

THE WISDOM OF THE SUBCORTICAL BRAIN

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Abstract:

This article discusses how early experiences shaped in the deepest neural networks become organizational schemas that colour our experiences during the lifespan. These basic organizational schemas inform the many ways clients relate with others through microphysiological reactions, gestures and physiological patterns. These patterns and reactions provide windows into early unconscious experiences (implicit memories), which are essential to explore in therapy. The importance of the therapeutic relationship is also discussed in terms of Porges' polyvagal theory, and how this relationship creates a safe environment to awaken the social engagement system and activate the neural circuits of healing, restoration and growth.

Key words: polyvagal theory, implicit memories, trauma treatment, therapeutic relationship, emotional regulation.

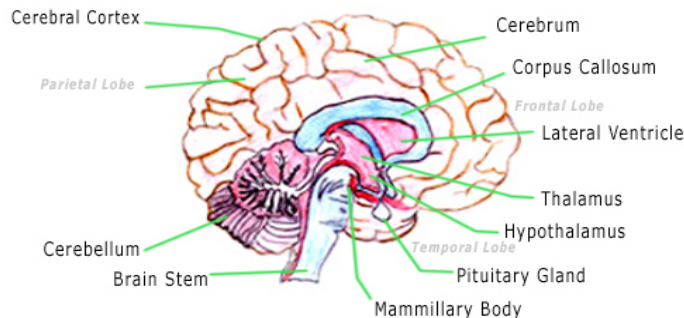
The intention of this article is to raise awareness among Integrative Psychotherapists as to the relevance of the primary and more primitive processes in our psychological functioning and how these related phenomena impact our observations and interventions in the field of psychotherapy. Throughout this writing, I will draw conclusions and extrapolations, which will be of value to the practice of psychotherapy. For this purpose, I will discuss and link the following ideas:

- Brain hierarchical architecture and hierarchical brain maturation
- The construction of relational schemas and acquisition of emotional learning, and subsequent impact shaping of experience
- The impact of polyvagal theory in psychotherapy and its implications in the therapeutic relationship

THE HIERARCHICAL MATURATION OF OUR BRAIN

Our brain is the only organ in our body that still reflects in its stratified layers phylogenetic development as a species. In a vision already outdated, Paul MacLean (1990) spoke of the triune brain to reflect this reality (Fig. 1). At the bottom we have the reptilian brain, which is responsible for the management of our major life functions such as sleep, wakefulness, temperature, metabolism and breathing. We can say that this is 'part of the I' in which lies "the life force." Above the reptilian brain, we have the limbic brain, or mammalian brain because it appeared in lower mammals. This part essentially deals with emotional phenomena, transformation of narrated lived experiences and the regulation of the interpersonal world. This drawn representation includes the amygdala which is like a smoke detector for threats that activate our body toward the defence; the hippocampus which manages our narrative memories so we can put our experiences into a context and to arrange in sequence an experience. In addition, we see the orbitofrontal cortex, which is the great headquarters for information integration from the external and the internal world and that part which integrates our experience in the social world of our relationships and our ability for meta-reflection. Here also lies the mind's ability to observe itself (mindfulness). Finally, in the upper layer we have the neocortex or neo-mammalian brain, where higher thought, language, and decision making functions take place.

Fig. 1 *Vertical Section of the Brain*



Vertical Section of the Brain
Sketch by Abhishake Sharma

For the purposes of this article, I will discuss how the brain matures hierarchically and dependent on life experiences. We know that the brain goes through 'critical periods' in which it has to learn the skills corresponding to that evolutionary period. Higher level skills in the hierarchy are based on what is built in lower subcortical layers, and they continuously shape our conscious experience.

Neuropsychologist Jaak Panksepp (1998a) in his book *Affective Neuroscience*, speaks of 'emotional systems' for life which are embedded in specific neurobiological circuits that control the execution of particular emotions. These basic neurobiological circuits are genetically predetermined and designed to respond unconditionally to stimuli that have some significance to the organism. They aim to produce well-organized behavioural sequences. Emotional systems are very "sensible" as they provide a neural substrate for various types of organismic coherence. They also make animals "active agents" in the world, as opposed to simply "information processors" or behaviourists.

The evolutionary "sense" of having raw affective feelings (which Panksepp called primary process) is to identify 'unconditionally' specific primary threats to survival. These brain states can also be used as elements of information for learning higher mental processes. We need to understand the powers of our ancestral minds. Whereas the cognitive aspects are linked more to the programming of each individual's development, raw emotions and affects represent our ancient, inherited tools for living. These basic emotional operating systems are organized in deep pre-propositional, pre-cognitive subcortical regions. Knowledge of the "power of the ancestral mind" is highly useful in the psychotherapy of people subjected to a history of chronic cumulative trauma and life threatening circumstances. These systems, therefore, cannot become integrated in an organized and sequenced response for survival and may become fragmented as dissociated 'parts' that are activated by a threat to the sense of self and/or life. As a result, we often find a 'part' in our clients which contains, for example, experiences of fear, paralysis, rage attack, and/or crying for attachment.

One of our first emotional systems involves the search for a caring relationship. The critical period for the consolidation of this 'action system' is between 0 and 1.5 years and involves emotional and internal states learning through interpersonal bond regulation (Schore, 2000). These relational schemas are recorded in the lower strata of our brain (orbitofrontal area and right hemisphere) as procedural memories; those remembering forms of which we are unaware and which are recorded in our corporality. In other words, at this critical period the 'be related schemes', or what Bowlby (1979) calls internal working models, are consolidated, as well as the ability to regulate oneself emotionally and to calm down. These basic skills remain as somatosensory experiential traces that will permeate and condition our ways of being in the world thereafter, which they will do in an automatic way without our conscious participation in the decision.

Braas and Haynes (2008) highlight in their research how our unconscious and visceral reality responds to external information milliseconds before we are conscious, and thus permeate our experience of external reality. In their research

they demonstrates how decisions we believe to have made consciously, have already been decided in our deep layers.

The little child, as a subcortical creature, is unable to regulate his or her internal states alone. It is a 'good enough' mother, in Winnicott's (1964) words, who regulates the internal states of the child through the quality of interpersonal contact and intervention with physical sensations. Emotional regulation is learned through attachment. Initially the mother works as an "auxiliary cortex" that identifies and meets the needs of the child, calming him and intervening in his welfare, and creating homeostasis. So as Schore (1994) claims, regulation of internal states begins as an 'interactive biological regulation', in order to eventually effect 'autonomous biological self-regulation.' In other words, when the child has been taken care of and responded to in a relationship of full contact and harmony with his inner world, he learns to 'take care of himself,' because he has internalized the other as a constant object and good care provider. When this has not occurred, the adult will demonstrate this legacy through difficulty with the ability to self-calm, and/or the experience of being overwhelmed by emotions.

Emotional regulation is one of the capacities most directly correlated with adaptive functioning and health of a human being. Patients with whom we work are characterized by deficient upbringings that often created damage and/or deficiencies in the neurobiological structures necessary for brain maturation in these critical periods of development. This leaves lingering injuries in the way a person manages experience. Early trauma leaves a legacy and traces that long affect the organism's maturation. People who have endured severe trauma, relational and otherwise, often have to disconnect or ignore their internal reporting and regulatory signals of their needs, causing damage to the body and core concept of the self. They often have not been able to consolidate a 'felt sense' to deserve love. The goal of a deep relational-integrative psychotherapy is to restore the damaged sense of self and help the patient regain a sense of their own worth and being. For this we must look at the experiential substrata residing in these subcortical layers and their somatosensory memories.

Authors in the field of neuroscience such as Antonio Damasio (2010), Jaak Panksepp (1998a), Louis Cozolino (2002), Daniel Siegel (1999), Allan Schore (2000) and Stephen Porges (2002), among others, highlight the importance of hierarchical maturation of the brain and how psychological phenomena are based on the most ancient neurobiological structures that come programmed in our birth. These ancient structures, in the form of reflexes and instincts, represent an 'unconscious but necessary wisdom to govern life.' It is this unconscious wisdom which provides the basis of our entire functioning and support the '*felt sense*' of self, which Damasio (2010) calls the 'proto-self.'

Damasio (2010) expresses this idea in the following words:

*"... the hidden knowledge of life management precedes the experience of being aware of any knowledge of this kind. I also argue that the hidden knowledge is quite sophisticated and should not be considered primitive. **The complexity of this knowledge is huge and its apparent intelligence remarkable**". By making this approach I do not demote the position of consciousness, however, I do give greater value to non conscious life management, while I suggest it constitutes the organizational plane that structures attitudes and intentions we find in the conscious mind." (p. 69)*

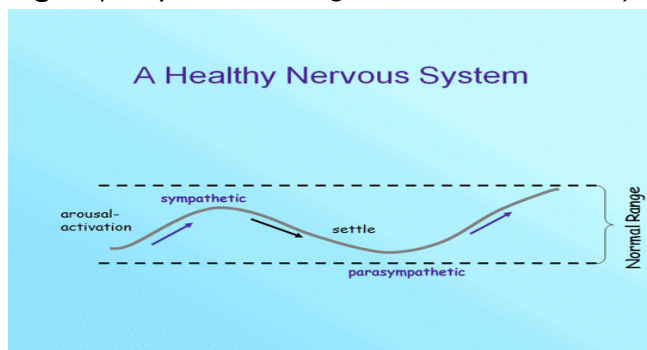
Thus, Damasio (2010) postulates that performance of the higher depends on good consolidation of the lower. The deepest and earliest traces of our history are still visible to the eyes of the therapist in the manifestation of procedural behaviours (Erskine, 2008, 2010); patterns of being in relationship with the other, survival reactions to the perception of a threat, avoidance of eye contact with the therapist perhaps due to fear of seeing judgement in the therapist's eyes, and other behavioural forms of implicit memories.

According to Panksepp (1998a) ancient minds still exist within our modern human minds, and we will not understand our higher mental processes unless we seriously address earlier neural solutions that still influence the complex mental apparatus in highly encephalized mammals. Panksepp also claims that higher cognitive abilities have a life of their own. All that is on top is linked to the many emotional networks in 'brain-mind' lower regions. These subcortical systems may have *'a life of their own'*. For example, our ancestral affects (primary emotional systems) under a big stress can control and regulate our higher cognitive processes.

I support the idea that every person's individual history is essentially recorded in his/her corporality, and hence in brain regions that register maps of the state of body. Just as the "black box" keeps tract of an aircraft's history, so too does the body keep a 'black box' that records our history, as the body keeps the score. Hidden layers of our neural processing pre-digest and organize our experience before it emerges into our consciousness. Most of psychotherapy is dedicated to detect, understand and correct the content and organization of these hidden layers, and our implicit procedural schemata of being in relationship with another human being. We have windows to access the contents of these deep, damaged layers by observing the physiological manifestations of survival, subtle physical reactions, script conclusions and decisions, and the patient's interpersonal and intrapersonal way of being in touch. It is by paying attention to narrative and bodily experience that we help patients access their procedural and implicit history, thus helping them to access a deep inner contact with their corporality.

The brain is a sophisticated organ that integrates our experience. This capacity to integrate appears when we are facing developmental learning challenges and tasks appropriate to our abilities and maturity level; what Winnicott (1956) called optimal disillusionment. As we grow in stable and secure environments our psychobiological system matures, restores and heals itself. **The system is capable of self-healing** and the brain is able to manage the internal and external world reaching homeostasis. Self healing capacities requires the brain to cope with internal stimulus in a range of intensity that could be tolerable. Ogden and Minton (2001) note that the intensity of internal stimulus should be in between what they call the windows of tolerance (see figure 2 below). So, when the brain copes with an issue while under a good amount of stress, it is still able to heal itself, which means integrate experience and restore homeostasis. The immune system is just one example of our brain ability to heal itself.

Fig. 2 (adapted from Ogden & Minton, 2001)



In a therapeutic setting, the therapist takes on the role of an interactive biological regulator (Schoore, 1994) through an attuned therapeutic relationship, helping the client's internal world to regulate in a manageable way. He assumes the role of the external auxiliary cortex, helping to identify, support and regulate the patient's inner world through interpersonal involvement. In this way, the patient and his/her brain is helped to cope with new challenges, learning and assimilation of experiences, integrating that which is new with previous schemata and thus gaining maturity and resilience.

IMPLICATIONS OF POLYVAGAL THEORY FOR PSYCHOTHERAPY

A very useful neurobiological model for psychotherapy is Stephen Porges (2001) polyvagal theory. His research shows how the vagus nerve evolved hierarchically alongside our phylogenetic evolution. The vagus arises from the brainstem and runs alongside the spine, and is involved in the regulation of our autonomic nervous system (ANS) and regulation of our emotional states and responses of survival and health. Traditionally, it was considered that our ANS

consisted of a branch of sympathetic activation that triggered our survival responses (fight-flight from the threat), in addition to a parasympathetic activation system, involved in the energy restoration process, healing and growth. These two branches alternate and inhibit one another. When one is active, the other is inactive. However, in extreme cases of threat to life, situations in which the body cannot escape and/or fight, active defence itself becomes a danger because the abuser will potentially do more harm. For example, the predator can kill the weaker opponent if he attempts to continue defending himself. Survival is then obtained by activating our passive defence system of surrender and freezing. This system is biologically determined to prevent the predator from continuing the attack and to avoid pain, as observed in all mammals and in invertebrates. We see this in all wild life when the prey is hunted and the first reaction is fake death. A new opportunity for escape is provided if the predator drops the prey. The defence system of freezing then stimulates endorphins, in an attempt to protect from physical pain.

During freezing, the body enters a state of tonic immobility after 'faked death' and so employs dissociation as an extraordinary survival mechanism. *When the body cannot escape, the mind seeks how not to be in reality, functioning as if nothing had happened; a sensation of no feeling or 'not being.'* Children in their first two years of development tend to employ this dissociative mechanism when they live among negligent, aggressive and violent caretakers, conditioning them for a future in which their neurological system will react to threat by 'disconnecting' and an attempt to paralyze their body and 'try to go unnoticed.' In traumatic abuse, the individual dissociates not only from the external world and from the processing of external stimuli associated with terror, but also from the inner world of painful stimuli arising within the body. Here we connect with contact interruption mechanisms that will be observed in the therapeutic relationship and to which we have to give recognition, validation and normalization through our involvement and careful observation.

In his book, Porges (2001) claims that the freezing-dissociation system, which he calls parasympathetic immobilization, is a survival system inherited from primitive reptiles and activated in situations of threat to life when the other two systems of social engagement and the fight-flight defence of mobilization have failed. Freezing utilizes the dorsal-vagal branch of the vagus activation. This state is highly effective in reptiles, who may remain in extended states of immobilization, but not in mammals who require large inputs of oxygen to the brain to stay alive and functioning. Thus, extending this freezing state involves serious risks to human life and health. People who have been exposed to life threatening chronic trauma early in their lives have learned to survive many times by paralyzing, freezing and dissociating. For them, *'trauma is encapsulated in the body as body deregulation and somatic memories.'* Thus, they are prone to psychosomatic illnesses, autoimmune disorders, visceral and digestive illness, and cardiovascular diseases, in addition to other disease processes.

According to the hierarchical activation model, we first regulate ourselves through social contact, which occurs in the ventral branch of the vagus, as developed in mammals. That is, we seek the safety and security offered by the figure of dependency. If this fails, we try to protect ourselves through sympathetic nervous system activation based on the fight-flight response. If all this is ineffective, we activate the oldest and most primitive system; the freezing response. Helping patients to climb this ladder is a matter of necessity in therapy. It implies bringing them to the relationship in order to experience the other as present and secure. It compels connection and interest with the environment.

Porges' (2001) valuable research shows how as mammals evolved, something special happened in the vagus. Mammals developed a new vagus, which Porges calls the social or mobilized parasympathetic vagus (Porges, 2001). This new vagus attenuates or calms the sympathetic and adrenal circuits in order to enable the individual to engage socially and optimize metabolic resources that allow the activation of more sophisticated brain capabilities. So, as mammals we calm our alertness in social interaction. In social involvement, metabolic demands are reduced and health, growth and healing are optimized. What is relevant to life and to psychotherapy intervention is that mammals require opportunities to interact reciprocally to regulate the physiological states of each of those involved. In essence, **we create relationships to feel safe and maintain health by facilitating the regulation of our energy**. This is the most important relational need and is always present. In the therapeutic relationship we continually build this security for the patient to return to the interpersonal relationship for re-shaping and transformation of his/her inner world.

Another curiosity is that the brainstem area that regulates new vagus fibres (ventral branch) is attached to the brain areas that control the striated muscles of the face. This area of the brain stem controls our ability to listen through the middle ear muscles and articulate through the laryngeal and pharyngeal muscles, and our ability for facial expression. If we are speaking with a soothing intonation, as in the prosodic aspects of speech, or showing soothing facial expressions, this information goes to the vagus nerve. This is why mothers have that special way of talking to babies called 'motherese.' So, when we listen to intonation we are reading the physiological state of the other person. If the physiological state is of calm, we calm down. In mammals, long before the acquisition of syntax or language, there are vocalizations, which are important components of social interactions. Vocalizations express to other members of the species whether we can feel safe with the other.

In nonthreatening contexts, the social engagement system regulates the sympathetic nervous system, facilitates involvement and interest in the environment and helps to form positive emotional bonds and social ties. Even under conditions of threat, a well-adjusted person can use the social networking

system, for example, to try to reason with a potential attacker. Therefore, what happens in our body (and particularly in our viscera) is also happening in our brains, through the information that runs alongside the vagus. We can say that mind-body responses during reciprocal interactions are not just correlations but are, in fact, one and the same, albeit different paths to the same reality. The vagus is the real body-mind connection. The conclusion is that we must provide and create security in the therapeutic setting and relationship so that the survival defensive responses may relax and therefore allow the social interaction system to help in the regulation of internal states.

When we are scared, we cannot be creative, loving, or healing to ourselves or others. Polyvagal theory (Porges, 2001) emphasizes the physiological aspects of the reciprocal interaction, and documents how neural pathways of social support and social behaviour are shared with neural pathways supporting health, growth and healing. The main message is that we need to understand that the human nervous system, like that of other mammalian species, is aimed at the search for security, and we employ others to feel safe. In addition, we must understand that physiological states or circuits are not selected voluntarily. Our nervous system is evaluating this at an unconscious level. Porges (2001) uses the term neuroception to recognize that our nervous system, without consciousness, is evaluating the risk of the environment. This is a neural perception. Our body works as a polygraph, continually responding to and evaluating people and places. The vagus is not just a motor nerve that runs from the brain to the viscera, it is also a sensory nerve that goes from the viscera to the brain. *Here we have the body-mind connection.* Once we feel secure, the social engagement system is activated. By responding with a positive facial expression and intonation, the therapist is stimulating the social engagement system. In this way, we must also consider the importance our own state of well being has for our patients. We cannot generate security if our own system is worried. In addition, the face is not only a mask, it is actually the manifestation of an extremely complex neurophysiological system that has evolved and, in fact, connects directly with the neurological regulation of our viscera.

In Relational Integrative Psychotherapy (Erskine et al, 1999) we seek to create a relationship of continuous full contact attuned with the patient's intrapsychic processes. So it is through respectful inquiry and providing a deep involvement and therapeutic presence that we help the patient to return to the relationship. We create safety and thus, facilitate the dissolution of the defences so that the system need not be alert to the expected damage from the environment as in previous experiences. In this way, the patient can access and explore their previously avoided or denied inner world. In other words, through interpersonal and attuned contact we facilitate secure access to internal contact, and we provide that the self-healing system and experience of integration can take place. In this way, throughout the therapeutic relationship we help the brain to be in a state of being able to self-heal and integrate the inner experience that is held in the body and neural networks. Some neuro-processing techniques

such as EMDR (Shapiro, 2001) and Brainspotting (Grand, 2013) can then act as powerful ways to help the brain reprocess the encapsulated memories.

Through an attitude of presence, the therapist stands as supporting and sustaining the patient's experience, showing genuine interest, loving compassion and an absence of ulterior motives or preconceptions about what the patient's experience is. Looking at the experience as it is, we allow it to unfold, and what was retained or dissociated can emerge to now be associated, transformed and integrated. So therapy becomes a process for helping the patient to self-define their experience in a new way. This leads to a '*reconsolidation*' of procedural and implicit schemata as they settle in a new and adaptive way.

With this in mind, I tell my students and supervisees, 'Do not seek anything from your patients'. With this principle I intend to shape the attitude of witnessing what the other is, as she or he is. As a result, we can 'call and wake' the patient's experience, and assist and support the person on the path to reconnection, both internally and externally.

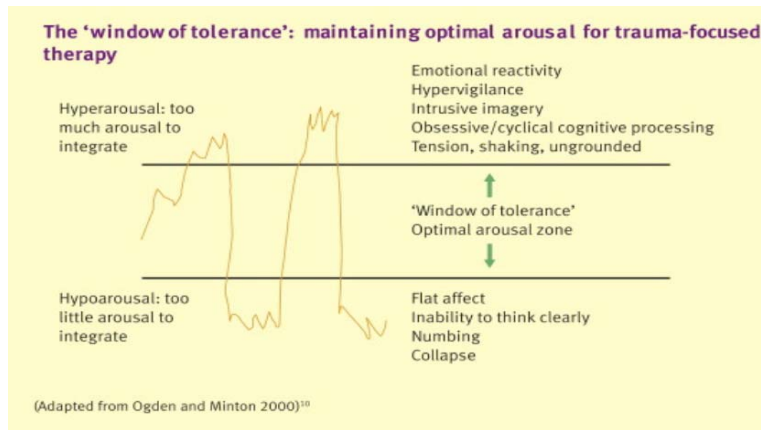
HELPING THE PATIENT BE PRESENT TO EXPERIENCE, REALLOCATION AND NEW MEANINGS

Patients with complex post-traumatic stress disorders (cumulative trauma) maintain their neurobiological states in an almost permanent hyper-alert state and corresponding sympathetic activation. Or, they often live in chronic periods of dissociation with the dorsal-vagal branch of the parasympathetic immobilized. As previously stated, this brings them to live in a state of chronic psychobiological disruption. They are exposed to the intrusion of symptoms that lead them to feel a lack of control in their lives and internal states. When one lives with the experience of a chronic failure of the social system in order to manage security and protection, as is often the case of chronic childhood trauma, the system usually 'turns off.' Without this modulation of internal states to function as 'brakes' for the social networking system, the sympathetic nervous system or the dorsal vagal system remain highly activated, causing physiological arousal that exceeds tolerance. In patients with these disorganization states, the therapist has to perform some important tasks to help the disorganized psychobiological system.

In these patients the survival system lives as if exposed to the permanent life-threatening situation (see fig. 3 below). They alternate between hyper-arousal states, producing symptoms of emotional and intrusive imagery, obsessive thinking, tremor, uprooting, and hypo-arousal states (dissociation-freezing) which manifest in symptoms of flat affect, difficulty with thinking and concentrating, numbing, and/or collapse. They alternate states of over activation and

biochemical disorganization with states of emotional anaesthesia. When internal stimulation is beyond the range of tolerance, it cannot be processed, as cortisol excess inhibits the hippocampus functioning and the limbic brain area involved in the experience of symbolization and contextualization. The result is that in this state of biochemical alteration, integration is not possible.

Fig. 3



Thus, the therapist has to:

- a) **Assist the patient to stay connected to the therapeutic relationship and, therefore, to the present context.** The therapist needs to provide containment, support and accompaniment. The social engagement system provided by the therapist promotes calm and flexibly adaptive general states (Porges, 2001), and because of this, allows physiological arousal to remain within the range of tolerance.
- b) **Act as an 'external auxiliary cortex'** that helps to modulate and regulate the intensity of the experience. Since these patients lack emotional regulatory skills, the therapist must modulate the amount of traumatic material the patient can handle, help regulate the intensity of the pain, and monitor the pace. The goal is for the patient to maintain the intensity of their experience within the 'window of tolerance' for possible integration. Nevertheless, it is important to teach patients some practical techniques to learn how to self-soothe, in order to foster self-control, and not only be dependent on the therapist when they feel overwhelmed or dissociative.
- c) **Help restore the mechanisms that facilitate the integration of experience.** This is what Janet (1928) called *presentification* – keeping in awareness that today they are remembering something that already

happened – and *personification* (Janet, 1903); feeling as authors and present in their own experience.

In this process, the therapist helps the patient to stay in touch with their experience from the Adult or the 'Internal Observer', facilitating the co-construction of a new narrative, reassigning new meanings and reconsolidating implicit memory schemas in an adaptive manner. In other words, we help the patient to reconnect with their deep wisdom, to rediscover the natural meaning of their primary processes and to modify the shaping of their survival system. The presence and offering of a compassionate, supportive and secure relationship helps to create a '*healing bubble*' or '*a healing space*,' in which we help the patient to loosen the defences and survival reactions from the outside world threat, so they can reach towards themselves and find internal contact. We provide the circumstances for the brain to remain in a state of social involvement. This is where healing and growth can take place.

From a neurological perspective, when we help the patient 'to be at and to observe' his experience, the prefrontal cortex area is activated; the sensory, bodily, interpersonal, self-regulatory integration area where the mind's ability to observe itself lies. Here, we are talking about *mindfulness* and meta-reflection to the experience itself. In mindfulness we create the experience of 'being today in the present and looking at something that comes from the history;' an 'I Observer' observing internal processes with acceptance, love and openness to whatever comes as it comes, and with curiosity, without expectations and without rejection of 'I Experience.' It involves the patient's own presence in their own experience. In this 'being present in their own experience,' dissociation is circumvented and 'association' is encouraged. In Siegel's words, "*Our 'lived self' resonates in a direct and clear manner with our 'awakened self', so we feel felt by our own mind*" (Siegel, 2007, pg. 91). The purpose is to enable the patient to embrace and welcome their inner experiences as they are, and to listen to the long retained message without judgment. With this, we facilitate what I call '*neuro-processing*;' observing and learning about the experience that was interrupted and organized in order to survive, so that now it may express its full meaning, be completed and reconsolidated with a new meaning. This is *trusting in the wisdom of our deep and subcortical brain*.

In conclusion, I want to highlight that the human brain is programmed to integrate experiences and heal itself. It only needs an environment that modulates and dispenses the kind of experiences it is mature enough to manage and digest, while at the same time providing the required nourishing elements such as a secure, supportive and stimulating environment. Adapting Winnicott's term (1956), we would speak of a 'good-enough therapist' that helps to modulate and shape the experience in order to re-construct the story. I end with what to me is the aspiration of a psychotherapist by quoting the Tao Te Ching (2008, p. 80).

In it, I offer the attitude of presence that creates the 'healing bubble' and how doing less can help more.

*"The sage controls without authority,
And teaches without words;
He lets all things rise and fall,
Nourishes, but does not interfere,
Gives without asking,
And is satisfied.
Reaches a state of inaction
Such that doing nothing, nothing is left undone "*

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