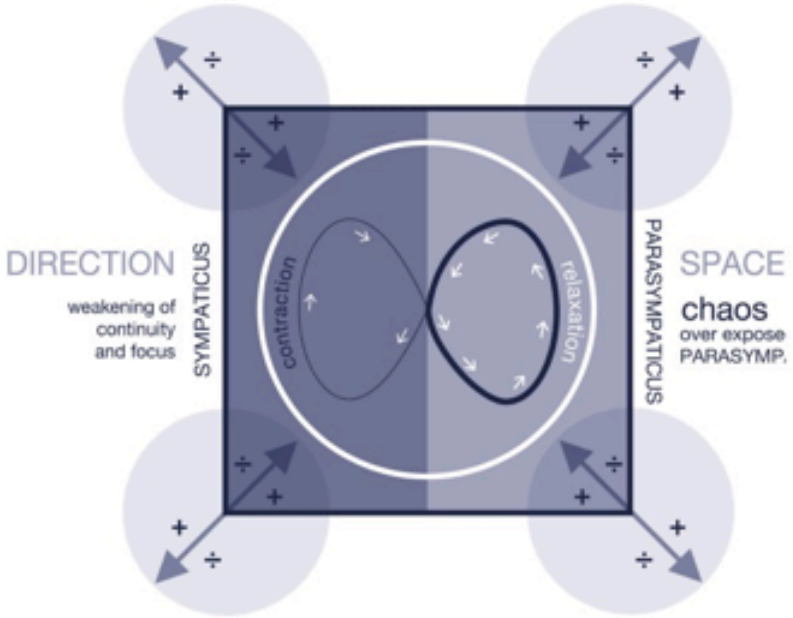


Sustainable balance – harmony in a complex living system

When the system is unbalanced, the energy flow of information and communication is weakened and tends towards either rigidity (sympaticus) or chaos (sympaticus).



Imbalance – tending towards rigidity

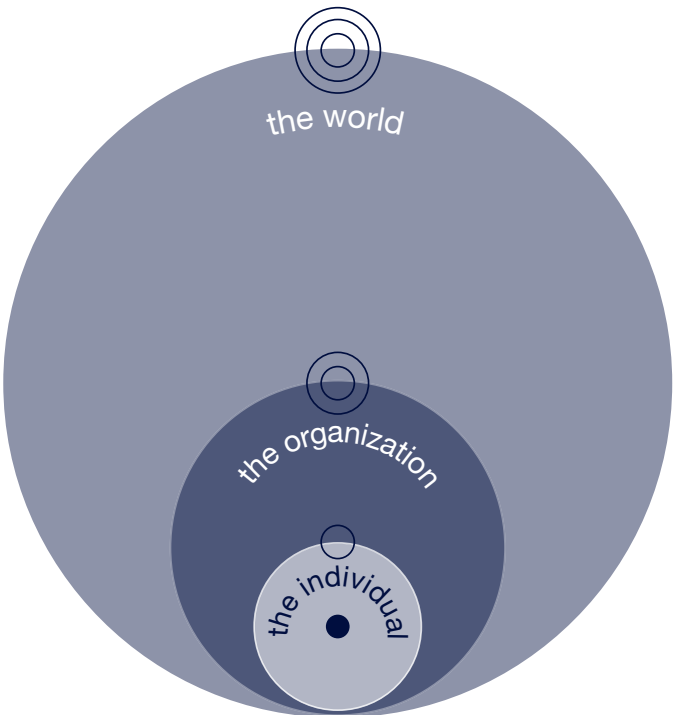


Imbalance – tending towards chaos

2.3 Living Complex Systems - Ecosystems

All systems are embedded in subsystems and metasystems. A human being consists for instance of a wide range of subsystems, e.g. organs, cells, etc. Concurrently we also participate in metasystems such as a family, an organization, a city, and ultimately the planet, the solar system, and the universe. Living systems are characterized by three important traits:

- Autonomy
- Circularity
- Self-reference



These characteristics enable living systems to create or renew themselves. As mentioned, the cognition biologists Humberto Maturana and Francisco Varela call this ability autopoesis, which literally means self-creation or self-production. The theory of autopoesis also considers the surroundings of a given system, but insists that the connections to any environment are conditioned by the system's internal factors. This means that the perception patterns (or the matrix) of the human brain and nervous system decide how a human being perceives external reality. Maturana and Varela also question the validity of distinguishing between a system and its surroundings. They do not consider systems to be totally isolated, even if living systems are closed and autonomous like human beings. The closure and autonomy mentioned are by nature organizational. Living systems encapsulate themselves for the purpose of creating communication patterns. The big question is where one system begins and ends? Systems are like Chinese boxes. They are totalities within greater unities. The system has no beginning and no end, because it consists of a closed loop of actions and communication. Its basic purpose is to reproduce itself. The main product is the system's own organization and identity.

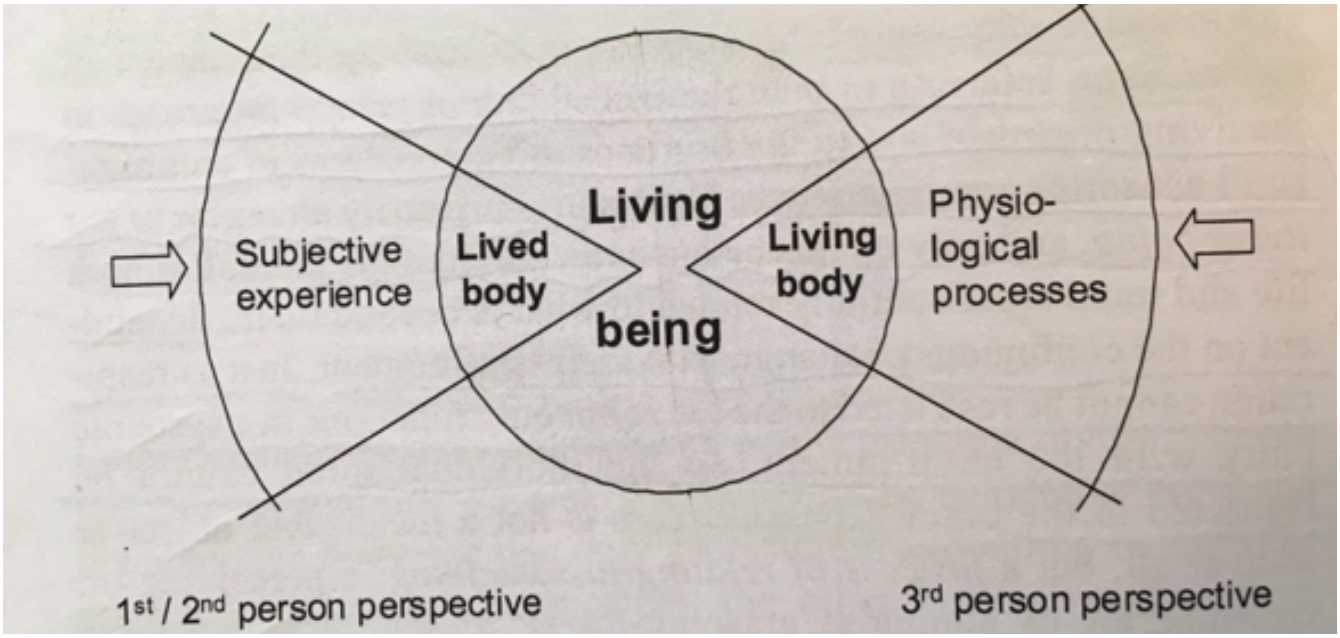
2.4 Neurophenomenology

Neurophenomenology is a research area that associates a classical empirical perspective (the so-called third person perspective) with subjective inner experiences (so-called first or second person perspective). You apply the understanding that the brain is a coordinating and mediating organ.

Neurophenomenology combines neuroscience with phenomenology in order to study experience, mind and consciousness with an emphasis on the embodied condition of the human mind. (Wikipedia)

"The brain is conceived as a plastic system of open loops that are formed in the process of life and closed to full functional cycles in every interaction with the environment. Each time a new disposition of coherent neural activity is formed through repeated experience, structures of the mind are imprinted onto the brain. The brain becomes a mediating organ or a window to the mind, for it is structured by the mind itself".

Th. Fuchs 2011



Cycles of Embodiment

Thomas Fuchs describes three interactive cycles mediated by the brain:

1) *Cycles of organismic self-regulation, including a basic bodily sense of self*

This first one has to do with regulatory cycles Involving brain and body at multiple levels.

2) *Cycles of intersubjective interaction, underlying the social self*

The human nervous system and our affective and emotional expressions are meant to participate and resonate with other peoples expressions.

3) *Cycles of sensorimotor coupling between organism and environment – resulting in an ecological self*

The main task of the nervous system is to mediate the cycles that connect organism and environment.

2.5 Social-Ecological Resilience

"The situation of the Anthropocene – where biosphere is shaped by humanity from local to global levels – reinforces that there are no ecosystems without people and no human development without support from the biosphere, hence, social-ecological systems".

Carl Folke

During the last decade the Stockholm Resilience Centre has researched and done interesting work on so-called Complex Adaptive Systems (CAS) in social-ecological systems. They have found seven principles that support the build-up of resilience: Diversity and redundancy, coherence and network, markers and feedback, knowledge of complex adaptable systems, action learning, inclusionary participation, support of multiple leadership systems.

A social-ecological system is an integrated system consisting of individuals and nature. They are intimately connected through comprehensive feedback.

The binary aspect – social and natural processes – has sparked the rapidly expanding professional field of social ecology, i.e. research in and experience of interference and dynamics occurring in social processes, cultured landscapes, and nature.

2.6 Ethics and Systemic Existentialism

The ethical and existential perspectives – the responsibility of handling the basic challenges in life – have traditionally been grounded in local life. The individual human being has responsibility for his or her own life – the responsibility for creating meaning, generating contact and coherence with other people. The individual is first and foremost challenged by his or her own mortality.

The understanding that the Anthropocene reality, as well as the phenomena and crises associated with this reality, change this perspective. Now survival is for instance no longer focused on the lone individual, but also on the species as such. This change in perspective is decisive to individuals and humanity at large. This is also the point of the hypothesis of the Anthropocene epoch or age.

"The human being is challenged by a specific question on responsibility in relation to a world whose condition the individual cannot be held responsible for. However, the individual is not entirely without guilt by virtue of the fact that he or she is a part of humanity."

The Human Turn

In the 60s and the 70s the German philosopher Hans Jonas published on the subject of creating an ethical approach that breaks out of the anthropocentric shell. He saw that human beings affected the processes of the globe so profoundly that the only right thing to do would be to proactively take responsibility beyond the human sphere, and hence also address ethical questions of the future in terms of nature, life, including the unborn human being, the next generations.

In the beginning of the 80s the concept of sustainability was introduced by Lester Brown (the founder of the Worldwatch Institute) and some years later the Brundtland Report provided the well-known definition that reminds us of our responsibility for preserving opportunities and resources for our descendants.

In 1987 the ground breaking book *The Tree of Knowledge* was published:

Every act in language brings forth a world created with others in the act of coexistence which gives rise to what is human. Thus every human act has an ethical meaning because it is an act of constitution of the human world. This linkage of human to human is, in the final analysis, the groundwork of all ethics as a reflection on the legitimacy of the presence of others. (Maturan/Varela)

The central point in the theory by Varela and Maturana, *The Santiago Theory of Cognition*, is that the process of cognition is identical to the life process. This means that life and sustainability basically concern cognition. Cognition occurs on all levels in life. In this context cognition is not limited to the human capacity for explicit reflection, but includes the inherent ability of all living organisms to adapt continually via the formation of structural links between themselves and the surrounding environment. Every organism is linked to the surrounding environment and is modified through interaction with this environment in order to ensure survival. The automatic exchange between a unique organism and the surrounding environment is cognition and learning. All living systems have an inherent intelligence. The feedback mechanism of an organism equals a cumulative cognition process.

The human turn

"Transitioning to the Anthropocene age, we seem to cross a threshold and step into a new and unknown territory of fundamentally new conditions, which we at this point can only see faintly."

The Human Turn

The human turn was a Danish research project of three years duration supported by the Velux Foundation. The purpose was to explore the new definitions of humanity in the current scientific and societal paradigms. The point of departure is six individual projects and cross-disciplinary fields that address the development of an intra-disciplinary science focusing on humanity.

One of the research conclusions is that the human turn occurs as a result of the new Anthropocene reality and hence the anthropocentric human being disappears. In this new reality *"human beings are resurrected in the environment they try to inhabit… by addressing the surrounding world human beings also begin to address themselves… they should be able to respond to and account for their approaches…" (The Human Turn)*

The phenomenon of sustainability will thus – in humanity's perspective – be addressed in systemic, existential, and ethical ways, where the personal responsibility and the shared holistic responsibility are identical. Or in other words, the responsibility for who you are and the shared responsibility for the community of which you are also always a part, are two sides of the same coin. To the individual the challenge is to focus directly on respect for life in conjunction with our more profound and significant values, and the positioning of these values in the personal, the social, and the societal spheres – the cornerstones of culture.

In the history of human development a decisive shift occurs when we acquire the ability to reflect - to know about knowing. With the capacity for reflection we generate a living system of untold opportunities from our primary survival oriented self-organizing process. The ability to reflect expands our consciousness in time and space, and creates a spontaneous existential situation. We are for instance able to understand that we are mortal.

3. Sustainability, Resilience and Health

Sustainability is about seeing and recognizing the dynamic, cyclical, and interdependent nature of all the parts and pieces of life on earth, from the soil under our feet to the whole planet we call home, from interactions of humans with their habitats and each other to the invisible chemical cycles that have been redistributing water, oxygen, carbon, and nitrogen for millions of years.

Margaret Robertson

In this chapter we shall give an overview of some of the central aspects/ areas in focus in terms of trying to understand more about sustainability, resilience, and health in the context of humanity.

What is health in terms of physiology, emotions, mental functions or existential considerations? What skills, principles or intelligences partake in and promote social processes, and how do we become better at learning from and making the most of nature's ways of organizing, living, and leading? How do we rediscover nature in ourselves and develop our ability to transform challenges to necessary changes? How do we create a more organically founded and robust society based on knowledge and respect for life, as well as holistic approaches to the biosphere?

*In ecology, **sustainability** is the capacity to endure. Healthy ecosystems and environments are necessary to the survival of humans and other organisms.*

*Resilience in **ecology** is the capacity of an ecosystem to absorb disturbance and still retain its basic structure and viability.*

***Health** is the level of functional or metabolic efficiency of a living organism. In humans it is the ability of individuals or communities to adapt and self-manage when facing physical, mental or social challenges (metabolism is the set of life-sustaining transformations within the cells of living organisms - these enzyme-catalyzed reactions allow organisms to grow and reproduce, maintain their structures, and respond to their environments). WHO defines health as a state of well-being in which the individual realizes his or her own abilities, can cope with normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.* (Wikipedia)

We need to attempt to understand some of the biophysiological processes involved in securing our survival, reproduction, and development – on individual as well as social levels.

Taking our point of departure in the theory of complex living systems, it is possible to see how all aspects of a human being's interior and exterior life processes interact in various ways, from cells and organs to the entire human being, who is also part of social structures such as families, communities, and societies.

Focusing on living systems, we see Mother Nature as a guide. Once she likes ideas or principles, she stays true to them by repeating such structures and strategies. This occurs in still more comprehensive layers of complexity – from neurons to social processes. In other words this complexity characterizes the nexus, where some of the central foundation principles of biology generate human coherence and integration.

Like every living system - from single neurons to complex ecosystems - the brain depends on interactions with others for survival. Each brain is dependent on the scaffolding of caretakers and loved ones for its growth and wellbeing. So we begin with what we know: ***The brain is a social organ of adaptation built through interactions with others….there are no single human brains - brains only exist within networks of other brains****.*

Louis Cozolino

Our task is hence to rediscover nature in ourselves and associate this basic domain with the social landscapes of the cultures we have created.

The fact that the nervous system is a highly specialized adaptation organ is a considerable resource as well as a challenge. On the positive side we have a good ability to adapt to unexpected challenges and survive. A negative aspect is that: *We are just as capable of adapting to unhealthy environments and pathological caretakers.* (L.C.)

Since all living organisms are organized by among other things the general principles of survival and reproduction, all subsets of these processes and systems must also to some extent be governed by these general perspectives. The control and regulation occur via comprehensive feedback systems, where the individual elements in the systems communicate with each other. When one aspect of a living system is affected, such an effect will to some extent resonate within the rest of the system.

3.1 Health as Resilience

On the basis of our knowledge of living systems and our knowledge of the ways in which organisms are organized, we can define health as a state of optimal self-regulation. Healthy organisms are thus organisms which – while constantly interacting with the surrounding environment – are capable of maintaining a suitable internal balance. The healthy organism is capable of reacting in biologically, psychically, and behaviorally suitable ways in accordance with given contexts and conditions. The healthy organism encourages us to behave in ways that are beneficial to our internal balance. (Bobby Zachariae, Professor, Dr. Med.)

Resilience

The concept of resilience has been researched and explored in a number of professional areas.

In the 1970s Aron Antonovsky associated the concept with a sense of coherence and the three central aspects that support the experience of coherence:

The sense of coherence is associated with the dynamics between

A. *comprehension:* the ability to transform experiences and learn from life, and thereby experience a degree of predictability

B. *manageability:* the way in which you transform challenges and hence build up greater robustness or ability to balance strain

C. *meaningfulness:* the way in which you transform yourself and participate in communities and semiotic systems.

The Canadian Professor Michael Ungar also contributed considerably to resilience research. He contributed to the identification of the most important resilience factors at play between children and adults subjected to changes and stress. Among other projects he edited a comprehensive book called *The Social Ecology of Resilience* (Springer Verlag).

When you gather various perspectives on resilience developed in social psychological fields, a number of aspects occur, which seem to further adaptation and robustness in human beings:

1. Meaningful life (purpose) – realistic plans and steps

2. Perseverance and Self-reliance – a positive self-concept and confidence in one's strengths and abilities

3. Communication and problem-solving skills

4. Equanimity – the ability to manage strong impulses and feelings

5. Coming home to yourself (existential aloneness)

Other researchers and practitioners have created a bio-psycho-social health concept, where the connection between biological, psychological, and social processes, and the significance of these to our health, is in focus.

In this perspective the human being is perceived as a living system organized in such ways that the internal processes co-operate to maintain an internal balance – also called homeostasis. As mentioned, living systems are constructed as self-organizing systems that continually adapt to external influences as well as to the internal changes in the system.

The cumulative effect of the feedback ensures that we maintain for instance a normal range of body temperature as well as balanced fluid and salt levels. These dynamics are self-organizing and self-regulatory.

It is decisive to the system's ability to self-regulate that the feedback and communication processes function well. Since we are social beings, sensibility, feelings, thoughts, contact, and attachment are also part of this self-organizing flow.

In this perspective health can be defined as a state of optimal self-regulation.

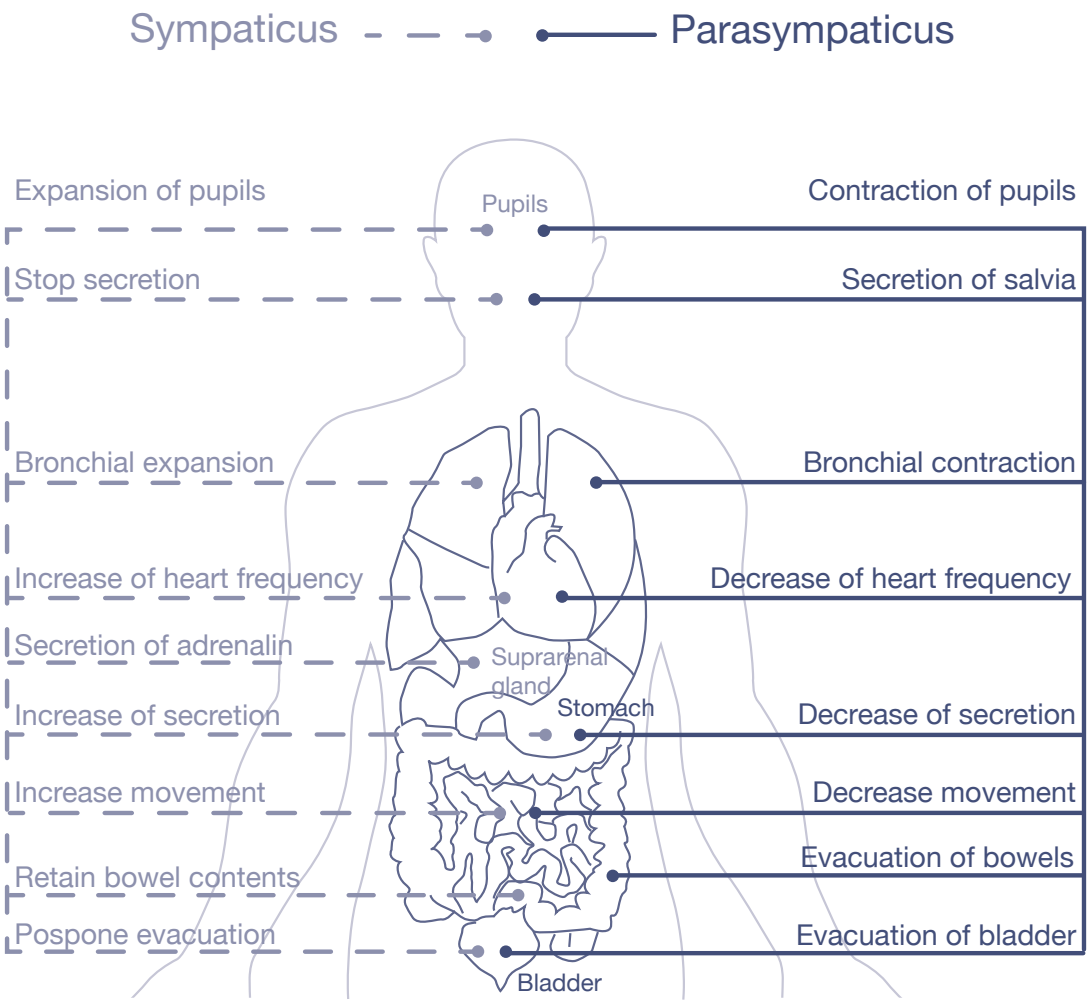
Our ability to self-regulate depends on well-functioning information and feedback systems as well as on our ability to perceive, interpret, and react to the signals we receive from our own body and our surroundings. An important precondition of health is our ability to perceive and respond to thoughts, emotions, and sensations. Moreover, our health also depends on our ability to understand what goes on around us.

Bobby Zachariae

3.2 Bio-Markers – Everyday Expressions of Resilience

The resent quotation explains that it is a precondition for self-regulation that we understand and know our information and feedback systems. In this context it is important that we understand that such feedback systems are embedded in a hierarchy at the bottom of which we find the central dynamics. In human beings these are associated with survival and reproduction – as expressed by the autonomic nervous system. Over time evolution has fine-tuned our contact with the body, our breathing, and the heart. Moreover we have developed a strong awareness of the autonomic nervous system's dynamics between tension and relaxation.

In an evolutionary perspective the human nervous system is constructed in such a way that it is constantly sensing and scanning inside out and outside in, in a calm and regular rhythm. Sympaticus and parasympaticus, the two branches of the autonomic nervous system, coordinate the heart rhythm in an even variation – sympaticus increases the heart rhythm and alertness, while parasympaticus lowers the heart rhythm and attends to relaxation and regeneration. The continuous out-in and in-out rhythm is co-ordinated with the sensing of the body and experiencing the external world through the senses. It is like a pendulum or an open/close mechanism which constantly alternates between being ready for action and then resting, constantly changing between sensing the surroundings and sensing itself. The constant organic attentive listening is vital to the feedback system, which since time immemorial has ensured survival and sustainability. The nervous system is totally committed to linking the internal and the external worlds.



The Autonomic Nervous System

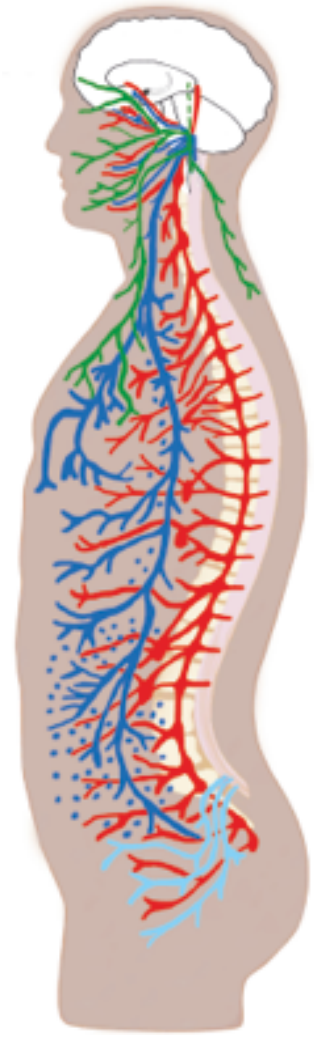
First we focus on the autonomic nervous system. Initially we shall take a look at its basic functions as they manifest in human beings. Then we move on to explore three models illustrating ways in which we can understand the autonomic nervous system in conjunction with the principles of complex systems. Subsequently we discuss imbalances and dysfunctions; the maintenance of inexpedient conditions or collapse will manifest as imbalance or trauma.

The intention is to point out how the autonomic nervous system is a decisive factor in the feedback system. It is hence also an important factor to read early warning signs of incipient imbalances – in this way the autonomic nervous system becomes an important gateway to the mastery of challenges and hence sustainability.

The autonomic nervous system is a comprehensive and complex structure whose main function is to support the body's internal balance system, also called the homeostasis. The autonomic nervous system is the neurophysiological basis of sensation. One of the simplest ways to link up with the homeostatic process is through the two branches of the autonomic nervous system: sympaticus and parasympaticus. Sympaticus guides and controls activation in response to threats and other kinds of high level energy processes, which manifest through an increase in the heart rhythm. Parasympaticus regulates relaxation, sleep, the lowering of the heart rhythm. The regulation of the relaxation also involves the emptying of the bowels and the bladder.

The Polyvagal Theory

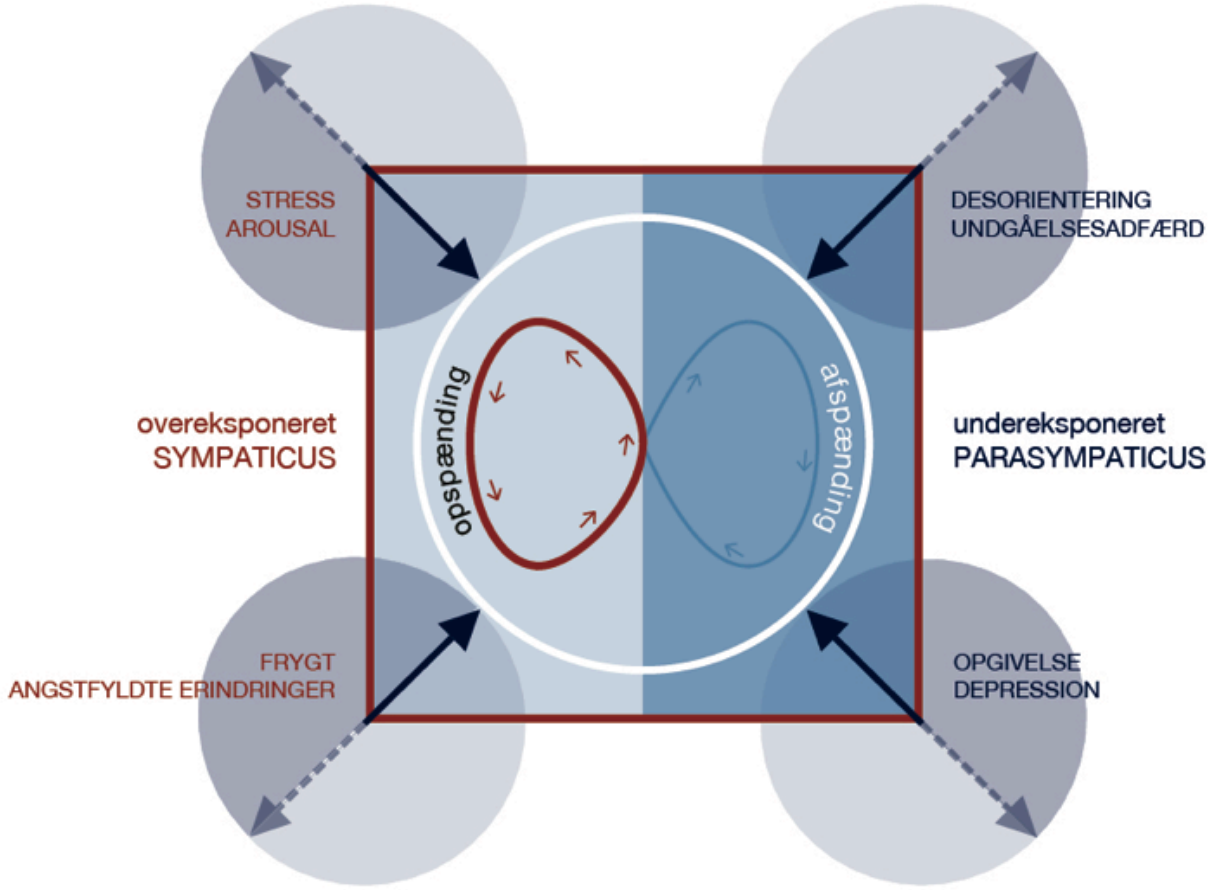
In recent years research into emotions and their basis and interaction with the autonomic nervous system has resulted in new comprehensive theories about the tenth cranial nerve, also called the vagus. The originator is Professor of Psychology Stephen W. Porges, who is supported by a number of the world's leading neurologists, psychologists, and psychiatrists. The central aspect of the theory is that the autonomic nervous system consists of three sections instead of the well-known two described above, i.e. the vegetative vagus, the sympaticus, and the social vagus. The vagal nerve has two branches, an early primitive branch – the dorsal branch, and a later and more developed one – the ventral branch, which attend to quite different processes, both being associated with the parasympaticus. The first system, the vegetative vagus (the dorsal branch), supports digestion and administers immobilization behavior. The second system, the sympaticus, mobilizes the fight/flight system. The third system, which Cozolino calls the social engagement system or the mammal nervous system (the ventral branch), supports engagement in the surroundings and has the ability to influence the heart rhythm directly. The ventral branch is linked to all the cranial nerves that control the muscles around the eyes and in the face, including the mouth and the inner ear. These all undertake social communication via behavior used to define and express emotions. The vegetative vagal nerve and the sympaticus are active from birth, whereas the social vagus is only activated during the first couple of months of the child's life.



In this model (based on Pete Walker) red illustrates the sympaticus, the blue the dorsal vagus, and the green the ventral vagus.

Sympaticus as well as parasympaticus are crucial in terms of communicating bodily sensations to the brain and translating them to emotions. Emotions embedded in the body immediately change the heart rhythm, which again influences the brain activity. This process, this dance or this organic wave occurs continuously in the body. Every minute, every hour around the clock there is an arrhythmia between sympaticus and parasympaticus. The arrhythmia speeds up the heart rhythm and relaxes it; it is linked to the limbic system which ensures that the body is constantly aware of any reasons for being particularly vigilant. In an evolutionary perspective this is a reflection of the fact that human beings used to be possible prey for enemies of every description, including animals. The increase and decrease in heart rhythm, which happen in a matter of seconds, are also called the heart rhythm variation.

In the following model we have conjoined the principles of living complex systems (see page 11-12) with the autonomic nervous system:



Trauma and dysfunction

When human beings are affected by trauma, stress, and other dysfunctions, the adaptability is weakened – the feedback mechanism is out of balance – and the natural routine of transforming disturbances weakends and freezes.

Trauma and stress are always a systemic reaction, which subsequently unfolds as systemic dysfunctions via daily expressions of trauma.

The self-organizing features of mind are an enriched version of the self-organizing features of life. The self-producing or "autopoetic" organization of biological life already implies cognition, and this incipient mind finds sentient expression in the self-organizing dynamics of action, perception, and emotion, as well as in the self-moving flow of time-consciousness … mental life is also bodily life and is situated in the world. The roots of mental life lie not simply in the brain, but ramify through the body and environment.

Evan Thompson

4. The Human Interior - the View from Within

This section concerns the description of various aspects and elements of the human interior. In this process we will take our point of departure in elements described in previous sections, and develop them step-by-step.

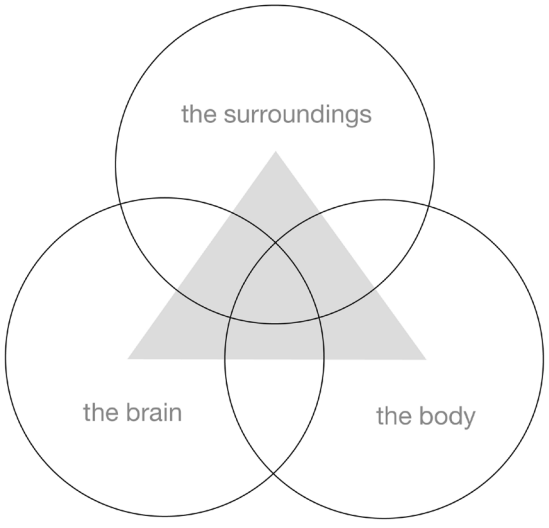
First we shall take a look at the principles inherent in living complex systems. When the processes in living complex systems are self-organizing – and thus also apply to human beings – they manifest in deeply embedded interior processes, and hence it is natural that this aspect should also be addressed. We wish to integrate part of the dynamics in the system of survival: basically we shall focus on the ways in which the nervous system responds to the processes of perception. In other words, the process of developing awareness.

So the basic question and the conduit to this section concern the modes in which we in concrete and practical ways can create an internally defined framework for sustainability in the individual human being. We have a suggestion as to how we can begin to develop a vocabulary that describes some of the central processes inherent to our nature – for instance the perception process, which is central in the context of survival. How does the individual human being sense, perceive, and gain experience?

The system of perception is a system of orientation, which in the present uses cumulative past experiences to predict the near future – with a view to ensure survival and reproduction.

When this translates to concrete action, we human beings use the following elements in our perceptual process:

1) *the memory system – the brain*
2) *the body – both as internal reference system and as external sensory reference when in contact with other people*
3) *the surroundings/the holistic model*



We use these elements in a comprehensive feedback process, creating a databank of cumulative information in the present in order to assess and strategize the next step.

This corresponds to the three circular movements which neurophenomenology uses as its point of departure – as mentioned on page?

For that reason this section concerns the definition and preparation of transitions between the timeless survival system, which we all express, as opposed to the cultured mind's social processes embedded in time – past, present, and future.

The decision to opt for real qualities in life is by no means a natural development for everyone. In fact, it seems that everything works against precisely this choice. If we do not consciously take control of our own lives, we will always be controlled by external forces that serve other purposes. Biologically programmed instincts will for the greater part of our lives "blindly" try to force us into a number of activities, whose basic purpose is partly to maintain biological life (eating, sleeping, drinking, etc.) and partly to reproduce our individual genes (falling in love, loving, libido, etc.)… But what does it mean to choose life beyond just biological survival? It must mean to live life to the full without wasting our time and potentials, becoming capable of expressing our own special unique humanity, while still participating intimately in the social contexts we are part of – partaking closely in the complexity of the universe.

Mihaly Csikszentmihalyi, 2005

4.1 Embodiment and Gear Shift – from Implicit to Explicit

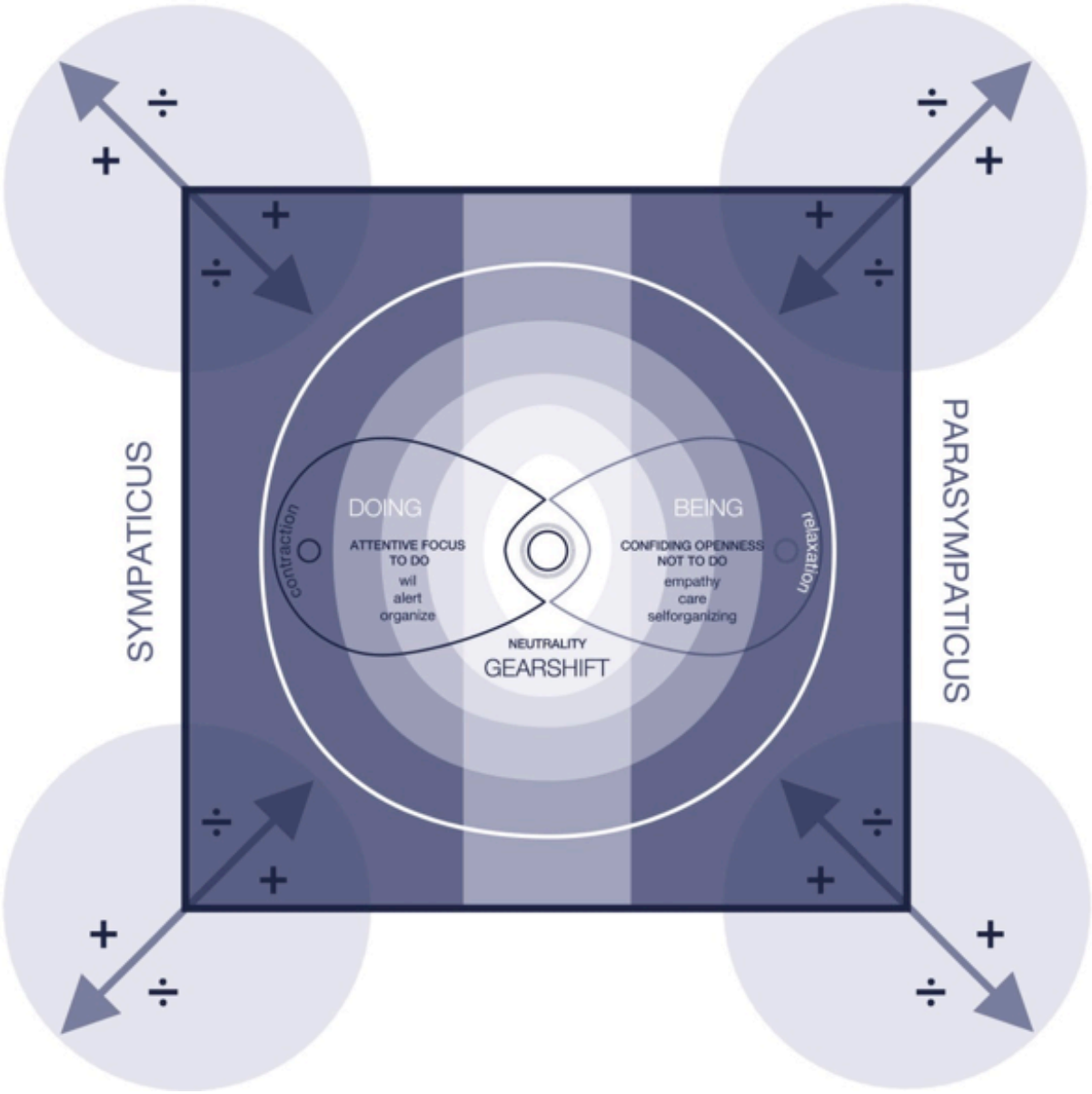
The basic processes associated with the body, breathing, and the heart occur autonomously and are hence self-organizing.in the quest to understand and develop an adequate discourse on this subject it is also necessary to place these self-organizing processes explicitly on the agenda. This occurs in mindfulness, relaxation, yoga, and many other training systems.

Here we have chosen to apply a broader and more general term: the gear shift.

The concept of the gear shift is important to the practical development of the ideas and the directions discussed in this paper. The concept of changing gears means to become conscious of any kinds of changes, and to understand what happens while it happens. Changing gears is a quite simple method of paying attention to changes in general and specific patterns.

The autonomic nervous system, which performs the central function of maintaining the body's internal balance through the homeostasis, provides an opportunity to learn about sustainability in a human context. The autonomic nervous system is also, as previously mentioned, the neurophysiological basis of sensation. One of the simplest ways to link up with the homeostatic process is through the two branches of the autonomic nervous system: the sympaticus and the parasympaticus.

The autonomic nervous system is a self-organizing "switch on-and-off" system. When one branch, for instance the sympaticus, is active, the other, the parasympaticus, is passive and vice versa. By reflecting on this issue, i.e. feeling and simultaneously recognizing the sympaticus as well as the parasympaticus, this "switch on-and-off" system is elevated to a "both-and" system. It thus becomes possible to simultaneously experience both explicitly. In time this process will generate a shared third space.



The sympaticus supplies attentive focus and the parasympaticus contributes confident openness. This blend generates an integrated registering witness function with an open neutral attention. As long as you can keep the balance, i.e. not give preferential treatment to either side, then it will be possible to witness more aspects of the ongoing events.

The greatest alteration or the most significant change of gears in this process of development and learning concerns the shift from being controlled by and focused on external factors to an anchoring of attentive consciousness in the individual human being, in other words to change your explicit disposition. We should learn from within the basic components of a human being, while also maintaining the individual as an instrument, by tuning and training him or her. The training is the crucial point, the vital discipline which enables a genuine change of gears.

*Autonomous systems are inherently **purposeful**, in the sense that they generate ends or purposes within themselves ... combined with **adaptivity,** autonomy generates sensemaking … **a point of view** from which the system and the environment are evaluated. The adaptive autonomous system is not just a unity of interrelations among processes but a **perspective** on the world that generates meaning and norms for itself, a locus of **inwardness.***

Colombetti, 2014

4.2 The Body-Mind as Nature, Culture, and Social-Ecological Systems

We have selected three different and completely developed cross-disciplinary aspects with which we have had a lot of experience through the years. These have been chosen to represent the human individual's inner experiences in three modes:

1) The social-ecological being – principles of social-ecological resilience – the Stockholm Resilience Centre

2) The internal culture – sustainable leadership – the triangle

3) The internal nature – empathy-work – the pentagon

The idea is to associate the principles in living complex systems with various domains in human beings. We shall take a look at where and how we can create language and thereby experiences describing internal processes – represented by the three domains; (pentagon and triangle) and SES. On the one hand we hope that this will be able to create greater clarity in terms of the various domains, because this process will give them a clearer profile. On the other hand the individual profiling will contribute to the clarification of the other domains. Moreover, the cumulative effect may perhaps contribute to the creation of a new holistic model of internally defined beneficial perspectives.

We have integrated these three in such ways that we get a preliminary description of how a human being on the one hand may experience self and mind as cumulative culture-specific experiences. These manifest in the past/present/future through subjective, intersubjective, and systemic processes – in the triangle and in a wider sense in the pentagon, where the timeless present moment expresses inherent competences; body/breath/heart/consciousness/creativity.

a) The pentagon relates to the individual as the nature-being – body, survival system or the sensory and the timeless aspect not associated with language

b) The triangle relates to the individual as a culture-being – fields of mind, language, and time

c) The three circles relate to the individual as a social-ecological and cooperating participant

When the brain makes maps, it informs itself… maps are constructed when we interact with others…from the outside of the brain toward its interior. I cannot emphasize the word interaction enough… action and maps, movements and mind, are part of an unending cycle….the human brain is a born cartographer, and the cartography began with the mapping of the body inside which the brain sits.

Damasio, 2010

As mentioned above, the main purpose of this article is to construct simple, natural, and concrete approaches to human sustainability. With regard to the human interior we distinguish between aspects associated with language and culture – embedded in timelines – and aspects associated with pre-language nature and the immediate sensibility embedded in the moment, which, as long as words and concepts are not applied, will manifest as timeless.

A) Interior "Culture"

When we zoom in and focus in order to find words to describe some of the quite basic interior processes of the individual, a number of questions arise – for instance how do human beings process/integrate the experience of:

Themselves i.e. subjectivity

The other(s) i.e. intersubjectivity

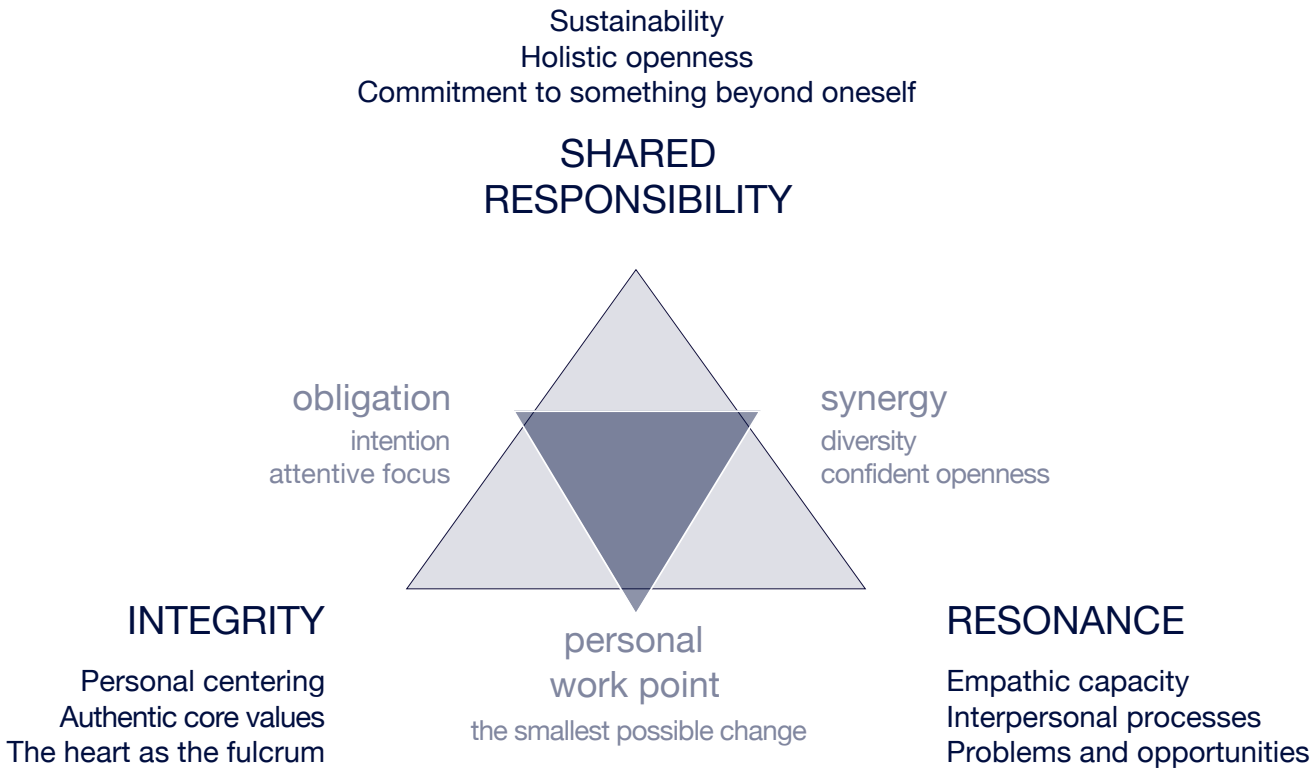
Communities/groups i.e. global concepts

We have unfolded these three interior landscapes in the leadership-from-the-heart triangle. This triangle reflects the three communication gears located in the processes of mind and personality

1) The way you sense, experience, and communicate with yourself – personal responsibility and confidence

2) The way you process yourself in contact with the other(s) – attentive presence and respect

3) The way you participate in and engage with communities/groups – shared responsibility and obligation.



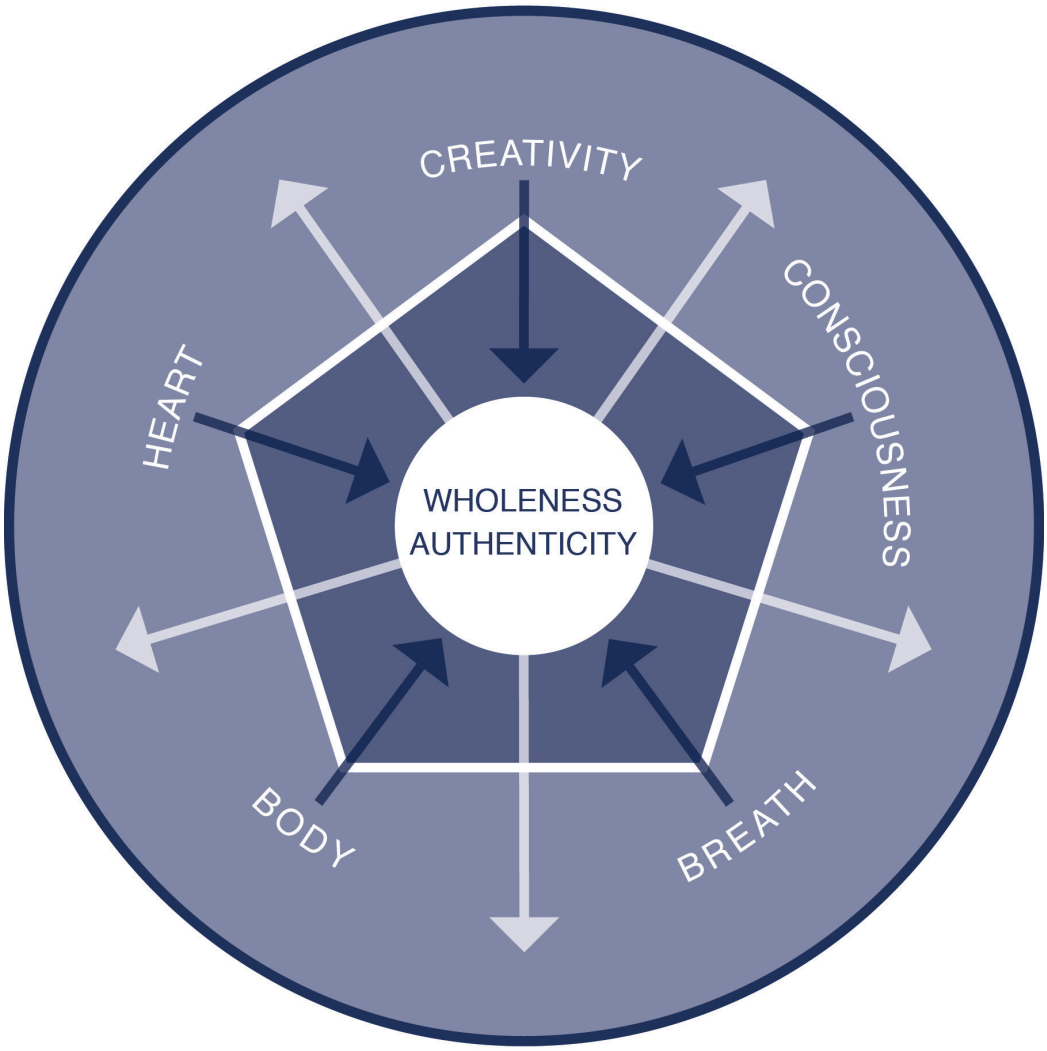
These three circularities will in the present form reflect the meeting between individual and culture – in the direction inside-out.

The left corner of the triangle, integrity (corresponds to point a) in the living system model), has an internal focus associated with the centering of the personality. The right corner, resonance (corresponds to point b) in the living system model), concerns contact and communication with individuals and smaller groups of people. The third and upper corner, co-responsibility (corresponds to point c) in the living system model), refers to commitment to and cohesion with organizational and holistic processes.

B) Internal ”Nature”

Below the threshold of consciousness the body’s self-organizing systems circulate in deep autonomous circuits. This is a perpetual process and we can access these landscapes through some of the natural entrances/doors, which we all know. We all have a number of innate non-acquired functions, to which we have immediate access: experience of the breath, the heart, the body, attention, creativity, and the many expressions of life they manifest in the body.

The so-called non-acquired functions, to which the five flow portals refer, also address the fact that these aspects are associated with our inherent biology and nature. It goes for all of them that their common denominator is the body in which the four other aspects are integrated and circulate.



THE PENTANGLE

five basic human capacities

Levels of Gearshift • 1

The model is a map of essential elements of the whole human being. And it is a description of how it is posssible to move inward towards deeper contact with oneself and outward towards better contact with one's fellow human beings. The map, also called gateways to empathy (Jes Bertelsen), covers five areas which we have the innate capacity to develop and explore. These natural competences are consciousness of:

1. The Body
2. The Breath - the energetic movements associated with respiration and contact to ANS
3. The Heart - attachment, affiliation, contact via eyes, trust
4. Basic Creativity, i.e. the fact that our environment, body and mind are experienced as being in uninterrupted creative movement.
5. Consciousness as such.

4.4 Social Sustainability – on Adaptability and Resilience

The Stockholm Resilience Centre recently published a systematic approach to the circularity of nature as well as the social processes of culture. Since the establishment of the Centre in the beginning of 2007, this line of thinking has been central to the cross-disciplinary and cross-scientific work. The international research projects, in which the Centre participates, has uncovered seven principles of resilience in social-ecological systems, and nine global/planetary borders (climate change, biosphere integrity, novel entities, stratospheric ozone depletion, ocean acidification, biogeochemical flows, land-system change, freshwater use, atmospheric aerosol loading).

The resilience approach views humans as part of the biosphere, and assumes that the resulting intertwined social-ecological systems behave as complex adaptive systems – i.e. they have the capacity to self-organize and adapt based on past experience, and are characterized by emergent and non-linear behavior and inherent uncertainty.

Biggs, Schluter, Schoon 2015

In the recent decade the Stockholm Resilience Centre has researched and worked on so-called complex systems of adaptation and their expression in social-ecological systems. A social-ecological system is an integrated system, consisting of human beings and nature, which are intimately associated via feedback loops on many levels. A resilience-based approach to sustainability focuses on the development of competences to contain and address unexpected changes, as well as on renewal and growth. In this perspective disturbances and changes are natural phenomena that should not be avoided. On the contrary they should be perceived as opportunities or potential for reorganization. The focus is on how to address the tension between continuity and change.

An important factor is ecosystem services: the benefits people obtain from their interactions with nature. Many variations on ecosystem services cannot be measured in fiscal terms. However, this does not decrease their significance. In fact it seems that some of those who are of least financial value may seem to be of the greatest significance to human quality of life in terms of identity and the meaning of life, and hence psychological well-being. This is of course old knowledge, manifested for instance in traditional societies' deep connection and interaction with nature – nomadic communities being naturally sustainable, etc.

Comprehensive experiences are accessible in terms of what furthers and supports resilience in various systems, be they landscapes, coastal zones, cities, etc.

In tandem with international colleagues, the Stockholm Resilience Centre has identified seven principles, which in decisive ways further resilience, adaptation, and robustness, central aspects of sustainability in such social-ecological systems. The focus is on the principles and work methods applied, when individuals and various public and private companies do multi-level co-operation on concrete projects located in the interface between society and nature.

1. Maintain diversity and redundancy

2. Manage connectivity

3. Manage slow variables and feedbacks

1-3, Key social-ecological system properties to be managed

4. Foster an understanding of social-ecological systems as complex adaptive system

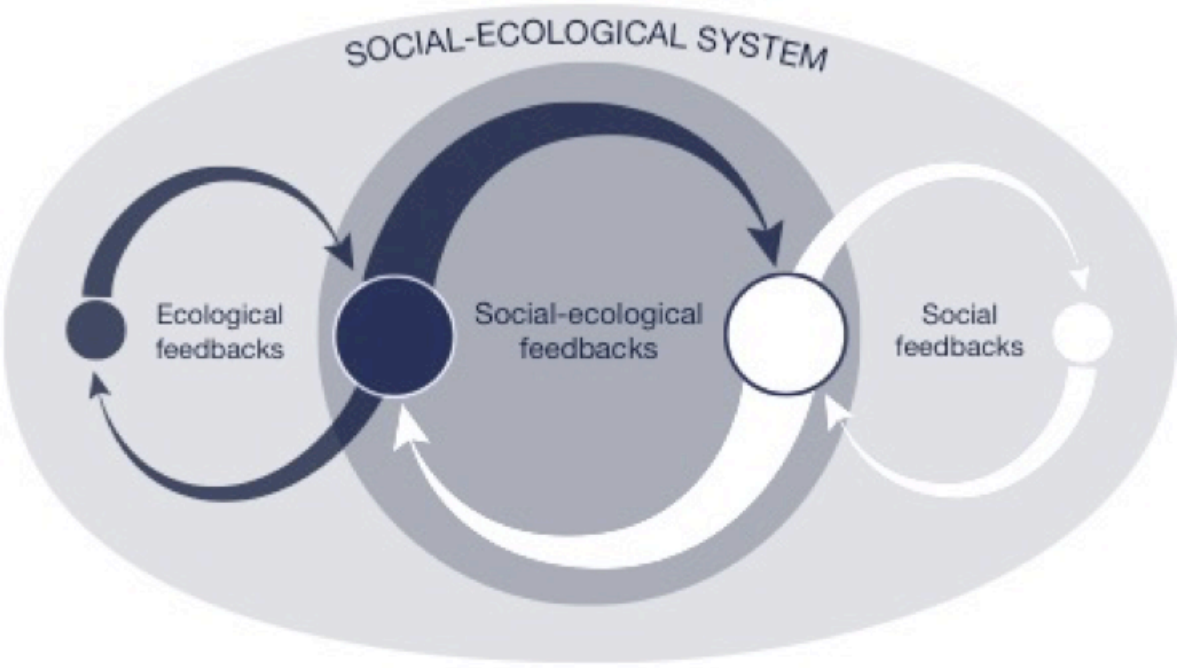
5. Encourage learning and experimentation

6. Broaden participation

7. Promote polycentric governance systems

4-7, Key attributes of governance system

In the resilience approch, Social-ecological systems are not simply seen as social plus ecological systems. Rather they are viewed as systems centered on the feedbacks between ecological (grey) and social (white) system components, which lie at the Interface of social and ecological systems. (model)



4.5 Feedback Processes in Social Ecological Systems

When looking at internal aspects of the human being, it is necessary to find orientation in culture/mind and nature/body processes, while also being able to separate them. In the first instance this requires linguistic and structural precision. The next step concerns the ability to build a capacity to find, embrace, and enunciate speech in the first person position. This requires gearshift/mindfulness tools.

Hence the exercise or the research is focused on using what we know about social processes and about the dynamics of nature to create some clear reference points or fields concerning the individual.

A number of questions need to be addressed:

How are these seven resilience principles reflected in human beings and their lives?

How are the pentagon dynamics reflected in the social-ecological field?

How are the triangle dynamics reflected in the social-ecological field?

The point of departure is that life processes on all levels are self-organizing.

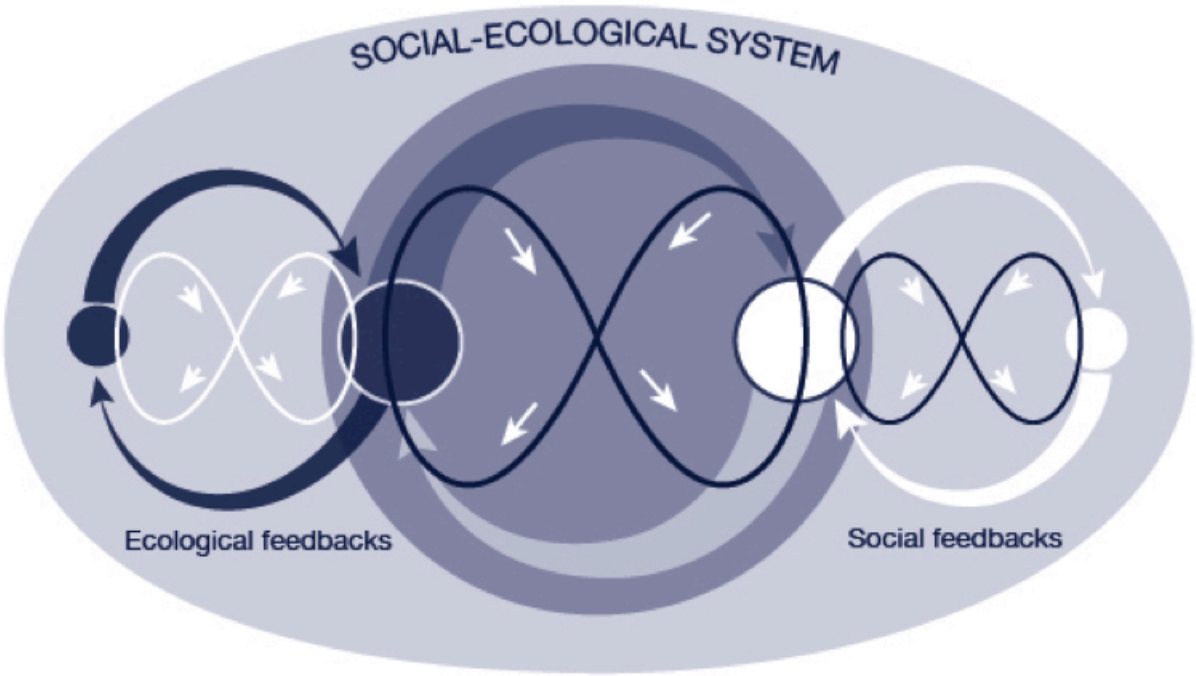
That is the first preliminary. The next is to define and clarify central elements in the organizational structure.

This is the second important preliminary – to address a comprehensive systemic orientation principle.

Profound systemic responsibility and the derived ethics will reflect an equal distribution of responsibility:

- In relation to yourself
- In relation to human beings around you
- In relation to communities/groups in which you participate

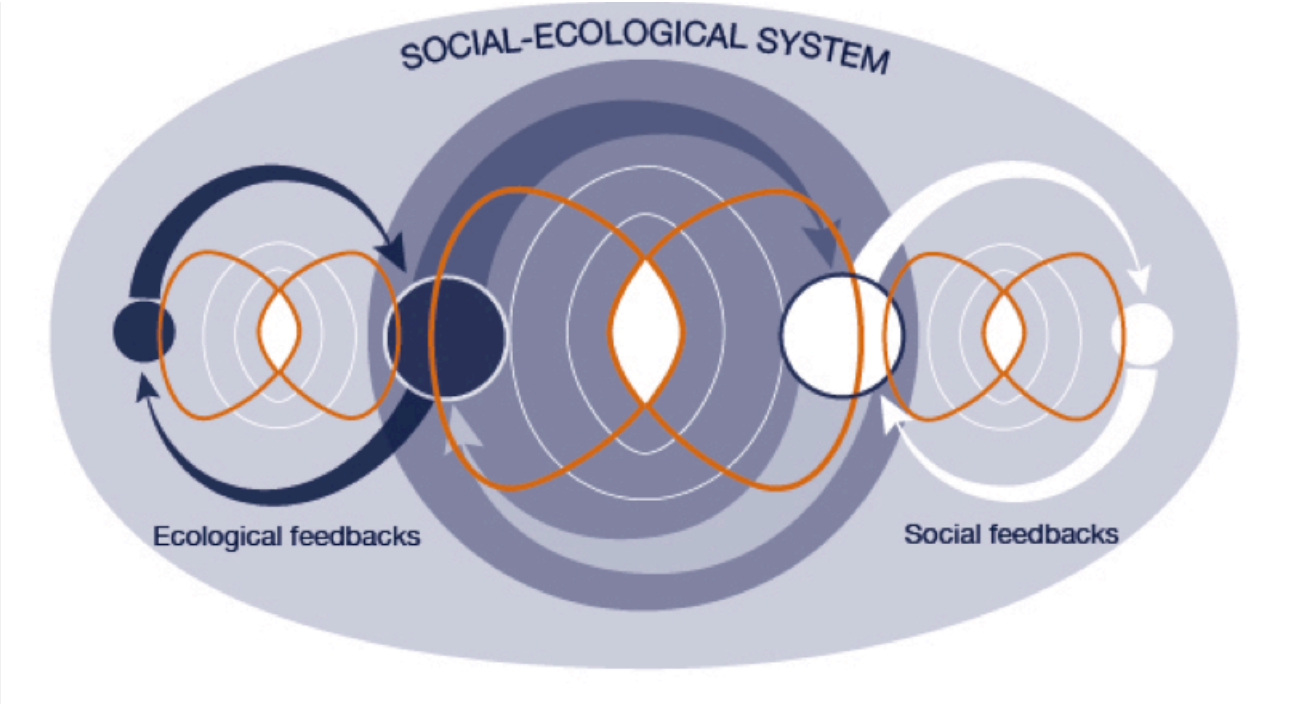
Most likely you will experience that a consequence of the systemic ”space-within-space-within-space” reality is that you exist in/live in and through participating in and relating to systems on all levels – from cells and sub-systems in yourself to those of the biosphere. You cannot sign out – everything is part of a holistic principle.



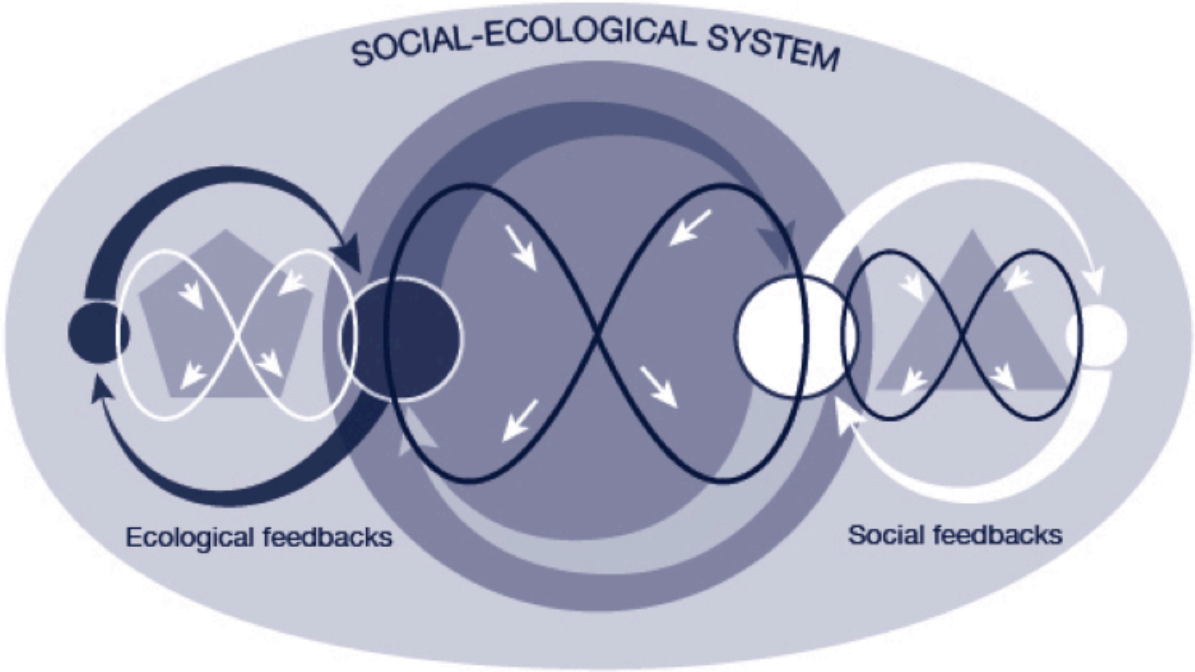
4.6 Social-ecological systems – various aspects of the views from within

In this section we shall address various approaches and models (lemniskat as a symbol of the self-organizing flow, gearshift-lemniskat, triangle, and pentagon) along with the model for social-ecological systems.

First we take a look at the symbol of the self-organizing dynamics:

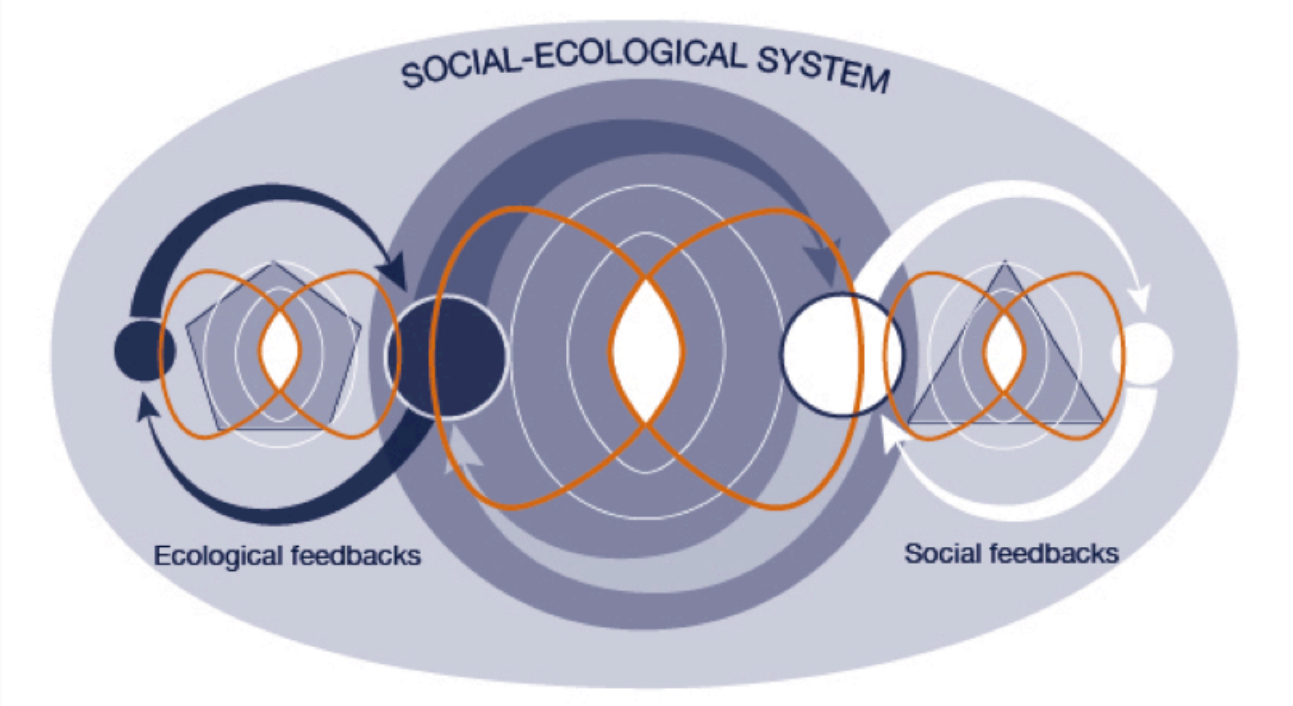


These three lemniskat-circulations are expressions of the general self-organizing flow. As previously mentioned this applies in all types of life processes – and hence it is natural and necessary to integrate them in this model.



The gearshift-lemniskat as a symbol of reflection on the self-organizing process.

The next step focuses on blending the pentagon and the triangle with these two models, and hence applying the model to an explicit gearshift in the individual human being.



The pentagon and the triangle embedded in the SES-lemniskat model, and below in the SES-gearshift-lemniskat.

When we subsequently combine the self-organizing lemniskat dynamics and later the gearshift-dynamics in the system, the previously described concepts and basic models are brought into direct interaction with the social-ecological model – providing an opportunity to plan a more systematic *view from within* perspective.

The pentagon and the triangle provide language and knowledge about internal processes on two levels. In other words an internal orientation system associated with our inborn nature. Via the pentagon, the knowledge refers to basic bio-physiological processes, and to the opportunity to experience these on concrete levels – to feel how attention to our breath has an immediate effect on the body and the mind. Subsequently it will over time be possible via training to build a basic capacity of being embedded in the body simultaneously with other active life processes.

The triangle likewise draws on knowledge, practice, and the building of experience in order to create adequate language and experiences, and hence an orientation system for everyday use. In unison the two landscapes or domains will reinforce their mutual clarity.

In practice and on concrete levels these descriptions mean that an individual who can access the internal domains has the opportunity to distinguish between a corporeal and more immediate non-language sensory orientation system, as opposed to a more cogent, language-based, and focused orientation system located in space and time.

These two internal, conscious and descriptive orientation roles or approaches will be able to provide a new kind of embedded nuance of each of the seven social-ecological points – in theory and in practice. A concrete example could for instance be to apply a reflective gear to the seven points.

The three circle model with interfaces for the three areas here.

THE DAILY EXPRESSIONS OF TRAUMA

4 strategies to face the fear: FIGHT/flight/faint/dissociation

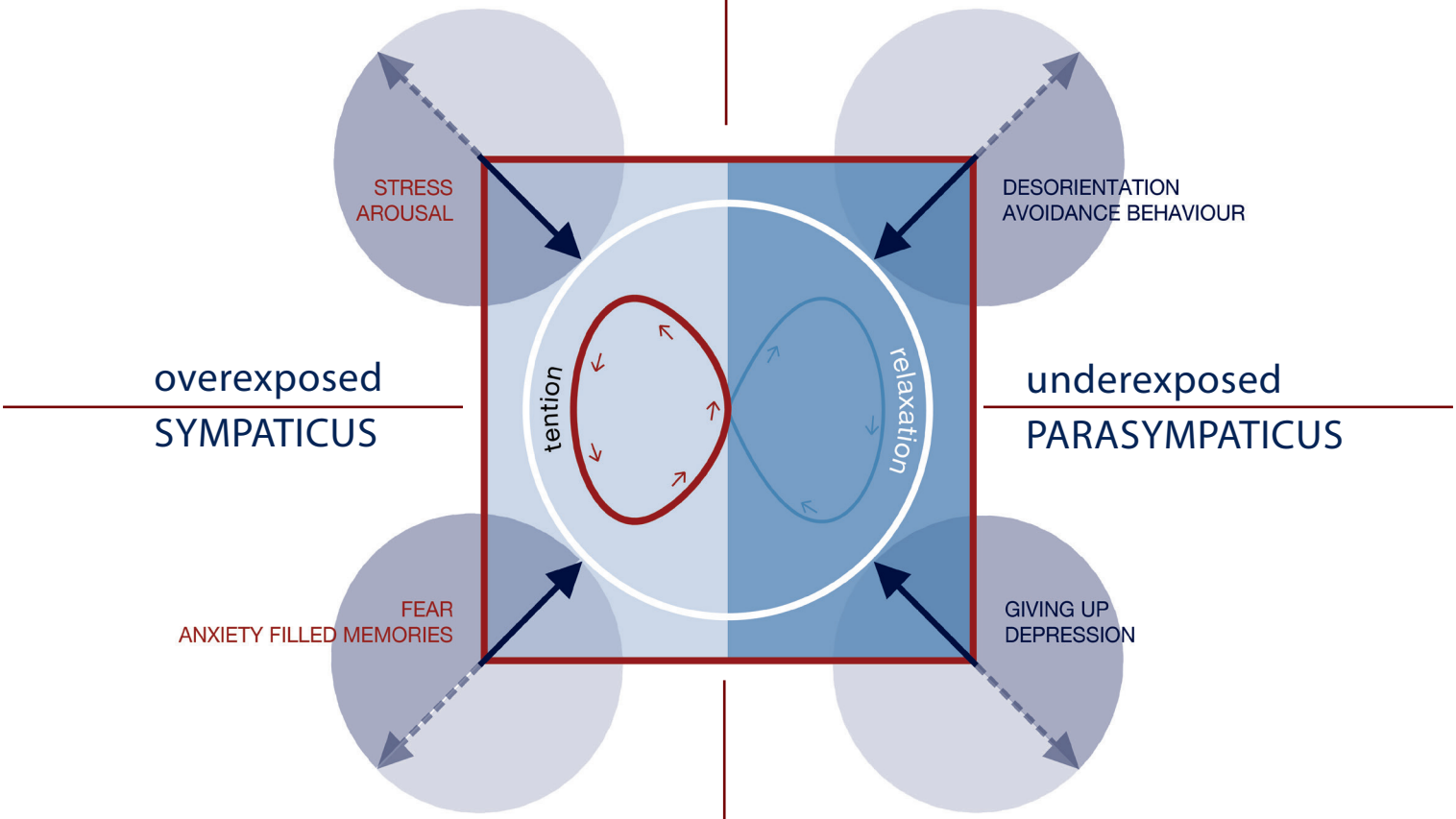
STATES
1. Hormonal imbalance/ cortisol poisoning
2. Tension, muscular tension
3. Physical pains, headache, stomach pains, etc.
4. Superficial breathing
5. Insomnia

BEHAVIOR/ ACTION PATTERNS
1. Physical agitation and restlessness (in and out the door)
2. Frustration, anger
3. Weakened deferral of needs
4. "Open telephone"
5. Weakened concentration

4 strategies to face the fear: fight/flight/faint/DISSOCIATION

STATES
1. Dissociation - disappearance
2. Confusion, ambivalence, doubt
3. Impaired memory
4. Chaos in time – location -- space
5. No feeling/sensing

BEHAVIOR/ ACTION PATTERNS
1. Withdrawal from the group
2. Low attendance
3. No confidence in others
4. "Loses track" easily
5. General "chaotic" behavior



STATES
1. Fluctuating emotions
2. Anxiety attack, flashback
3. Hypervigilance
4. States of shock
5. Astral states, hallucinations

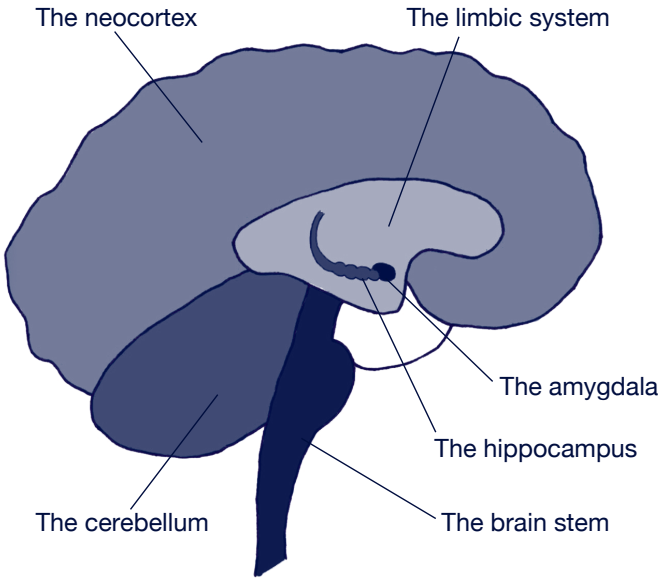
BEHAVIOR/ ACTION PATTERNS
1. Emotional agitation, "constant flight"
2. Neurotic anxiety behavior
3. Emotional control
4. Disturbing thoughts
5. Seeing problems everywhere

4 strategies to face the fear: : fight/FLIGHT/faint/dissociation

STATES
1. Lack of muscle tonus, fatigue, exhaustion
2. No motivation, sadness, meaninglessness, grief
3. Hopelessness, apathy, despair, suicidal thoughts
4. Loneliness
5. Catatonia, paralysis

BEHAVIOR/ ACTION PATTERNS
1. Shyness, withdrawal, isolation
2. Incapable of making a decision
3. Lack of responsibility
4. No energy to participate
5. Letting things drift

4 strategies to face the fear: fight/flight/FAINT/dissociation



The brain

The Brain's Tripartite Structure

The human brain is made of a large number of varied and complex interconnected functions. Since Paul MacLean in 1970 described the brain as "three in one", it has been common knowledge that the brain was structured by evolution. The oldest sector is the reptile brain (1) on top of which we developed an emotional mammal brain (2) and most recently the human brain or the neocortex (3).

In the recent decades research in neuroscience has made great progress, which indicates that the brain is much more complex than previously assumed. The new data also specify that our present knowledge represents only a fraction of what we still have to learn about the brain! For our present purpose the following simplified and pedagogical model will suffice:

1) The brainstem and the cerebellum (the reptile brain)

2) The limbic system (the mammal brain)

3) The neocortex (the human brain)

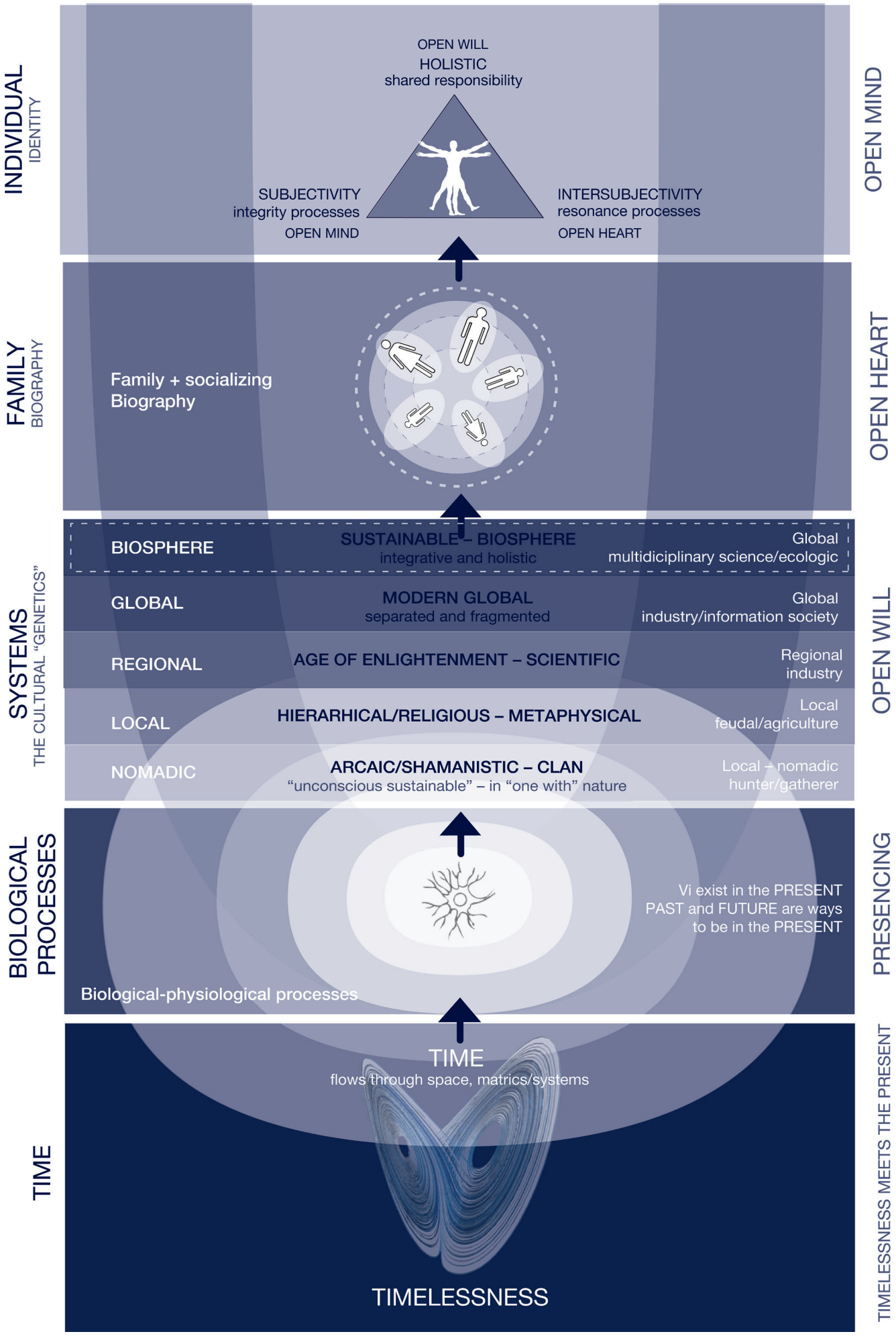
The brainstem and the cerebellum constitute a basic unity which attends to the greater part of the autonomous processes in the human psychophysical system, including the regulation of heart rhythm, breathing, and hormonal functions as well as the basic balancing of a number of subsystems in the totality of the human organism – also called the homeostasis. The brainstem is in charge of bodily sensations and energy regulation in the human body.

The limbic system is located in the center of the brain and plays a vital role in all kinds of emotional processing. In the context of trauma, the sectors amygdala and hippocampus, which will be mentioned later, are significant. Moreover, this system attends to the balance between the internal and the external world, and interprets and processes the impulses from the brainstem.

The neocortex interacts with and analyses experiences from the external world and is considered to be our emotional, thinking, and planning system. The brain is not only constructed on a hierarchical basis. It is also divided into a right and a left hemisphere with completely different functions and periods of growth. In the adult brain the left hemisphere attends to categorization, classification, analytical, and differentiating processes, while the right hemisphere is in charge of holistically oriented, spatial, social, and integrative processes.

HUMAN – SYSTEMS

Sustainable Co-Creation



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