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THE SOUND OF CONSCIENCE: MANTRA CHANTING AS EMBODIED HEALING

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1. Introduction

During 14 months between the years 2014 and 2015, I developed an awarded undergraduate research project called "The Sound of Consciousness: practice of the mantra *baba nam kevalam* as a 'strange attractor,' in the organisation of the artist-creator System during the creative process" at the Pontifical Catholic University of São Paulo (PUC-SP, Brazil). In this project, I tried to draw parallels between the ancient science of mantra chanting, and Spiritual Sciences such as Anthroposophy and Tantra, together with Chaos and Systems Theories. All of this was backed by the research of my academic advisor, the contemporary dancer and physicist Gaby Imperato, around her own practice with a modified Martha Graham modern dance pelvic contraction, which worked as a trigger for creative artistic processes.

As a trained classical singer and contemporary dancer, esoteric spirituality, and the ancient knowledge of Dakṣiṇāchāraṅtantra (Right-Hand Path) have been formative and are an integral part of my artistic and creative processes. I have also studied Voice through the *School of the Uncovering the Voice*,¹ envisioned by Rudolf Steiner (1861-1925) and the Swedish opera singer and voice teacher Valborg Werbeck-Svärdström (1879-1972). If this could demonstrate anything, I hope it would be that spirituality is not only part of my artistic identity, but also of my human experience.

¹ Cf. Werbeck-Svärdström, 2008.

In this essay, however, due to a matter of time constraints and methodology, I have chosen to not focus on one specific mantra, as I have done in my previous research, but rather to continue my investigation on mantra chanting and its neurophysiological implications, by expanding its understanding from the tantric philosophical concepts. You will also notice, as the title of my previous research suggests, that I have, now, stripped this essay from its specific interest in regard to artistic creative processes, also due to the impossibility of carrying out such an endeavour right at the moment in which we find ourselves amongst a global pandemic.

What you will find in common with my previous research project is that I am still going to take a considerable amount of time to delve into cognitive sciences and complexity theories, which are my epistemological background, in order to understand how mantra chanting can have not only physical effects on the body, but also on the other realms of human existence. My hypothesis, which will be carefully drawn out in the following pages, would be that mantras have a healing property already known by Hindu cosmology, but that has become understandable through a Western lens only very recently, with current developments in the fields of Neuroscience and Psychology.

I invite you to go on this journey with me, which still has no accurate conclusion to be regarded by academic standards. But I hope that my findings might lead to more questions, and to your feedback on how this research could grow and develop through the years — as I see the ensuing writings as the mission of my soul's investigation in this lifetime.

May you be caressed by the sound of Conscience while you read.

Om

1.1. A systemic view of reality

Systemic theories were organised primarily by the Austrian biologist Ludwig von Bertalanffy (1986) and plead for the rediscovery of a holistic scientific vision, in lieu of the primacy of atomism as a scientific model. In fact, systemism has been considered as a candidate for *scientific ontology* with great efficiency of interlocution in the different areas of knowledge, according to Bunge (1979) and Vieira (2000).

Atomism, concerned with the smallest indivisible particle – the atom – seems to have been a Platonic appropriation greatly expanded by Cartesian dualism, throughout the 19th century, in what is regarded as the Western world. Holism, from the Greek *holos*, which means “all,” is a form of Aristotelian thought commonly associated with the world that is regarded as Eastern, and has been taken up since the beginning of the 20th century – mainly by Russian researchers such as Alexander Bogdanov (1873-1928) and Avenir Uyemov (1928-2012).²

From a systemic perspective, the production of knowledge has taken place through networks of relationships between the different areas of knowledge. As a result, there is a radicalisation in the form of construction of these connective flows, insofar as they occur in a processual manner, and in ways consistent with their contexts.

In such a way, the web of knowledge is built in a horizontal proposal, free from hierarchies, which intends to blur the definitive thresholds between different areas of knowledge. The possibilities of spoiling an ontological model that is closed in hermetic “drawers” of knowledge can be seen as political alternatives for asserting the concept of *indiscipline*:

The concept that guides the existence of the disciplines is today “opaque at the core and frayed at the edges” (Bauman, 1998). To deal with the body, it is not enough to make an effort to paste knowledge sought in disciplines here and there. Neither trans- nor interdisciplinarity are strategies competent for the task. Therefore, the proposal is to abolish the discipline frame in favour of the indiscipline that characterises the body (Katz, 2004). (Greiner, 2005, p. 126, my translation)

In this sense, the Aristotelian maxim “the whole is greater than the sum of its parts” will be faced in this work through the *indisciplinary* movement (Greiner, 2005) between areas of knowledge that, until the emergence of systemic thinking, were organised in order to maintain hierarchies of separation between body and mind.³

² For more information on the context of the genesis of systemic thinking and its philosophical implications, cf. Chapters “2 - From the Parts to the Whole” and “3 - Systems Theories” in Capra, Fritjof. *The Web of Life: A New Scientific Understanding of Living Systems*. New York: Anchor Books, 1997.

³ In this essay, you will see that I have chosen to speak of the body without separating it from its other realms of consciousness, in an effort to not fall into the trap of mind-body dualism. For this reason, I will write *bodymindspirit*, without using a hyphenated structure.

To assist in the analysis of sound as a form of vibrational energetic organisation of the matter, and to try and understand what are its neurosensory implications in the human system, a conversation will be made with other theories. These selected theories seem to make no dualistic and dichotomous distinctions between the bodymindspirit, creator-creation, and between the whole and its parts.

1.2. Tantra and the Cosmogenesis of Sound

Among these theories, Tantra was chosen, an ancient Eastern spiritual science born in India circa 7,000 years ago. Its importance is due to the proposition of a mantric science that understands sound as a catalyst for the evolution of the bodymindspirit. The Western student of such an ethical-spiritualist system, British Indologist Arthur Avalon (1974) – pseudonym of Sir John Woodroffe (1865-1936) – defines Tantra as a practice that awakens the "serpent power," the same name of his groundbreaking book, first published in 1918.

In this work, Avalon discusses, among other aspects, the enunciation of the serpent's power (*kundalinī-shakti*) – translated in simple words as the energetic and spiritual merging of the figure of goddess Shakti of Hindu mythology, which represents the primal energy of creation, with pure Consciousness, the god Shiva, through the raising of the *kundalinī* energy from the base of the spine to the top of the head. From this polarity between Energy and Consciousness, transubstantiated in the Shakti-Shiva duality, one would find the cosmogenesis of sound.

According to Georg Feuerstein (1998), a German Indologist and Tantra scholar, the Sanskrit word *kundalinī* (translated as "coiled like a snake") is the metaphor for the power of Consciousness (*cit-shakti*) and would thus be "the superintelligent force that sustains the body and mind through the agency of vital energy (*prāna*)".⁴

The *kundalinī*, therefore, approaches the absolute sonic entity (*shabda-brahman*), from which all other sounds come from, whether audible or unmanifested (non-audible), transposed to the cosmic level as simply sound (*shabda*). *Shabda*, in this conception, would correspond to the sounds with and without meaning, which we define, according to the musician, composer and Canadian scholar R. Murray Schafer (1986), as "sound" and "noise," respectively.

⁴ Feuerstein, 1998, p. 185.

According to the mantric science (*mantra-vidyā*) proposed by Tantra, sound is born out of, and contains a process of densification of vibrating matter, which reaches its conformation as audible sound (*dhvani*) from a seminal point of vibration (*bindu*). *Bindu* would be a mental image prior to thought, an inaudible and transcendental manifestation of the sound of the Absolute, and seed (*bīja*) of all the letters and words that constitute the mantras – a tripartition between Consciousness (Shiva), Energy (Shakti), and a relatively stable presence of Consciousness and Energy.

According to Dr. Susan Andrews,⁵ from the standpoint of what Quantum Physics has been able to elaborate more closely on the constitution of the universe in the pre-Big Bang moment, by the notion of zero-point field (ZPF), in Tantra, the constitution of sound takes place through the post-vacuum configuration of primordial particles. At that moment, the subtle suprasensory sound of the cosmos (*nāda*)⁶ is affirmed by the mixture of the three main manifestations of the vibrational nature of matter: purity (*sattva*), dynamism (*rajas*) and inertia (*tamas*).

All this complex introduction to the sound paradigm according to Tantra finds a simplified visual scheme in two illustrations below. In **Figure 3**, you can see an image of the Feuerstein book, probably taken from the original Tantric documents. **Figure 4** is a simplification of that same tantric concept, made by Austrian graphic designer Michael Paukner. In both of them, we see a representation of the human body and its subtle anatomy, composed of channels (*nāḍī*) through which vital energy (*prāna*) flows.

The two helices that make up the *kundalinī*, represented by two serpents, one white (*idā nāḍī*, lunar domain), and a black one (*pingalā nāḍī*, solar domain), converge along the axial axis (*sushumnā-nāḍī*) at the intersections that denominate the seven well-known psychoenergetic centres called *chakras*. The chakras establish spiralling and cyclical energy patterns that flow like in a *toroid* – a three-dimensional figure that originates from a point and returns to it, in a ring-like form (**Image 4**). This configuration would be responsible for sustaining and supporting the body in a subtle anatomy.

⁵ Yogi monk, Psychologist and Anthropologist that studied at Harvard University, Didi Ananda Mitra (spiritual name) holds a PhD in Transpersonal Psychology from the University of Greenwich (USA). She is the author of more than twelve books, translated into ten languages. She also founded and coordinates the Visão Futuro Institute (Porangaba, SP), dedicated to the integral development of the human being.

⁶ Padoux, 1990, pp. 96-7. Resonance, sound or voice, "a particularly subtle form of sound, a form that appears more akin to the resonance following a sound than to the sound itself; this is felt as too closely connected with the physical means wherefrom it arose to be considered as subtle."

The toroid presents itself as a potential attractor.⁷ Its geometric representation, for example, follows the model of nonlinear equations, consistent with that of *strange attractors*. It even has similarities with the famous Lorenz attractor, which you can see below:

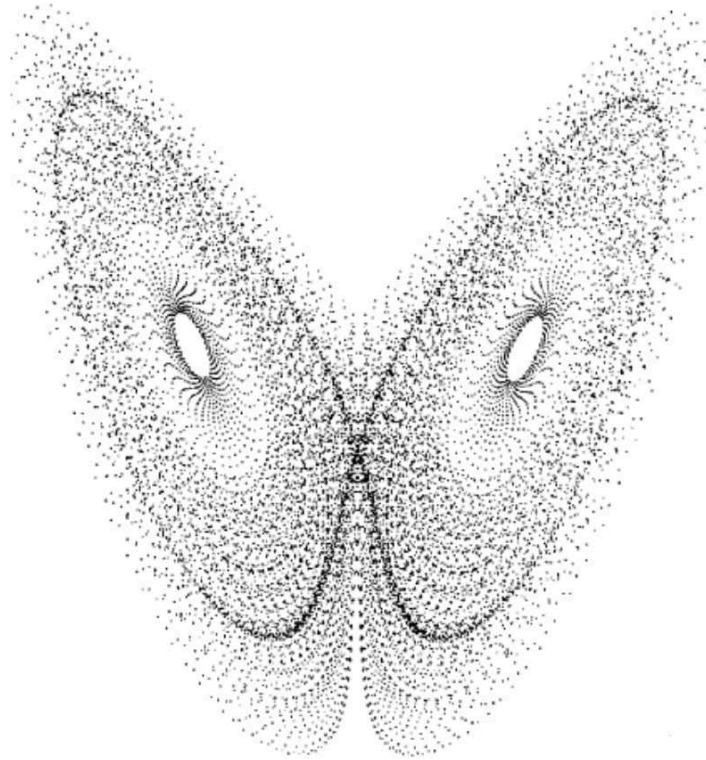


Figure 1: Lorenz, Edward. *The Essence of Chaos*. Washington: 1993, p. 14.

In support of this idea, the principle of attraction through sound can be exemplified by experiments such as the one created by the German physicist and musician Ernst Chladni⁸ (1756-1827), who used metal plates struck by sounds (i.e. attractors) to resonate sand particles, forming geometric patterns:

⁷ Cf. Prigogine, 1977;1998. Attractors are regions of space, around which things make their orbit. These things can be systems. Edward Lorenz (1917-2008), North American mathematician and meteorologist responsible for Chaos Theory, created a mathematical representation for strange attractors (systems that generate non-linear functions), popularised for its resemblance to the wings of a butterfly (the "butterfly effect").

⁸ Chladni's plates are artistically exemplified by Tragtenberg (2011) and Davaa; Falorni (2003). The same principle of attraction to sound can also be recreated inside a Tibetan bowl, which, half filled with water, is struck by a wooden stick.

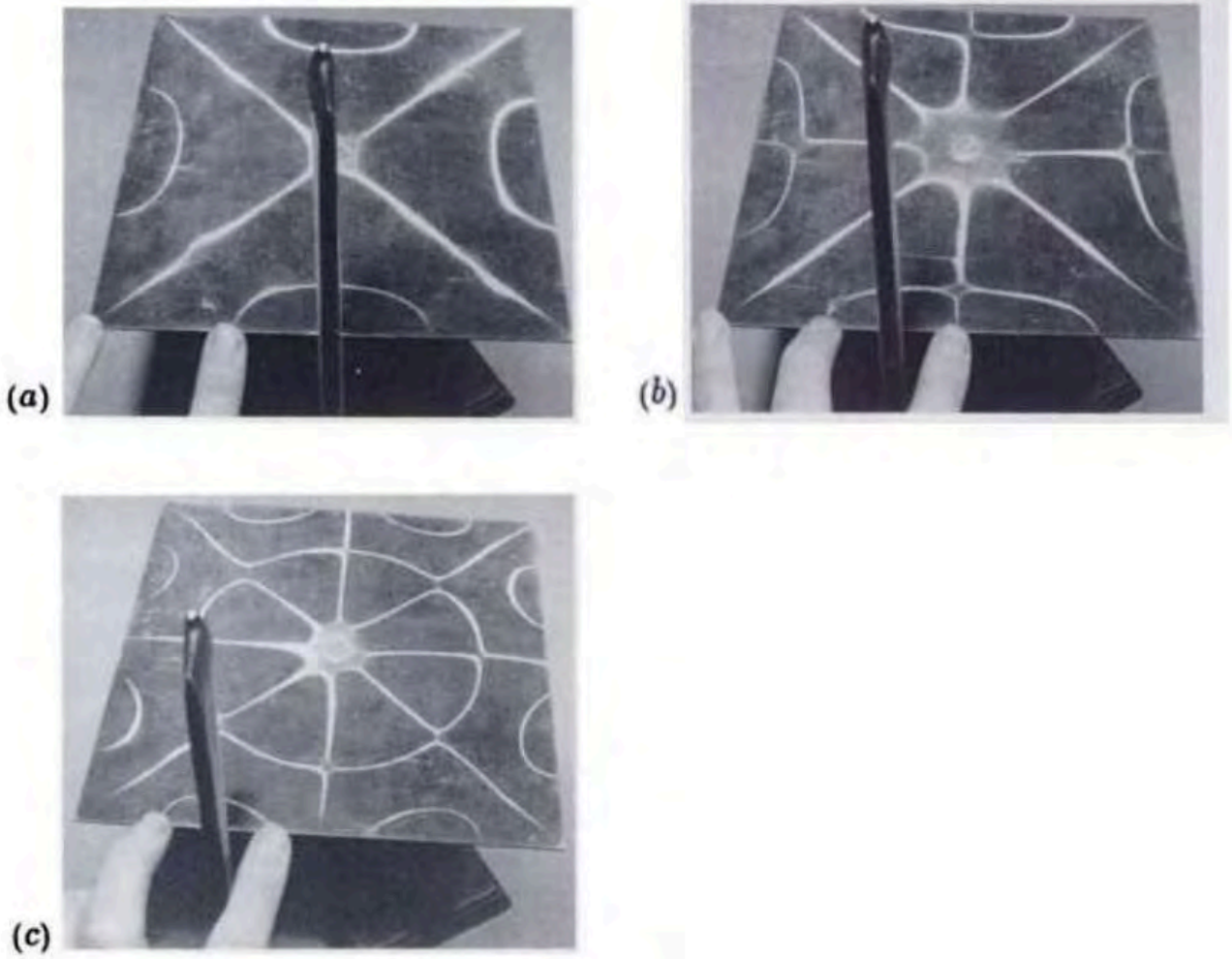
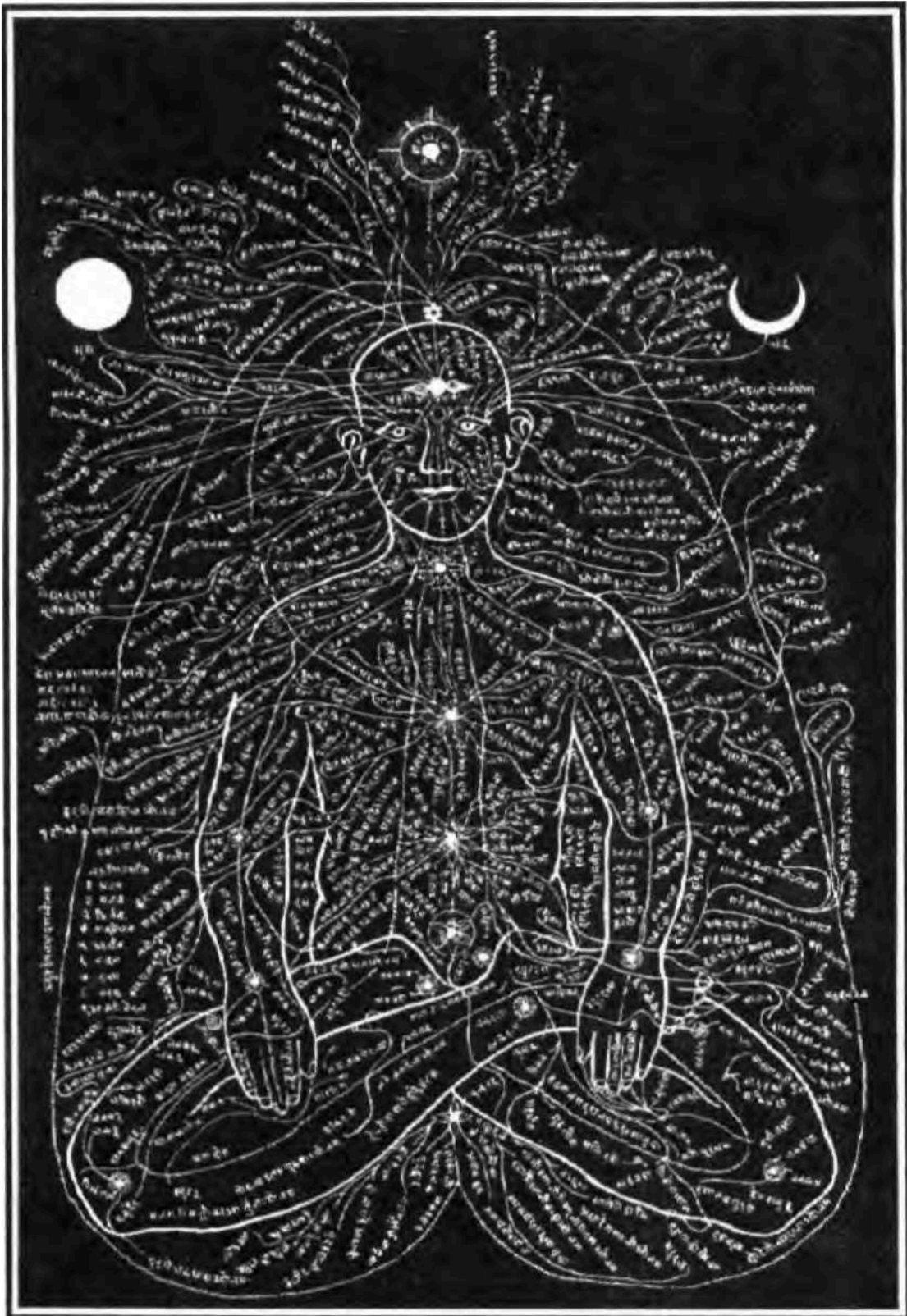


Figure 2: Taylor, Charles. Exploring Music – The Science and Technology of Tones and Tunes. Bristol: 1992, p. 93.

In the subtle configuration⁹ of vibrating matter – explained by **Figures 3 and 4** –, the polarity Shakti-Shiva is established in the energetic-vibrational ascent of the sound from the base of the spine (Shakti) to the top of the head (Shiva). With this upward movement, the sound encounters the cosmos and acquires a suprasensory nature.

⁹ It is worth mentioning that, throughout this text, whenever the expressions “subtle” and “dense”, as well as “lower chakras” and “higher chakras” are used, there is no dichotomy or judgment of value imprinted on these concepts. There is only a hierarchy of position and energetic conformation in relation to the bodymindspirit. They are all parts of the whole that do not make sense separately.



Representation of the subtle channels (nadi) through which the life force circulates.

Figure 3: Feuerstein, 1998, p. 161.

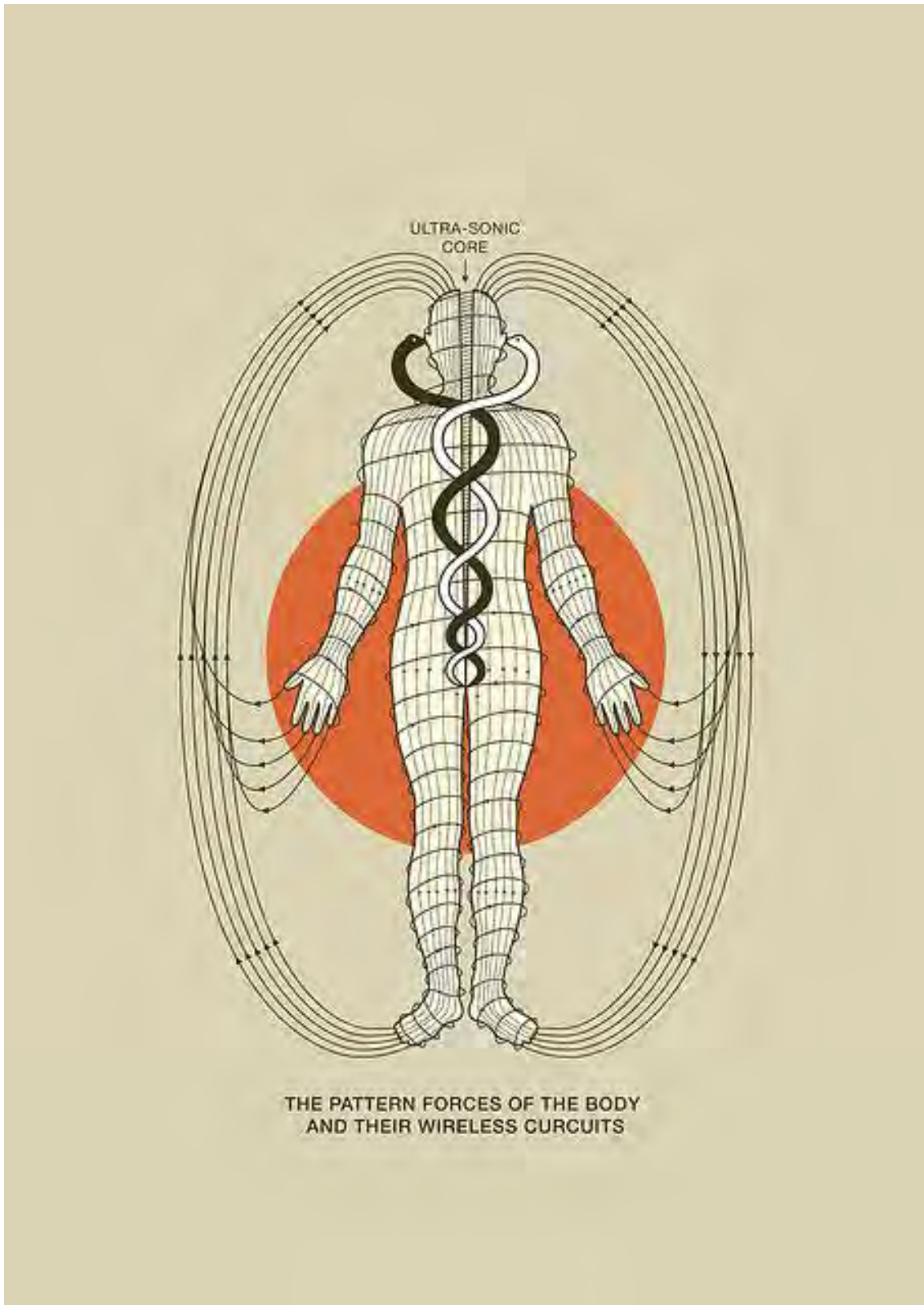


Figure 4: Representation of graphic designer Michael Paukner.

In this way, Feuerstein (1998) points out that the mantra would act as an enhancer for the raising of the energy of the *kundalinī*, as it is itself composed of the fifty letters of the Sanskrit alphabet (*varna*), the sound matrices (*mātrikā*) that form the language and are imbued in the primordial sound (*nāda*). Such a viewpoint is one of the main aspects of tantric practice (of the right-hand path).

Mantras have been used as a gateway to altered states of consciousness, as in meditation practices, for thousands of years. By adopting a systemic thought, one can consider them as attractors (Vieira, 2008; Prigogine, 1998) responsible for the subtle body energetic organisation. Thus, mantras would set up a geographic region around which the systems formed by the chakras are placed in orbit.

1.3 Polyvagal Theory

Based on this ancient tantric knowledge, a parallel will be now established with recent discoveries of contemporary neuroscience, in the form of the Polyvagal Theory proposed by Dr. Stephen Porges,¹⁰ which is the proverbial bridge to the power of sound in the emergence of a foundational neurophysiology of emotion, self-regulation and human communication. The hypotheses defended by this researcher have helped in the healing of psychological disorders such as post-traumatic stress disorder (PTSD) and in the treatment of children with autism.

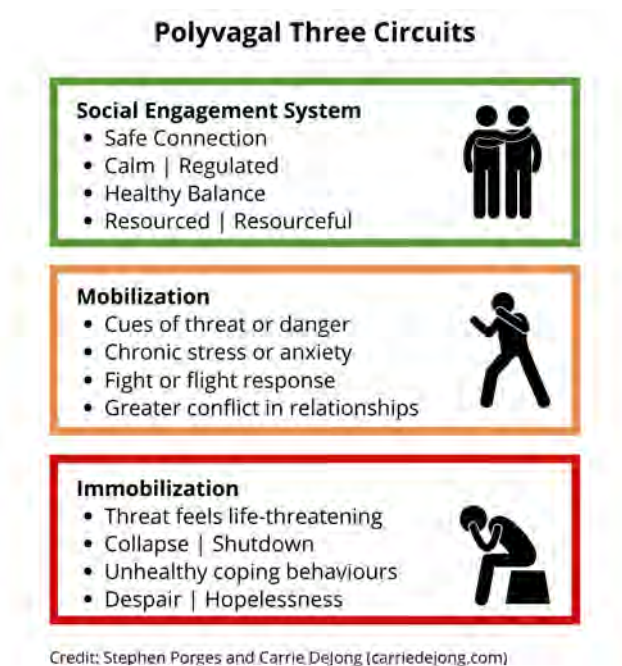
The studies done by Porges (2011), which focus on the autonomic nervous system of vertebrates, specifically analyse the vagus nerve, a structure that starts in the brain medulla and goes all the way down to the viscera, transmitting information felt in the ears, heart, larynx, lungs and stomach to the brain. The Polyvagal Theory proposes discoveries from an extensive bibliography on neurophysiology, neuroanatomy, and psychophysiology. Perhaps the most important finding of this theory has been the way it connects the neural and muscular parallel between face and heart,¹¹ in the evolutionary definition of two vagal systems:

¹⁰ Ph.D. Distinguished University Scientist at Indiana University, where he is the founding director of the Traumatic Stress Research Consortium. He is Professor of Psychiatry at the University of North Carolina, and Professor Emeritus at both the University of Illinois at Chicago and the University of Maryland.

¹¹ This is done from the observation and analysis of reaction and social communication mechanisms present in mammals, such as facial expressions, head movements, vocalisations and listening, in face of life-threatening situations (Porges, 2011).

- One that is the phylogenetic remnant of amphibians and reptiles,
- Another which is the most recent development in mammals.

Through the Polyvagal Theory, it is possible to understand the correlation between ear, eyes and heart in the imminence of the creation of evolutionary strategies that privilege communication and social engagement, rather than aggressive, high-stress responses that would bring us closer to death. From this, it is possible to establish the existence of three neural circuits present in humans, as expressed in the diagram below.



Furthermore, the nervous connection between the face, heart and viscera may support the hypothesis that sound is a powerful entity with a high level of influence on the organisation of brain networks. Vocalisations and different uses of vocal prosody in mammals, according to Porges, have direct effects on the definition of autonomy in relation to the phylogenetic hierarchy exposed in the previous scheme.

With regard to the emergency character of the survival strategies created in the face of life-threatening situations, we as humans were evolutionarily prepared to feel compassion through neuromotorial responses. As in the triune brain model (MacLean, 1990), empathy started to appear as an evolutionary process in the limbic brain, and the rational-emotional analysis was developed in the neocortex, in counterpoint to the immobilisation (reptilian brain) and fight-or-flight (limbic brain) responses.

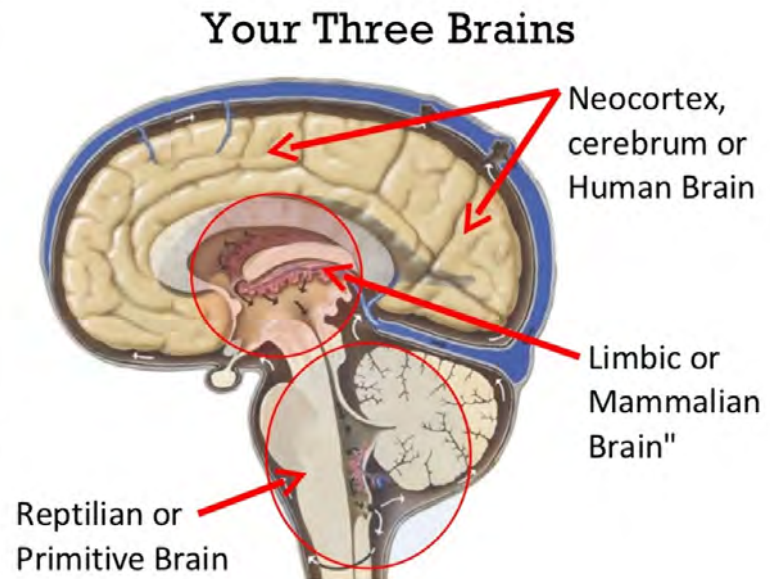


Figure 6: Representation of the triune brain model, created by North American physician and neuroscientist Paul D. MacLean (1913-2007).

Finally, the emergence of mantras as a trigger for this research takes place by its current use in the practice of *kiirtan*, or devotional chant, systematised in contemporaneity by one of the main diffusers of Tantra in the 20th century, the philosopher and Indian revolutionary Prahbat Rainjan Sarkar (1921-1990).

The effects of the practice of devotional chanting and meditation on the endocrine system and nervous system, including considerable improvements in bodily inflammation caused by diseases such as cancer (Fabien Maman, *Academy of Sound, Color and Movement*, Paris), are part of recent research carried out by renowned scientists and researchers, all over the world.

Furthermore, decades of experiments carried out by world-renowned scholars, such as neurologist Oliver Sacks (2007), and musician Robert Jourdain (1997), corroborate this research. This essay also draws upon the diffusion of Tantra by the Indian revolutionary P. R. Sarkar (1967), and by monks such as Dr. Susan Andrews (Didi Ananda Mitra).

2.1. From an ontology of impermanence

The Sanskrit word yoga means “unity”. According to yogic masters, no distinction is made between the whole and its parts: the beings that inhabit the cosmos are all part of the same spiritual family. With this idea in mind, yogic postures (*asanas*) aim to prepare the bodymindspirit for a larger perception of the *whole as greater than the sum of its parts*.

The human species evolved in what we call the macrocosm, the region of reality scanned by our perception. Other levels, adopted in science, are the microcosm and the megacosm, that is, the domains of the very small and the very large. As we do not access the level of the microcosm and that of the megacosm, we have to invent them, and test these inventions to see if they are consistent with reality. (Vieira, 2009, p. 62, my translation)

In a worldview similar to this one, yogis approach the structures of the microcosm with those of the macrocosm, during meditation, through techniques of breathing and concentration (Feuerstein, 1990). In this way, the perception of the aspects that correspond to the most introverted level, in the bodymindspirit, meet with the more gigantic proportions, experienced on an extraverted level, in the encompassing environment surround humans. Thus, an esoteric body-environment fusion is configured: subjective and objective become one.

This paradigm is already, since thousands of years ago – in Tantra – equivalent to the contemporary conceptions of biology and culture as being part of the same reality. The body, therefore, is in a constant process of reconfiguration of itself, a two-way street progression of becoming itself in-between nature and culture, which is not the result of social determinism, nor of only biological patterns of the environment.¹²

Because of these aspects, systemism becomes a theoretical partner par excellence. In addition to systems thinking being a possible scientific ontology that understands “things” and “objects” as relative to systems,¹³ it also finds its reverberations in the discussions on complexity proposed by the 1977 Nobel Prize Winner Ilya Prigogine (1917-2003).

¹² Notes from the Seminar: *Arts of the Body - Indisciplinarity*, with Prof. Dr. Christine Greiner (First Semester 2013), taught at the B.A. in in Communication of the Body Arts (PUC-SP).

¹³ Bunge, 1979 apud Vieira, 2000, p. 13.

If I use the definition of a System by the Russian scientist Avenir Uyemov,¹⁴ every system can be expected to be an aggregate of things that maintains relationships among themselves, and from which shared properties emerge. In addition, a system has certain basic parameters (Bunge, 1979) that characterise it as a system, and collaborate to its existence in the universe:

- Permanence, as a characteristic of survival, in biological language;
- Environment (from the German *Umwelt*), as an enveloping system, where the necessary exchanges that contribute for the survival of the system take place;
- Autonomy, as a kind of informational “stock” that functions as a memory of the system's past, and as an index for its possible futures.¹⁵

It is assumed that all systems are open or partially open, that is, they exchange energy, matter and information with its environment. Such exchanges disrupt systems through varying states of stability and instability.

2.2. Keeping the channel open: ways to find a “blessed unrest”

Martha Graham (1894-1991), pioneer artist of the US Modern Dance, is remembered as having given the following advice to her colleague Agnes de Mille (1905-1993):

“There is a vitality, a life force, a quickening that is translated through you into action, and because there is only one of you in all time, this expression is unique. And if you block it, it will never exist through any other medium and be lost. The world will not have it. It is not your business to determine how good it is, nor how valuable it is, nor how it compares with other expressions. It is your business to keep it yours clearly and directly, to keep the channel open. You do not even have to believe in yourself or your work. You have to keep

¹⁴ apud Vieira, 2000, p. 14

¹⁵ Vieira, 2000, pp. 15-16 and notes from the *General Theory of the Body as a System* undergraduate Seminar taught by Gaby Imparato, in the First Semester 2013 and First Semester 2015, at the B.A in Communication of the Body Arts (PUC-SP).

*yourself open and aware directly to the urges that motivate you. Keep the channel open. No artist is pleased. There is not satisfaction whatever at any time. There is only a queer, divine dissatisfaction, a **blessed unrest** that keeps us marching and makes us more alive than the others.”* (De Mille, 1991, p. 264, my emphasis)

In this research, the search for a *blessed unrest* translates into changes in bodily states (Damasio, 2011; Imperato, 2005). These are understood as hormonal fluctuations, i.e. *emotions* and *feelings*, in the Damasian vocabulary, and *mental propensities* (*vrttis*), in the Tantric vocabulary. To this end, the research of Dr. Susan Andrews, yogic monk and author of the book *Stress a Seu Favor* [*Stress in Your Favor*] (Ágora Publishing House, 2015), is combined with my research. From this exchange, one can trace a correlation between emotions (mental propensities) and the *dissipative structures* of Prigogine (1977, 1998).

Having studied systems far from thermodynamic equilibrium, that is, those that tend to instability and chaos,¹⁶ Prigogine realised that the irreversibility of the processes of exchanges of these systems with the environment leans towards energy dissipation. “When the system departs from equilibrium, we witness the emergence of new states of matter, whose properties contrast markedly with those of equilibrium states.”¹⁷

Such hormonal fluctuations, here, can be understood, therefore, as an index of crisis (Prigogine, 1991), because both Tantra and Systemism understand that “there is no spiritual evolution without obstacles” (Sarkar, 1967). In this sense, the dissipation of energy through an emotional path would be what Stephen Porges (2011) identifies as a *phylogenetic perspective* in the origins of compassion.

The crisis would be configured, then, in the struggle for survival waged by systems in their environments. Therefore, *entropy* is added – a measure of systemic organisation expressed by the

¹⁶ The notion of chaos defined by common sense, as something without organisation and close to the death of a system, is refuted by Prigogine. Therefore, chaos would be a possibility of organisation that arises from the instability of the states of matter (Imperato, 2005, p. 94; Prigogine, 2002, p. 12).

¹⁷ Prigogine, 1996, p. 31 *apud* Imperato, 2005, p. 121.

second law of thermodynamics – as a form of complexity generated by the order-disorder interchange (Vieira, 2000, p. 23).

In 2012, I was introduced, before enrolling in the undergraduate course in Communication of the Body Arts (PUC-SP), to the knowledge of Biopsychology, a spiritual science interested in neurophysiological processes in connection with spirituality, as devised by Indian spiritual Guru, philosopher and composer P.R. Sarkar (1921-1990). The Biopsychology course, in its initial portion, was taught by Dr. Susan Andrews at Visão Futuro Institute (Porangaba, São Paulo), over eight modules.

In the midst of this environment, I was exposed to important readings, which have been fundamental for the development of this research. Some examples: the introduction to the thought of Portuguese-American neuroscientist António Damásio; to the concept of the “Triune Brain” from Paul McLean (as demonstrated above); to the Polyvagal Theory from Dr. Stephen Porges (also mentioned above); and to the dissipative structures of Prigogine and their relationship with Tantra – studies that have all already been made through a systemic worldview.

Committed to establishing parallels between the main discoveries of Western science, in relation to what has been said, for centuries, by Eastern sciences such as Tantra, Dr. Susan Andrews held – in this Biopsychology course – lectures and debates based on texts that evidenced a cultural pluralism of ideas. These texts would often question the binary ways of thinking that have been brought by the East-West split, often analysed by former professor of literature at Columbia University, and founder of the academic field of postcolonial studies Edward Said (1935-2003).

In 2013, I continued my studies in Tantra and Biopsychology, participating in the advanced modules of training as a biopsychologist at the Visão Futuro Institute, as well as through a Tantra study group from this same institution with students from all over Brazil, carried out by videoconference. It was fundamental, for this research, not only the experience of the first modules of the Biopsychology course, but especially the advanced module classes — one of which even had a lecture on Psychoacoustics and a live reenactment of the Chladni plates experiment, with the renowned Brazilian musician and researcher Marcelo Petraglia.

2.3. From Western science to Tantra: the subtle anatomy of the bodymindspirit

2.3.1. Chakras, emotions and the nervous system

The immense imprecision with which the chakras are sometimes described by popular publications and in common sense sometimes can make their understanding restricted to *New Age* philosophies that, at times, do not contribute either to their study or to their practical symbology. Many of these iconographies illustrate the chakras compared to the colours of the rainbow, or relate the basic seven positions of these energetic vortexes to the seven musical notes of the diatonic scale, or even make other associations, which — like these — are already influenced by Westernised perceptions of Hindu philosophy and cosmology.

In fact, the representation of the chakras is done, most of the time, in a metaphorical way, or through a graded colour system, since as vibrating entities (i.e. sound) invisible to the naked eye, these energy centres cannot be measured by any available contemporary technology. Therefore, in Tantra, a science that does not disregard the spiritual world, studied by the aforementioned Indologists Georg Feuerstein and Arthur Avalon, the chakras are represented as petals of a flower, as you will see in the **Diagram 2**.

As you can also see in both **Diagrams 1** and **2**, there is a numerical count among the first six chakras that comprises the following number of petals: $4 + 6 + 10 + 12 + 16 + 2 = 50$ petals. Feuerstein (1998) argues that *kundalinī* —the supersonic entity that ascends from the base of the spine (Shakti) to the top of the head (Shiva) — is composed of the fifty letters of the Sanskrit alphabet (*varna*). Therefore, each of the 50 sounds that make up the matrix of the subtle body anatomy correspond to what are called *mental propensities* (*vrttis*). These would be:

Diagram 1:

The terranean plexus, or *múládhára chakra*

(basis of the spine, close to the coccyx)

1. *dharma* (psycho-spiritual longing)
2. *artha* (psychic longing)
3. *káma* (physical longing)
4. *moks 'a* (spiritual longing)

The fluidal plexus, or *svádhišt'hána chakra*

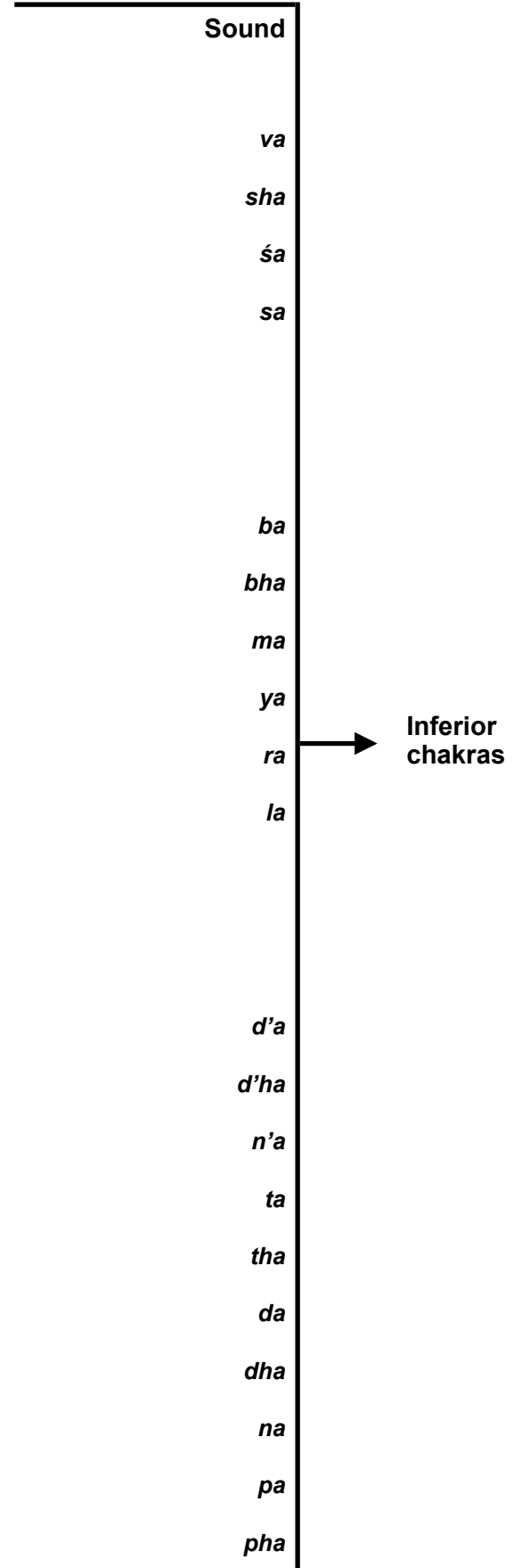
(sexual organs, circa four fingers under the navel)

1. *avajiná* (belittlement of others)
2. *múrcchá* (psychic stupor, lack of common sense)
3. *prashraya* (indulgence)
4. *avishvása* (lack of confidence)
5. *sarvanásha* (thought of sure annihilation)
6. *kruratá* (cruelty)

The igneous plexus, or *mañipura chakra*

(stomach region, close to the navel)

1. *lajjá* (shyness, shame)
2. *pishunatá* (sadistic tendency)
3. *iirs 'á* (envy)
4. *sus 'upti* (staticity, sleepiness)
5. *vis 'áda* (melancholy)
6. *kas 'áya* (peevishness)
7. *trs 'n 'á* (yearning for acquisition)
8. *moha* (infatuation)
9. *ghrná* (hatred, revulsion)
10. *bhaya* (fear)



Sound

The solar plexus, or *anáhata chakra*

(heart chakra)

- | | |
|--|-------------|
| 1. <i>áshá</i> (hope) | <i>ka</i> |
| 2. <i>cintá</i> (worry) | <i>kha</i> |
| 3. <i>ces'á</i> (effort) | <i>ga</i> |
| 4. <i>mamatá</i> (mine-ness, love) | <i>gha</i> |
| 5. <i>dambha</i> (vanity) | <i>una</i> |
| 6. <i>viveka</i> (conscience, discrimination) | <i>ca</i> |
| 7. <i>vikalatá</i> (mental numbness due to fear) | <i>cha</i> |
| 8. <i>aham'kára</i> (ego) | <i>ja</i> |
| 9. <i>lolatá</i> (avarice) | <i>jha</i> |
| 10. <i>kapat'atá</i> (hypocrisy) | <i>ina</i> |
| 11. <i>vitarka</i> (argumentativeness to point of wild exaggeration) | <i>t'a</i> |
| 12. <i>anutápa</i> (repentance) | <i>t'há</i> |

→ **Superior
chakras**

The sidereal plexus, or *vishuddha chakra*

(throat chakra)

- | | |
|--|------------|
| 1. <i>śad'aja</i> (sound of peacock) | <i>a</i> |
| 2. <i>rśabha</i> (sound of bull or ox) | <i>a'</i> |
| 3. <i>gándhára</i> (sound of goat) | <i>i</i> |
| 4. <i>madhyama</i> (sound of deer) | <i>ii</i> |
| 5. <i>paiñcama</i> (sound of cuckoo) | <i>u</i> |
| 6. <i>dhaevata</i> (sound of donkey) | <i>ú</i> |
| 7. <i>nis'áda</i> (sound of elephant) | <i>r</i> |
| 8. <i>onm</i> (acoustic root of creation, preservation, dissolution) | <i>rr</i> |
| 9. <i>hummm</i> (sound of arousing kulakuñd'alini) | <i>lr</i> |
| 10. <i>phat'</i> (practication, i.e. putting a theory into practice) | <i>lrr</i> |

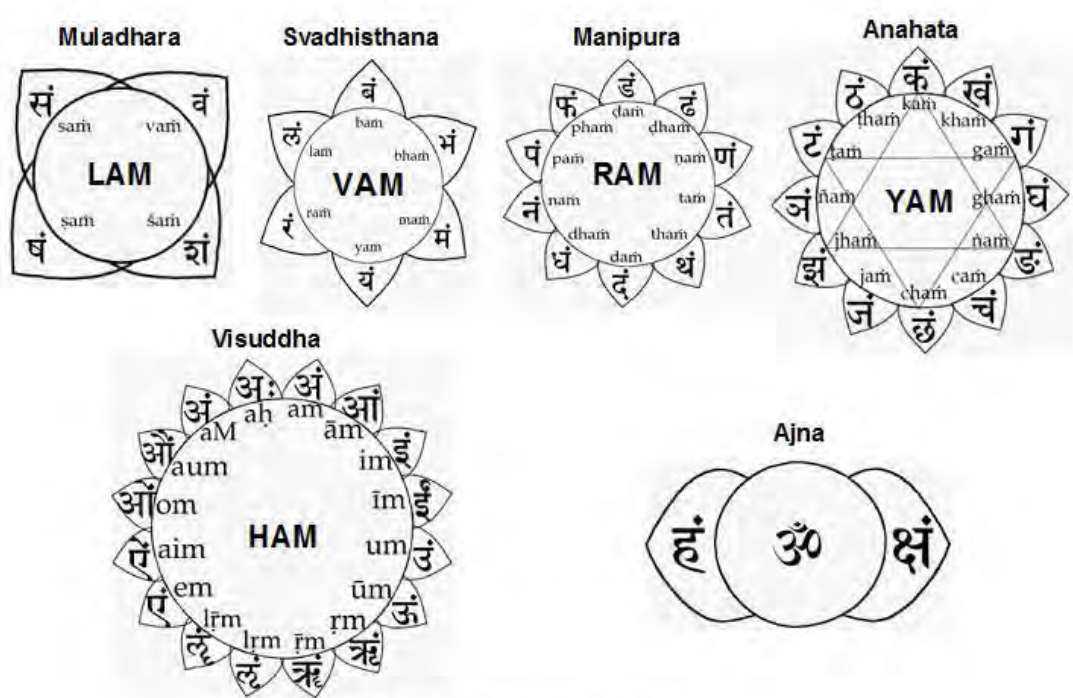
	Sound
11. <i>vaośat'</i> (expression of mundane knowledge)	e
12. <i>vas'at'</i> (welfare in the subtler sphere)	ae
13. <i>sváhá</i> (performing noble actions)	o
14. <i>namah</i> (surrender to the Supreme)	ao
15. <i>vis'a</i> (repulsive expression)	am'
16. <i>amrta</i> (sweet expression)	ah

**The lunar plexus, or ájíná chakra
(third eye)**

1. <i>apará</i> (mundane knowledge)	kśa
2. <i>pishunatá</i> (spiritual knowledge)	ha

Source: Sarkar, 1967, pp. 117-122.

Chakras with Petal letters and Bija letters



All letters end in M with overdot
M with Overdot is pronounced as NG
VAM is pronounced as VANG
LAM is pronounced as LANG and so on.
<http://www.shrifreedom.com/yogachakrabijas.shtml>

Diagram 2

All 50 *vrttis* that make up the subtle *mātrikā* (sound matrix) of the human body have their equivalent in a Sanskrit phoneme (*varṇa*), as explained in the right column of **Diagram 1**. It is important to note that these sounds are acoustic roots responsible for the bodymindspirit regulation of the emotions, prior to the endocrine secretion of the hormonal glands, which not coincidentally are located exactly in the chakra regions. Only in *vishuddha chakra* (throat chakra) is there the presence of seven *vrttis* not necessarily linked to an emotion, but to animals with dominant features and distinctive sounds.

In order to avoid that the dichotomies of separation between the bodymindspirit, and the binary division of East-West, make it impossible to understand these *mental propensities* as an emotional acoustic image prior to the embodied experience known as emotion, it is important to have a dialogue with the Portuguese-American neuroscientist António Damásio. In one of his most recent works, *Self Comes to Mind: Constructing the Conscious Brain* (2010), Damásio reviews his work and deepens his research on emotional states, in addition to presenting a differentiation between the concepts of emotion and feeling.

It is not surprising, thus, that his views on brain neuroscience, his relationship to the formation of consciousness and to the rejection of the mind-body dualism, observed in the systems of regulation and preservation of life (embodied by his idea of emotional states), have profoundly complex relationships with the notions mentioned above from Tantra.

According to Damásio, when we talk about *emotion*, we are referring to a process that is almost involuntary in the regulation of life. In this sense, we refer to the *actions* programmed by evolution, in our bodies, as a response to situations that involve a *cognitive* process (linked to memory, reasoning, imagination, attention, etc.).

From this point of view, postural, facial and even visceral changes occur, that reorganise the human behavioural patterns. In this line of thought, *feelings* would be the perceptions of the momentary emotional state, involving the apprehension of the action-response logic triggered by emotions.

Accordingly, the definition of *vrttis* (mental propensities) in Tantra seems to agree with the concept of emotion defended by Damásio. The acoustic image presented by each of the 50 sounds that make up the subtle anatomy of the *kundalinī* would be nothing but the *start* for the process of triggering

and rendering of emotions, which would happen at a suprasensible level prior to the perception embodied in the form of *feeling*.

It is not surprising, therefore, that tantrics and yogis have always considered the influences of the cosmos and the subtle human anatomy — represented by the chakras — in a systemic vision, which does not separate the result of an action from its process.

In fact, in Tantra, a correspondence is made in the region of the chakras (which constitute the energetic anatomy of the body, on a spiritual plane) with the endocrine glands (the medium of emotional experience in the physical world). In this sense, the following images show a schematisation of the regions where the chakras are found, and their respective endocrine pairs:

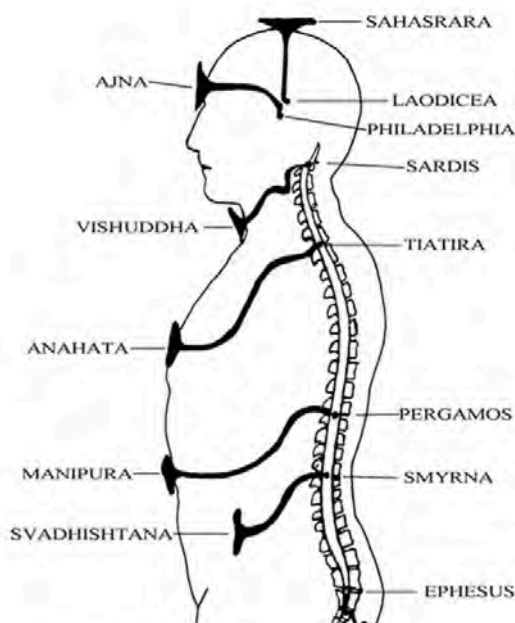


Figure 1: Chakras, vertebrae and the Seven Churches of Revelation.

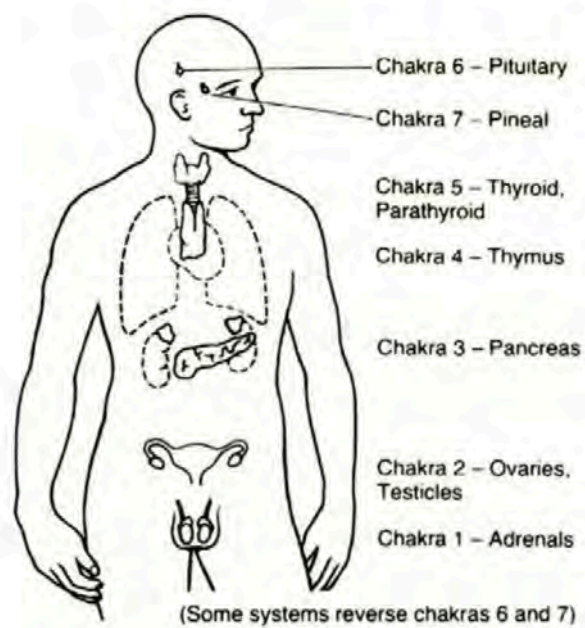


Figure 2: Chakras and their equivalent glands.

It is important to point out that, as they are vibrating (i.e. sonic) entities, the chakras do not find themselves perfectly aligned in a straight line, as is customary to represent them in schematic figures, nor are they restricted to only one dimensional plane of the body. Their conformation is closer to the figure of a toroid (as explored in section 1.2. *Tantra and the Cosmogogenesis of Sound*), which envelops the body much like in light beams, or energy spirals.

It is worth emphasising, in addition, a coincidence that is not a mere coincidence, but information *that makes the difference*:¹⁸ there are seven chakras (the most depicted ones), and there are seven glands present in the bodymindspirit.

2.3.2. The seven chakras and the endocrine glands

The equivalence between the acoustic root of the chakras and the hormonal secretions predisposed by evolution in response to hazardous situations, or where agreements are required for maintenance of survival, could be seen as nothing more than a device engendered by evolution to preserve consciousness and the survival of the species as a transmitter of information. This way, the evolutionary data stored in the cerebral amygdala, linked especially to memories and traumas, would be not only part of the *hard drive* that keeps the human operating system alive, but also as the conduit that, according to Paul McLean's triune brain model, would promote the rational-emotional analysis developed in the neocortex — in contrast to the more primitive responses of immobilisation (reptilian brain) and fight/flight (limbic brain).

Therefore, based on what can be seen in **Figures 1** and **2**, it is possible to create the following scheme:

- 1) *múládhára chakra* – regulation of the adrenal glands: secretion of adrenaline and noradrenaline (promote mobilisation of the body when facing stressful situations)
- 2) *svádhiśt'hána chakra* – regulation and secretion of sex hormones (testosterone and progesterone)
- 3) *mañipura chakra* – rules the pancreas (digestive secretions, insulin, glucagon)
- 4) *anáhata chakra* – rules the thymus gland (immunity)
- 5) *vishuddha chakra* – rules the thyroid and parathyroid (regulation of metabolism)
- 6) *ájiná chakra* – rules the pituitary gland (oxytocin – love bonds)
- 7) *sahasrára chakra* – rules the pineal gland (melatonin – immunity and aging)

IMMOBILIZATION:
reptilian brain

First three chakras

FIGHT/FLIGHT:
limbic brain

4th and 5th chakras

**RATIONAL-
EMOTIONAL
ENGAGEMENT:**
neocortex

6th and 7th chakras

¹⁸ Bateson, 1980, p. 76.

Thus, the key that connects the millenary knowledge of Tantra to the most recent advances in neuroscience seems to have been the formulation of the Polyvagal Theory by Dr. Stephen Porges. The vagus nerve, a well-known anatomical structure, runs throughout the body and is mainly responsible for the visceral regulation of emotions.

In this manner, the tripartition of the brain as an evolutionary survival strategy meets not only the structure of the cerebral cortex, but also the complex autonomic nervous system, in terms of foundational neurophysiology of emotions.

According to Porges (2011), the vagus nerve has been defining the current conformation of the human species by a predisposition to the evolutionary mechanism of social engagement, in lieu of the immobilisation reaction (reptilian brain) and fight/flight response (limbic brain), when facing dangerous and life-threatening situations. From this argument, Porges defends the existence of three branches of the autonomic nervous system, as explained by **Figures 3 and 4**:

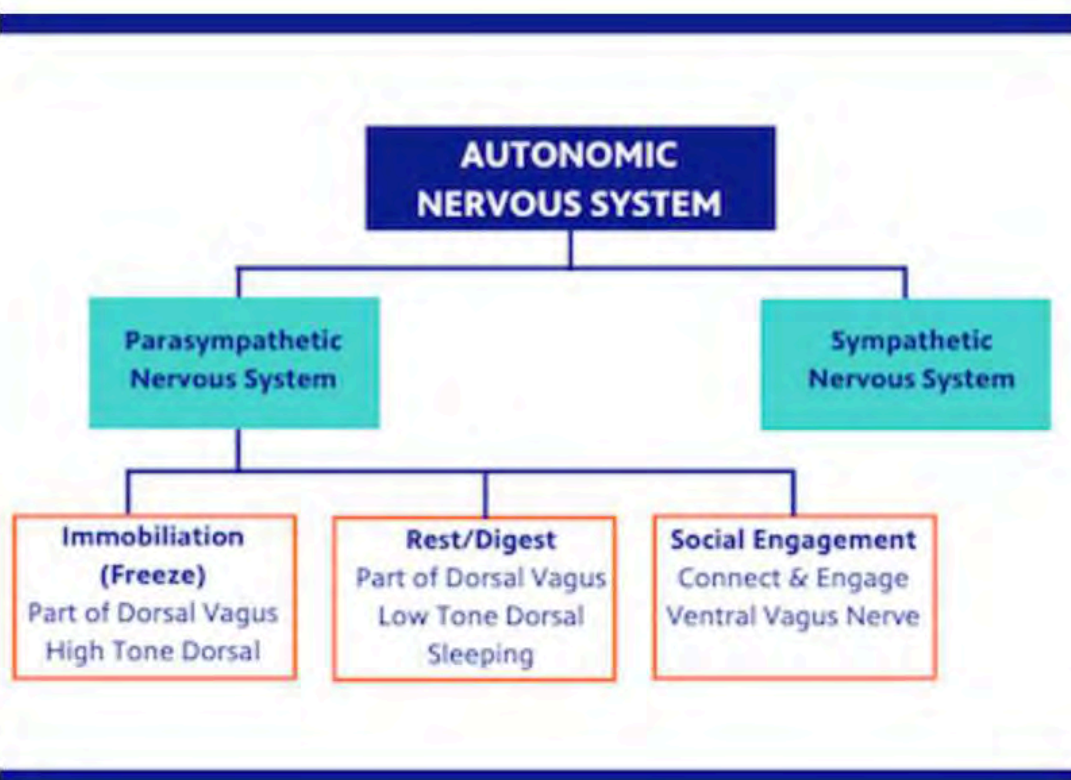


Figure 3: <https://www.pbs.org/education/blog/finding-ways-to-reflect-and-recharge-during-difficult-times>

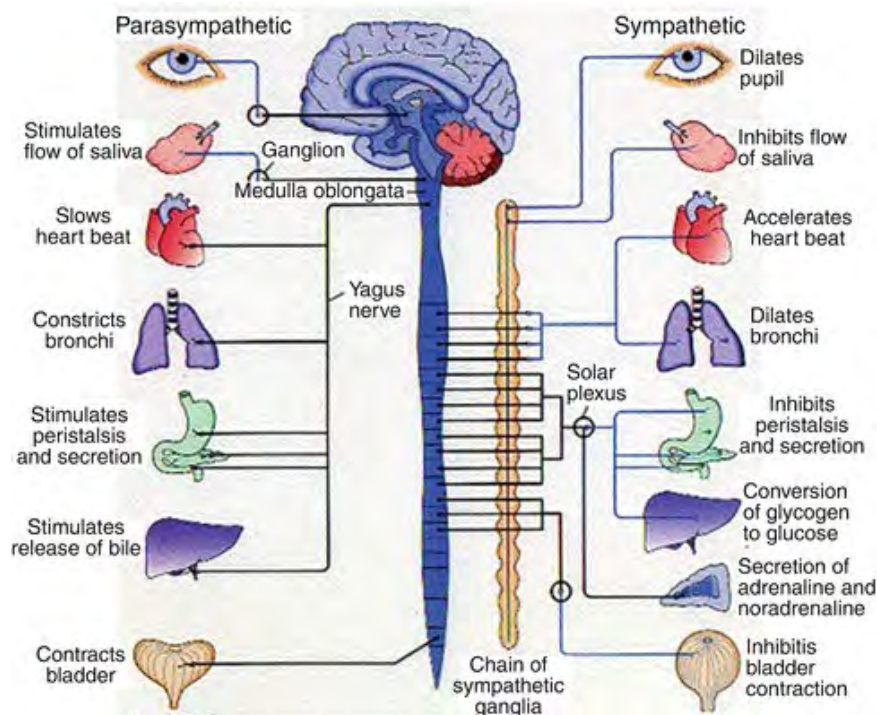


Figure 4: Autonomic Nervous System and the Vagus Nerve

Considering that the parasympathetic nervous system — a component of the autonomous nervous system responsible for mobilising endocrine-physiological reactions in crisis situations — is the one most innervated by the vagus nerve, Porges' hypothesis is drawn on the importance of the polyvagal system as an evolutionary strategy for the human body. This hypothesis has found success as the basis of a therapeutic practice in Porges' research during clinical treatments performed with autistic children. researcher uses music therapy to stimulate the production of greater vagal tone — which in people with autism seems to be the main difference when compared to individuals considered neurotypical.

In his book, released in 2011, and in numerous articles he has been publishing on the subject, Porges demonstrates through photos how his clinical treatments with music therapy have had apparent results in the facial tonus of the children in question. If we observe that the vagus nerve has a deep relationship with the body viscera, it is not surprising that a greater activity of the ventral vagal system (social engagement stimulus) provides stimulation of hormonal secretions, which can regulate bodies otherwise shaped by genetic and/or physiological differences.

In agreement, the practice with mantras seems to make possible for the organisation of the endocrine systems through the vibratory stimulus of the glands with which each sound is related.¹⁹ Even if we disregard the spiritual relationship of sound to matter, it is inevitable not to wonder about the reasoning behind some physiological configurations of the body, especially in what concerns vocal physiology.

If we look closely at the nasal cavities that are filled with air, we can realise that there is one of them just below where the pituitary gland is located (also known as hypophysis): the sphenoid sinus. The close relationship of this region with the endocrine stimulus from sound vibrations is made explicit by the neural connection itself, and by the importance of the pituitary as the “command centre” of almost every other gland in the body.

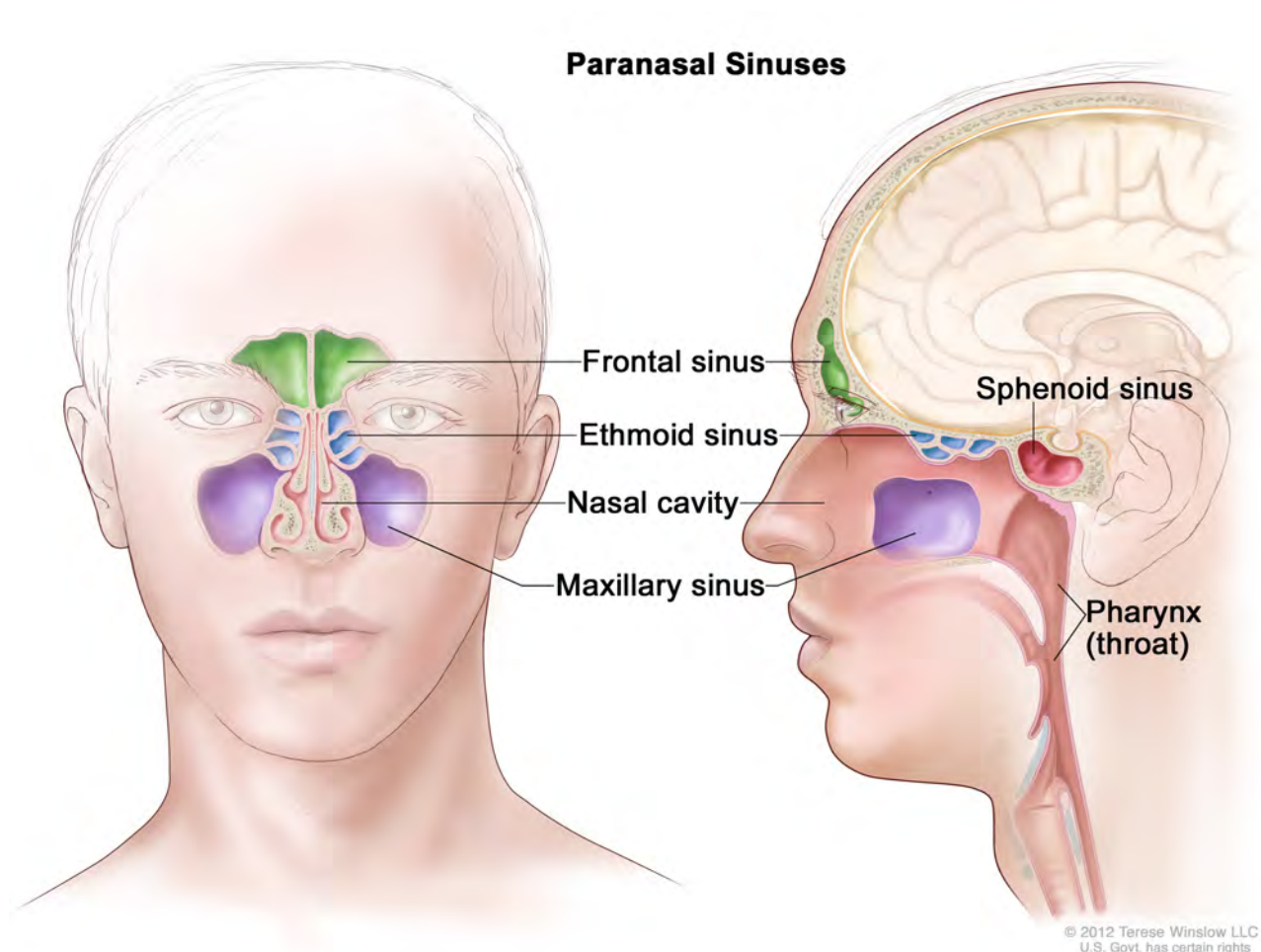


Figure 5: <https://snyderwenner.com/sphenoid-sinusitis-how-to-treat-in-the-emergency-room/>

¹⁹ As seen in the section 2.3.1. *Chakras, emotions and the nervous system*, mantras are themselves combinations of the Sanskrit acoustic roots of the *vrttis* (mental propensities) that compose the chakras. In this correlation, it is possible to observe the connection of sound as a promoter of hormonal regulation, as has been the scientific practice of yogis for millennia.

3. The School of Uncovering the Voice (Valborg Werbeck-Svärdström and Rudolf Steiner)

To dedicate a section of this essay to a pedagogy of singing that does not disregard the spiritual world, and which is part of this research practice, is necessary as a political action of the body. Voice pedagogy, especially in the academic field, is still largely conditioned by the compartmentalised and mechanistic thinking that was implanted by the Cartesian thought.

The research of the Swedish opera singer Valborg Werbeck-Svärdström, in this School, is joined by the complex philosophical-scientific-spiritual system created by Rudolf Steiner: Anthroposophy. He asserts himself, through anthroposophic practitioners, that this School is the only method published and taught in the contemporary world with the consideration of the physical, vital, animic and spiritual nature of the singing being.

In the formation of anthroposophical thought, one can find the presence of a philosophical-scientific Goethean epistemology that generated studies on the tri-membered systems (sensorineural - “thinking”, rhythmic - “feeling”, and metabolic-motor - “wanting”) and fourfold bodily composition (physical, etheric, astral and the “I”) of humans. For a real understanding of these aspects, another essay would be necessary, which is not what will happen now, fortunately for you, dear reader. Therefore, evidence will be given to what interests anthroposophical knowledge and that of the School of Uncovering the Voice in relation to mantric science.

In accordance with the spiritual vision practiced by Anthroposophy, Mrs. Werbeck (as she is still affectionately called, even after her death) questions the practice of teaching Voice as an activity guided solely by the mechanism of muscular structures. The vocal mechanics not only relate to the vision of a machine-body, but also disregard the fact that sound already exists in the cosmos as a suprasensible entity prior to any human influence.

From this standpoint, Mrs. Werbeck makes use of anthroposophical knowledge, through the framework closely linked to the research of Johann Wolfgang Von Goethe (1749-1832) and through her personal contact with Steiner, in order to deepen the teaching and research of sound as an *archetypal* entity.

In the anthroposophical view, as is in Tantra, the musical tone existent in the universe, much like the Sanskrit phonemes used by mantras, is found prior to the manifested sound (i.e. audible sound): it reveals itself as an archetype that already exists independently of human mediation. In this view,

there is a relativisation of any and all apprehensions of sound as *just* a physical entity that is *produced* via the mechanical vibration of the organs of human physiology.

The notion of sound as a systemic entity creates other levels for study and practice of singing as an artistic, therapeutic and healing activity – in order to question bodymindspirit binaries that dissociate sound also from its embodied manifestation. In addition, this School also questions pedagogies that consider singing as strictly connected to the respiratory-vocal tract.

This is deeply related to what Feuerstein (1998) explains about the tantric view of sound conformation as a process of densification of vibratory matter, initiated from a seminal point of vibration (*bindu*), which is a mental image²⁰ prior to thought. In this paradigm, which can also be compared to the anthroposophical archetypal model, the manifested sound that is already present in the cosmos, in a subtle manifestation, crosses the system formed by the human body and finds, in a densified physical structure, an environment suitable for sound resonance.

In the process of cosmogenesis of sound according to Tantra, added to the knowledge of modern physics that we have available, sound permeates its subtle (inaudible) conformation, densifies and manifests itself as an audible entity by friction with the body cavities. In such a way, the phenomenon of resonance is observed, through which a vibration threshold of the vocal folds in adduction is bypassed to achieve vibration, by sympathy, in the air molecules, generating then audible sound.

Therefore, according to Svärdröm (2008), yes, the spiritual manifestation of the sung sound depends on the bodymindspirit to exist as an audible entity (being a medium for sound resonance), but the existence of sound precedes the body itself. That opera singer is living proof that this hierarchy is not a dualistic one, as having become aphonic during a career of success, she turned this moment of crisis into a creative opportunity, and shaped her own methodology that would become the School of the Uncovering the Voice.

²⁰ In the Western paradigm, the philosophical concept that is perhaps closest to the notion of *bindu* is found in the triadic classification of Peircean Semiotic. The idea of something prior to thought would be placed as a cognitive apprehension of reality, one which is ideally located in a region anterior to the qualisign (a quality functioning as a sign). Thus, there is no audible sound in *bindu*, as there is not even an interpreting mind capable of producing perception about the sign by itself.

4. Conclusion

In this essay, relationships between the tantric knowledge about psychoacoustics were approximated with the research of Dr. Stephen Porges, to prove the importance of sound as an attractor of chaotic systems. In this case, the objective of the research was to demonstrate how sound, organised in mantric systems, has enormous potential to promote relative stability (i.e. regulation of emotional states) to the practitioners of mantra chanting.

The possibility of promoting healing of mental propensities (or *vrttis*, in the Hindu language) is something that many yogis and tantric masters have been doing over the centuries. My personal scope in this matter, however, has been to, perhaps, find a Geminian way of interculturally and intellectually connecting this perspective to theories and methods that might or might not necessarily have a spiritual language for this understanding.

Through this, the notion of mantras working as a possible yogic method of "cooling down" the bodymindspirit could be hypothesised with specific objectives. My main goal here has been to investigate how mantras can work on promoting greater complexity in the organisation of information found in human bodies.

The complex cosmogenesis of sound, in Tantra, has been, nevertheless, the most effective and comprehensive ontology for the realisation of these studies, since I started to delve deep into them almost a decade ago. While most of the knowledge presented here has been only briefly touched upon (again, maybe another aspect of my highly Geminian capacity of being a specialist in nothing), I hope to have embodied the concept of *indisciplinarity*, in order to create a complex conversation that does not see reality through a binary way of thinking.

While this written research is largely of a foundational nature, my interest is to further develop these systemic connections through my own artistic process — which would by itself render another academic or non-academic work. I hope to have been able to prove how Tantra can be an embodied philosophical-spiritual practice, responsible for the understanding of not only the physical reality, but also of other invisible realms not measured by current human technology.

Namaskar!

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