APPENDICIES

A1. How we know the world and the road to modern medical science.

We need to make sense of the world and act.

Until 300 years ago things were very straightforward and any questions about the nature of reality in the West were addressed by the Catholic church and its interpretation of the bible. If you felt the earth revolved around the sun it was best to keep your head down.

With the development of Protestantism in the 17th century, the shackles of the church were loosened. The development of scientific instruments and mathematics accelerated an objective exploration of the world. Modern science was born, and the mind of man was set free. The organising principle was that systems could be understood by breaking them down into their component parts.

Science proceeds by constructing models – sensing the world, putting things together in descriptive bundles and recognising cause and effect relationships between them. Models take several forms as shown in figure A1.1.

A law- a consistently observation or repeatable relationship without necessarily articulating underlying causality.

A hypothesis - a speculative idea of a relationship or reason why things happen. We can never prove a hypothesis is correct with 100% certainty. However, we can show it is incorrect. Medical science gives probabilities about our level of certainty and what we are prepared to accept. In medicine, we are arbitrarily prepared to accept a result with a 1 in 20 risk that our findings have occurred by chance.

A conjecture something that we will never be able to prove or disprove.

A story - an interpretation of chains of cause and effect that contain emotion and metaphor. Often within a fixed narrative structure.

Figure A1.1. Models of the world. Approaches to understanding what's out there.

There are two major contrasting philosophical standpoints of how we can understand the world:

1). Models can only ever be approximations of the world, and that mathematics and language are human constructs which offer opportunities to identify regularities that are useful to us. In essence, we bring forth the world in terms of our language and mathematical frameworks. The important thing is to know which model is appropriate for the task in hand. This is my personal disposition, an approach known as critical realism.

2). Most scientists take the position that there is only one universal model of how the world works and the mathematics that we use to describe it reflect the properties of the world itself. We will eventually converge to one model of how the world works. For example, our three approaches to understanding the universe (quantum physics for the very small, Newtonian mechanics for the mid-size and the physics of relativity for the very large), are seen as part of one unified model which will eventually become apparent with scientific endeavour. The truth really is out there and will eventually yield with investigation and analysis, an approach known as positivism.

The formal scientific method is:

i). Based on theoretical calculation, observation or intuition, a model or hypothesis is formed of how the area of interest works.

ii). From this model we deduct things that naturally follow. For example, there is a hypothesis that a signalling molecule in the brain known as CGRP is complicit in migraine and becomes elevated during an attack. It can be deduced that a drug blocking this molecule would prevent migraine. Experiments are then conducted to see if this stands and whether these experiments are repeatable.

The experiments need to be as rigorous as possible and other confounding factors minimised. For this reason, drug trials are undertaken within the context of a randomised blind control trial where subjects are allocated at random between the active drug and a dummy drug or placebo and both subjects and experimenters are blind to which group gets the active drug.

iii). If the deduction is incorrect, for example if there is not a difference between drug and placebo, then the hypothesis is rejected. If there is a difference, then the hypothesis stands but can never be fully proven as there may always be other unknown factors at play.

The insights from medical science apply to groups of people but say nothing about individuals within those groups - what works for who in what circumstances?

A2. Insights for interacting systems from complexity theory.

Complexity theory offers an alternative model of how things work in contrast to the scientific model which approaches problems by breaking them down into their component parts. We have seen how systems can be seen as complicated (science) or complex (complexity theory). The Latin derivation of the two words is instructive.

"Com" - with

"Plica" – fold. Systems can be understood by unfolding them.

"Plexus" – braided together or entwined. Systems cannot be understood by reducing them into their parts.

- A *complicated (linear)* system can be understood by reducing it into its component parts.
- A complex *(non-linear)* system, exchanges information re-iteratively giving rise to very different features. In a re-iterative interaction, each element takes in information, processes it, and after a finite time delay sends information on to other elements. These systems cannot be understood by a reduction into their component parts and identifying a relationship between cause and effect is problematic. All biological systems are best seen as complex, although in some conditions analysis as a complicated system may be appropriate and can yield useful results.

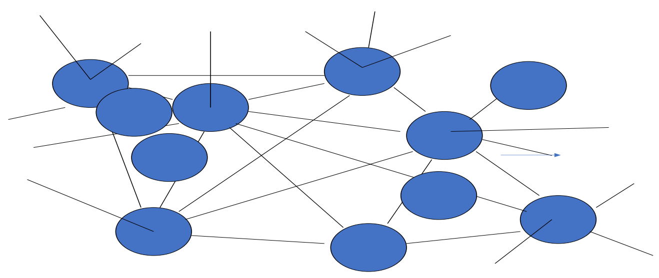

Figure 2.1. A complex system. A network of changing interactions that cannot be understood by breaking into their component parts.

Complexity is an organising principle for mind-body practices where mind, body and external world are viewed as one interacting system. The focus of attention shifts to the nature of interactions between system components and how patterns emerge that cannot be predicted from analysis of the individual elements. When the number of system elements are small, chaos theory can offer a mathematical analysis but with larger systems, quantitative analysis becomes problematic, and the focus is on qualitative insights. Table 1 summarises important differences between complicated and complex systems. https://www.youtube.com/watch?v=8saDn3SIfP8 expands on these principles in more detail.

Linear system **Complicated**	**Non-linear system** **Complex**
System elements process and exchange information that flows continuously	System elements process and exchange information reiteratively
Systems can be understood by a reduction into their component parts	Cannot be understood by a reduction into their component parts
Simple relationship between cause and effect	Unpredictable relationship between cause and effect. Small inputs can have large effects and vice versa (the butterfly effect)
The future state of the system is predictable	The future state is not predictable other than in broad outline
Feedback loops are negative. Positive feedback loops lead to instability	There are multiple positive and negative feedback loops which facilitate both change and stability
The focus is on the maintenance of a desired system output	The system is continually changing with time, but self-organising patterns can emerge within the boundary constraints on the system. These emerge from the recursive interaction of "simple rules or principles" acting predominately at a lower level of organisation
Boundaries are fixed and well defined	Boundaries can be problematic due to the unpredictable effects of small perturbations which may occur outside the system under consideration

Table 2.1. Some important differences between linear (complicated) and non-linear (complex) systems

Self-organised criticality in complex systems

An important feature of complex systems is that they can configure themselves in an optimum format in response to the demands and constraints that are placed on them. This is known as a state of *self-organised criticality* and has been found across a wide range of biological systems including neural systems, organs and social networks (1). At this state:

- There is optimum memory and information processing capabilities.
- The system is optimised for robustness and the capability to adapt to environmental change with the least amount of effort.
- Information is transferred most effectively between interacting networks.

Following Ashby's Law (2) this can be interpreted as a similar number of variables or in complex systems, similar levels of information entropy or complexity matching (3).

Complexity insights into the notion of health.

Current definitions of health posit notions of physical, psychological and social "well-being" and "flourishing".

A more rigorous approach is to invoke the principle of entropy - the inevitability of all systems to move towards a more disordered state. This can be interpretated as a reduction in the predictability of how a system will evolve with time or information entropy. See appendix A5.

From the perspective of complex systems, health is defined as a configuration where the complexity of interacting systems is coherent, a state that maximises information transfer and resists the natural tendency of any system to disorder. i.e. a state of self-organised criticality. A beneficial health care intervention facilitates harmony of interacting systems and minimising the tendency to disorder.

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1. Tadić B. Melnik R. Self-organised critical dynamics as a key to fundamental features of complexity in physical, biological, and social networks.2021. Dynamics; *1*(2): 181-197
2. Ashby R. An introduction to Cybernetics. Chapman and Hall. London, 1956.
3. Mahmoodi K, West B, Grigolini P. 2019. Complexity matching and requisite variety. arXiv:1806.08808

A3. Accessing the scientific literature

Scientific studies or theories are published in scientific journals. They are closely scrutinised by other scientists before publication. Figure 3.1 shows an example of how the research is referenced.

Croop R, Lipton RB, Kudrow D, Stock DA, Kamen L, Conway CM, Stock EG, Coric V, Goadsby PJ. Oral rimegepant for preventive treatment of migraine: a phase 2/3, randomised, double-blind, placebo-controlled trial. The Lancet. 2021 Jan 2;397(10268):51-60.

Croop R, Lipton RB, Kudrow D, Stock DA, Kamen L, Conway CM, Stock EG, Coric V, Goadsby PJ. *These are the people that undertook the research.*

Oral Rimegepant for preventive treatment of migraine: a phase 2/3, randomised, double-blind, placebo-controlled trial. *This is the title describing the research.*

The Lancet. *This is the name of the journal where the research was published.*

2021 Jan 2;397(10268): Page 51-60. *This is the date of publication and journal reference.*

Figure 3.1 Explaining a scientific research paper.

If you want to read a paper, some must be accessed through a subscription to the journal where it is published, but many are now freely available, and all have a free summary. Download Google Scholar and put the paper into the search box to access it.

A4. How the nervous system works.

The nervous system is divided into the *central nervous system* (brain and spinal cord) and the nerves outside of it, the *peripheral nervous system*.

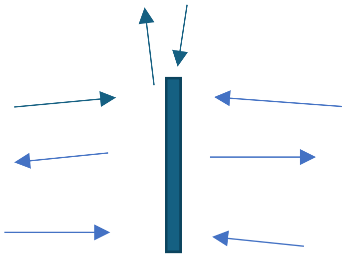
The central nervous system.

The brain and spinal cord form the central nervous system. We don't have a complete picture of how the brain works. Indeed, contrary to the confident assertions of neuroscientists, I suspect we may never will. The brain is a classic example of a complex system and as we have seen in A2, only limited insights can be obtained by breaking it down into its component parts.

The brain has 86 billion neurons with 100 trillion connections that form complex networks. Although the brain comprises only 2% of body weight, it is power hungry consuming 20% of the body's energy requirement.

The four fundamental building blocks of our central nervous system reflect how our nervous system has evolved over time.

The spinal cord

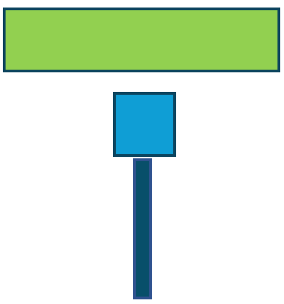


Although predominantly a route of transmission of nerves to and from the brain from other organs, simple reflexes are located here. For example, withdrawing quickly from a painful stimulus can occur without input from the brain.

The mid brain

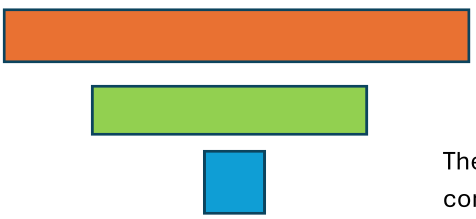
This area at the base of the brain controls basic functions required for life such as breathing, heart rate and body temperature. Basic automatic reflexes that protect the organism and respond to threats are also organised here. For example, fear, anxiety, aggression. These are our basic survival emotions.

The emotional brain



This part of the brain known as the limbic system contains networks that organise more complex emotions that have evolved to facilitate socialisation and living in groups.

The higher brain or cortex



The area of the brain known as the cerebral cortex is responsible for complex functions such as problem solving, planning, decision-making, judgement, language. Its rapid development over the last 300,000 years is what has made humans unique.

Emotions

Emotions are complex patterns of behaviour often associated with physical accompaniments, (e.g. increased breathing and heart rate), expressions (e.g., smiles, frowns, growls) They are mediated by specific chemical neurotransmitters some of which are shown in figure A4.1.

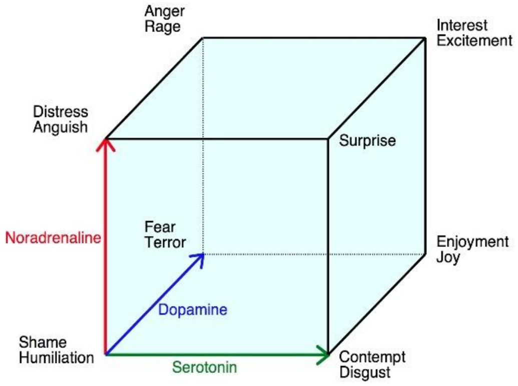


Figure A4.1. Some important chemical messengers or neurotransmitters and the emotions they control.

Emotional responses have a long evolutionary history and originally directed survival but additionally, as group living became more important, social cohesion. Emotions are positive (we move towards something) or negative (we move away from it). They also have differences in intensity ranging from high arousal to low arousal.

It has been suggested that there are eight primary human emotions that can all be found in higher animals: anger; anticipation; joy; trust; fear; surprise; sadness and disgust. Emotions can vary in intensity, for example annoyance to rage. Or they can be combined, for example, disgust + anger = contempt.

Many emotions are accompanied by changes in body language, often so subtle that we are unaware of them. These act as important signalling mechanisms. They can also synchronise brain activity across individuals, promoting social activity.

Emotions interact with higher functions of the brain: for example, if angry we may make conscious decisions which we regret later; in cases where people have had their emotional brain areas damaged they can find it difficult to make decisions; emotive rhetoric is very persuasive; listening to uplifting music can help creativity, as can experiencing two emotions that aren't typically felt together such as frustration and excitement. Conversely, it is possible to consciously modulate emotions.

Contrary to the common intuition that bodily responses follow emotions, psychologists have long hypothesised that things may be the other way around - the feelings associated with an emotion result from the perception of physiological changes that arise in the body in response to an event. That is, emotions originate in the body, or they are "embodied". When we take in information from the world, this stimulates body activity such as changes in heart rate, blood pressure, respiration rates, perspiration, bowel motility and these sensations are interpretated as a corresponding emotion.

Brian networks

Traditionally, the focus of study has been on identifying which parts of the brain are responsible for specific actions. With more advanced imaging techniques, interest has shifted to the importance of cortical networks - areas of the brain often far apart but richly interconnected.

Many networks have been identified, for example the "reward network" implicated in motivation and addiction. Four of the major networks are described below. All are interconnected so the picture is probably even more complex.

a). The salience network.

This takes in external and internal sensory data and decides what we should pay attention to. An important focus will be on patterns that we have found useful previously.

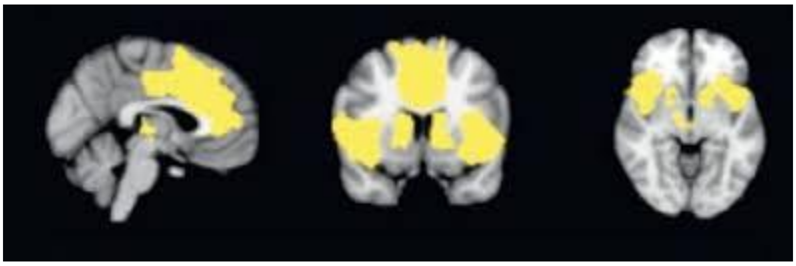


Figure A4.2. Areas of the brain that are important in the salience network.

b). The central executive network.

This energises our conscious brain and maintains attention on the task in hand, preventing us from wandering off. It supports the regulation of emotion, behaviour, and thought. It is activated during efforts to exert self-control, appraise threatening stimuli and suppresses intrusive or unpleasant thoughts.

c). The task negative or default mode network.

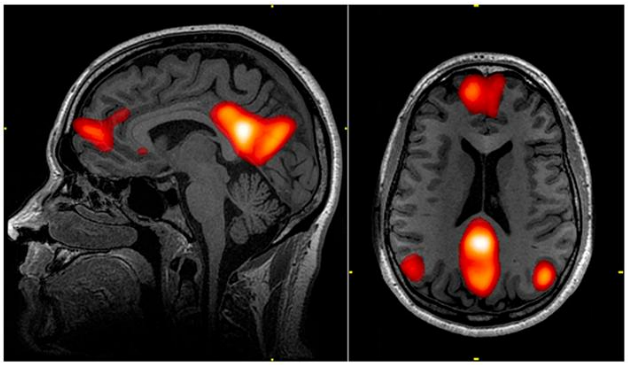


Figure A4.3. Areas of the brain that are important in the default mode network.

This network is active when we are not focused on the outside world although it does contribute to elements of experience that are related to external tasks such as socialisation It has several disparate functions:

i). The basis for our concept of self.

- Memories of events and facts about ourselves - our autobiographical memory.
- An awareness of our current emotional state.

ii). Thinking about others.

- Assessing the thoughts of others and what they may or may not know.
- Understanding and empathising with the emotions of other people.
- Making social judgements about the effect of an action.
- Reflecting on social characteristics and status in a group.

iii). Looking back to the past and thinking forward to the future.

- Recollecting past events.
- Projecting into the future and visualising events that may happen.

- Story comprehension - understanding and remembering a narrative.

This network is active more than any other and can manifests as "mind wandering" or daydreaming where "internal conversations" are important.

d). The Task Positive Network

Activity of this network suppresses the default mode network and maintains attention on a specific task in hand, often to the exclusion of all other activities. When it is fully active, we lose our sense of self and find ourselves in "the flow". These are activities where the challenge and skill required are high and we can lose ourselves in the task at hand.

The peripheral nervous system

This connects the central nervous system to the rest of the body:

i). Sensory nerves carrying sensations from inside and outside the body.

ii). Motor nerves transmitting signals to cause muscle action.

The autonomic nervous system.

This regulates the involuntary functions of our internal organs and is divided into the sympathetic nervous system which prepares the body for fight or flight responses and the parasympathetic nervous system which promotes rest and digest activities. Table A4.1 shows the main function of each system.

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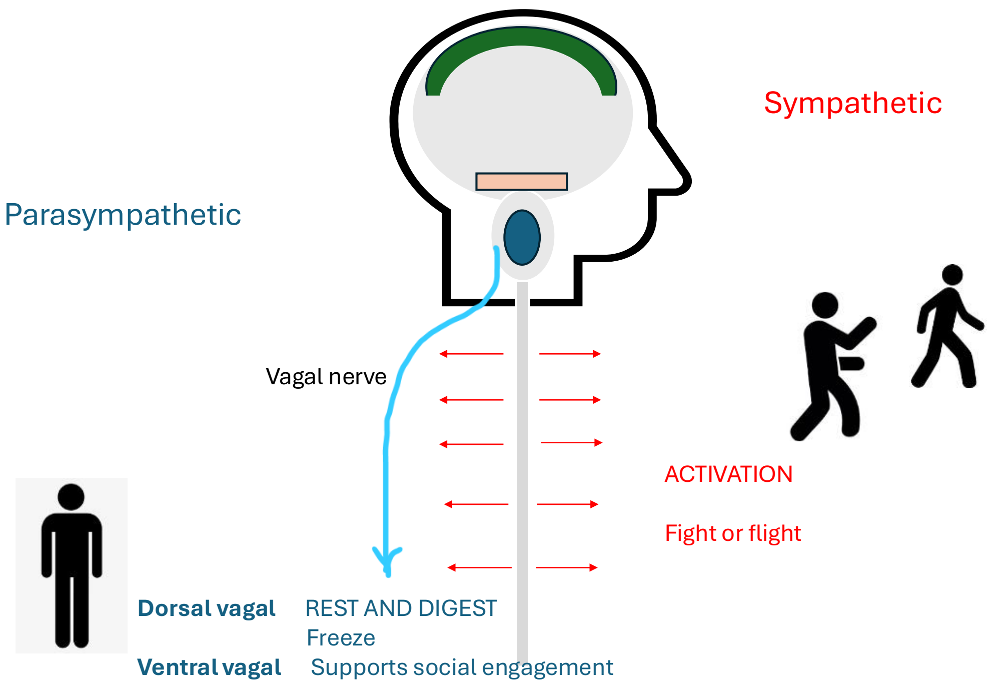

Figure A4.4. The divisions of the autonomic nervous system. Sympathetic and parasympathetic systems. It has been suggested that the vagal nerve comprises of two divisions – dorsal and ventral.

Feature	Sympathetic Nervous System "Accelerator down"	Parasympathetic Nervous System "Brake down"
Action directed	"Fight or Flight"	"Rest and Digest" or "Feed and Breed"
Main Function	Mobilizes the body in response to stress	Calms the body, conserves energy
Activation Trigger	Survival Stress, danger, high demand	Support Safety, relaxation, digestion
Heart Rate	Increases	Decreases
Breathing	Quickens, becomes shallow	Slows down, becomes deeper
Pupil Size	Dilates (to enhance vision)	Constricts
Digestion	Suppressed	Stimulated
Saliva Production	Decreases (dry mouth)	Increases
Adrenal Glands	Stimulated (adrenaline/cortisol)	Calmed
Urinary Function	Inhibited	Stimulated
Energy Use	Consumes energy	Conserves and restores energy
Mood Association	Alert, anxious, ready	Calm, peaceful, grounded. In the extreme: shut down, low, dissociated, frozen.

Table A4.1. The functions of the autonomic nervous system.

A5. The brain as a predictive organ.

The brain has evolved two control mechanisms to meet its objectives:

- *A reactive mechanism.* For example, I step on a nail and react immediately by withdrawing my foot; the level of my thyroid hormone is too high so the action of the hormone that stimulates my thyroid gland is reduced. (This is known as a feedback system or homeostatic control).
- *A predictive mechanism.* For more complex tasks, the brain operates a predictive model. Based on previous experience it generates a model of what needs to be done to achieve its objective and acts accordingly. It monitors its environment to see if there is an error between where it has got to and where it wants to be. If there is an error, the predictive model is updated appropriately. (This is known as a feedforward system or allostatic control).

As an example, consider what happens when you climb a flight of steps. The differences between these two mechanisms are shown in figures A5.1 and A5.2.

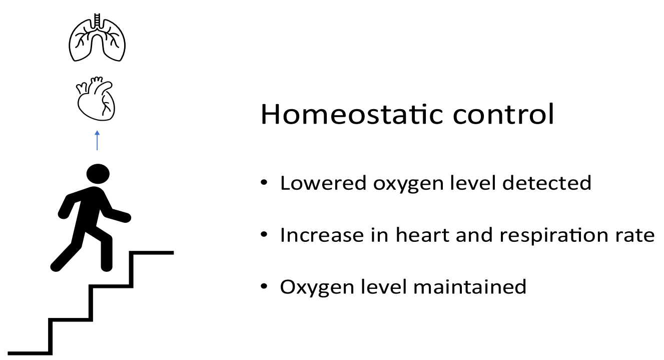

Figure A5.1. A reactive or homeostatic mechanism. As you climb the stairs, the body senses a lower oxygen level which leads to an increased heart and breathing rate thus maintaining a satisfactory oxygen level.

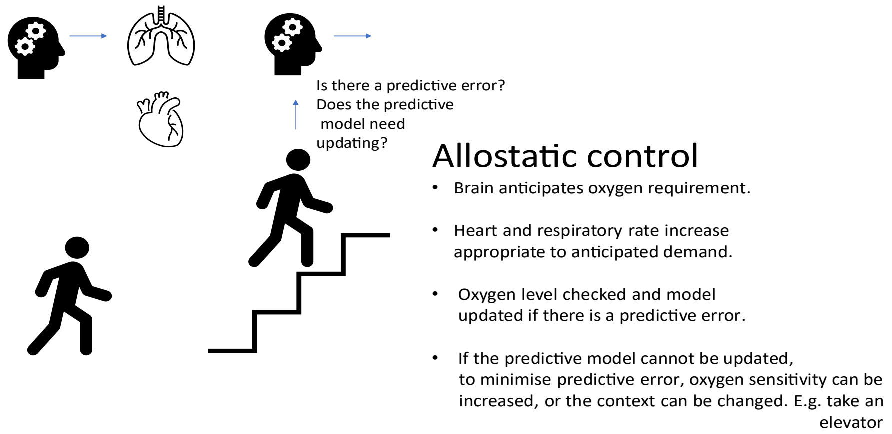

Figure A5.2. A predictive or allostatic mechanism. The brain predicts what the requirements of the body will be and increases heart and breathing rates accordingly. It keeps a check on the accuracy of this prediction which is updated if necessary to minimise its predictive error.

The predictive brain and the free energy principle

As we have seen above, sensory inputs monitor the world, and the causes of these sensations are inferred. By sampling and navigating the environment, exchange with it is restricted within bounds that preserve physical integrity and the tendency to disorder. A unifying framework known as the "free energy principle" has been proposed to explain this process and expand the notion of the predictive brain. (1).

Free energy is analogous to the thermodynamic notion of entropy and interpreted as information entropy. (The complexity of a system is defined as the inverse of its information entropy). See box A5.1. The free energy principle suggests that living systems must minimise the unpredictability of the actions that are undertaken to achieve objectives and in doing so resist the tendency to disorder. i.e. Allostatic control seeks to maintain a desired state, monitoring interoceptive and exteroceptive signals, predicting what needs to happen to attain that state to reduce information entropy or free energy.

Thus, from this perspective healthcare can be interpretated as an intervention to reduce the unpredictability of the organism's assumption about the output of its actions or reducing its predictive error, thus minimising its tendency to disorder.

Consider a perfectly balanced coin being tossed. There is a 50:50 chance of heads or tails so the system is unpredictable, and information entropy is high. If the coin is slightly asymmetrical and favours a particular outcome, then there is less unpredictability, and the system has lower information entropy. (There is more information contained in the system). The system of the asymmetrical coin being tossed is more complex than the balanced one.

Box A5.1. An example of information entropy and differences in system complexity.

The accuracy of the predictive model is continually monitored, and predictive error minimised, by updating the predictive model where necessary. This process takes place in a hierarchical manner with lower levels of the brain dealing with larger predictive errors which if not resolved, are transmitted to higher levels and eventually conscious awareness.

From a pathological perspective, it has been suggested that a chronic stress response to physical, social or psychological events activate inflammatory mediators which can inhibit the predictive ability of this allostatic mechanism (2). If the predictive model cannot be satisfactorily updated, to minimise predictive error either the context of the action is changed i.e. action on the world; or incoming signals are modulated to achieve the desired prediction, potentially leading to dysfunctional consequences.

In migraine this can be interpreted as increased sensitivity to migraine attacks, and internal body signals leading to the pain of IBS and fibromyalgia.

Approaches to changing predictive modelling and the implications of chronic inflammatory load can offer theoretical understanding of some holistic practices.

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1. Friston, K. The free-energy principle: a unified brain theory? Nature reviews neuroscience. 2010:11(2):127-138.
2. Borsook D. Understanding migraine through the lens of maladaptive stress responses: a model disease of allostatic load. Neuron. 2012; 73.2 : 219-234.

A6. Multiscale architecture

This concept maps closely on to complexity thinking and suggests that biological systems are organised in a hierarchy across multiple scales of time and space. This proposal is supported by current evidence in systems biology and computational modelling and is finding an application in prediction and management of human disease. The basic principle suggests that each level from the individual down to the single cell have memory and processing capacities that extend across time and space horizons which are larger at higher levels of scale. It emphasises the importance of integrating information across these different levels.

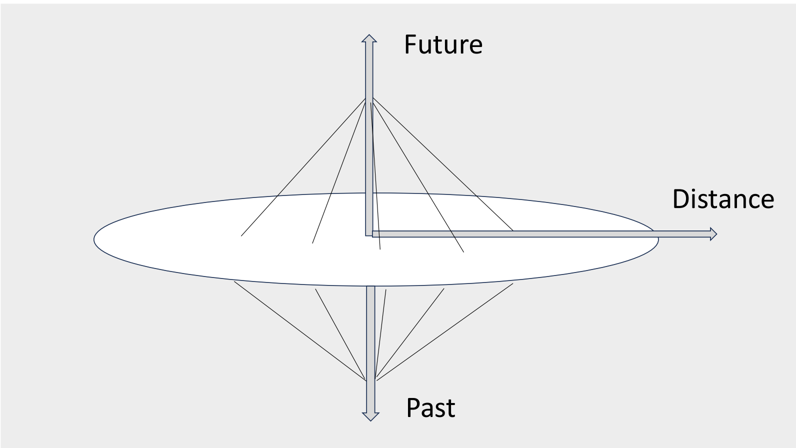

Figure A6.1. The cognitive cone. Each hierarchical level of a biological system has different time and space horizons but integrate into one overall system.

In evolutionary terms, information has been exchanged effectively between hierarchical levels where complexity was within a narrow range. But our highest level of hierarchy i.e. the brain has evolved to a level distant from the rest of its system as its cognitive cone i.e. memory, processing, recognition of past, future and distance have become exponentially greater with the use of technology. We have become disconnected with our body cognitive hierarchies.

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St Mary C, Powell THQ, Kominoski JS, Weinert E. Rescaling Biology: Increasing Integration Across Biological Scales and Subdisciplines to Enhance Understanding and Prediction. Integr Comp Biol. 2022 Feb 5;61(6):2031-2037. doi: 10.1093/icb/icab191. PMID: 34472603.

A7. How holistic practices might work.

Medical science is now only beginning to identify underlying mechanisms.

Lubianiker, N., Koren, T., Djerasi, M. *et al*. Upregulation of reward mesolimbic activity and immune response to vaccination: a randomized controlled trial. *Nat Med* (2026). https://doi.org/10.1038/s41591-025-04140-5

Is an important paper and one of the first to identify potential neural pathways over which we have conscious control and that can influence biochemical markers.

Speculative mechanisms of the practices described in the handbook are:

i). *Techniques that reduce the sampling frequency or rate of scanning of the environment and rate of brain processing*. These might include mindfulness, emotional freedom technique, binaural beats, nature immersion.

ii). *Techniques that modify what the brain predicts will happen*. These might include emotional freedom technique, visualisation or guided imagery.

iii). *Techniques that detach thoughts from unhelpful emotions*. These might include mindfulness, body awareness, non- judgemental awareness, self-compassion, emotional freedom technique, cognitive behavioural approaches.

v). *Techniques that impact on modulation of signals to the brain*. These might include body awareness and posture, breathing techniques. These are predominately techniques that reduce inappropriate sympathetic drive and encourage more parasympathetic input.

vi). *Breathing techniques that balance the autonomic nervous system*.

Holistic approach	Scanning rate and breadth of internal and external signals	Signal modulation	Cognitive processing speed	Predictive modelling
Guided imagery				+
Mindfulness	+	+	+	
Body awareness		+		
Breathing techniques		+	+	
Emotional freedom technique				+

Figure A7.1. How holistic practices might work.

A8. A background to Mindfulness.

In the 1970s, parts of the Buddhist practice of S*ati* was rebranded in the West as stress-reduction “mindfulness.” This secular form of mindfulness has become widespread in medical and wellness contexts and embraced globally as a tool for mental health.

However, the focus of Sati was insight into the impermanence of everything and the concept of non-self. This contrasts with current use as a tool to consolidate the self!

Although there is extensive evidence to support its current use in health care, recent critiques have cautioned against treating it as a one-size-fits-all remedy as it drifts further away from its spiritual home. It has been suggested that by focusing narrowly on stress relief, the practice has been stripped of its deeper philosophical foundations rooted in Buddhist tradition. Viewed through this lens, modern mindfulness is only a fragment of what Sati once encompassed.

However, the concept of Sati does map onto perspectives of interconnectedness we have visited in section 10 and 11 and which is a recurrent theme in holistic practices. This brings us a little way back to its original roots and may be worth bearing in mind.

A9. Energy flow and metaphysics.

Many healing practises invoke the concept of energy flow, (for example, Reiki healing, acupuncture). Illness or disease can arise when our energy channels are blocked. These theories are discredited by medical science but there may be cause for circumspection.

Energy is an abstract construct, the presence of which we can only infer. In its simplest terms it is the ability to do work and can be converted from one form into another. It can occur in several forms such as heat energy, movement energy, chemical energy, nuclear energy. We can never see energy, only measure its potential or the effect of it in operation.

Energy transport forms the basis of all living systems as they operate away from thermodynamic equilibrium, (or the same temperature as their surrounds). By taking in low entropy (or less disordered) energy (for example food) and discharging higher entropy energy (heat), living systems form transient areas of organisation that resist a natural tendency to disorder. This is known as a “dissipative system.”

We don’t have a clear handle on energy - 68% of the energy in the universe can only be implied and not measured directly. Quantum physics has demonstrated that particles remotely separated can exchange information/energy faster than the speed of light. Indeed, we don't even have a handle on particles. We tend to think of them as small entities with definite properties but they're really just energetic spikes in the underlying field that permeates the universe and can't be observed directly, all of which gets a bit confusing.

We may be over presumptive in our rejection of energy healing approaches when energy flow forms the basis of life and its action and context in the physical world is poorly understood.

Ancient Indian philosophies see “Prakriti” as the matrix of all life out of which creation arises and is composed of three constituent energies, a creative energy, a retarding energy and an energy that harmonises the two. When this equilibrium is disturbed, the universe begins to manifest in its variety. Modern and ancient approaches to energy may not be a dissimilar as we like to think

A10. Further thoughts on the nature of self.

We can only speculate whether “Self” was a product of natural selection offering enhanced social capability or whether it was an unintended by product of the development of language and other decision-making networks in the brain. What we can say is:

- We begin to identify that we are different from the external world by the age of two. We become aware that our thoughts are not observable by others and that we are separate from them.

- At five we are already situated within a web of social commitment as influence from peers becomes relevant. By eight we can interpret our own feelings and abilities and consider feedback from others. We have elements of sameness and difference to others.
- We perceive that we have an inner mental presence that is distinct from our bodies - a constant background awareness of our mental goings on.
- We can identify conditions where the sense of self becomes distorted or absent. For example, psychosis, personality disorders, and dementia.

As self is intimately related to consciousness, its study will be limited by the same self-referential concerns that are relevant for the study of consciousness. i.e. can we study conscious processes using the phenomena of consciousness?

There is no convergence across philosophical positions on the nature of self. They include:

- *Psychological formulations.* The early modern formulation was developed in the late 19th century, based upon the work of William James (1842-1919). He proposed that we had two selves: the "I" as self - the ego or subjective thinking self; and the "Me" - the object itself based on external factors. Freud (1886-1939) and other early psychologists such as Jung (1875 -1961) develop these themes highlight the importance of subconscious drivers of which we are unaware.
- *Social constructionist perspectives*. There is no independent sense of self, but it arises because of complex social process arising from our interaction with others.
- *Existentialist perspectives.* Life is meaningless but we must "stare into the dark void of space" and choose what we want to become based on our own authenticity and not the influences of others.
- *Religious or spiritual approaches.* The self is aligned with an external agency or part of a wider cosmic framework.
- *Self as an illusion.* Buddhists hold that there is no solid permanent self and that to realise this truth liberates one from the fear of death. The influential Scottish philosopher David Hume (1711-1776) suggested that the self is "nothing but a bundle of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux and movement" and that "the identity we ascribe to the mind of man is only a fictional one."

You can pay your money and take your choice.

A11. A measure of anxiety - GAD7.

Over the last two weeks how often have you been bothered by:	Not at all	Several days	More than half of the days	Nearly every day
Feeling nervous, anxious or on edge	0	1	2	3
Not being able to stop or control worrying	0	1	2	3
Worrying too much about different things	0	1	2	3
Trouble relaxing	0	1	2	3
Being so restless that it is hard to sit still	0	1	2	3

Becoming easily annoyed or irritable	0	1	2	3
Feeling afraid as if something awful might happen	0	1	2	3

Table A9.1. The General Anxiety Disorder-7 (GAD7) score to detect anxiety. (Scores 1-5 mild anxiety; 6-10 moderate anxiety; 11-15 severe anxiety).

A12. A measure of depression - PHQ9.

Over the last two weeks how often have you been bothered by:	Not at all	Several days	More than half of the days	Nearly every day
Little interest or pleasure in doing things	0	1	2	3
Feeling down, depressed, or hopeless	0	1	2	3
Trouble falling or staying asleep, or sleeping too much	0	1	2	3
Feeling tired or having little energy	0	1	2	3
Poor appetite or overeating	0	1	2	3
Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual.	0	1	2	3

Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

Figure A9.1. PHQ 9 depression test. (Depression Severity: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe.)

A13. The history and current challenges of the NHS.

The NHS began in 1948 at a time of great hope after a long period of war induced austerity. The confident assumption would be that providing free healthcare would reduce demand on the service as people became healthier! (We can see this folly repeated in the confident assumption that prevention will address our current problems. Although of undoubted benefit to an individual, this merely shifts the problems later down the line while other demands on the service simply expand to fill the space available.)

The intransigence of the doctors almost strangled the NHS at birth. The consultants were bought off by "stuffing their mouths with gold" allowing them to maintain their private practise alongside a salaried hospital service. GP's who were fearful of the loss of their independence were allowed to remain as independent practitioners, operating as small businesses

A plethora of other health care professional groups held tenaciously to their roles and resisted change. Over the years, the developing health service evolved to meet the demands of the professions within it rather than the more logical converse.

Some current challenges to the NHS are shown in figure 16.1. Continual organisational changes have sought to address these imbalances the most important of which have been introducing a degree of competition between suppliers of health care.

- With an ageing population comes an increasing number of medical problems.
- A significant acceleration in the number of advanced medical technologies and medications that are available.
- A population who are increasingly well educated and have access to he once privileged domain of medical knowledge which increases expectation.
- A sentimental attachment to the NHS that inhibits radical change.
- Politicians who collude to maintain the view that everyone can have the healthcare from which they can benefit and see the health system as a machine with levers that offer simple solutions to complex challenges.
- A continued failure to integrate health and social care.
- A difficult balance in containing health care costs and encouraging life science research which is an important part of the UK economy.

Figure A11.1. Some current challenges to the National Health Service.

This video gives a useful idea of the complexity of the NHS.

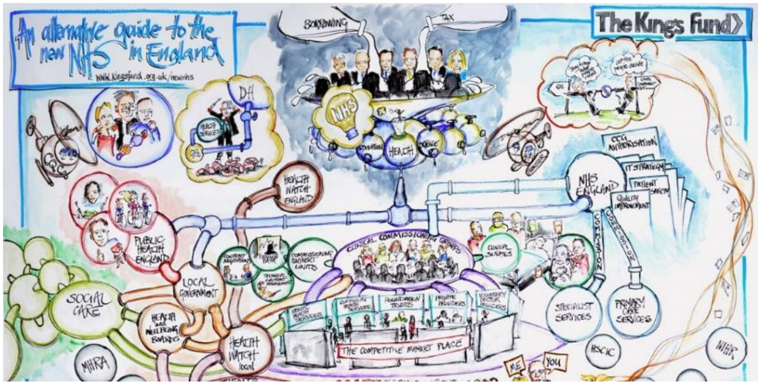

Figure 11.2. A guide to how the NHS works. An updated version is available, but this one gives a good flavour of the labyrinthine structure of the evolving NHS.
https://www.youtube.com/watch?v=8CSp6HsQVtw