

The Art of Healing: An Information and System Theory Approach

Further Building the Psi <==> Spi Bridge

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Abstract

Recent developments in information and systems theory have created tools that may be applicable in optimizing physician – patient interaction dynamics which may in turn accelerate healing and/or promote healthy living in patients. Understanding such developments may usher in a new way of thinking about these relationships and shed some light on how to improve them for the benefit of patients and non-patients alike. We will briefly discuss some concepts and tools in systems theory and information science that may be utilized in the healing arts.

Introduction

Relatively new theories and tools derived from system and information theory as well as fields such as physics, biomedical engineering and mathematics, may have significant impact in improving human health and the ability to heal ourselves. This also applies to the caregiver/patient relationship and how caregivers do their job most effectively.

In this brief paper we will review some of the relevant principles from these diverse fields and describe how they relate to optimal healing considerations. None of the system/information principles themselves are new – they all are well founded currently in the science/engineering world. Our contribution here will be to combine these principles and tools in a new way – to “put the pieces together” in furthering the completion of a jigsaw puzzle that relates these components to optimal healing principles and practices. In so doing we address the question “how do we ultimately optimize human healing?”

The question “how CAN spiritual-based healing principles/practices relate to biomedical science-based healing?” needs to be examined prior to being able to address the question “DO spiritual-based healing practices actually work and how?” Our ultimate goal is to determine if we can construct a framework from which a description of how [science/engineering/mathematics] and spirituality relate to one another, and then how best to construct and utilize the so-called science \leftrightarrow Spirit bridge to improve human health and healing.

System “Think”: For Worse or for Better?

No doubt that a significant proportion of our potential ability to improve human health and healing has come (and will continue to) from developments in the classical biomedical science disciplines. Indeed in the Health Science Center I work in significant resources are dedicated to building an Institute for Molecular Medicine for just this endeavor. Within these classical disciplines today (those which underlie many modern

developments in all the clinical sciences) there are underlying assumptions about how we perceive and analyze the biomedical systems we study.

These assumptions often are simply accepted blindly or remain implicit as science marches headlong forward on its track. The saying “if you do the same things you’ll get the same results” comes to mind here, along with the computer programmer’s mantra “garbage in, garbage out.” In order to ensure that one is not living “inside a box with no windows or doors,” with an unknown universe pregnant with possibilities just outside its walls, such assumptions must be continually brought into the light for re-examination – only then do we stand upon the lookout point from which it is possible for scientific revolutions to become manifest. We have an expression for that today, “thinking outside the box,” whose meaning is much more significant than an ordinary cliché! There is no doubt in my mind that there are potential revolutions in the biomedical sciences just waiting in the wings, yet to be “awakened.”

One assumption that underlies much of biomedical research is one of a mindset that exists in doing this work, of relating “physics to physics” – that is to say that the viewpoint is one of passive and mechanistic matter-energy relations (a type of materialism). This is a manifestation of 1) reductionism in science and 2) another underlying system assumption: linearity. There is an additional assumption here that is limiting: that bio-science only progresses by sticking to the already accepted “rules” of the game, what is already known, and what is capable of human observation and “knowingness”. Bio-science does not do very well when it comes to dealing with “the unknown”, the so far unexplainable, or anything that does not fit inside the current dimensions of “the box”! Yet it was Carl Sagan who pointed out the following:

“Science requires a strange mating of two contradictory tendencies: a willingness to consider even the most bizarre ideas, and at the same time, a most rigorous skepticism, requiring hard evidence to back up very claim. A scientist must hover in a strangely divided state of mind – open to all, yet closed to anything but the most rigorously proven. Both perspectives are critical to scientific inquiry, and neither works without the other.” [1].

Clearly a balance between skepticism (“sticking to the rules”) and being “open to all” (thus being willing occasionally to break the rules) needs to be achieved in the bio-sciences if we are to make much-needed progress. In addition, exploring the dimensions of the unknown, asking questions about it, perhaps of it, can be significant enablers of the discovery process itself.

Signals and Information

At the heart of system theory are the concepts of “signal” and “information.” Signals are essentially communicated sources of information. Examples are the historical Dow Jones industrial average, daily temperatures, heart rate, and brain activity (electroencephalogram - EEG). One may argue that signals only exist when they are communicated – meaning that they must be transmitted, later received, and their information content extracted via some sort of analysis process carried out by the receiver. This is reminiscent of the question “if a tree falls in the forest yet no one hears, did it indeed fall?”

Information reflects knowledge. Yet there is a crucial distinction between information and the next step, which is the decidedly human process of attaching significance to the information from which some action(s) may follow. That is, arriving at an understanding, through wisdom, of the meaning and significance of the knowledge (hopefully) leads to prudent, affirmative and decisive action. This modern scientific understanding of signals and information directly connects (or reconnects) back to what the ancient wisdom masters (AWM's) in a bygone age taught us – the existence of a universal “system” consisting of a “Circle of Truth” containing the double triangle (diamond) of wisdom, understanding and knowledge (see Figure 1) powered by intent or will. The circle reflects the wholeness of truth while the diamond represents a quite stable yet dynamically interacting system (note that all arrows are bi-directional) supporting the overall system wholeness.

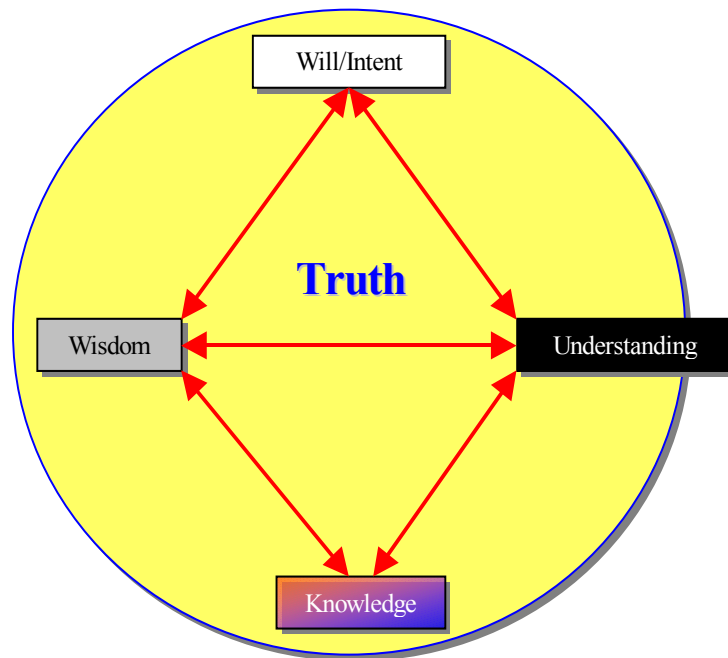


Figure 1. The Circle of Truth containing the Diamond of Will/Intent, Wisdom, Understanding and Knowledge – leads to (hopefully) prudent real-world action.

Types of Systems: Linear and Not-Linear

There are many different “species” of systems that will eventually be important for us to discuss within a healing context. Here I wish to focus on just two classes: linear systems and not-linear (nonlinear) systems. Up until the last approximately 40 years, for hundreds if not thousands of years prior, many of our scientific models of the world were grounded fundamentally in linear systems theory where future system behavior is predictable based on our analysis of previous linear systems measurements.

An example would be the performance, over time, of the stock market. This may be assessed in a simple way by looking backward over an arbitrarily chosen time window and computing a least squares trend line through the data. Then we interpret the results, draw conclusions and choose a course of action. Notice that the information derived is neutral: we attach meaning to it based on the analyses we select to perform.

What should one conclude if the trend line’s slope is negative? One stockbroker may conclude “since the market has been down it’s more likely to continue its downward trend tomorrow.” Then he responds to that information – his response is by choice, not fixed or inevitable, even though he may feel compelled to respond to the information in a certain way. He therefore has a fairly equal chance of making money or losing money.

This is interesting given that the information hasn’t changed. We all know that good brokers can make money in any kind of market. But notice that initially we used a linear tool to analyze the market – this likely assumes that the inherent nature of the market is linear and so under this assumption it would indeed make sense to conclude that “since the market has been down it will likely stay down.” Yet this is just one possible conclusion that

can be drawn from the information. We all know that the market could reverse its trend tomorrow despite its historical downtrend. Imagine how the possibilities for accurately predicting what the market will do tomorrow will decrease if we relax the assumption that the system behaves linearly. It certainly would make predicting any particular outcome at the very least, difficult.

The other side of this is freedom from the past! Assuming that the human being is not a linear system (safe assumption) what this says is that we have the active potential to not be self-victimized by our past. That past behavior does not necessarily predict future behavior. This has clear implications for some diseases (“down trends in our market”) – we may be able to reverse the trend based partially on our choice to do so and our conscious intent.

Thus not-linear systems are a kind of gateway leading to more equally probable possibilities. Such systems are characterized by high entropy and thus information content. It is safe to say that that is a useable tool for health and healing. In engineering science today we now recognize that linear (low entropy) systems are just one of a subset on a continuum of nonlinear (high entropy) ones.

System Building Block: The Ubiquitous “Black Box”

In system theory and in the engineering sciences a fundamental building block is referred to as “the black box” (Figure 2). It is a subsystem component that performs one or more functions. Exactly what those functions are however, are not directly accessible or necessarily knowable. That is, it is very difficult if not impossible to gain direct access to the “essence” or intrinsic nature of the subsystem (you cannot “get into the

brain” of this subsystem directly). We can however, infer what those functions might be through a process of examination of the subsystem’s behaviors resulting from those functions (which are fundamentally hidden outside of themselves), assuming that they produce measurable behaviors. One way to do that is to transmit known signals (input) into the subsystem in order to manipulate or perturb it in some (hopefully) determinable manner, and then measure the subsystem’s behavioral responses (its “output”).

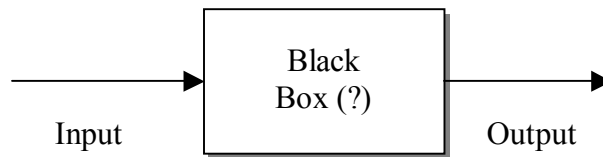


Figure 2. “Black box” with known signals going in (input) and measurable behavior emerging (output). The question mark indicates that its essence may be unknowable from the outside but not necessarily onto itself!

If the black box’s inputs and outputs are indeed measurable and their information content is accessible, we might imagine constructing an *a priori* model of how the inputs and outputs relate to each other and might set out to uncover this relationship. This is called “system identification.” In fact, what happens is that the black box transforms in some manner the inputs to produce outputs. By uncovering how the information contained in the output relates to the information contained in the input we can “reverse engineer” the nature of the transformation and infer something about how the black box functions. This idea becomes very interesting because instead

of the input modifying the contents (or essence) of the black box it is actually the black box that performs the action of transforming the input to produce a behavioral system response (output). In other words the black box is an “active” rather than a “passive” entity. It is the “do-er” rather than the “do-ee.”

Imagine then that the human brain-mind is a kind of black box. Johnny is diagnosed with schizophrenia and he is prescribed medications to “fix it.” The psychiatrists’s underlying assumption or implicit working hypothesis is that the medication will “do something” to Johnny’s brain-mind to help alleviate his condition. What the medication will do is not very well characterized at this point given our current state (or lack) of knowledge.

However, according to system theory the primary effect is not that the medication physically alters Johnny’s brain-mind, rather it is Johnny’s brain-mind that in fact transforms the physical medications producing some measurable behavioral outcomes. This is done through the exchange of signals and therefore information – it is a transformation of information/energy primarily, rather than a “physics on physics” effect. This is truly a case of “mind over matter”!! But to ramp the stakes up a little higher in Johnny’s case, we can go at least one step further: his “black box” – which is the “do-er”, is a rather special kind of black box in that it has the ability to transform itself in (possible) response to the external input (e.g., medication).

Indeed neuroscientists have in recent years reversed a number of previous myths about the brain such as “once it is damaged it cannot repair itself.” Now we know for example, that the brain can not only be rehabilitated when injured (not that that is necessarily easy to do in all cases of course)

but it is much more “plastic” than previously thought, it indeed can “re-wire” itself and can increase its learning capabilities well into the senior years (yes your IQ can increase over time!).

Note how placing this mind-brain illness example within a system-theoretic framework brings forth a potentially new dynamic with respect to the healing arts. Indeed the “tables have been turned upside down” with respect to who’s doing what to whom when it comes to how one is healed. It places both the major responsibility and main capability for healing on the healee rather than the healer (or healing facilitator). That is, in my view, a profoundly important shift in emphasis. A corollary of that shift is that without the healee providing “permission” on some level of consciousness for healing to occur it likely will not. Without this, even the best medicine prescribed by the brightest most capable physicians will likely be ineffective.

When the healee accepts responsibility for their own healing, this can provide significant self-empowerment that may in itself lead to a crucial shift of consciousness which in turn may accelerate the patient’s own healing response. In addition, if the caregiver understands this then he/she can take steps to utilize it advantageously to help accelerate the patient’s healing response. For example, establishing a relationship of trust and empathy can assist the patient’s responsiveness. Sharing a true and genuine love for the healee because the healing facilitator recognizes herself in the former, can do even much more.

When the caregiver empowers the patient to meditate on their own biology, to “talk with their entire body” in a holistic, loving way, and encourages them to explore their own birthright and abilities to maintain their health,

they are assisting in this process and maximizing the interaction between caregiver and patient, thus bringing forth the best from the partnership.

When the caregiver takes on the role of healing coach or facilitator, attempting to bring forth from the patient how valuable and loved/lovable they are; that the patient is not alone, is supported, and has the capacity for abundant health if they truly desire, accelerated healing is inevitably facilitated.

It may seem simple, yet the preponderance of negative messages that caregivers transmit to patients both overtly and covertly is still too high and is a result of a great deal of frank ignorance about the workings of human healing on the part of the medical community. Our medical training institutions can and should be doing much better now.

The Black Box that “Knows” Itself

A very simple modification to the black box subsystem leads to profound functional implications. This is the feedback principle which is at the heart of the field invented by the brilliant biomathematician Norbert Wiener called *Cybernetics* [2]. The modified black box is shown in Figure 3 with the feedback signal, taken from the black box output, shown there.

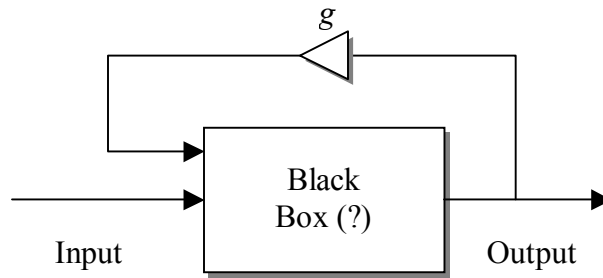


Figure 3. “Black box” system showing self-feedback signal.

The feedback signal is usually amplified or reduced (g for “gain” factor in the figure) and its polarity may be inverted or not. System feedback “mimics” a form of self-awareness or self-learning. The system therefore “remembers” what it just did and attempts to modify its predicted future behavior. Therefore, even though the black box’s essence is still inaccessible outside of itself, it has become more aware of its own essence! Such a system has equal facility in responding to its environment as well as its own core truth whatever that happens to be.

When the feedback signal is inverted (multiplied by -1) this represents inhibitory or negative self-feedback to the black box. This type of self-feedback helps to stabilize and maintain the black box’s current behavior by presenting an opposing signal to it that is proportional to the system’s behavior itself. If the system’s “core” behavior is “unhealthy” to begin with then negative self-feedback will tend to maintain such behaviors. Alternatively if the core behavior is “healthy” that will tend to be maintained by negative self-feedback as well.

On the other hand, positive self-feedback tends to promote “other” behavior or “change.” In engineering circles this is a destabilizing system tool, however, with respect to human health and healing it would be a mistake to view this tendency (in moderation) as something to avoid! One can come up with all sorts of clinical health examples where a patient is diagnosed with an illness or syndrome in which they might be characterized in a dynamical sense as “being in a rut”, clinical depression, obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD) come to mind as examples of syndromes where cyclical-repetitious behaviors occurring over a period of years (despite state-of-the-art medical care in many cases) are not uncommon.

In those cases a destabilizing tool (such as positive self-feedback), one with the potential to “kick the patient out of their rut” (ever so gently and compassionately of course!) may be just what is needed in order for one’s self-healing potential to manifest. One example tool for both negative and positive self-feedback is *neurotherapy* – in which the subject undergoes feedback training using the EEG and/or other neuro-signals such as the electromyogram (EMG). The effect of this type of intervention may be analogous to opening up a new exitway for someone stuck in a room with no doors or windows.

A System’s View of Caregiver ↔ Patient Interaction

In years past, many psychoanalysts were trained in such a way that key principles from system theory were incorporated into their clinical practices. The patient was recognized by the analyst as belonging to a family unit, a community, a social group, etc. The analyst would likely recognize that the patient-analyst interaction is itself a unique system with a

rich repertoire of potential dynamics (see Figure 4). The analyst would explore those dynamics and ask probing questions of both the patient, and of him/herself. Such questions as “what is going on in the patient’s life?”, “what are the external influences/forces on the patient?”, “why is the patient demonstrating a limp in his stride (for example)?”, “what is going on with me, what feelings does this interaction evoke in me?”, etc. Such questions arose out of an understanding of the nature of the system, how its components are in communication with each other and how they interact. Information, timing, and dynamics are key in such a mindset. Understanding some of the components of systems and information theory are thus prerequisite to the design and application of tools that may assist in optimizing the healing imperative, particularly with respect to caregiver/client inter-relations.

Today unfortunately, psychiatrists are no longer as well trained in this type of holistic system thinking. They are more likely to be influenced by largely “biological” explanations and models of mental illness. They often make the logical mistakes 1) that the basis of the illness is biological, and 2) if item 1 holds then a biological therapy (e.g., drugs) must be employed and has the maximum chance of working. This is an example of rational-linear-reductionistic thinking with unchecked assumptions thrown in for good measure! Yet the evidence supports that certain mental illnesses are better treated behaviorally or by means other than pharmaceuticals, or by combination therapies.

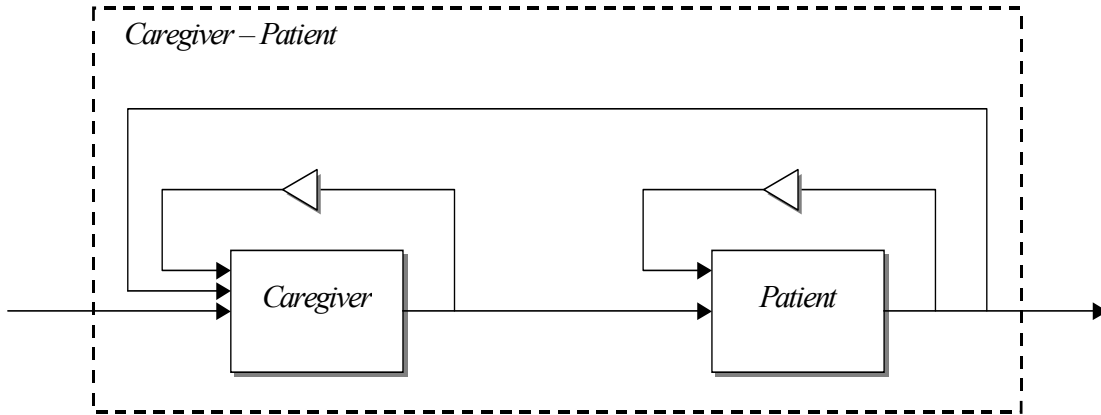


Figure 4. Caregiver–Patient “system” showing the individual subsystems and their information intra- and inter-communication channels. Note the information channel coming in from the environment and going out to it.

The following anecdote highlights the dilemma: A Texas psychiatrist-teacher explained how he trained residents this way, “we make it very clear that when the resident interacts with the patient they must first ‘leave their baggage’ outside the door no matter what is going on in their own life, and always put on a happy face. Anything less than full attention to the patient is unacceptable.” That is all well and good in principle, however it neither reflects “correct” system theoretic principles nor is it even possible in practice.

Furthermore it may leave out some things that may be of tremendous healing value within the relationship itself such as the therapist’s own insights (possibly learned from their own difficult life experiences), and the transmission of affirmative and supportive information coming from his/her compassionate heart and spirit. By failing to recognize how the caregiver/patient **system** is in fact constructed, how that system operates

with maximal efficiency, and how to optimize the utility of its inherent resources, we may stymie the patient's recovery/healing.

Taking a look back at Figure 4 we see an overall system with two subsystems that interact with themselves and each other using feedforward/feedback mechanisms. In understanding how this overall system works, one must understand the individual subsystem behaviors, their interactions and something more – that the two interacting subsystems create the emergence of a third subsystem (shown as the dashed box) – the overall “holistic” one that has its own distinct properties and rules independent of the constituent subsystems.

This is analogous to the formation of a water molecule: the chemical properties of H₂O are largely independent of the separate characteristics of hydrogen and oxygen. In some sense then, the system in Figure 4 is an example of the nonlinear equation $1 + 1 = 3!$ Figure 4 is of course not an exact representation of the caregiver–patient interaction system in all cases. There are many possible variants, however the purpose was to make explicit the general features of the system in terms of how the subsystems interact forming a new system at a metalevel of *synalysis*. In the therapy room this amalgamated system is just as “real” as the caregiver and patient themselves!

Another interesting idea is revealed by Figure 4: if one switches the labels of the two subsystems, the overall system's functional characteristics remain essentially unchanged. This tells me that the roles of healer and healee are interchangeable, or that each one is simultaneously part healer and healee! When “thinking out of the box” about this, the next question I ask is “can I use this insight (the seeming blurring of the roles) to optimize

the healing of the overall caregiver–patient system, and if so how?” This is an awareness that the “teacher is a student also” and vice-versa. This then puts an interesting spin on the Texas-psychiatrists admonishment for the resident to “leave his baggage outside” of the therapy office.

Our AWM’s also understood this system-level description of caregiver-patient interrelationship. This is embodied in the following metaphoric description: “when one is ill it is as if they are locked-up in a jail cell. They need someone from outside to unlock their cell door in order for them to be ABLE to attain their true freedom. But even if that occurs, the one who is ill must **at least intend** to leave the cell before their freedom can possibly be acquired.”

Conclusion

The objective of this brief work was to describe how some tools of both information and system theory/engineering may be used to re-conceptualize caregiver-patient relationships as well as to show their potential utility in individual self-healing. We provided some admittedly simple examples of using these tools that may reveal some of the implicit inter- and intra-system interactions. While information is the unit of communicatory exchange in these systems, energy concepts (not discussed explicitly here) also play an important role as the “carriers” of information.

Along these lines, another goal was to begin the process of building a logical, consistent framework that can address the question “does spiritual-based healing and science-based healing relate in any way, if so how and in what ways?” So for example, what are the implications of a caregiver imparting to a patient the idea that “you are an active, self-aware individual

with as yet untapped potential for your own healing, and you therefore hold the ultimate key to unlocking this tremendous potential inside of you”? Might this, in and of itself, open a “doorway” beyond which lies tremendous healing power for the patient? By fully exploring these questions I believe we can avoid squandering a major opportunity to make significant inroads toward improving human health and healing.

References

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2. Wiener N (1948). *Cybernetics*, MIT Press.