

Neurophysics

Exploring the Multiple Dimensions of Consciousness

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Introduction

Every piece of creative work reflects the subjectivity of its creator. This applies equally to the sciences as it does to the arts. And while the scientist subscribes to the concept of objectivity and impartiality, inevitably an intrinsic bias becomes evident. This applies both to the nature of the substrate being investigated as well as to the sampling and statistical interpretation. Indeed the subjective bias even becomes apparent in meta-study reviews, where subjective bias will ultimately determine whether the glass is half empty or half full.

This text represents my subjective reality and consequently, my intrinsic bias. As in all art forms, I offer it to you the reader as my personal art form. While I have attempted to remain true to my scientific heritage and have reviewed information as objectively as possible, the overall text is woven together with my subjective interpretation.

This work has been motivated by my passionate interest in all aspects of the brain and consciousness. In recognizing that human consciousness is a core determinant of the external environment as well as of many aspects of body metabolism, the model of consciousness would necessarily need to incorporate all neuro-somatic (mind-body) connections as well as connections within a quantum physics environment. I firmly believe that it is essential that any practitioner working within the neuropsychological spheres be familiar with the broad context of influences exerted upon and by, consciousness and its processes. These practitioners would include medical and para-medical practitioners, psychologists, social workers, personal coaches as well as those individuals studying the concept of consciousness in all its manifestations.

The structure of this text is such that the initial section describes the physical environment which provides the substrate for consciousness development. The debate of evolution versus intelligent design is reviewed in terms of its influence upon human consciousness. The second section represents a detailed examination of the functioning brain with a proposed heuristic model of consciousness and emotion. The functioning human brain-mind is reviewed in the context of human physiology and metabolism. The third section represents an application of the model proposed in the

second section, in the context of personal and work environments. In this section, the usefulness of the derived Triangles Model is demonstrated as a way of logically engaging the multiple challenges of daily life. Finally, the last section incorporates the Triangles Model of consciousness within a quantum physics dimension (nonlocality). In this way, consciousness as a multi-faceted process is illustrated as a core influence in an extended environment. The lasting theme is one which emphasizes the subjectivity of individual consciousness. Consequently the extended environment reflects the collective contribution of a multitude of subjective, individual consciousnesses.

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Part 1 – The Extended Environment

The extended physical environment forms the fundamental substrate for developing consciousness. An understanding of the components and the dynamic of this environment is thus essential before engaging the concept of consciousness.

Champions of the theory of evolution have conveniently steered away from incorporating concepts of theoretical physics into biological evolution. Yet all biological entities comprise molecules and subatomic particles/photons. It is therefore imperative to extrapolate certain theoretical physics concepts to biological theories, specifically those which address processes occurring over protracted periods of time. In fact the very concept of *time* is questioned. Some argue that *time* is an artificial concept having very little significance in a more absolute quantum-physical environment.

We have now come to realize that the world around us consists of more than is portrayed by our five senses. Through our five senses we perceive a reality which represents a very narrow spectrum of a far greater environment. This greater environment we shall call the *singularity* as opposed to the five-senses based environment which we shall refer to as the *dimension of relativity*.

The Dimension of Relativity

This dimension is true to all that our five senses have conveyed to us. We recognize individual entities, both living and non-living, all having specific traits in terms of colour, shape, mass, texture, smell and taste. In many cases there is also a characteristic sound. Individual entities however enjoy unique space and are separated from each other by distance. The progression of time also brings about recognizable changes in the individual entities. Associations between entities both living and non-living also become discernable. This is the environment that we are familiar with. Importantly, in the relativity dimension, nothing travels faster than the speed of light.

In the context of this dimension, following the "Big Bang", life is seen to have evolved spontaneously in terms of natural selection from a fortuitous beginning characterized by fission and fusion of early chemicals (abiogenesis). And behold there was life! Life then becomes a matter of moving towards pleasant and stimulating environments and away from noxious or threatening ones, procreating (and recreating!), maturation and death. Disease states develop as a result of processes which affect the normal structure and function of the organism. Consciousness based in the brain-mind is not regarded as a significant causative variable in the aetiology of these conditions

The Singularity

The evolving study of quantum physics has shed light on the existence of a whole new reality in which you and I and indeed the entire universe has representation.

Matter exists simultaneously in both a physical/mass form in the relativity dimension as well as in an energy/frequency form in the *singularity*. Within the singularity dimension, matter appears to be connected not only across space *but also across the gulf of time*. This is referred to as nonlocality. Experimentally, nonlocality has demonstrated instantaneous connectivity between two or more entities. The connectivity occurred at speeds faster than the speed of light and was thus independent of time and space. In addition, the consciousness of the observer has been shown to influence the outcome of nonlocality experiments. The intrusion of consciousness tended to shift entities from the singularity into the relativity dimension.

Energy-frequency exists in the form of specific "packets" or *quanta* (one quantum, hence the name quantum physics). Just as a vibrating tuning fork stimulates another tuning fork of similar vibrational frequency (or harmonic thereof) through the phenomenon of *resonance*, so similar energy quanta may activate each other through resonance. The singularity may therefore be defined as a dimension characterized by the presence of the energy equivalent of physical entities devoid of time, mass and distance. However the energy representation must be in the form of identifiable quanta which retain their individual integrity so that when in the relativistic dimension the mass is re-materialized. I propose that within the singularity, the

phenomenon of resonance occurs between similar energy quanta or through the harmonics thereof. This in itself would contribute to the connectedness of the dimension. In this way the instantaneous transfer of information takes place which may become manifest in mass entities existing within the relativistic dimension.

The challenge is to propose some process which unifies the two dimensions, each with their unique, proven properties. According to Einstein's theory of relativity, when mass is accelerated to velocities close to the speed of light, its mass tends to increase towards infinity. At a critical mass relative to its volume (Schwarzschild radius), the mass-volume can no longer be maintained and it collapses in on itself. It converts into a black hole and exits the relativity dimension and enters singularity. One speculates that if the acceleration and resultant velocity diminishes below the threshold speed, matter re-enters and re-forms in the relativity dimension. One way of explaining the existence of a constant acceleration and deceleration situation is if all physical matter in the Universe rotates near the speed of light (peri-luminal speeds) relative to a fixed centre of rotation. Velocity along the circumference of rotation (angular velocity) can be viewed as an average velocity of individual segments of circumference and velocity. With changing vectors of force and acceleration along the circumference there are incremental changes in angular velocity. As the circumferential path changes at the start of the next increment, the angular velocity has diminished below the threshold value because the previous vectors of force and acceleration have diminished as the new vectors increase angular velocity in a different direction. Hence the mass re-emerges from singularity at the lower velocity, experiences the new vector influences, accelerates to threshold angular velocity and re-enters the singularity. In this way the process repeats itself and in fact establishes an oscillation between the singularity and the relativistic dimension. This process is illustrated in figure 1.

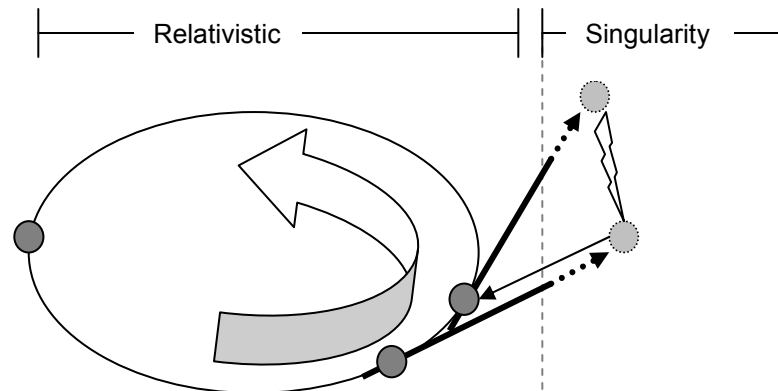


Figure 1. Universal Oscillation

Quantum theory describes matter as conforming to wave configurations (Shrodinger). The wave configuration represents statistical possibilities of outcome on re-emergence from the singularity back into the relativistic domain. Once an entity has returned to the relativistic domain there are no further possibilities regarding alternative outcomes. The entity has moved from possibility to actuality. As entities actualize, the wave of possibility "collapses".

The living human brain within the relativistic dimension records information relating to mass, energy, distance and associations thereof. Organically recorded information within the brain is itself subject to the oscillation described above and in this way will influence the energy equivalent quanta of mass entities within the singularity. The mode of influence is explained through resonance of the representative energy of the mass itself with the energy equivalent quantum representing the stored form of the mass and its associations within the neurological structures of the brain. Expressed in different terms, the energy interactions or perpetual

flux of the singularity represent the Shrodinger wave of possibilities. It is the associations of the entities as represented in the human brain which biases specific resonant connections and which becomes manifest on re-materialization. This process in effect collapses a segment of the wave of possibilities. The influence of human consciousness upon nonlocality phenomena has been clearly demonstrated. It appears that the human brain may be a convergence point through which flux originating within the singularity, attains manifestation by wave collapse within the domain of relativity.

Facets of determinism are manifest in the individual components of this integration which includes basic elemental properties, the relativistic and nonlocality milieu's as well as human consciousness. The properties of the basic elements have remained unchanged since the origin of our earthly environment. The properties of the elements determine their interaction with all other elements which in turn gives rise to our physical environment. It is these basic elements which have supported the evolution from simple, inanimate compounds, to compound organic matter which in turn has evolved into living organisms.

The second law of thermodynamics states that systems are inherently driven to move to their lowest energy states – a state characterized by maximum disorder or *entropy*. The properties of our basic elements and their interactions have remained remarkably constant. In effect they have defied the second law of thermodynamics because the integrities of the elements are maintained. Consequently the interpretation is that the fundamental properties of the elements have been deterministically programmed to support the evolution from the primordial elemental state into life forms with the ultimate emergence of human consciousness.

It has been proposed that the physical environment is the resultant manifestation of a perpetual oscillation between mass-energy conforming to relativistic laws on the one hand and non-locality (singularity), laws on the other. The interaction of mass-energy within the relativistic physical domain is determined by the collective of intrinsic elemental properties within a perpetually changing milieu. This dynamic is modulated by nonlocality influences operating independent of time and space. In this way, the behaviour of mass-energy entities is modified and orchestrated by timeless-spaceless data representing similar entities (subatomic, atomic

and molecular). The mode of influence is instantaneous resonance (independent of time and space constraints).

A Deterministic Natural Environment

Embarking on a study of the extended natural environment immediately brings us face to face with the issue of evolution versus intelligent design. In fact a review of this issue necessarily outlines all the environmental components determining human consciousness.

Classical evolutionary theory proposes that:

- The origin of life is fortuitous
- The chemical substrate of life (polypeptides/proteins/nucleosides) developed fortuitously and spontaneously from a primordial "soup"
- Life commenced from the spontaneous arrangement of appropriate substrate (abiogenesis)
- Different species evolved from the mutation of the genome and/or the introduction of new gene substrate, followed by the selecting out of favourable traits conducive to survival in a given environment (Natural Selection)
- The theory is seen to be substantiated by the findings of earlier primitive species and later, more sophisticated speciation in a given environment
- Further substantiation is claimed by the existence of common genome molecular structure across a wide range of species and over a prolonged period of time

Life as we understand it in the present time is characterized by the following traits:

Existence - Living organisms are defined as utilizing energy from metabolism to germinate and develop. In the case of animals they also move within and between environments. Organisms both co-operate and compete within complicated ecosystems. All existence is dependant upon

and modified by the greater universal environment (meteorological, geological and marine).

Persistence - All organisms are driven to complete identifiable life cycles and/or life spans. Termination of the integrity of the living organism is often heralded by traits of degeneration (functionally and anatomically), inefficient or pathological metabolism (pre-terminal traits). In the human and indeed in some other animals, pre-terminal traits may be preceded by an identifiable mind state. This is becoming more apparent in the developing science of psychoneuroimmunology (PNI).

Perpetuation - All organisms are driven to multiply their genome molecular structures whether they be uni-or multicellular.

The origin of these traits of life should be identifiable in the processes associated with the origin of life as well as during periods of speciation.

Let us assume that against all reasonable probability a polypeptide/protein was to develop spontaneously from the primordial soup. Let us further assume that this protein configured into a functional enzymatic entity. Would it "know" that it could perpetuate itself if it configured DNA and RNA components? Why would it "want" to persist and perpetuate itself? Clearly even if protein had to come into existence spontaneously and fortuitously and further develop a configuration compatible with enzymatic function, it is most improbable that enzymatic function would fortuitously develop into appropriate polymerases required for protein synthesis.

Improbability multiplies with the required existence and appropriate "grouping" of substrate required to establish the primordial organism. When we consider that the primordial organism, probably virus-like in nature, requires a host for perpetuation (multiplication), the improbability of existence, persistence and perpetuation becomes an impossibility.

Let us now accelerate forward in time to observe amoebae as representing early unicellular organisms. These organisms together with a whole host of other uni-cellular organisms, have remained essentially unchanged over several millions of years. This is despite the pressures brought to bear

upon them to select out. Evolutionary theory states and/or implies that unicellular organisms evolved into co-operative multicellular/syncytial entities. Why would competing unicellular entities "agree" to co-operate when all were competing for survival? Did some organisms evolve into sting cells, others into phagocytes and still others into neuronal-like co-ordinating cells, coming together fortuitously and spontaneously to evolve into a hydra?

Once again it should be emphasised that improbability multiplies with the need for the spontaneous occurrence of other multiple components for evolutionary speciation. In these cases the improbability equates to impossibility. Furthermore, the theory has failed to provide a satisfactory answer in regard to the concept of driven existence, persistence and perpetuation in the context of spontaneous and fortuitous origins.

Evolutionists often cite *in utero* development as illustrative of the full spectrum of evolution. Here we observe a constant genome manifesting in the full spectrum of speciation. Thus it is concluded that our genome incorporates and in fact represents a map of all previous mutations which were pivotal in the process of natural selection.

The opposing argument is equally compelling. The complete animal (human) genome which remains constant throughout the gestation period, manifests as both a lower phenotype of organism as well as the highly evolved animal phenotype. **The complete genotype could then quite feasibly have been in existence at the origin of the species with subsequent desuppression of appropriate segments of the genotype in subsequent environments.**

I propose therefore that the more probable scenario is the presence of the complete genome at the time of the origin of life. This necessarily implies the existence of a deterministic process. Ongoing desuppression of appropriate segments of the genotype occurs in sequential environments. The intrinsic drive giving rise to the desuppression of sequential segments of the genome arises from changing environmental circumstances. The nature of the desuppression is epigenetic. The process of sequential desuppression of the genome could also be seen to provide the impetus

for biological existence, persistence and perpetuation as well as providing the template for the complex interlocking of the ecosystem.

Differing phenotypes reflect corresponding suppression or de-suppression of the genome. I have proposed that segments of the genome that are permanently suppressed may atrophy and cease to exist or cease to attain phenotypic expression in the specific organism (possible "junk" DNA or pseudo-genes). In this way the specific genome would ultimately differ from the "universal" one.

By implication one would expect the human genome to incorporate segments of the entire plant and animal genome spectrum. I have proposed that the synthesis of appropriate enzymes related to digestion (of plant and animal tissue) as well as the synthesis of specific immune antibodies in relation to immunity reflect the expression of "lower" genome segments.

Tissue recognized as "self" by the immune system does not elicit an immune response. Tissue or organisms perceived as foreign, will elicit an immune response (in the presence of an uncompromised immune system). Suppressed (methylated) segments of the universal genome coding for potentially foreign tissue or organisms do not elicit an immune response as long as they do not gain expression. In the event that a foreign-coding genome segment gains expression through demethylation, an immune reaction will inevitably occur. Allergic or auto-immune activity may then be explained on the basis that primitive genome segments similar to the challenging antigen may be expressed due to partial desuppression (partial penetrance). The specific immune response would then be directed both at the invading organism as well as at the cells expressing the similar antigen. As regards the immune reaction to the exposure to foreign material or chemical, demethylation and expression of a potentially foreign coding genome segment may occur. The desuppressed and expressive primitive genome then stimulates an immune reaction. These situations would elicit an appropriate immune response to foreign, "non-self" tissue expression. However should the desuppression of these segments occur in cells of the immune system as well, the immune response would be compromised or absent. This latter situation would then result in the development of a

fulminant infection (in the case of an invading organism) and / or the growth of potentially neoplastic tissue and subsequent tumour formation.

Thus it is proposed that allergic reactions, auto-immunity and neoplasia represent a continuum of pathological conditions in which segments of the genome, coding for potentially foreign organisms or tissue, are expressed and elicit an immune response in the case of allergic reactions and auto-immunity; or compromise immune function if the desuppression process goes on to involve cells of the immune system.

Conclusion

When we superimpose the natural environment and its inherent evolutionary processes upon the relativistic-nonlocality dynamic, deterministic influences are clearly recognizable. This includes the constancy of elemental properties through the eons of time together with the influences arising from the nonlocality dimension. Added to this is the hypothesis that the universal genome was present at the onset of life with the de-suppression of appropriate segments, selected out by sequential environmental circumstances. Life and the intrinsic process of evolution therefore incorporate modulating influences derived from a far more extensive integration. Matter is programmed for constancy with a deterministic outcome through a process which is self-perpetuating and does not require intervention or maintenance.

Factors which support a deterministic theory of evolution include:

- The improbability of the fortuitous development of existence, persistence, perpetuation
- The improbability of the spontaneous occurrence of appropriate multiple evolutionary components
- The improbability of the spontaneous development of a complex interlocking ecosystem
- The deterministic implication of the constancy of the properties of matter and energy prevailing throughout the vast period of evolution

Any theory which proposes the incorporation of deterministic factors would need to allude to the determined purpose of the entire evolutionary process. It would seem apparent that *consciousness*, or more specifically, *human consciousness*, represents the final stage of this biological process.

References

1. Barrau, A., J Grain J. (2004), *The case for mini black holes*, CERN Courier 44(9)
2. Bell, J. (1987), *Speakable and Unspeakable in Quantum Mechanics*, Cambridge University Press
3. Longo, M.,J. (2011). Detection of a Dipole in the Handedness of Spiral Galaxies with Redshifts $z \sim 0.04$. *Physics Letters B*

Part 2 – Consciousness and Emotion

Advances in our knowledge of the neurological processes supporting consciousness and emotion have led to a proposed new working model of the human brain. Based on the understanding of the extensive interaction of these neurological processes with endocrinology and immunology, the model becomes inclusive of a far wider dynamic of influence. As a result, multiple modalities of intervention deriving from a shared model provide a more comprehensive and effective solution to fundamental neuro-psychological problems.

Introduction

Ongoing research in neurophysiology has resulted in the convergence of multiple neurological and neuropsychological concepts into an integrated holistic model. By employing such modalities as fMRI spectroscopic scanning, PET and SPECT scanning as well as electroencephalography we are witnessing significant breakthroughs in the understanding of the core processes of the human brain. Although the observed neurological processes are complex, it is still possible to discern relatively simple functionality supported by defined areas and their connections. In this regard we are now able to identify the neuro-anatomy and neuro-physiology (including neuro-chemistry) of such fundamental functions as memory and recall, emotion and motivation. In this section the relevant neuro-anatomy will be described initially. Thereafter the core components of memory, emotion and motivation will be defined in the context of neuro-anatomy and associated neuro-physiology.

Overview of the anatomical components and their functions

All neurological activity is based on the function of the neuron. Neuronal integration occurs as a result of the propagation of electro-chemical activity along neuronal processes (axons and dendrites), which then stimulate the adjacent cell or process at the *synapse*. The synapse represents a chemical bridge that connects the activated neuron or process to the next cell. The chemical released into the synaptic cleft is referred to as a

neurotransmitter. Simplistically, the brain can be regarded as a sphere surrounding a central core of cells or nuclei from which a stem originates. This is illustrated in Figure 1.

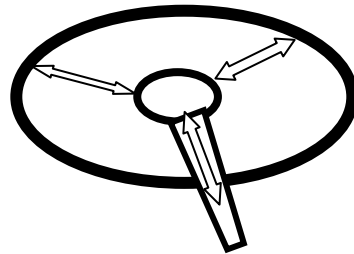


Figure 1. Brain topography.

The circumference comprises the cortex. This incorporates all the primary sensory areas, the areas receiving sensory information such as vision, hearing, touch and smell, as well as their related association areas. This is defined in more detail below. All the information represented in these cortical areas is integrated or connected and all project to the very front of the cortex, to the area referred to as the pre-frontal cortex. The pre-frontal cortex is the seat of such functions as concentration, motivation and working memory (Arnsten, 2009). Working memory is an abstract process in which sensory, sensory association and other integrated information is further integrated to a higher level. The processes taking place within the pre-frontal cortex are referred to as executive functions. In this way the pre-frontal cortex may be regarded as the driver of conscious action.

The entire cortex projects to the deep nuclei, specifically to the *thalamus*. This projection is a two-way connection. We are therefore able to define two projection or connection configurations: circumferentially through the cortex (termed the horizontal integration); and from the cortex to the deep structures (termed vertical integration). See Figure 2.

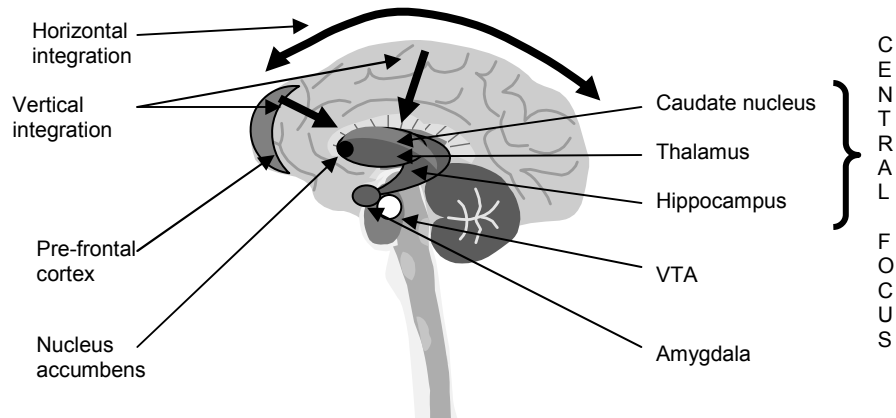


Figure 2. Neuro-anatomical structures and integration.

The thalamus also receives connections from the brain stem, which represent sensory fibre connections from the entire body. The thalamus in turn conveys motor connections through the brain stem to the entire body. In this respect we can regard the thalamus as being a major relay station connecting all motor and sensory fibres from the brain to the entire body (Percheron, 2003). But the thalamus is functionally more than just a relay station. It represents the central focus of cortical activity with major representation of the pre-frontal cortex (fronto-thalamic tract). We can, in fact, view the thalamus as the screen of consciousness - the place where our subjective consciousness resides. The thalamus is well connected to the *hippocampus*. The hippocampus supports important short-term memory functions, as well as contextual (spatial) memory. This connection logically promotes the memory and storage of information screened at the thalamus. Without the active input of the hippocampus, screened information at the thalamus would disappear after momentary projection, very much like RAM in a computer – the memory disappears when the computer is switched off.

The thalamus is also connected to emotional centres. The two important areas are the *amygdala*, which supports fear, anxiety, panic and anger and

is also associated with emotional memory, and the *nucleus accumbens*, which is the centre supporting pleasure and gratification (Amunts et al., 2005). In fact, as will be discussed below, a significant proportion of the emotional spectrum is derived from an interplay of these two emotional centres.

Movement co-ordination is supported by other deep nuclei termed the *basal ganglia*, which also connect to the thalamus. In this way, screened information, mainly from the pre-frontal cortex, motivates movement. The neurotransmitter for movement in the basal ganglia is dopamine. This is produced in the *ventral tegmental area* (VTA) of the brainstem and functions as a neurotransmitter in the basal ganglia. When dopamine production diminishes, Parkinson's disease may develop. This is essentially a movement disorder but often has an associated cognitive dysfunction, possibly reflecting a degeneration of connections to the thalamus and pre-frontal cortex. Dopamine originating in the VTA is also conveyed to the nucleus accumbens, where it is the mediator of pleasure and gratification. Dopamine is also the mediator in the hippocampus and in the *caudate nucleus*, another of the deep nuclei that is involved with procedural memory and learning and which has a strong connection to the pre-frontal cortex. Already, at this stage we note the integration of memory, learning, motivation and pleasure/reward through a common neurotransmitter, dopamine (Packard & Knowlton, 2002).

Horizontal Cortical Integration

The initial growth configuration of axonal and dendritic processes of the neuron in the embryo reflects genetic influences. With further maturation, environmental factors begin contributing to this hard-wiring phase of neuronal development with a progressively increasing influence. It has been shown, for example, that maternal hormones, notably cortisol, cross the placenta and influence neuronal development. This is discussed in more detail below.

Reviewing the hard-wired configuration at the level of the primary and secondary sensory areas, as well as at the level of association, it becomes apparent that neuronal cells and collections of neuronal cells are stereotypically, spatially arranged for function. The areas most clearly demonstrating this arrangement are the visual and auditory cortices. In

effect, the sensory process at the cortical level is characterized by the fragmentation of the incoming signal into its most fundamental components. In the visual cortex, the incoming light signal is fragmented to a level at which first order receptive cells respond only to fixed points of light frequencies or darkness. Thereafter subsequent order cells higher up in the filtering hierarchy begin synthesizing the sensed information received from the lower order cells through specific receptivity to further qualities of the sensed signal such as static and moving lines in all angles of orientation (Ganong, 1979). The information is further filtered through progressively higher order neurons which are individually responsive to more qualities of the sensed signal and in this way begin to synthesize the perceived information (Felleman & Van Essen, 1991). This process continues until it arrives at a point where the cells at the apex of this filtering and re-synthesizing hierarchy are the representation of the perceived entity. It is postulated that this apical representation is most likely situated in an association area. This sensory-association process may be summarized as follows:

1. First order cells receive the incoming sensory information in a fragmented form.
2. A hierarchy exists such that the sensed information is transferred through successive orders of cells, each being responsive to more of the features of the sensed information than the preceding order.
3. The configuration of all the cells is stereotypically arranged to carry out this required function.
4. The overall configuration of participating cells is triangular (pyramidal or conical in three dimensions) in that the base comprises the greatest numbers of cells, each specific only to very small increments of sensed information, while higher orders comprise progressively fewer cells, each specifically representative of more information. The least amount of cells would be situated at the apex of the configuration – the specific representation of the sensed entity.

This process represents the labeling of individual entities in the environment. Once a foundation of labeled entities is established, the process continues with the integration of associations of labeled entities. In this way awareness evolves into understanding that ultimately contributes to the development of pre-frontal lobe qualities.

Creativity

The hard-wired process described above will give rise to an adequate integration, supportive of human consciousness and independent function. This represents a common foundation, stereotypically similar for all individuals. We deduce this from the observation that neuro-anatomy and neuro-physiology are similarly spatially localized in different individuals. At this point we would need to project further in terms of this integration process to provide a model supportive of individual creativity. In order to explain creativity, we would need to expand the hard-wiring beyond the apices of primary triangular configurations, specifically representative of entities and their associations. In effect, hard-wiring represents an integration of environmental entities and their associations. Creativity, on the other hand, reflects a future-based, abstract integration.

We can assume that many “un-labeled” neurons and processes exist within the milieu of the integration process. These neurons would provide the substrate for further integration. In the event that the apices of two or more representative triangles of configuration are triggered, neighboring neurons and their processes may be recruited and incorporated in the synaptic circuit. In effect, the recruited neurons, termed inter-neurons, would be those caught in the common penumbra of triggered apices. This is illustrated in Figure 3. This process would be more likely to occur if the triggering were repetitive and if there was an element of reward (dopamine-based). As in all neuronal circuit creation, the initial neuro-transmitter mediated connection would evolve into a structurally permanent circuit through protein synthesis and axonal/dendritic growth (Kandel, 2001). The integration of apices elevates neuronal association to a higher order. The expansion of consciousness is therefore a consequence of repeated integration of subsequent apices of representation. The process of recruitment of substrate inter-neurons and the elevation to a higher level of apical representation appears to be co-ordinated in the anterior part of the non-dominant superior temporal gyrus (Jung-Beeman et al., 2004). Activity in this region is associated with the generation of a burst of gamma EEG frequency – the ‘aha’ moment.

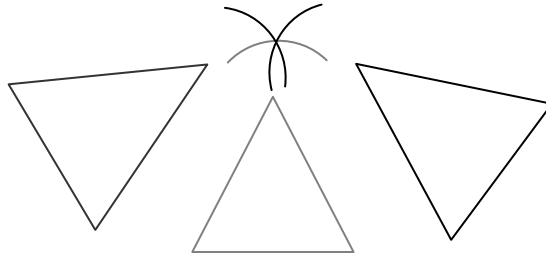


Figure 3. Apical integration.

The Basis of Memory Storage

Memory refers to the stored information that has resulted from the integration process. The function of memory recall depends on a logical and efficient storage configuration. Two broad categories of memory have been defined: Memory that can be consciously recalled is referred to as declarative memory, while memory associated with complex motor activity (procedural memory), and that related to emotion (emotional memory), cannot be recalled in terms of individual components. This latter memory function is referred to as non-declarative (Davachi & Dobbins, 2008). Declarative memory recall is initiated by the dorso-lateral regions of the left (dominant) pre-frontal cortex while non-declarative emotional memory recall is initiated by the ventro-medial pre-frontal cortex, predominating on the right side. The hippocampus is the structure associated with declarative memory, while the basal ganglia and amygdala support procedural memory and emotional memory respectively.

The key to understanding the process of memory storage is the appreciation of the interplay of genetic expression with activated, stereotyped neuronal cells. It has been shown that primordial neurons differentiate in response to genetically determined induction factors. Of significance in this regard is the finding that neuronal differentiation is dependant upon location within the developing neural tube. Following differentiation, neuronal cell processes migrate to specifically predetermined destinations under the influence of cell-derived guidance factors (Jessell & Sanes, 2000). From these observations it can be

extrapolated that neuronal populations are stereotypically configured in terms of their anatomical location to represent specific functions or bytes of information. The initial stimulation of a given neuron occurs therefore as a result of the location of the neuron within an integration, which is genetically determined. The configuration of synaptic connections is also genetically determined. Consequently a given neuron and its connections, when stimulated, immediately represents a pre-programmed byte of information. The genetic transcription of prion-like proteins to establish permanent synaptic connections completes the hard-wiring process (Si et al., 2003). In this way memory storage is a product of precise, stereotyped neuro-anatomical location and the subsequent transcription-driven imprinting and labeling of the neuron when triggered with a byte of information appropriate for that specific neuron within the integration. In other words, a given neuron represents a convergence point for specific representation of information by virtue of its genetically determined, stereotyped anatomical location and its position within a synaptic integration. In regard to creativity, it is proposed that the inter-neurons which mediate this process, harness genetic substrate and synthesize prion-like proteins appropriate for the integrated configurations.

It follows that the loss of neuronal cells and consequently the bytes of memory incorporated within them, would not necessarily diminish the information stored within the greater configuration. More integrated neurons higher up in the configuration that have been activated and imprinted with information would incorporate the information represented by lower tier cells. Evidence in favor of this postulate is the finding that the removal of the first order visual cells (decortication) in the monkey does not result in an appreciable loss of visual discrimination. Clearly, higher order levels of representation had been imprinted with lower order information (Keating & Horel, 1972).

The horizontally integrated information projects to the thalamus via the vertical cortico-thalamic integration and thereby brings to awareness the information represented by the specific neuronal component of the integration. It is postulated that every cortical apical neuronal representation is represented at the thalamic level. This anatomical arrangement achieves a more rapid and efficient screening of stored information, including newly integrated apices, at the central focus. In effect, appropriate apices of representation are retrieved via both the

existing cortical (horizontal) integration, as well as by radial projection to the thalamic central focus. As indicated previously, it is the hippocampus which is required to facilitate memory and recall of information screened at the thalamus. In this context it is postulated that the hippocampus maintains connections to all radial, cortical projections. In order to facilitate its memory and recall function, the hippocampus would need to incorporate a precise spatial-contextual map of representation of the entire cortical neuronal integration. In support of this function has been the finding that taxi drivers in London, who store vast amounts of spatial information, have markedly enlarged hippocampi (Maguire et al., 2000).

Emotional Centers and Connections

The two defined emotional centres are the amygdala and the nucleus accumbens. A significant proportion of emotional activity reflects the interplay of these regions. The amygdala supports fear, anxiety, panic and anger and plays a major role in emotional memory (Gorman et al., 2000). When stimulated, it activates its connections to the paraventricular nucleus of the hypothalamus and to the *locus ceruleus*, resulting in the secretion of cortisol and noradrenalin respectively. The secretion of noradrenalin, together with adrenalin, initiates the sympathetic response. The sympathetic response is manifested by a rapid heart rate, increased blood pressure, sweating and an increased respiratory rate. These are all the physiological changes seen in the anxiety or panic state. These changes also occur in response to hypoglycaemia, hypoxia and pain. It is postulated, therefore, that these states in the neonate trigger and integrate the hard-wired amygdala, thus establishing fear and its manifestations. The raised cortisol levels associated with the activated amygdala have far reaching effects on immune function and general metabolism. Finally, the amygdala projects to the thalamus and thence to the pre-frontal cortex and also directly to the pre-frontal cortex thus integrating the fear or anger emotion with conscious perception.

Reciprocal connections from the pre-frontal cortex, as well as connections from the hippocampus to the amygdala, serve to modulate (stimulate or suppress) the emotions supported by the amygdala. fMRI studies have revealed that the activated right pre-frontal cortex suppresses amygdala activity. In this way it can be appreciated that if amygdala function is modulated by pre-frontal activity, the individual is in a *reflective mode*. If, on

the other hand, fight or flight behavior manifests, reflecting unmodulated amygdala activation, the individual is in a *reflexive mode* (Arnsten, 2009). Recent studies have revealed a connection between the nucleus accumbens and the amygdala. Following deep brain stimulation of the nucleus accumbens, significant diminished metabolic activity was noted in the amygdala. Clinically this manifested as antianhedonia with anxiolysis (Bewernick et al., 2010).

Cortisol stimulates amygdala function (Chrousos & Gold, 1998). In this way a positive feedback phenomenon occurs in that cortisol stimulates the amygdala, which in turn increases cortisol secretion (via the paraventricular nucleus of the hypothalamus). Recent studies have shown that high levels of maternal cortisol in a stressed, pregnant woman cross the placenta and sensitize the amygdala of the developing fetus. This appears to promote an excessive fear and /or anxiety component in the new born infant in response to stressors (Van den Bergh et al., 2005). The problem may be compounded if the new born infant is exposed to nurture deprivation (Coplan et al., 1996). Raised levels of cortisol occur in the new born infant in response to stress, but diminish when adequate nurture levels are maintained. If nurture is inadequate or interrupted, levels of cortisol remain high and continue to sensitize the amygdala, thus amplifying fear and anxiety. Studies have also shown that children who were exposed to chronic deprivation such as occurred in orphanage institutionalization have raised cortisol levels in the later part of the day (Tarullo & Gunnar, 2006). A percentage of adults who were maltreated as children were shown to have decreased cortisol levels in response to stress. This finding may be explained by the observation that deprivation states in children are associated with enlarged amygdala's which subsequently atrophy in adulthood in a significant percentage of individuals (Tottenham & Sheridan, 2010).

Chronically raised levels of cortisol have also been shown to disrupt hippocampal function (McEwen, 1998). Consequently, short term memory, contextual memory and memory recall may be impaired. If raised cortisol levels persist, hippocampal cells may degenerate and die off with resultant hippocampal atrophy. This is observed on MRI scanning. Timely intervention however has been shown to halt and even reverse the process. The converse of this finding has also been noted: Children from enriched environments have been shown to have increased hippocampal

volumes (Luby et al., 2012). Finally, chronically raised cortisol levels suppress cell-mediated immunity (natural killer cell activity) which may result in a state of immunosuppression.

Nurture deprivation has more recently been shown to impede the myelination of fibres in the pre-frontal cortex (Makinodan et al., 2012). This resulted in a significant impairment of working memory. Although the mechanism for this damaging process has yet to be elucidated, the possibility exists that the mediator is raised cortisol levels. This is based on the finding that high levels of antenatal cortisol in foetal sheep results in delayed myelination (Huang et al., 2001).

The nucleus accumbens is the seat of pleasure and gratification (Zahm, 2000). The mediating neurotransmitter is dopamine. Substantial connections exist between the nucleus accumbens and the pre-frontal cortex. The mediating neurotransmitters in the nucleus accumbens-frontal connection include both dopamine and noradrenalin. The nucleus accumbens is activated when sensory pleasure, reward and achievement are experienced or anticipated. Drugs such as cocaine, amphetamines and opioids stimulate the nucleus accumbens, eliciting subjective pleasure. Physiological activity such as eating, exercise and orgasm are also associated with raised dopamine levels. The subsequent activation of the pre-frontal connection results in a heightened focus and concentration. The caudate nucleus, a deep nuclear structure close to the thalamus and nucleus accumbens, is an important memory centre with projections to the pre-frontal cortex. It appears to be specifically involved with feedback memory. Neurotransmitter mediation in the caudate nucleus and in the projecting fibres to the pre-frontal cortex is via dopamine. Studies have shown that reward-activated nucleus accumbens activity appears to enhance memory and learning as supported by the caudate nucleus, mediated by dopamine (Olds & Milner, 1954).

The complex interactions between the amygdala, the nucleus accumbens and the prefrontal cortex have been elucidated through several studies. Stimulation of the amygdala in rats resulted in suppressed activity of the dopaminergic system in the nucleus accumbens. This was mediated by suppressive glutaminergic neurons of the pre-frontal cortex (Jackson & Moghaddam, 2001). Raised cortisol levels have been shown to stimulate the outer shell of the nucleus accumbens. This resulted in a heightened

motivation for reward gratification (Peciña, Schulkin, & Berridge, 2006). From these studies it becomes apparent that the nucleus accumbens and amygdala function in opposition to each other (mutually antagonistic). Thus while the activated nucleus accumbens gives rise to enhanced subjective gratification, it also suppresses amygdala activity and hence anxiety (Bewernick et al., 2010). The activated amygdala in turn suppresses the dopaminergic activity in the nucleus accumbens and hence the sense of gratification by stimulating pre-frontal inhibitory projections to the nucleus accumbens. The increased cortisol levels resulting from anxiety as supported by the amygdala, stimulate the outer shell of the nucleus accumbens, thereby heightening the motivation for reward and gratification.

Identifiable emotional configurations and motivation

In a partial nurture deprivation situation, the following determining factors are presumed to exist: *In utero* maternal cortisol levels are moderately raised. The new born infant has raised cortisol levels with the partial nurture deprivation maintaining the raised cortisol levels. This triggers the amygdala, which manifests a subjective sense of fear. The connection to the sympathetic nervous system controlling area (locus ceruleus) integrates the physiological manifestation of fear (rapid pulse rate, breathing rate, sweating). The amygdala also stimulates the paraventricular nucleus of the hypothalamus, which ultimately results in a rise in the cortisol level, thus perpetuating the background fear dynamic. (The locus ceruleus has also been shown to stimulate the paraventricular nucleus.) With heightened stimulation of the amygdala, fear may progress to anger and/or to panic. Both these states are mediated by a sympathetic nervous system raised to a higher level of function.

When the infant's nurture needs are met and gratification is experienced, the nucleus accumbens is triggered and dopamine levels rise. It is the degree of nucleus accumbens activation that drives the infant to seek further gratification of needs when they arise. The needs-fear-gratification dynamic is integrated in the pre-frontal cortex. Also integrated in the pre-frontal cortex is the motor/movement function, which supports the physical effort of approaching closer to the nurture source. Dopamine plays a major part as the primary neurotransmitter in this process, with noradrenalin being a secondary neurochemical mediator. Therefore, from the partial

nurture deprivation situation arises an individual prone to fear as well as anger/panic, but highly motivated by reward and gratification of prevailing needs. Reward and gratification has generally been experienced, albeit delayed from time to time.

In a marked nurture deprivation situation, the following dynamic is recognizable: Excessive *in utero* cortisol production occurs. This sensitizes the fetal amygdala. The new born infant has significantly raised cortisol levels, probably due to the excessive amygdala stimulation and subsequent paraventricular nucleus triggering. This manifests as heightened fear/panic, which triggers the sympathetic nervous physiology. As a result of the poor nurture response, this infant experiences unfulfilled gratification for prevailing needs (which are excessive). The chronic absence of gratification results in diminished activity of the nucleus accumbens, with decreased dopamine secretion. The integration in the pre-frontal cortex is one of futility and despair for unmet needs despite the efforts exercised in this regard. Low gratification also leads to diminished motor activity, resulting in an overall situation of poor motivation. In psychological terms, this syndrome has been described as hopeless-helpless. This refers to individuals who experience a marked absence of meaning and purpose in their lives and who feel that the situation is unchangeable, unmanageable and futile. The latter state incorporates poor self-esteem, which is a further manifestation of the extreme nurture deprivation and the futility of experiencing gratification of needs. The chronic absence of gratification leads to anhedonia. These individuals have been shown to have lower levels serotonin and dopamine (Raison et al., 2006). Decreased levels of serotonin are associated with depression and anxiety.

In an attempt to experience some gratification, the individual who is a product of severe deprivation may turn to activities that stimulate the nucleus accumbens and dopamine production and thereby provide a degree of pleasure and gratification. This includes excessive exercising, eating and smoking, or the use of such drugs as cocaine, opioids and amphetamines. The tendency to addiction results from the need to chronically stimulate the nucleus accumbens and dopamine production. From a neuropsychological perspective, the mind state that has been shown to be associated with consistently raised dopamine levels is one characterized by purposefulness, a sense of achievement or anticipated achievement and one of autonomy. Raised levels of noradrenalin, together

with dopamine within a narrow range, contribute to optimal motivation, concentration, working memory and other pre-frontal cortex executive functions (Arnsten, 2009). However, excessively raised levels of noradrenalin and dopamine disrupt pre-frontal cortex, executive function. The disruption of executive function results in a shift from reflective and insightful pre-frontal activity to the reflexive fight or flight activity of the amygdala.

The configuration of decreased serotonin and dopamine, with raised noradrenalin, is associated with the secretion of raised levels of pro-inflammatory cytokines (interleukin 1, interleukin 6 and tumor necrosis factor α) by the immune system macrophages (Raison et al., 2006). Chronically raised levels of pro-inflammatory cytokines also occur in the presence of chronic infection/inflammation. Pro-inflammatory cytokines circulate back into the brain where they affect several areas of function:

1. They induce sickness behavior – a state characterized by lethargy and poor motivation, anorexia, lack of libido and low grade fever. This situation pre-disposes to a subjective mind state of hopeless-helpless.
2. They increase the levels of cortisol by diminishing the sensitivity of the paraventricular nucleus to circulating cortisol (In the normal situation, high cortisol levels decrease paraventricular nucleus activity thus lowering cortisol levels in a negative feedback loop). Peripherally (in the body) raised cortisol levels contribute to diminished cell mediated immunity.
3. They further diminish the levels of dopamine and serotonin levels (Miller, 2009).
4. They disrupt hippocampal functioning and thus short term memory. In time, cell loss may occur within the hippocampus with resultant hippocampal atrophy. This situation has been shown to be associated with a higher incidence of developing Alzheimer's disease in later years (Henneman, 2009; Leonard, 2007). More recent research has shown a correlation between chronically raised levels of pro-inflammatory cytokines, intra-cellular free radicals and the development of amyloid protein. Amyloid protein results in the disruption of neurological function as seen in Alzheimer's disease (Marchesi, 2011).

5. Chronically low levels of dopamine appear to predispose an individual to Parkinson's disease, a motor disease characterized by the degeneration of dopamine producing neurons. These individuals also develop poor motivation and, in certain cases, dementia. Dopamine levels have been shown to decrease with advancing age, which further aggravates the effects of chronically raised pro-inflammatory cytokines. A reciprocal relationship exists in regard to levels of dopamine and serotonin. Raising levels of serotonin activity by means of serotonin agonists has been shown to decrease levels of dopamine. This occurs selectively in the nucleus accumbens but not in the nigrostriatal system, the system supporting motor function (Di Giovanni et al., 2000). It has also been shown that increased serotonin activity following the administration of the serotonin agonist *m*-chlorophenylpiperazine leads to increased levels of cortisol (Ghaziuddin et al., 2003).

Three intrinsic physiological mechanisms exist whereby high levels of pro-inflammatory cytokines may be decreased (Johnston & Webster, 2009):

1. Raised levels of cortisol have been shown to effectively decrease high concentrations of pro-inflammatory cytokines. In effect, this represents a feedback loop in that pro-inflammatory cytokines stimulate high levels of cortisol.
2. Pro-inflammatory cytokines stimulate vagus nerve afferents, which reflexively trigger vagal efferents. Stimulated efferents have been shown to decrease high levels of pro-inflammatory cytokines.
3. The hormone oxytocin has been shown to decrease pro-inflammatory cytokines as well as cortisol levels (Szeto et al., 2008). In a neuropsychological context oxytocin secretion is associated with the experience of empathy (both expressed and received). Empathy experienced in the nurture environment has been shown to diminish the secretion of cortisol resulting from states of deprivation (Chen et al., 2011). Oxytocin also inhibits amygdala activity and thereby functions as an anxiolytic. It has also been shown to stimulate the nucleus accumbens giving rise to a subjective feeling of gratification.

Persistently raised levels of pro-inflammatory cytokines resulting from the neuro-chemical configuration described previously render these feedback

mechanisms relatively ineffectual. However, direct vagal nerve stimulation with a paced electrode has been shown to be effective in decreasing raised levels of pro-inflammatory cytokines.

Memory, learning, storage and retrieval are influenced by emotional states and their associated levels of motivation. Lesser degrees of deprivation with adequate reward and gratification are characterized by higher levels of motivation. Even if there is a delay in a nurture response to early needs, the fact that an adequate response or reward is eventually forthcoming will justify future efforts directed at eliciting and expecting a response. Conversely higher degrees of deprivation with an inadequate response to needs are associated with lower levels of motivation because of the perceived futility of being rewarded with an adequate response. In the context of the triangular configuration of cortical integration these relationships can be represented graphically. If the vertical Y-axis represents gratification-driven motivation and the X-axis represents all aspects of labeled sensory information and associated integration, then the process of triangular integration can be depicted by a triangular configuration curve. This follows on from the fact that the higher one ascends in the hierarchy of specific representation in the cortical integration, the more specificity of representation occurs and the fewer the cell numbers. The resulting triangular graph is termed an energy-integration curve. This is illustrated in Figure 4. Three variations of this curve may be identified:

Type 1: Lesser deprivation, adequate gratification – the Bravo archetype. This configuration has a high motivation or energy input centred upon a narrow integration base of 'own needs'. In this situation there was a delay in response to nurture needs but ultimately this was forthcoming. A period of anxiety thus evolved during the delay period which focused attention primarily on the need to appease 'own needs' at the expense of a wider integration. This archetype therefore has a pre-occupation with 'own needs' being fulfilled, a fear that these may not be fulfilled, but an awareness that a response will invariably be forthcoming after the period of striving and fear/anxiety. There is a tendency to excessive levels of noradrenalin with an activated amygdala. The high levels

of noradrenalin may shift pre-frontal activity towards inefficiency.

Type 2: Significant deprivation, minimal gratification – the Charlie archetype. This configuration is again centred upon a narrow base of 'own needs' but due to the poor nurture response, low levels of gratification occur. This gives rise to a perceived futility relating to any effort exerted in the attempt to obtain a meaningful response to nurture needs. Consequently the motivation level is low on the Y-axis. In this situation excessive fear has resulted in a markedly activated amygdala with resultant raised cortisol and noradrenalin. Dopamine and serotonin levels are usually low while pro-inflammatory cytokines are raised.

Type 3: Minimal deprivation, high levels of gratification – the Alpha archetype. Here 'own needs' were never an issue and therefore integration is based upon a far more extensive integration. Motivation is driven more by the gratification of ongoing broad-based integration than by the gratification of 'own needs'. In this configuration serotonin and dopamine levels are more than adequate while levels of noradrenalin tend to be low. Personal gratification is the hallmark of this profile. This archetype generally has lower levels of noradrenalin which may impact negatively on motivation.

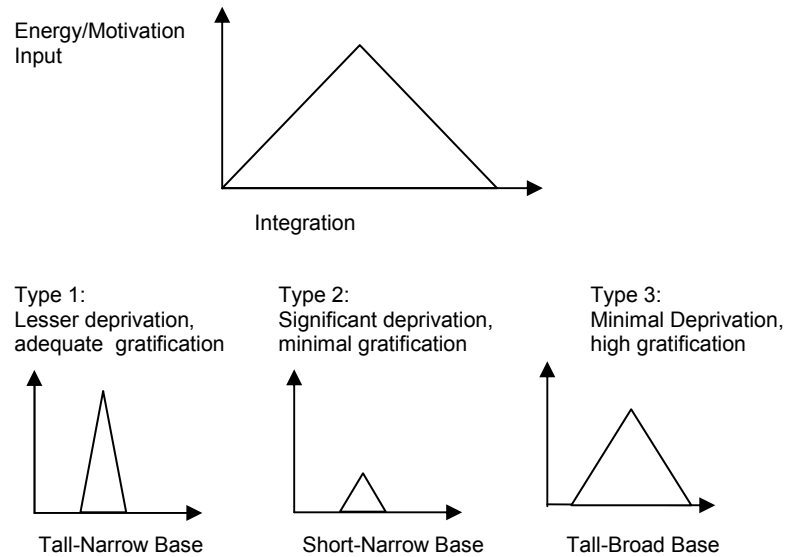


Figure 4. Energy–Integration configurations.

These three curves/archetypes form the basis of the Triangles Model which was developed by the author as a way of accessing the chemistry of wellness and performance. The application is fully quantifiable by means of an online diagnostic program (Weinberg, 2009).

Discussion

The proposed model of the human brain that emerges from a review of ongoing studies is one that integrates multiple disciplines of intervention. As our understanding of neurological processes expands, it becomes evident that neuro-anatomy and neuro-physiology (incorporating neuro-chemistry) are supportive of and in fact unify the full spectrum of neuro-psychology and neuro-endocrinology. The multiple disciplines that have contributed to the development of this model also derive from it. Specific modalities of intervention obviously reflect unique interest areas. However, understanding and accepting this new holistic neurological model will lead

to greater levels of collaboration between the disciplines, which would ultimately enhance the quality of intervention.

Memory, emotion, immunity and general body metabolism are intimately connected at the level of fundamental neurophysiology. Consequently, our thoughts and feelings impact upon our bodies, the internal environment, as well as upon the external environments in which we find ourselves. But with this action comes a reaction. All processes generate feedback loops that positively or negatively impact upon the neurophysiology at source. In this regard, we note that lowered levels of dopamine and serotonin are associated with raised levels of pro-inflammatory cytokines, which in turn circulate through the brain and further lower the levels of dopamine and serotonin. This situation negatively impacts memory, predisposes individuals to sickness behavior, anxiety and depression and leads to raised levels of cortisol (Raison et al., 2006). Raised levels of cortisol sensitize the amygdala, which sustains both anxiety as well as raised cortisol.

The fundamental human drive is motivated by gratification and pleasure. When this is experienced, our levels of function in terms of mentation, general metabolism and immunity are greatly enhanced. The greatest impediment to achieving lasting gratification, however, rests with inherited deprivation influences. The challenge therefore is to engage this heritage and to neutralize its negative influences by embracing a multi-modality approach. In the context of intervention it should be remembered that while negative physiological processes conspire against us, positive processes, once engaged, promote and perpetuate enhancement at multiple levels.

References

- Amunts, K., Kedo, O., Kindler, M., Pieperhoff, P., Mohlberg, H., Shah, N., Habel, U., Schneider, F., & Zilles, K. (2005). Cytoarchitectonic mapping of the human amygdala, hippocampal region and entorhinal cortex: Intersubject variability and probability maps. *Anatomy and Embryology (Berlin)*, 210, (5-6), 343–52.
- Arnsten, A.F.T., (2009). Stress signalling pathways that impair prefrontal cortex structure and function. *Nature Reviews Neuroscience*, 10,6, 410–422.
- Bewernick, B.H., Hurlmann, R., Matusch, A., Kayser, S., Grubert, C., Hadrysiewicz, B., Axmacher, N., Lemke, M., Cooper-Mahkorn, D., Cohen, M.X., Brockmann, H., Lenartz, D., Sturm, V., & Schlaepfer, T.E. (2010). Nucleus accumbens deep brain stimulation decreases ratings of depression and anxiety in treatment-resistant depression. *Biological Psychiatry*, 15, 67, 2, 110-116.
- Chen, F.S., Kumsta, R., von Dawans, B., Monakhov, M., Ebstein, R.P., & Heinrichs, M. (2011). Common oxytocin receptor gene (OXTR) polymorphism and social support interact to reduce stress in humans. *Proceedings of the National Academy of Sciences*, 108, 50, 19937–19942.
- Chrousos, G.P., & Gold, P.W. (1998). A Healthy Body in a Healthy Mind and Vice Versa. The Damaging Power of “Uncontrollable” Stress. *Journal of Clinical Endocrinology and Metabolism*, 83, 6, 1842-1845.
- Coplan, J.D., Andrews, M.W., Rosenblum, L.A., Owens, M.J., Friedman, S., Gorman, J.M., & Nemeroff, C.B. (1996). Persistent elevations of cerebrospinal fluid concentrations of corticotropin-releasing factor in adult nonhuman primates exposed to early-lifestressors: Implications for the pathophysiology of mood and anxiety disorders. *Proceedings of the National Academy of Sciences*, 93, 1619-1623.
- Davachi, L., & Dobbins, I.G. (2008). Declarative Memory. *Association for Psychological Science*, 17, 2

- Di Giovanni, G., Di Matteo, V., Di Mascio, M., & Esposito, E. (2000). Preferential modulation of mesolimbic vs. nigrostriatal dopaminergic function by serotonin (2C/2B) receptor agonists: a combined in vivo electrophysiological and microdialysis study. *Synapse*, 35, 1, 53-61.
- Felleman, D.J., & Van Essen, D.C. (1991). Distributed hierarchical processing in the primate cerebral cortex. *Cerebral Cortex*, 1, 1-47.
- Ganong, W.F. (1979). *Review of Medical Physiology*. 9th Ed. Lange. Los Altos, 99-100.
- Ghaziuddin, N., Welch, K., & Greden, J. (2003). Central serotonergic effects of *m*-Chlorophenylpiperazine (*m*CPP) among normal control adolescents. *Neuropsychopharmacology*, 28, 133-139.
- Gorman, J.M., Kent, J.M., Sullivan, G.M., & Coplan, J.D. (2000). Neuroanatomical hypothesis of panic disorder, revised. *American Journal of Psychiatry*, 157, 4, 493-505.
- Henneman, W. (2009). Hippocampal atrophy rates in Alzheimer disease: added value over whole brain volume measures. *Neurology*, 72, 999-1007.
- Huang, W.L., Harper, C.G., Evans, S.F., Newnham, J.P., & Dunlop, S.A. (2001). Repeated prenatal corticosteroid administration delays myelination of the corpus callosum in fetal sheep. *International Journal of Developmental Neuroscience*, 19, 4 415-425
- Jackson, M.E., & Moghaddam, B. (2001). Amygdala Regulation of Nucleus Accumbens Dopamine Output is Governed by the Prefrontal Cortex. *Journal of Neuroscience*, 21, 2, 676-681.
- Jessell, T.M., & Sanes, J.R. (2000). The decade of the developing brain. *Current Opinion in Neurobiology*, 10, 599-611
- Johnston, G.R., & Webster, N.R. (2009). Cytokines and the immunomodulatory function of the vagus nerve. *British Journal of Anaesthesia*, 102, 4, 453-62.

- Jung-Beeman, M., Bowden, E.M., Haberman, J., Frymiare, J.L., Arambel-Liu, S., Greenblatt, R., Reber, P.J., & Kounios, J. (2004). Neural activity when people solve verbal problems with insight. *PLoS Biology*, 2, 4, 500-11
- Kandel, E.R. (2001). The Molecular Biology of Memory Storage: A Dialogue Between Genes and Synapses. *Science*, 294, 1030-1038.
- Keating, E.G., & Horel, J.A. (1972). Effects of prestriate and striate lesions on performance of simple visual tasks. *Experimental Neurology*, 35, 2, 322-336.
- Leonard, B.E. (2007). Neurodegeneration: the link between depression and Alzheimer's disease. *Neurologia Croatica*, 56, 5, 51-55.
- Luby, J.L., Barch, D.M., Belden, A., Gaffrey, M.S., Tillman, R., Babb, C., Nishino, T., Suzuki, H., & Botteron, K.N. (2012). Maternal support in early childhood predicts larger hippocampal volumes at school age. *Proceedings of the National Academy of Sciences*, 109, 8, 2854-2859.
- Maguire, E.A., Gadian, D.G., Johnsrude, I.S., Good, C.D., Ashburner, J., Frackowiak, R.S., & Frith, C.D. (2000). Navigation-related structural change in the hippocampi of taxi drivers. *Proceedings of the National Academy of Sciences*, 97, 8, 4398-403.
- Makinodan, M., Rosen, K.M., Ito, S., & Corfas, G. (2012). A Critical Period for Social Experience-Dependent Oligodendrocyte Maturation and Myelination. *Science*, 337, 6100 1357-1360
- Marchesi, V.T. (2011). Alzheimer's dementia begins as a disease of small blood vessels, damaged by oxidative induced inflammation and dysregulated amyloid metabolism: implications for early detection and therapy. *FASEB Journal*, 25, 5-13.
- McEwen, B.S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine*, 338, 171-179.

- Miller, A.H. (2009). Mechanisms of cytokine-induced behavioral changes: Psychoneuroimmunology at the translational interface. *Brain, Behavior, and Immunity*, 23, 149–158.
- Olds, J., & Milner, P. (1954). Positive reinforcement produced by electrical stimulation of septal area and other regions of rat brain. *Journal of Comparative and Physiological Psychology*, 47, 6, 419–27.
- Packard, M.G., & Knowlton, B.J. (2002). Learning and memory functions of the Basal Ganglia. *Annual Review of Neuroscience*, 25, 563-593.
- Peciña, P., Schulkin, J., & Berridge, K.C. (2006). Nucleus accumbens corticotropin-releasing factor increases cue-triggered motivation for sucrose reward: paradoxical positive incentive effects in stress? *Biomedical Central Biology*, 4, 8.
- Percheron, G. (2003). Thalamus. In Paxinos G., and May J., (eds). *The human nervous system*. 2d Ed. Elsevier. Amsterdam, 592-675.
- Raison, C.L., Capuron, L., & Miller, A.H. (2006). Cytokines sing the blues: Inflammation and the pathogenesis of depression. *Trends in Immunology*, 27, 1, 24–31.
- Si, K., Lindquist, S. & Kandel, E.R. (2003). A neuronal isoform of the Aplysia CPEB has prion-like properties. *Cell*, 115, 879–891.
- Szeto, A., Nation, D.A., Mendez, A.J., Dominguez-Bendala, J., Brooks, L.G., Schneiderman, N., & McCabe, P.M. (2008). Oxytocin attenuates NADPH-dependent superoxide activity and IL-6 secretion in macrophages and vascular cells. *American Journal of Physiology – Endocrinology and Metabolism*, 295, 1495–1501.
- Tarullo, A.R., & Gunnar, M.R. (2006). Child maltreatment and the developing HPA axis. *Hormones and Behavior*, 50, 632–639.
- Tottenham, N., & Sheridan, M.A. (2010). A review of adversity, the amygdala and the hippocampus: a consideration of developmental timing. *Frontiers in Human Neuroscience*, 3, 68, 1-18.

Van den Bergh, B.R., Mulder, E.J., Mennes, M., & Glover, V. (2005). Antenatal maternal anxiety and stress and the neurobehavioural development of the fetus and child: links and possible mechanisms. A review. *Neuroscience and Biobehavioral Reviews*, 29, 2, 237-58.

Weinberg, I. (2009). Accessing the Chemistry of Wellness and Performance. *NeuroleadershipJournal*, 2, 85-93.

Zahm, D.S. (2000). An integrative neuroanatomical perspective on some subcortical substrates of adaptive responding with emphasis on the nucleus accumbens. *Neuroscience and Biobehavioral Reviews*, 24, 85–105.

Part 3 – Accessing the Extended Environment

Research in the area of mind-body influences has revealed the significant effects that thoughts and feelings have upon body function by altering body chemistry. Equally dramatic has been the findings that these induced changes in body chemistry in turn affect our thoughts and feelings. No longer can we neatly remove the phenomenon of consciousness or the psyche, from the dynamic of body structure and function. For the inescapable truth is that our thoughts and emotions are intimately connected to our body structure and function by heavy two-way traffic. In this section a working model is described which we currently use to define the relevant variables of this dynamic and which also forms the basis for accurate diagnostic evaluations and intervention.

Introduction

Identifiable mind states are associated with the secretion of neurotransmitters and neuro-peptides which then circulate in the blood stream and impact upon body metabolism. In this way, mind states influence wellness and performance in a profound way. The study of this mind-body chemical connection is referred to as psychoneuro-immunology (PNI). The challenge is to be able to access the core processes of consciousness and thereby move the individual into a resourceful neuro-chemical configuration. The context of this dynamic is summarized by the illustration in figure 1.

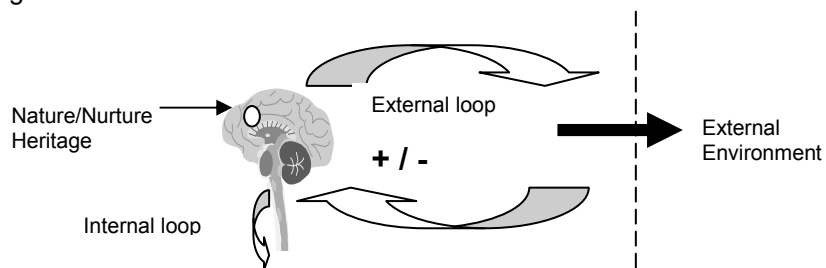


Figure 1. Context of interaction.

In effect our nature-nurture heritage gives rise to our world-view or subjective reality. If this heritage is comprehensive and free of deprivation, then when we interact with the external environment we see things as they really are and consequently make accurate decisions. This leads to success and we thus return with a positive *feeling*. Conversely, if the nature-nurture heritage is a product of deprivation, we will not see things as they really are and thus experience failure. We return with a negative feeling. These feelings, products of the *external loop*, drive our PNI chemistry from the feeling areas of the brain via the *internal loop*. This will determine ultimately our levels of wellness and performance.

The Triangles Model

The Triangles Model forms the foundation for accessing the chemistry of wellness and performance. It is fully quantifiable by an online diagnostic which measures stress profiles, PNI resilience in terms of wellness and performance as well as cardiac risk. Due to the comprehensive quantification, the effectiveness of intervention may be evaluated on an ongoing basis. Central to the *Triangles Model* is the *energy-integration curve*. This is illustrated in figure 2.

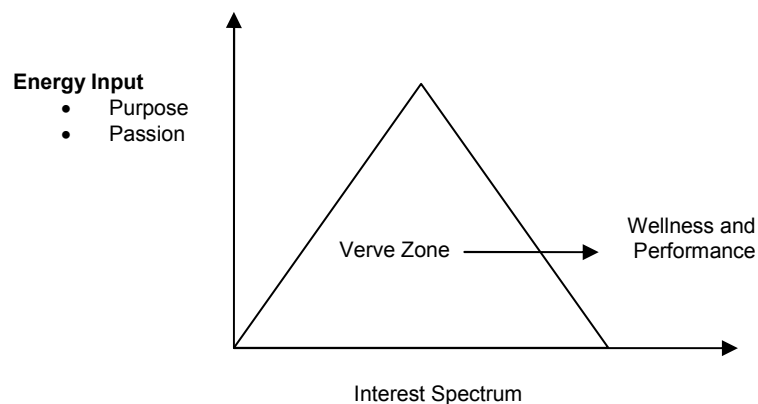


Figure 2. Energy – integration curve.

The Y-axis or height of the triangle represents passionate, purposeful energy input while the X-axis represents the spectrum of the environment that has been integrated in the subjective world-view. The volume within the triangle has been shown statistically to represent the PNI chemical resilience as manifest in wellness and performance. Three archetypes of behaviour are described which reflect differing nature-nurture dynamics reflected in variations of the basic energy-integration curve. The neuropsychological derivation of the archetypes was comprehensively described in the previous section.

The first of the archetypes is referred to as the Bravo Archetype. This is illustrated in figure 3.

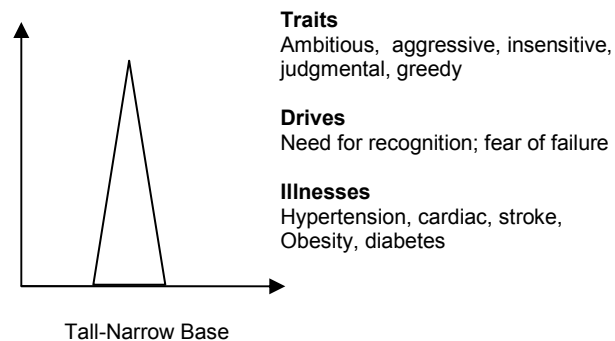


Figure 3. Verve Archetype 1- Bravo.

This archetype reflects a nurture dynamic in which a response to needs was delayed. A fear that the response would not be forthcoming resulted in the infant narrowing down the interest area to “own needs”. Ultimately the needs (mainly feed) were appeased and the efforts in this regard were thus justified. The archetype is represented by a tall and narrow-based triangle. The spectrum of the environment that is integrated in the base represents

only “my needs”. This is therefore an archetype obsessed only with own needs and driven ambitiously to achieve these needs. The first drive is essentially one of fear – fear of failing to achieve the objectives. The second drive is one characterized by the need for recognition and adoration. The excessive drives give rise to the very tall triangle. This archetype has integrated only “own needs” into the baseline. Therefore everything which lies outside of the triangle of interest (subjective world-view) is judged to be unimportant and of inferior value. This archetype is thus insensitive to all that lies outside of the triangular configuration. The volume of the triangle is statistically adequate to drive PNI resilience in terms of wellness and performance.

The next archetype is termed the Charlie Archetype. The Charlie traits are illustrated in figure 4.

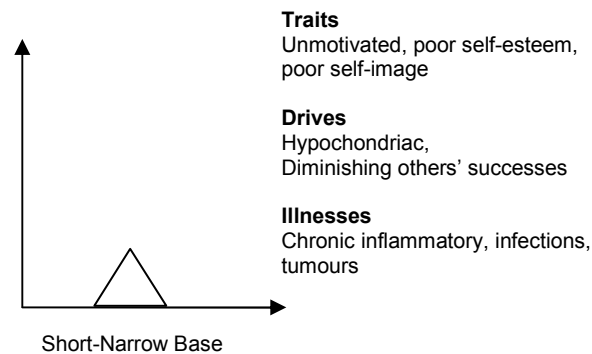


Figure 4. Verve Archetype 2 – Charlie.

This archetype is represented by a small triangle, both in terms of height and base. Once again the narrow spectrum of integration represents “own needs”. The difference between the Bravo and Charlie archetypes in terms of the height of the respective triangles is that while the Bravo archetype has experienced success, the Charlie archetype has only experienced very limited success and gratification. Therefore the Charlie Archetype emerges

from a heritage of futility. This futility results from continued failure to experience success and gratification in the nurture environment for “own needs” despite the repeated attempts in this regard. A point is reached where subjectively the Charlie Archetype believes that no amount of energy input will result in any meaningful result. This mind state is termed hopeless-helpless and is associated with self-destructive chemistry. As a consequence of this dynamic, the energy input diminishes as manifest by the low triangle height. Statistically there is insufficient PNI resilience to positively drive wellness and performance.

Two noticeable drives of the Charlie Archetype include hypochondriasis and the need to diminish the successes of others. The former reflects the need to be noticed and acknowledged while the latter results from a situation wherein the Charlie Archetype, having never really experienced success and gratification, finds it difficult to share an environment with successful individuals. The Charlie Archetype therefore may sabotage the successes of others to lessen the pain of failure. The Charlie Archetype is prone to suffering the ailments of inadequate PNI resilience such as recurrent infections and tumours.

The final archetype is the Alpha Archetype. This is the “gold standard” and is illustrated in figure 5.

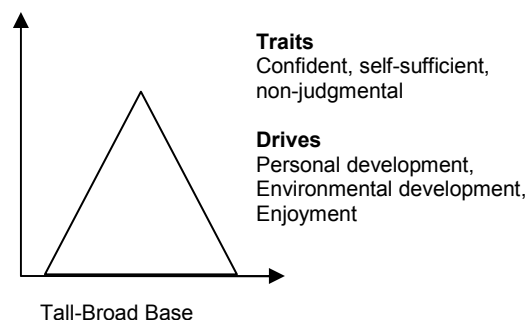


Figure 5. Verve Archetype 3 – Alpha.

In this Archetype we find adequate triangular height signifying a healthy purposeful energy input together with a very broad base reflecting an

environmental integration well beyond “own needs”. In this archetype, “own needs” were never an issue. As a result the volume of the Alpha archetype reflects a significant surplus of PNI resilience in terms of wellness and performance. The broad environmental appreciation precludes the development of insensitivity and / or judgmentalism which is found in the Bravo type. The Alpha type is driven by the need for personal development and fulfillment as well as enjoyment. There is very little fear of failure in this confident and self-assured individual. Illness occurs very rarely.

Applications

We spend most of our lives in one or more of three areas of interest. These are:

- Work or application
- Personal or inter-personal
- Recreation

As a result of the requirements of daily life we will prioritize these areas of interest accordingly. Furthermore, because each of these interest areas occupy a different segment of the environment our triangular configuration will separate into three independent, identifiable areas. The separation of these interest areas is termed un-integration. As a result of the different priorities given to these areas and the subsequent energy input, the triangles of interest representing these interest areas may range from Charlie to Alpha in their configurations.

When functioning within a specific interest area, we take on all the traits of that specific configuration. We also become unaware of the other triangles of interest. This concept is illustrated in figure 6.

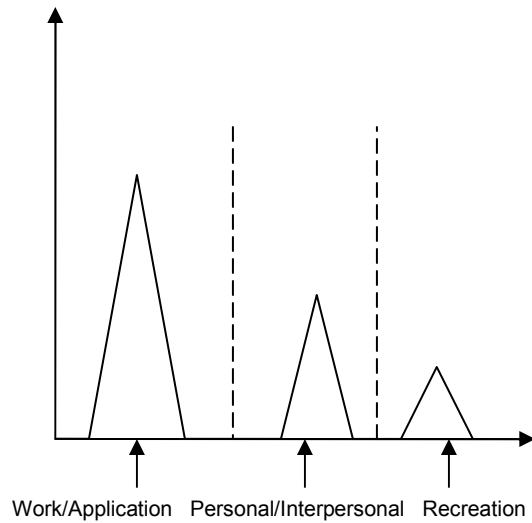


Figure 6. Interest areas.

The above illustration depicts three un-integrated areas of interest where work/application is a Bravo Archetype while personal/interpersonal and recreation triangles reflect Charlie Archetypes. In this situation most of the PNI resilience in terms of wellness and performance is derived from the Bravo work triangles. Should circumstances such as retrenchment or retirement result in loss of the work triangle, the individual will be catapulted into the remaining un-integrated Charlie triangles and experience the traits of hopeless-helpless. This will further diminish the available PNI chemical resilience manifesting in compromised wellness and performance.

The loss of the Bravo triangle may also be subjective in that the apparent activity and interaction still exists but passionate and purposeful energy within the Bravo triangle has diminished. Outwardly the individual still appears to be interacting normally. However the loss of purposeful energy has resulted in the individual imploding into a functional Charlie Archetype within that specific sphere of interest. We refer to this as a *pseudo-verve* phenomenon. Within a Charlie pseudo-verve, the individual will once again

experience all the subjective traits of the Charlie Archetype as well as a significant loss of PNI resilience. See figure 7.

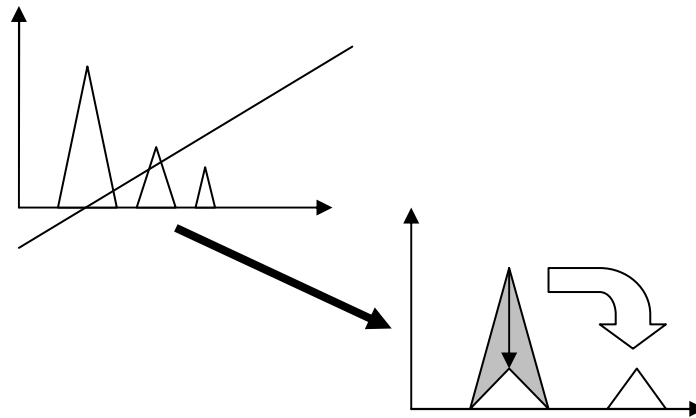


Figure 7. Pseudo-verve.

The solution to this problem is to develop a triangular configuration characterized by the overlapping of Alpha triangles reflecting each of the three areas of interest. This is illustrated in figure 8.

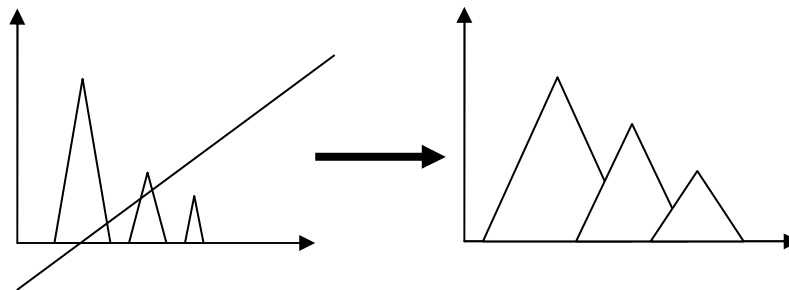


Figure 8. Optimal Alpha overlapping.

The overlapping of Alpha triangles is the optimal configuration in terms of PNI resilience. It is the consequence of expanding the base of integration of each triangle of interest such that an overlap occurs. In this way awareness is maintained of other areas of interest even while prioritizing the environment in which we find ourselves at a given time. For example while functioning in the work environment, awareness is maintained of personal as well as recreational needs. This translates into a sensitivity of the full environment irrespective of the priority area in which we are interacting at a specific time. Functionally this translates into a situation of balance. Furthermore, should a specific triangle of interest pseudo-verve, there will still be adequate purposeful energy to drive the re-creation of a new triangle of interest.

Hollow integration

Generally, the process of integration results from a bottom-up synthesis of labeled entities and their associations. As happens in life, we may incorporate the superficial characteristics of entities into our world view without their complexities and the representative circuitry. For example, we integrate all the characteristics of a car without engaging and integrating the intricacies of its mechanics. The unintegrated segment of our configuration is termed a hollow integration. See figure 9.

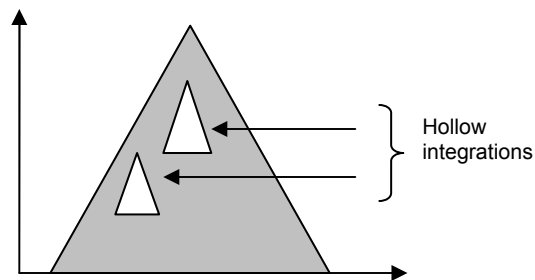


Figure 9. Hollow integrations

It is still feasible that an individual with an Alpha configuration remains a functional Alpha even with multiple hollow integrations. The deciding factor whether an individual with an Alpha configuration and hollow integrations is

a functioning Alpha is their attitude towards their hollow integrations. An Alpha attitude will acknowledge the shortcomings of their hollow integrations while a Bravo will conceal or fabricate the absent information represented by the hollow integration.

Inter-personal Dynamics

At this point we are in a position to review the dynamics that occur when different archetypes interact with each other. The first example reflects the interaction of the Alpha with Bravo and Charlie Archetypes. The fundamental characteristic of the Alpha configuration is that its broad base and adequate height incorporates the Bravo and Charlie triangles well within its subjective world view. In this way, all aspects of the subjectivity of Bravo and Charlie are integrated within Alpha thereby maximizing sensitivity and minimizing judgmentalism (from the Alpha perspective). This is illustrated in figure 10.

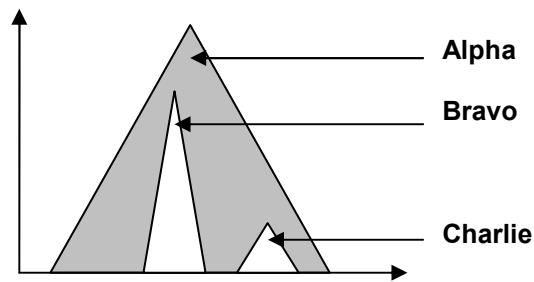


Figure 10. Relative integrations.

Consider the next example in which a Bravo Archetype interacts with a second Bravo. This is illustrated in figure 11.

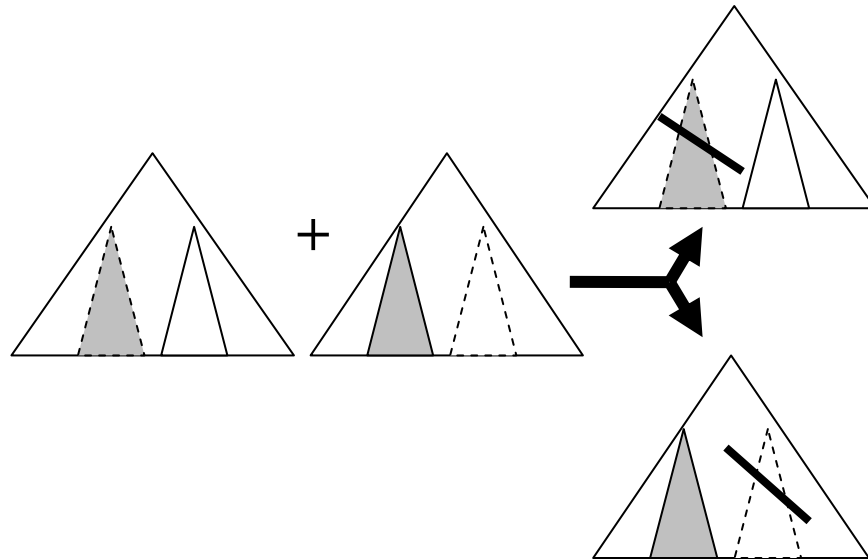


Figure 11. Bravo-Bravo Clash: Mechanism.

In this situation each Bravo occupies a different segment of the prevailing environmental spectrum. As a result, each will take a judgmental stand against the other and attempt to deny their existence. This is because each falls outside of the other's subjective reality driven by own needs. There are several possible outcomes to this interaction as indicated in figure 12.

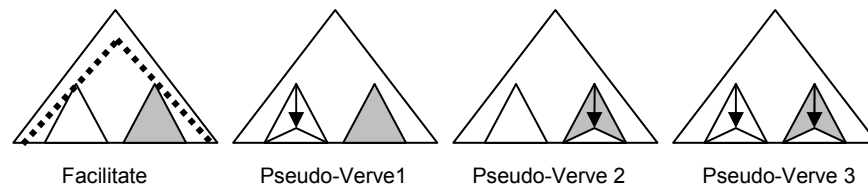


Figure 12. Possible Bravo-Bravo Outcomes.

The most optimal outcome is arrived at through facilitation. When facilitated by an Alpha Archetype the fears, aspirations and preferences of each are incorporated into a phantom Alpha triangle which will function as a vehicle of co-operation for the specified environment. This facilitation may need to be repeated on a regular basis. Without facilitation either or both of the two conflicting Bravo's may devolve into *pseudo-verve* Charlie's with all the associated hopeless-helpless traits. This situation is commonly seen in inadequately facilitated mergers where merging groups assume the postures of fearful Bravo's.

The union between a Bravo and a Charlie occurs as a result of the needs of each. The Bravo needs an individual to control (and in some cases, to abuse) and someone to provide ongoing adoration. The Charlie on the other hand requires recognition which in this union is derived from the accolades bestowed upon the Bravo partner. The Bravo triangle is therefore incorporated by the Charlie into his/her own configuration – but as a phantom. It is a phantom because on dissolving the union, the phantom Bravo triangle will disappear leaving the Charlie in *hopeless-helpless* wretchedness. This is illustrated in figure 13.

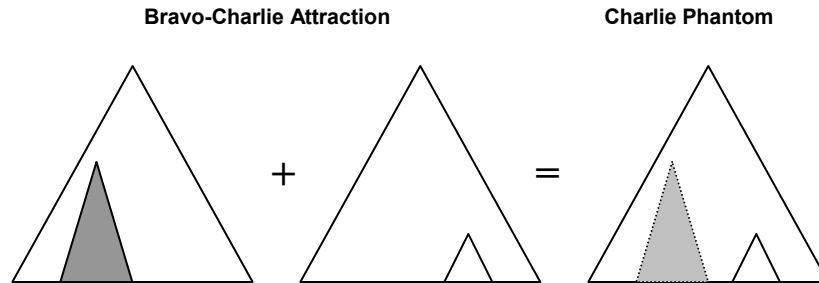


Figure 13. Bravo-Charlie Attraction.

Charlie-Charlie attraction occurs because each Charlie empathizes with the other. Each identifies with the other's loss of self-esteem as well as misfortunes which may prevail. In this way they find mutual solace in each other. However should the female of the union experience any success or gratification, the male will be quick and brutal to bring her back to wretchedness because her success or gratification is too painful for him to bear. This is therefore the configuration that may lead to physical and emotional abuse. The dynamic is illustrated in figure 14.

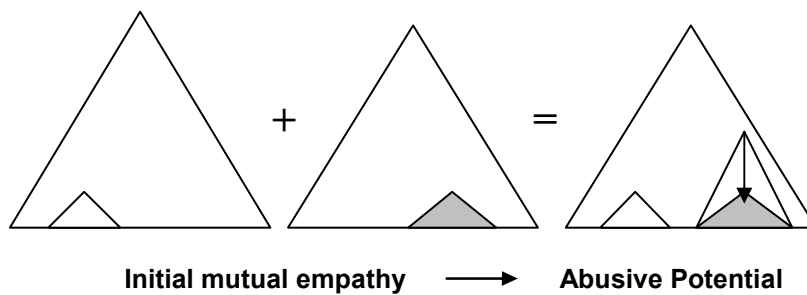


Figure 14. Charlie-Charlie Interaction.

Archetypes and Leadership

Archetypal traits directly determine leadership styles. Thus in the case of Alpha, the broad-based integration reflects the traits of unprejudiced sensitivity, adequate self-confidence and an appreciation of the bigger picture. This translates into an individual who leads by facilitating dialogue between Archetypes. The intrinsic understanding that the Alpha has for the Bravo's aggressive ambition and judgmentalism, fuelled by self-interest and the fear of not achieving, gives rise to facilitation in which the fear element is neutralized. Once fear is minimized through assurances of value within the team, the Bravo is reconciled with the bigger picture and encouraged to contribute to the collective dynamic. In effect, the Alpha functions as facilitator and mentor. In regard to the Charlie, the Alpha understands the deficient self-esteem and self-worth of this archetype. Sensitivity and support are essential in buffering the Charlie and ensuring that suppressed value gains expression. Through facilitation, Alpha maximizes the human resource potential. Supported dialogue contributes to morale and enhanced productivity.

The Bravo leads by prescription. The management structure is denoted by a collective Bravo configured triangle, tall and narrow-based. Anyone expressing a view which falls outside of the triangle of interest is regarded as a threat to the organization. Thus unquestioning conformity is a prerequisite for tenure and promotion. Unfortunately a significant amount of intrinsic human resource potential is lost as a result. This leadership style is driven by fear.

The Charlie in a leadership position may result in a potentially damaging situation. The Charlie's with significantly compromised self-esteem may surround themselves with competent Bravo's. In effect the Bravo's are held to ransom by the leading Charlie. As long as the Bravo's perform, they remain in good standing with the Charlie. If the Charlie perceives questionable loyalty, vengefulness born out of a threat to self-esteem and self-worth may cause the Charlie to inflict damage upon the offending Bravo.

In a business environment, the Alpha tends to become the entrepreneur in that they are devoid of fear, see the bigger picture and are adequately self-

assured. Conversely the Bravo, with inherent fear and a narrow base centered upon self-interest, is more orientated to success within a corporate hierarchy. In terms of their respective approaches, the Bravo is driven by ambition to achieve an objective/destination. Inherent in this drive is the fear of not achieving. Very little regard is given to the journey in pursuit of the destination. The Bravo thus lives almost entirely in the future which is invariably fear-based. Alpha on the other hand confidently aspires to the objective/destination. In this case however, Alpha attributes as much importance to the journey in the present as to the destination in the future.

The Chemistry of Wellness and Performance

It should be indicated at the outset that the influences of neuro-psychological processes on the immune system alone, traditionally the PNI domain, have expanded in that we now recognize the influences of mind-states on a more diverse spectrum of body function. For example, negative mind-states have been shown to correlate with the development of osteoporosis, heart disease and even Type 2 diabetes.

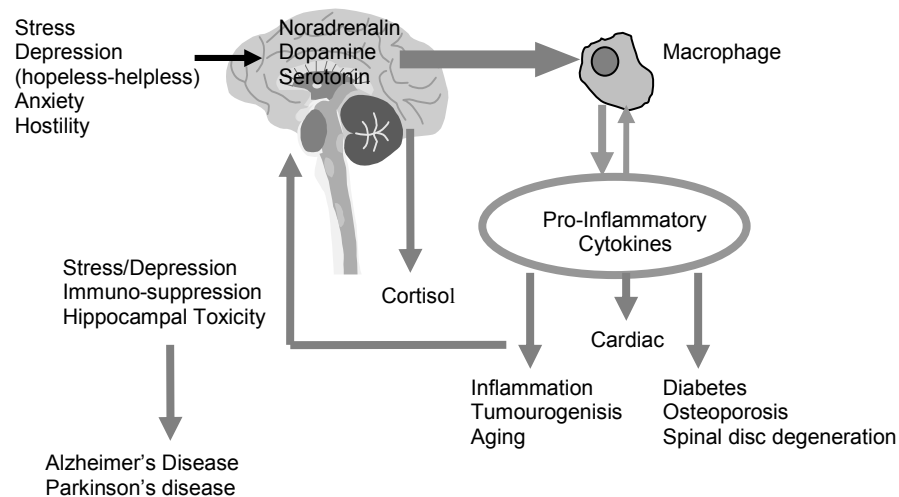


Figure 15. The chemistry of wellness and performance.

At the heart of the chemical process is the interaction of brain chemistry, the neurotransmitters, with the modulating messenger chemistry in the body, the neuropeptides (see figure 17). The important neurotransmitters are serotonin, dopamine and adrenalin while the important group of neuropeptides have been identified as the pro-inflammatory cytokines (Interleukin 1, Interleukin 6 and Tumour Necrosing Factor α). Experiencing stress, anxiety, depression (inclusive of states of hopeless-helpless) and hostility is associated with a change in the relative concentrations of the neurotransmitters. The configuration that arises is one in which levels of serotonin and dopamine are diminished while levels of noradrenalin and adrenalin are raised. The configuration of decreased levels of serotonin and dopamine with raised levels of noradrenalin is associated with the increased secretion of pro-inflammatory cytokines by the macrophage cells of the immune system. Raised levels of noradrenalin and generalized sympathetic activity have been shown to directly stimulate pro-inflammatory cytokine production. Conversely, parasympathetic stimulation decreases pro-inflammatory cytokine production.

The pro-inflammatory cytokines have a widespread negative effect on multiple target areas. Included in the identifiable effects of the pro-inflammatory cytokines are the following:

1. Precipitate or enhance inflammatory activity in any target area
2. Contribute to athero-sclerosis, most notably in the coronary and cerebral arteries. This may give rise to heart attacks and/strokes
3. Suppress cardiac muscle contractility
4. Contribute to the development of osteoporosis and Type 2 diabetes
5. Suppress enzymes that correct abnormal DNA splicing – gives rise to tumour formation (myeloma, breast cancer)
6. Feedback on the brain and result in the following effects:
 - Disruption of hippocampal function – results in impairment of short term memory
 - Disruption of neuro-transmitter production (diminished serotonin and dopamine levels) resulting in *sickness behaviour*

- The latter may go on to evolve into depression in susceptible individuals (enhancement of negative mind-states)
- Stimulation of the release of CRF which increases cortisol production. This will contribute to immuno-suppression, Type 2 diabetes and osteoporosis. Raised cortisol levels also affect the hippocampus resulting in loss of cells and atrophy. The latter effect, hippocampal atrophy, has been shown to be reversible if appropriate intervention is initiated before threshold loss of tissue.
- Chronically raised levels of pro-inflammatory cytokines are associated with loss of neuronal cells in the basal ganglia, giving rise to possible Parkinson's disease. In addition there may also be cell loss in the pre-frontal cortex and amygdala. This cell loss together with hippocampal atrophy may evolve into Alzheimer's disease.

Two other situations have been shown to increase pro-inflammatory cytokine production and thereby give rise to a similar chemical cycle. The first of these is sleep deprivation. Diminishing the duration and/or quality of sleep results in a decrease in melatonin production. Melatonin normally suppresses pro-inflammatory cytokine levels. Therefore the decrease in melatonin results in raised levels of pro-inflammatory cytokine levels. The second situation is one of chronic pain. Pain nerve endings secrete peptides such as Substance P. These peptides stimulate the macrophages of the immune system to secrete pro-inflammatory cytokines thus initiating the chemical cycle as described previously.

In the clinical situation, specific configurations and associations have been observed:

- a. The Bravo archetype is associated with higher levels of noradrenalin and adrenalin with only moderate levels of pro-inflammatory cytokines and cortisol. This archetype is associated with pathologies reflecting the higher levels of adrenalin and noradrenalin such as hypertension. Excessive noradrenalin also compromises pre-frontal cortex, executive function.
- b. The Charlie archetype is associated with higher levels of pro-inflammatory cytokines which appear to correlate with the

hopeless-helpless mind state. High levels of the pro-inflammatory cytokine Il-6 have been observed in the chronic care-giver situation and appear to suppress the DNA splicing correction enzyme which may then evolve into myeloma. Cortisol levels are generally raised but may be paradoxically low if the individual experienced chronic infantile deprivation. This is possibly explained on the basis of adrenal fatigue.

- c. The Alpha archetype is associated with adequate levels of serotonin and dopamine with lower levels of adrenalin. This reflects high levels of personal gratification (triggering nucleus accumbens) and low levels of anxiety. Markedly low levels of noradrenalin however may become counter-productive in that the configuration gives rise to complacency (low motivation).

Based on studies performed over several years it is possible now to identify the mind state giving rise to an optimal chemical configuration as opposed to one giving rise to a destructive configuration. The optimal mind state incorporates the triad of purposefulness, a sense of achievement or anticipated achievement and a self-regulatory, supportive environment. The destructive configuration is associated with hopeless-helplessness.

Inflammation, cancer and aging

Wellness and performance are ultimately a reflection of the vitality of individual living cells. The living cell is an autonomous entity which maintains the process of life by creating energy from nutrients and oxygen and replenishing its functioning components from amino acids. The replenishment is co-ordinated by the DNA template together with messenger and transfer RNA. The overall modulation of cellular activity occurs at the level of the cell membrane where messenger chemicals dock with receptors and influence intra-cellular activity.

Every cell produces electro-chemical activity as a consequence of its living processes. The collective electro-chemical environment derived from all cells within the body has been shown in turn to have an effect on every living cell by interfacing with the cell membrane. Increased electro-chemical activity results from driven, purposeful activity while the diminished activity seen in states of hopeless-helplessness decreases electro-chemical activity. One of the effects of electro-chemical activity on

the cell membrane is the activation of an enzyme called sodium-potassium ATPase. This enzyme functions by maintaining the concentrations of the electrically active ions, sodium and potassium, at the correct levels and on the correct sides of the membrane. Potassium is maintained in higher concentrations on the inside of the membrane while sodium is maintained in higher concentrations on the outside.

Hopeless-helpless mind states are also associated with raised levels of pro-inflammatory cytokines. Raised levels of pro-inflammatory cytokines have been shown to suppress the activity of the sodium-potassium pump. Therefore diminished electro-chemical activity as well as raised levels of pro-inflammatory cytokines resulting from the hopeless-helpless mind state both contribute to decreased activity of sodium-potassium ATPase. Decreased sodium-potassium ATPase activity results in raised levels of extra-cellular potassium and low levels of extra-cellular sodium. This contributes to the syndrome of sickness behaviour (also referred to as the sick cell syndrome) seen in states of hopeless-helpless as well as in situations of physical illness and injury. Other features of sickness behaviour include irritability, a disinterest in the environment, fever, anorexia and lowered libido.

Associated with high levels of pro-inflammatory cytokines are raised levels of intra-cellular free radicals. Free radicals are highly toxic to intracellular organelles. Free radicals are products of the metabolic pathway which are usually broken down by intracellular enzymes. Levels of free radicals however will increase in inflammation, in response to toxins, in response to UV and therapeutic irradiation and with increasing age. Both pro-inflammatory cytokines and free radicals negatively affect chromosomal function and DNA replication. There is evidence that they interfere with the methylation process (suppression and de-suppression of chromosomal segments) as well as with the enzymes that correct abnormal DNA splicing. The resultant abnormal DNA has been shown to give rise to neoplastic (tumour) cells. Chronic inflammation therefore may give rise to tumour formation over a period of time. The risk of tumour formation is enhanced when immune function is suppressed, as occurs in states of hopeless-helpless.

Changes associated with the aging processes have been shown to be related to and mediated by the effects of raised pro-inflammatory cytokines

and free radicals. It is postulated therefore that the hopeless-helpless mind state, associated with lowered levels of dopamine and serotonin and raised levels of pro-inflammatory cytokines and free radicals, contributes directly to the aging process.

Intervention

The evolution from Charlie to Bravo requires the input of purposeful, passionate energy while the evolution from Bravo to Alpha requires a broadening of the integration. This latter broadening of integration is a fundamental shift away from a narrow base representing *my needs* and fear of these not being fulfilled, to one of accepting that my needs will be fulfilled and becoming aware of the bigger picture. The pre-occupation of the Bravo with the fear of not experiencing the fulfilment of own needs, results in an insensitivity to all elements of the prevailing environment not included in the Bravo configuration. Only once the obsession with own needs is modulated, can there be a shift to appreciating more of the prevailing environment, with the appropriate sensitivity. This step facilitates the evolution into the Alpha configuration.

It is possible to achieve a more rapid evolution of Charlie to Alpha in that many Charlie-type individuals are sensitive beings, often with creative talents. The intervention rests upon the creation of awareness of these talents and sensitivities; the formulation of a purposeful strategy; creating a feedback loop in which personal accomplishment and self-gratification leads to the enhancement of self-esteem. Purposeful energy is generated from the small increments of success derived from this application. Many nurture-based Charlie individuals have experienced an inadequate peer interaction in their early nurture period as a result of being forced into a role of premature responsibility (usually due to maternal absence/disinterest). If one accepts that peer interaction is vital for the development of a self-identity, early self-actualization, self-confidence and the experience of enjoyment, then the absence of this interaction results in an adult who is characterized by poor self-esteem, self-confidence and an inability to enjoy life, termed *anhedonia*. This translates into the classical hopeless-helpless Charlie trait. Intervention is further aggravated by a subjective feeling on the part of many of these individuals, of not deserving of any gratification. This latter component creates tough challenges in terms of creating a

sustaining strategy. As indicated above, the solution to this problem is to facilitate small increments of success and gratification for the Charlie individual and then mirror back with amplification, the achieved outcome with its gratification.

In addition to the process of energy and integration enhancement, we need to create a mechanism by which we buffer ourselves against negative influences, originating both from the external environment as well as from our subjective deprivation 'baggage'. The comprehensive approach therefore is to establish an ongoing drive towards the overlapping Alpha configuration (Maxi-Verve) as well as creating a consistent buffer zone or 'calm zone'. This comprehensive strategy is illustrated in figure 16.

Intervention Summary

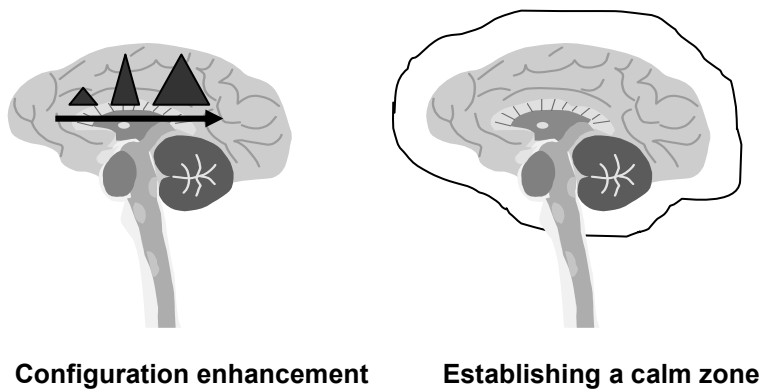


Figure 16. Intervention summary

Broadening the bases of triangles is achieved through enhancing the integration of the environment while increasing triangular height is achieved by purposefully energizing activities in each of the three areas of interest. See figure 17.

1. Maximize **meaning** and **purpose** **Energy**
 - Establish own mission statement
 - Maximize positivity – distance from negativity
 - Diversify within environment
 - Re-structure
2. Maintain **Broad Base** of activity ... **Integration**
 - New activities, people, environments - **sensitize and empathize**
 - Prioritize and manage
3. **Mind-State** Enhancers
 - Live in the presentmaximize the present
 - Acknowledge feeling, express feeling ...empathy + gratitude
 - Strive for Alphaneutralize Bravo, Charlie
 - Shirking responsibility Bravo + Charlie
 - Envy and malice Charlie
 - Self-interest and insensitivity .. Bravo
 - Fear Bravo
 - Guilt and regret Charlie

Figure 17. Principles of Approach.

Practically, each aspect of enhancement is facilitated through a logical process. Energy enhancement is achieved by maximizing *meaning* and *purpose*. This in itself is a function of one's mission statement. It is fundamental to establish genuine needs, aspirations and preferences before embarking on a process of re-structuring in any of the areas of interest. In most cases a radical re-structuring is not required to enhance purpose, meaning and gratification. All that may be required is to add new activities or approaches to enhance gratification. Generally adopting a mind-set of hopefulness in which positivity is emphasized and negativity avoided, contributes significantly to purposeful energy.

Integration is enhanced by incorporating new elements in existing areas of interest. As an example if a Bravo employer is introduced to the concept of sensitivity to the personal and recreational needs of employees, productivity is usually enhanced. In many cases one arrives at this point for the wrong reasons – the Bravo is generally only driven by profit. But if the Bravo is shown that sensitivity to the needs of employees enhances productivity and profit, they may arrive at this Alpha state by default! An awareness needs to be established of the three archetypes and their traits so that non-resourceful and damaging PNI chemistry is avoided. Living in the present is an Alpha trait. Fear of future consequences is Bravo while previous loss, regret and guilt are Charlie traits. Acknowledging present success through the expression of gratitude re-enforces the Alpha state as does empathy towards others who are victims of a less resourceful archetypal mode. Contributing value to the environment and acknowledging the value contributions of others, also enhances the Alpha state.

In addition to establishing a resourceful configuration as described above, successful intervention requires that we establish a buffer zone. The second principle of intervention therefore is the formation of a protective envelope created as a buffer zone for impinging potential negative influences. These influences may arise from our environments or alternatively, from internal deprivation thoughts and emotions. There are two levels of approach to potentially negative influences:

1. Accept the impinging information without judgment or response
2. Modulate the information by neutralizing the deprivation consequences

The level one response in essence is one of initial inaction. We are aware that the stimulus can give rise to a response which can move us into a deprivation Bravo/Charlie configuration. We choose to deal with this information in dialogue mode – non-judgmental and fully mindful of the individual or circumstances that may be the source of the information.

The second level of response is designed to neutralize the Bravo fear complex and its conversion to anger. If the aggravating stimulus persists, the fear-anger complex may devolve (pseudo-verve) into hopeless-

helpless. The prevailing fear of losing control and not meeting objectives may be aggravated by any environmental situation which obstructs the Bravo type in his/her quest. This environmental situation effectively pushes a button which converts the Bravo fear into anger (see figure 18). The resulting anger precipitates all the extreme Bravo traits centred upon achieving "own needs". This includes the need to control, driving ambition, judgmentalism and insensitivity. If the prevailing situation defies the Bravo's ability to manage and control, fear and anger may devolve to hopeless-helpless. The antidote is to factor in a second "button" which is pushed simultaneously with the first and which triggers a program of **patience** and **trust**. In this program patience functions as a break state enabling the Bravo individual to change from aggressive language to non-judgmental dialogue. The internal dialogue then functions to highlight the following aspects of the situation:

- The acceptance of prevailing elements which cannot be managed or changed
- Empathy towards others who may have inadvertently obstructed the Bravo quest
- Dissipation of ego self-interest in the face of a far bigger and uncontrollable environmental dynamic
- Trust in one's own ability (based on previous successes)
- Trust in one's own aspirations which invariably come to fruition
- Remain mindfully in the present emphasizing the positives of one's life (gratitude)

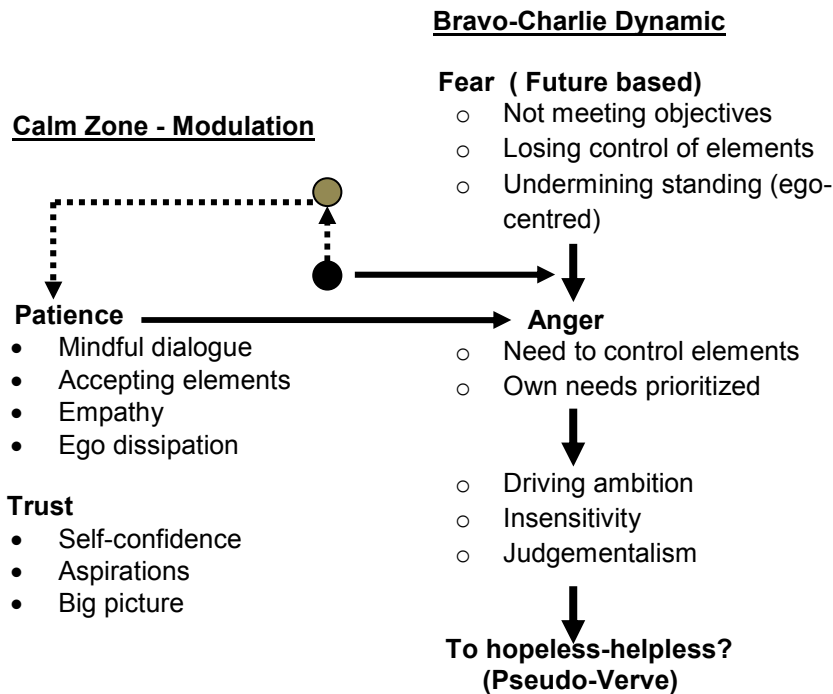


Figure 18. Calm Zone modulation

Intervention based on Chemical Processes

It is far more effective and sustaining to optimize the chemistry of wellness and performance by applying the principles outlined above. By enhancing meaning and purpose and diminishing issues relating to poor self-esteem, a chemical configuration is attained in which serotonin levels are raised and dopamine and noradrenalin levels are brought into the optimal zone for performance. The resultant lowering of pro-inflammatory cytokine levels predisposes to enhanced wellness.

In addition to the above application one may need to introduce more direct interventions designed to correct disadvantageous chemical profiles. In this regard it should be noted that exercise enhances dopamine levels. However excessive exercise may result in raised levels of pro-inflammatory cytokines (usually as a result of the secretion of endorphins) which will tend to lower the levels of dopamine. This then becomes counter-productive. The use of drug therapy may be required to bring the individual into the most resourceful state. Thus the use of SSRI's will tend to raise levels of serotonin which would ameliorate states of fear, anxiety and panic. Several agents can be used to raise dopamine activity which enhances subjective feelings of gratification. The use of agents that enhance dopamine and noradrenalin activity, specifically in areas connected to the pre-frontal cortex, may enhance the executive functions of the pre-frontal cortex.

The use of non-steroidal anti-inflammatory agents (NSAID's) diminishes the inflammatory activity of the pro-inflammatory cytokines. The use of NSAID's also diminishes the negative effects of pro-inflammatory cytokines on the brain and has been shown to enhance levels of personal gratification. Finally it has been shown that stimulation of the parasympathetic nervous system tends to lower levels of pro-inflammatory cytokines. Consequently direct stimulation of the vagus nerve with a paced electrode has been shown to decrease levels of pro-inflammatory cytokines.

Discussion

The Triangles model is proposed as a working application in which individuals and their unique behavior can be defined and quantified in the context of the full spectrum of daily life. The model, which was derived from neuro-physiological processes occurring in the visual cortex, provides the means whereby the chemistry of wellness and performance may be accessed. This is achieved consequent upon the fact that the three defined archetypes reflect not only traits of behavior but also associated chemical activity. Cognitive intervention therefore results in a profound effect upon body physiology, including consciousness itself.

The vast majority of individuals live their lives in default mode. They remain unaware of their strengths and weaknesses and make no attempt to engage fundamental neuro-psychological processes. In fact they are the

products of significant deprivation in their heritage, by not engaging and initiating appropriate intervention, they may remain victims of a less resourceful configuration. In this way they compromise themselves in terms of wellness, performance, quality of life and longevity. In this regard, the Triangles model can be viewed as a practical, empowering application supporting the enhancement of wellness and performance and thus personal efficiency and gratification. The application is not restricted to personal coaching of the individual. Rather, it should be viewed as providing a comprehensive framework for the implementation of multiple modalities of intervention, including leadership training, team-building, management re-structuring, and wellness enhancement.

References

- Appels, A., Bar, F.W., Bar J., Bruggeman, C., de Baets M. (2000). Inflammation, depressive symptomatology, and coronary artery disease. *Psychosomatic Medicine*, 62, 601–605.
- Everson, S.A., PHD, Goldberg, D.E., Kaplan, G.A., Cohen, R.D., Pukala, E., PHD, Jaakko, T., & Salonen, J.T. (1996). Hopelessness and Risk of Mortality and Incidence of Myocardial Infarction and Cancer. *Psychosomatic Medicine* 58,113-121.
- Freund, G.G. (Ed). (2006). Psychoneuroimmunology. *Neurologic Clinics* 24, 3.
- Kiecolt-Glaser, J. K., Preacher, K. J., MacCallum, R. C., Atkinson, C., Malarkey, W. B., & Glaser, R. (2003). Chronic stress and age-related increases in the proinflammatory cytokine interleukin-6. *Proceedings of the National Academy of Sciences, USA*, 100, 9090-9095.
- Kiecolt-Glaser, J.K., Robles, T.F., Heffner, K.L., Loving, T.J. & Glaser, R. (2002). Psycho-oncology and cancer: Psychoneuroimmunology and cancer. *Annals of Oncology*, 13,4, 166-169.
- Lipton, B. (2005). *The Biology of Belief : Unleashing the Power of Consciousness, Matter and Miracles*. Santa Rosa : Mountain of Love.

Miller, A.H., Maletic, V., & Raison, C.L. (2009). Inflammation and its discontents: The role of cytokines in the pathophysiology of major depression. *Biological Psychiatry*, 65, 9, 732-741.

Peng, B., Hodge, D.R., Thomas, S.B., Cherry, J.M., Munroe, D.J., Pompeia, C., Xiao, W., & Farrar, W.L. (2005). Epigenetic Silencing of the Human Nucleotide Excision Repair Gene, *hHR23B*, in Interleukin-6-responsive Multiple Myeloma KAS-6/1 Cells. *The Journal of Biological Chemistry*, 280, 6, 4182–4187.

Schetter, A.J., Heegaard, N.H.H., & Harris, C.C. (2010). Inflammation and cancer: interweaving microRNA, free radical, cytokine and p53 Pathways. *Carcinogenesis* 31, 1 37–49.

Tsong, T.Y. (1989) Resonance electroconformational coupling: a proposed mechanism for energy and signal transductions by membrane proteins. *Bioscience Reports* 9, 1 13-26.

Weinberg, I.R., (2007). *The Last Frontier*. Johannesburg: Interpak Books.

Part 4 – Applied Neurophysics

In previous sections we have described at length the influences that we exert upon our extended physical environment as well as the influences exerted upon our immunity and metabolism. At the source of these influences has been our mind state which has been quantified by the *Triangles Model*. The effects of consciousness however are not limited to the extended physical environment or the relativistic domain. As was described in the first section, consciousness is the bridge between the relativistic domain and the singularity. We are now in a position to superimpose the *Triangles Model* of consciousness on the flux of the singularity.

The oscillation between the relativity and singularity domains is illustrated in figure 1.

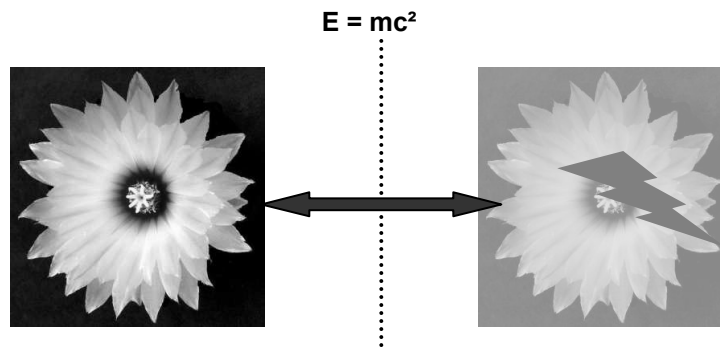


Figure 1. Physical-energy oscillation

The brain creates representations of all the entities in the physical, relativistic environment as well as their associations. The brain is also a physical entity and is therefore subject to the process of perpetual oscillation between the relativistic dimension and the nonlocality singularity. The circuitry of the brain, incorporating the represented entities, will resonate with and thus influence the energy equivalents of the actual

entities while within the energy dimension. On the collapse of the wave, the entities will incorporate the influences of the associations within the influencing brains. In a similar way, the brain circuitry representing specific associations may be stimulated by resonational activity within the nonlocality domain. Thus resultant neuronal activity in the relativistic domain is a product of sensory and sensory-associated stimulation, internal neuronal integration as well as the stimulation of circuits arising from nonlocality resonance activity.

The flux within the singularity is a product of the interacting entities through resonance together with the influences derived from the neuro-psychological content of interacting brains. Although we all create representations of the entities that we perceive through our five senses, the entities that are stored in our individual neuro-psychological circuitry are “coloured” by our unique bias configurations. In this way our influences remain unique and retain their individual integrity within the singularity and may be recognized by a unique *carrier frequency* or *interference pattern*. The latter is the energy manifestation of our unique triangular configurations.

In terms of the Triangles Model, our heritage influences therefore include not only our genetics and early nurture period, but also all the nonlocality energy influences operative at the time of our conception, *in utero* development and birth. The profound influences are termed *convergence*.

Thereafter the evolving individual continues to interact with both the physical and singularity dimensions. Consequently the influences exerted by the individual as well as those experienced from the extended environment derive from both the relativistic and singularity dimensions.

As regards the individual Triangles Model archetypes, each configuration now can be seen to have a far more profound effect on the individual's extended environment. The Charlie configuration will manifest both its purposelessness as well as its expectations of failure within the non-locality dimension. It is important to note that the calamity befalling the Charlie in their respective environments is not consciously determined but reflects rather the materialization of grouped phenomena resonant with the Charlie hopeless-helpless state. The materialization of this outcome in the

personal physical environment of the Charlie-type will only serve to further endorse the wretchedness of this configuration.

While the Bravo-type will manifest the purposeful drive inherent in this configuration, the fear within this configuration may well result in the materialization in the physical, of the very consequences that are feared. Excessive adrenalin and noradrenalin in this configuration would tend to disrupt pre-frontal activity resulting in a high resistance to receiving resonant, nonlocality stimulation. One should remember that the interaction within the nonlocality dimension is mutual. Therefore the Bravo-type is not only deprived of receptivity to available flux, but also influences the flux to a far lesser degree than the Alpha configuration. The materialization in the personal environment of the Bravo-type of less than was hoped for or expected, will further aggravate this fear-based configuration.

The Alpha-type incorporates the maximum potential for resonance. In this configuration, maximum influence is exerted in the non-locality dimension and the full flux is "captured". The Alpha-type will therefore materialize most of that which is strived for in the personal, physical dimension. The success of the Alpha-type is not only due to the far greater expanse of the integration (x-axis) but also to the degree of the integration. In other words the Alpha-type perceives the environment as it really is in its greater expanse.

We can now appreciate how profound the influences of mind states are upon the extended environment. The latter now includes the physical environment, the internal PNI milieu as well as the singularity. Refer to figure 2.

Configuration Influences

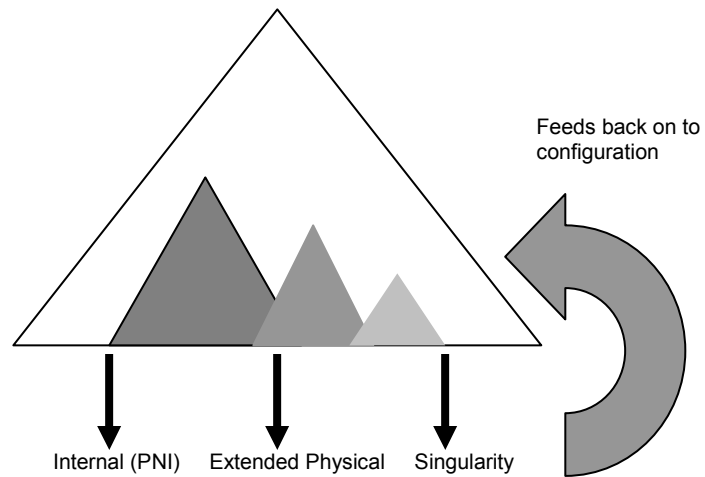


Figure 2. Configuration influences

The final physical manifestation within our personal environments is ultimately a consequence of our individual configurations. To a significant degree this is also the consequence of our convergence heritage. Whether we are to remain victims of deprivation influences or whether we make attempts to enhance our configurations through appropriate intervention, is a matter of personal choice. Some would argue that the capacity for self-enhancement itself requires that convergence influences have incorporated the receptivity to this need. From the interventionist's perspective however the approach is one which assumes receptivity to enhancement on the part of the individual until proved otherwise.

The purists in the area of nonlocality and entanglement physics would state that nonlocality influences occur in all the environments irrespective of the observed causes and effects. Let us enlarge upon this concept of cause and effect in the context of non-locality.

In a pure physical context it is true to state that there are observable causes and effects. For example I kick the ball and the ball flies off. At a

higher level of organization, a malignant Charlie configuration gives rise to a neuropeptide environment which results in immuno-suppression. In time a malignant tumour may emerge. When viewed from the perspective of the nonlocality environment, the mind state configuration materializes the entire chain of events by collapsing the wave into physical reality. The apparent causes and effects are individual components which resonate with each other, the originating mind state (configuration) and the final result. In other words the malignant Archetypal configuration resonates with a negative neuropeptide environment which also resonates with immuno-suppression, malignant tumour and possible death. Resonance with this malignant mind configuration may resonate with entities and environments much further afield. For example the person afflicted with the malignant tumour, resonant with a malignant mind configuration, may simultaneously experience mechanical car problems and suffer injuries in a road accident.

As a result of this expanded reality the manifestations of a negative mind configuration may become manifest beyond body ailments. In fact we need to identify the full profile of dis-ease manifestation. This full profile of information represents in effect, the extended symptoms of the Archetypal configuration in question. In terms of an intervention using the Triangles Model, it is important that the diagnostics include an examination of the full profile of the individual who presents with a dis-ease. This will include the following:

1. The presenting dis-ease
2. If the dis-ease is an actual illness, then a full history is required with specific emphasis on preceding mind-states (preceding the illness) as well as possible correlations of relapses with psycho-social circumstances
3. Information pertaining to nature-nurture dynamics (baggage)
4. Positive and negative events which may have occurred in the fullest extent of the external environment (work, personal and recreation). Attempts should be made to correlate positive and negative occurrences with preceding mind states (configurations) in an analogous way as was done with illness.

It is important to re-affirm to the client/patient that they consciously did not will the calamity to befall them. Rather, the synchronous dynamic that has resulted in the dis-ease represents a mind state or configuration whose development they themselves had little influence upon. In certain situations I have however identified a conscious choice on the part of the individual which has resulted in a desired negative outcome. The following real life example illustrates this point in a profound way.

Dr M was a successful professional in private practice. His configuration was essentially a high level Bravo with one degree of overlap with personal/interpersonal. The pseudo-Verve line varied between 50% and 70% (dependent upon practice circumstances). Personal/interpersonal was a low Bravo. Recreation was at Charlie levels and was un-integrated. Dr M was in need of constant recognition and acknowledgement. Dr M experienced progressively less fulfillment from his profession. At a certain point he acknowledged that he was dragging himself off to the practice, motivated only by the need to make a living. He yearned to have more time to himself and be free of the drudgery of the practice. His gratification level dropped to 25%. Nine months later Dr M was diagnosed with cancer.

Friends, patients and colleagues were devastated by the news of the cancer and rallied around Dr M and his family. Dr M entered a chemotherapy program and was out of work for a period of one year. During this time he benefited from a dreaded disease insurance policy. Dr M responded dramatically to treatment and was in remission in three months. Although there was significant discomfort experienced on days following chemotherapy, Dr M enjoyed the comfort of being at home with his family and being free of the stresses and tedium of his practice. He also experienced ongoing gratification as a result of the prevailing concern of friends and colleagues relating to his condition.

Eventually Dr M was well enough to return to his practice, but only on a part-time basis. He found that he was far more disposed to limited practice. He was far more fulfilled on a broader front in that the stresses and tedium of practice was halved while he had a lot more low risk time for himself. There was however a significant drop in income which had to be borne by the family. Dr M has remained in remission now one year following the completion of chemotherapy.

From a broad neuro-physics perspective Dr M developed a malignant mind state due to the pseudo-verve development in the triangle that held most of his PNI reserve. Dr M was consciously aware that his viability could not be sustained by the existing status quo. In effect the prevailing situation was a hopeless-helpless one in that he could not change professions at such a late stage because of the income needs of the family as well as criticism which would be forthcoming should he abandon his profession. Even though Dr M did not consciously materialize his cancer, his mind state together with his intuitive needs became resonant with:

1. Immuno-suppression and cancer
2. A legitimate removal from a low gratification work environment
3. A profound response to chemotherapy treatment
4. A final materialization of a low stress situation characterized by a drastic but legitimate decrease in work stress with an associated enhancement of the interpersonal environment.

Intervention Principles

The profound consequences of the specific Archetypal configurations can now be better appreciated. The deprivation Archetypes (Bravo and Charlie) will often materialize environmental and personal physical phenomena which tend to perpetuate the negative traits. In the case of Bravo, insensitive aggression and the inability to delegate will give rise to a harsh environment where empathy and support will be scarce. This will only serve to harden the resolve and thus negative traits of the Bravo. Fear of failure and/loss will often materialize that which is feared. This again serves to aggravate the already highly stressed Bravo.

The Charlie on the other hand perceives himself/herself as a victim. There is no expectation of success. In fact there is an expectation of loss, failure, illness and calamity. And indeed as a result of the non-local influences, it is these expectations which materialize in the form of illness as well as in environmental damage and loss. This only serves to re-enforce the Charlie configuration.

In moving the configurations from deprivation to the high resourceful state of Alpha it is important to communicate the awareness of the concept of resonance of the deprivation states with negative environmental phenomena and illness. At this point, the Alpha state, its traits and its environmental manifestations should be reviewed. In effect one is modeling the *modus operandi* of Alpha and thereby integrating the traits. By definition this should lead to an enhancement of the deprivation configurations.

Fundamental to the Alpha Archetype is the comprehensive energy-integration triangle. This translates into an individual who has integrated a significant proportion of the environment inclusive of the people within it. The integration is characterized by an awareness of the greater order of things, inclusive of the influences of non-locality, together with an empathy directed to all who are part of this dynamic. As a result the Alpha individual remains sensitive to the collective environment in the pursuit of his/her needs. The concept of gratitude further serves to enhance empathy as well as the integration. The Alpha individual is driven to materialize self-fulfillment but the mode of achieving this is always tempered by the prevailing environment. Invariably the Alpha individual feels the need to make a positive contribution to the collective whole.

The implicit awareness of and belief in the greater order of things gives rise to a mind set in the Alpha Archetype that as long as there is an accurate and comprehensive mission statement, goals will be achieved. There is no fear of failure or loss and no apprehension in this regard. The mission statement has after all been formulated on the basis of personal needs tempered with the prevailing environmental dynamic – comprehensively integrated. The drive is further re-enforced with the belief that the sought after outcome will be achieved. If the outcome is not realized to the satisfaction of the Alpha, the strategy will merely be modified without disappointment or self-reproach. The Alpha will interpret a failed outcome as reflective of a goal not resonant with prevailing environmental circumstances at that time and/or in that place. Whatever the outcome, in the case of the Alpha it is the journey which is as important as the desired result. In this way the Alpha Archetype has maximized the experience in the present

Bravo Intervention

The Bravo Archetype is driven by fear. The fear of not achieving, not being acknowledged as well as a fear of loss, gives rise to a configuration characterized by a tall, narrow integration. Only that segment of the environment which is seen to further the aims of the Bravo type has been integrated. In terms of behaviour traits the Bravo keeps the environment obsessively under control. There is very little delegation of work/application. Essentially the Bravo believes that “what you see is what you get”. Everything outside of the integration is deleted or distorted because this is seen to challenge the Bravo world view. The mind state in this regard is aggressive judgementalism. Bravo takes according to his/her needs irrespective of the effect that this may have on the greater environment. Much energy is wasted on projecting feared scenarios into the future with the result that living in the present is significantly compromised.

From the nonlocal perspective, the Bravo Archetype is excluded from exerting a significant influence on the extended environment. This results both from the fact that the integration is narrowed to a relatively small segment of the prevailing environment as well as from the fact that the fearful and obsessively controlling mind state is not receptive to available information. What is in fact projected by Bravo are the feared situations, which consequently materialize. This serves to further aggravate the Bravo mind state.

Effective Bravo intervention rests on the need to provide logical information and awareness. It has to be conveyed to the Bravo that the excessive amount of fear translates into inefficiency, diminished quality of life and results in illness. In terms of the bigger picture when nonlocality is considered, faith and trust in one's own ability as well as faith and trust in the people in both the work/application and interpersonal environments will serve to provide the initial “softening” of Bravo. This intervention needs to be re-enforced by introducing the concepts of empathy and gratitude. At this point efforts should be directed at enhancing the fulfillment of the journey (in the present) and diminishing the all important outcome as an end in itself. Exercises and activities need to be devised to encourage the Bravo Archetype to “smell the roses”. Small modifications in approaching low risk aspects of life must then be implemented to illustrate to the Bravo

that significant achievements can be realized with far less fear-based stress. Nothing works better in regard to the effectiveness of intervention for a Bravo than personally experiencing the overall enhancement. As the new mind state is established and re-enforced, the configuration of the "softened" Bravo will become more integrated while the need for large amounts of energy input (essentially fear-driven) will diminish. In effect there will be a transition towards Alpha.

Charlie Intervention

The Charlie Archetype reflects either a primary nature-nurture type or alternatively a secondary pseudo-verve type. In both situations the influence which manifests through non-locality is one of purposelessness of self and the environment as well as one expecting calamity. Often some calamity has usually materialized, re-enforcing the mind state. The approach to intervention is centered upon the need to identify a fulfilling talent or activity in any or all of the three spheres of interest. There is usually sufficient empathy for other Charlie types. What is therefore needed, is to illustrate the negative traits and dis-eases of Bravo in an attempt to expand the empathy base. It may then be possible to enhance the Charlie self-worth by showing that even the successful, experience dis-ease. Thereafter the intervention requires that the Charlie implement new approaches and experience new gratification in small, low risk situations. This new experience needs to be expanded such that gratification from an expanding integration provides renewed energy for further activity. Overcoming illness provides one of the strongest incentives to further integration.

As the integration expands in the Charlie Archetype the input into non-locality will become enhanced in a positive sense. Through resonance the Charlie individual will experience a transition to gratification and success. When this is identified, there develops an accelerated move to higher integration.

A Final Word

A condition for the perpetual oscillation of consciousness between its relativity-based physical form and its energy equivalent within the singularity is that there needs to be an intact and resonantly perfect physical/organic brain receptacle. If circuitry is lost, the energy equivalent of that represented by the lost circuitry remains in the singularity as a quantum of unique and defined energy. Following brain death the extreme situation will occur in which none of the energy equivalent of the entire neuropsychological circuitry can be returned to the relativity-based physical brain. In the singularity, the energy-based equivalent of consciousness would become re-united with previously lost quanta and regain its complete energy-based format.

We can conclude therefore that within the singularity exist also the energy/frequencies of the configurations of those no longer physically alive. It is possible that these frequencies may resonate with the configurations and thus the consciousness of living individuals. In this way these nonlocal frequencies of consciousness may gain expression through living, physical neuropsychology if resonant with the configuration.

References

Barrau, A., J Grain J. (2004), *The case for mini black holes*, CERN Courier 44(9)

Longo, M.,J. (2011). Detection of a Dipole in the Handedness of Spiral Galaxies with Redshifts $z \sim 0.04$. *Physics Letters B*