

Landscapes of synesthesia: views from art, science and philosophy

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ABSTRACT: Etymologically derived from a combination of the Greek *syn*, for together, and *aisthêsis*, for perception through the senses, the term *synesthesia* (also spelled *synaesthesia*) denotes a process of inter-sense analogy, whereby one sense modality experiences what usually belongs to one or more of the other senses. This paper explores the distinct approaches that Art, Science, and Philosophy have assumed towards the concept, and discusses how an awareness of synesthetic bodily-mental-sensory processes opens up new perspectives of research that may interrelate the arts with cognitive neuroscience, as well as transform other fields of contemporary knowledge.

1 INTRODUCTION

Although the phenomenon of synesthesia—referring to an inter-connectedness or conjoining of different modes of sensory perception—was only given its name by the end of the nineteenth-century, it was already conveyed by the Greeks of ancient times, namely by Pythagoras (sixth century BCE) who wrote on the “music of the spheres,” and by Aristotle (fourth century BCE) who equated the harmony of colors to the harmony of sounds. In the eighteenth-century, scientists Isaac Newton (in 1704), Louis Bertrand Castel (in 1725) and Erasmus Darwin (in 1790) attempted to invent musical instruments that would produce color-music. Some decades later, early-Romantic artists Percy Shelley, John Keats and E.T.A. Hoffmann experimented with synesthetic writing.

The phenomenon, however, was for the first time actually emphasized by artists and thinkers of the fin-de-siècle Symbolist movement, who considered that there were correspondences among the arts, natural phenomena, and the bodily senses, and therefore associated the process of synesthesia to a reciprocity between the physical world and the spiritual world.

After an intermission caused by two world wars, the interest in synesthesia was recuperated by phenomenology in the mid-twentieth century, through the writings of French philosopher Maurice Merleau-Ponty. According to his theories, the act of perception is a dynamic participation between things and the various interconnected sensory systems of the “lived-body;” the overlap of the senses, therefore, corresponds to our primordial and preconceptual experience, which is inherently synesthetic.

In a similar vein, early twenty-first century Sensory Critics (David Howes and Constance Classen, among others) argue that isolating the senses into the usual five categories (established after Aristotle's work *De Anima*) means following a predominantly Western notion of embodiment, where mind, will, desire, and dream are separated from body; they claim, therefore, that an awareness of the phenomenon of synesthesia opens up the terrain of the inter-sensory.

In the last three decades neuroscience stopped regarding synesthesia as an illusion or metaphorical skill, to perceive it as a neurological phenomenon worthy of scientific explanation. Several contemporary neuroscientists, however, use the term synesthesia to refer exclusively to an abnormal and clinical condition of cross-modal association, distinguishing it from the conscious contrivances of sensory fusion effected by nineteenth-century artists. Contrastingly, yet other trends of neuroscience contend that there is increasing evidence for the interconnectedness and interaction of sensory areas of the brain.

2 SYNESTHESIA IN THE SYMBOLIST MODE

Inspired by Charles Baudelaire's sonnet "Correspondances," written in 1857, the fin-de-siècle Symbolists considered that there were correspondences among the arts, natural phenomena, and the bodily senses, and therefore associated the process of synesthesia to the concept of correspondences, considering both to be epistemological principles of Symbolist theory.

The Symbolist notion of correspondences was manifestly derived from Neoplatonic thought. Third-century Platonic philosopher Plotinus held that the One Being comprehends all beings, but each being explicates Being, i.e., there is both divine emanation from Being and divine immanence in all beings:

"All things must be enchained; and the sympathy and correspondence obtaining in any one closely knit organism must exist, first, and most intensely, in the All. (...) At the same time, the parts are not merely members but themselves Alls" (Ennead II).

In the same vein, eighteenth-century Swedish scientist and philosopher Emanuel Swedenborg argued in 1758 that all things that exist in nature, from the least to the greatest, are interconnected and constitute correspondences (§ 57). In effect, "Anything that occurs in our natural world (that is, in our bodies and their senses and actions) because of our spiritual world (that is, because of our minds and their intelligence and volition) is called something that corresponds" (§ 91).

Baudelaire linked the Swedenborgian concept of correspondences to the process of "synesthesia" when he observed that "Everything, form, movement, number, color, smell, in the spiritual as well as in the material world, is significant, reciprocal, converse, correspondent" (Baudelaire 1861, XVI-1). For the Symbolists, the interconnectedness among the senses became therefore allied to reciprocity between material and spiritual, between outer and inner worlds, between physis and psyche.

According to Paul de Man, the Symbolists sought correspondences under the influence of both Swedenborg and Neoplatonism as a means to recover a "lost unity of all being" (7). Anna Balakian, however, argues that the Symbolists did not understand correspondences as a direct communication with a Divine being, but rather envisioned them as complex sensual and intuited ("superrational") connections, apprehended as "mood" and evoked through poetic language (5, 104).

The latter view corresponds best to Stéphane Mallarmé's own, since the French poet argued that experience could be intuited and expressed through "symbols," or through compositional scores of ideas, sensations, and emotions, which in turn would be apprehended by keen readers/viewers ("Crise de vers," 1897). Differing from the most frequent usage of the term, the "symbol" in Symbolist theory is neither a metaphor nor an allegory, since it does not substitute one range of ideas for another, nor provides an illustration of the general by the particular. From a Symbolist perspective, symbols may never be turned into symbolic fixed meanings, since they are polysemic, generating various signifieds and correspondences among signifieds (Corrêa 2011: 59). Aesthetic experience is the result of a synesthetic imaging activity of both producers/artists and receivers/beholders—to the point that artworks are co-

created through such combined process.

As Maurice Tuchman states, the two fundamental hallmarks of Symbolist art at the end of the nineteenth-century were a fascination for correspondences and an exploration of synesthesia: “Artists were intrigued with the prospect of intermingling senses and, more specifically, with painting's approximating music” (32).

Most notably, painter Wassily Kandinsky developed a mystical streak of synesthesia that led him to seek correspondences between colors and sounds. Inspired by the theosophical writings of Helena P. Blavatsky (*Isis Unveiled*, 1877; *The Secret Doctrine*, 1888), and by the illustrations of the auric form of thoughts and emotions in Annie Besant and Charles Leadbeater's *Thought Forms* (1901), Kandinsky sought to incite synesthetic experiences through his works, so as to convey spiritual vibrations:

“The artist is the hand that plays, touching one key or another, to cause vibrations in the soul. (...) Every color is inwardly beautiful in painting because every color creates a spiritual vibration and every vibration enriches the soul. (...) Words, musical tones, and colors possess the psychical power of calling forth soul vibrations (...) they create corresponding vibrations, ultimately bringing about the attainment of knowledge” (Kandinsky 1912: 25, 35, 94).

Although he was not a synesthete himself, Kandinsky believed that he could produce synesthesia by exercise, in the hope of achieving and conveying higher perception.

The Symbolists' fascination for synesthesia, for a wholeness of sensory experience, for a connection between exterior and interior, microcosm and macrocosm, was closely linked to their aim of synthesizing all the arts. Already in 1902, the musical composer Aleksandr Scriabin conceived of a multimedia performance combining sound, sight, smell, feel, dance, and décor, which would unite feminine and masculine principles, transcend the “I” and the “Non-I,” and lead to a final cosmic apocalypse. Entitled *Mysterium*, this transdisciplinary concert was to be performed in the open air for seven days and nights in India, at the foothills of the Himalayas. Barriers separating audience and performers were to be removed so as to create conditions favorable for spiritual communion; the performance would be followed by the end of the world and by the replacement of the human race with nobler beings. Because he believed that the artist, as a microcosm, could affect the macrocosm, with the *Mysterium* Scriabin hoped to usher humanity into a new and more satisfying plane of existence (Morrison, 2002).

Whereas the Romantic concept of imagination involves a return to an ethos of unity (an ontological closure), Symbolism privileges the process of “imagining,” a process of synesthetic image-production that does not culminate in a final, coherent and stable image/message but rather in an open-ended one—thus making imagination an activity of transformation, of becoming (Corrêa 2011: 60-1). In this sense, as Patrick McGuinness suggests, Symbolism does not designate a style, an epoch, or a school, but rather invokes a set of concepts and perspectives on writing and beholding, a drift of specific ideas on the role of art that have cyclically returned, “recombined, accentuated and synthesized” (3).



Figure 1. "Thirty" by Wassily Kandinsky (1937).

3 A PHENOMENOLOGICAL ECOCRITICAL ASSESSMENT

French philosopher Maurice Merleau-Ponty understood the act of perception as a dynamic participation between things and the various intertwined sensory systems of the lived-body. According to him, the overlap and interweaving of the senses corresponds to our primordial, preconceptual experience, which is inherently synesthetic: "Seen in the perspective of the objective [Cartesian] world, with its opaque qualities, and the objective body with its separate organs, the phenomenon of synaesthetic experience is paradoxical. (...) Synaesthetic perception is the rule, and we are unaware of it only because scientific knowledge shifts the center of gravity of experience, so that we have unlearned how to see, hear, and generally speaking, feel, in order to deduce, from our bodily organization and the world as the physicist conceives it, what we are to see, hear, and feel" (265-6).

In Merleau-Ponty's understanding, we are led to experience the sensory world as a place of orderly segregation, and to consider the synesthetic intertwining of sensory modalities as unusual, because we have become culturally estranged from a direct experience with the entities and elements that surround us.

Perception for Merleau-Ponty is an ongoing synesthetic interchange between our lived body and the things that surround it. Such emphasis on a participatory relationship between body and environment, between human and non-human materiality, evidently connects his phenomenology to contemporary ecocentric criticism. As David Abram notes, "In *The Visible and the Invisible* Merleau-Ponty supplements his earlier perspective—that of a body experiencing the world—with that of the world experiencing itself through the body. Here he places emphasis upon the mysterious truth that one's hand can touch things only by virtue of the fact that the hand, itself, is a touchable thing (...). Likewise the eye that sees things is itself visible (...). We can experience things, can touch, hear and taste things, only

because, as bodies, we are ourselves a part of the sensible field and have our own textures, sounds, and tastes. Indeed, to see is at one and the same time to feel oneself seen; to touch the world is also to be touched by the world” (75).

This reciprocal aspect of perception—what Merleau-Ponty designates as “reversibility”—entails an interweaving and synesthetic communion between body and space at every level of experience, and is akin to the Symbolist conjoining of synesthesia with macro- and micro-cosmic correspondences.

4 VIEWS FROM SENSORY CRITICISM

The notion of synesthesia has been specifically investigated within recent Sensory Theory, since it is considered pivotal in asserting a multi-directional interaction of the senses, or what may be called intersensoriality:

“Synesthesia involves short-circuiting the conventional five-sense model and experience of perception. It establishes cross-linkages between the modalities at a subconscious level, and so opens up a whole new terrain—the terrain of the inter-sensory” (Howes 2005: 292).

Sensory theory seeks to reflect upon environmental, cultural and historical phenomena not only in visual terms, but above all by investigating the ways in which the various other sensory faculties—auditory (verbal and non-verbal), gestural, olfactory, gustatory, and tactile—interact. Within such a context, sensory critics claim that multi-sensory readings may not only help correct the excesses of “textualism” and “ocularcentrism” of modern culture, but also lead to reconnecting cognition to the “lower” senses of taste, touch, and smell (Howes 2005: 399).

Isolating the senses into the usual five categories means following a predominantly Western notion of embodiment, where mind, will, desire, and dream are separated from “body.” Further, it means to compartmentalize the body/ies in autonomous sensory sectors (or organs) that are hierarchically arranged. As Susan Stewart points out, there is a whole history of the senses which is “the history of an economy that ranks the senses and regulates the body’s relation to the social world in a transformed and transforming way” (62). Stewart further notes that in our Western-based civilization the senses of seeing and hearing have been ranked as the highest, and taste and touch as the lowest, since the latter are allegedly dominant in all other animals (61).

In effect, the normative and widely adopted five-faculties sensory model has been increasingly challenged, namely by anthropologists who argue that such separation is seldom verified in non-western indigenous cultures. As observed in the Tzotzil of Chiapas, in the Desana of the Amazon, and in the Temme of West Africa, for instance, human sensory orientation and experience relies heavily on additional faculties such as the perception of heat, color, and bodily position (Howes and Classen 2014). As Constance Classen notes, it is the sensory model adopted by a society that translates its communal sensory perceptions and concepts into a particular worldview, and that provides the basic perceptual paradigm to be followed or resisted (Classen 1997: 402). Accordingly, sensory critics argue that the human sensorium is culturally formed (Howes 2005: 3); although it may be negotiated by each individual, it is always mediated by the ways of sensing unique to a given culture (Howes 2005: 22).

Within a rise of interest in sensory crossovers and human perceptual systems, Radu Alexander has argued in a recent article (“How many senses do we have?” 2014) that since the definition of a sense is not yet well established, we should start considering the existence of at least six additional senses: thermoception (sense of temperature), proprioception (sense of the body and its positions), equilibrioception (sense of balance), nociception (sense of pain), interoception (sensitivity to stimuli originating inside one’s body) and chronoception (sense of time).

Not surprisingly, Howes and Classen’s latest book, *Ways of Sensing* (2014), reflects extensively upon the cultural phenomenon of synesthesia, on how it has been dismissed as an artistic invention and vague metaphor, or else a rare neurological condition. Contrastingly, they contend that “synesthesia can function as a fundamental vehicle for the production of cultural meaning” (11), as in the case of many traditional

societies, from the Incas in South America (trained in reading the colored knots of the quipu), to ancient China (whose theory of the five elements of Wood, Fire, Earth, Metal and Water corresponds to an odor, taste, color, musical tone, season and direction), to the western medieval mystical practices (associating prayers with fragrance from incense), where synesthetic associations and practices are used to structure memory, symbolize social relations and order the cosmos (Howes and Classen 2014: 152-74).

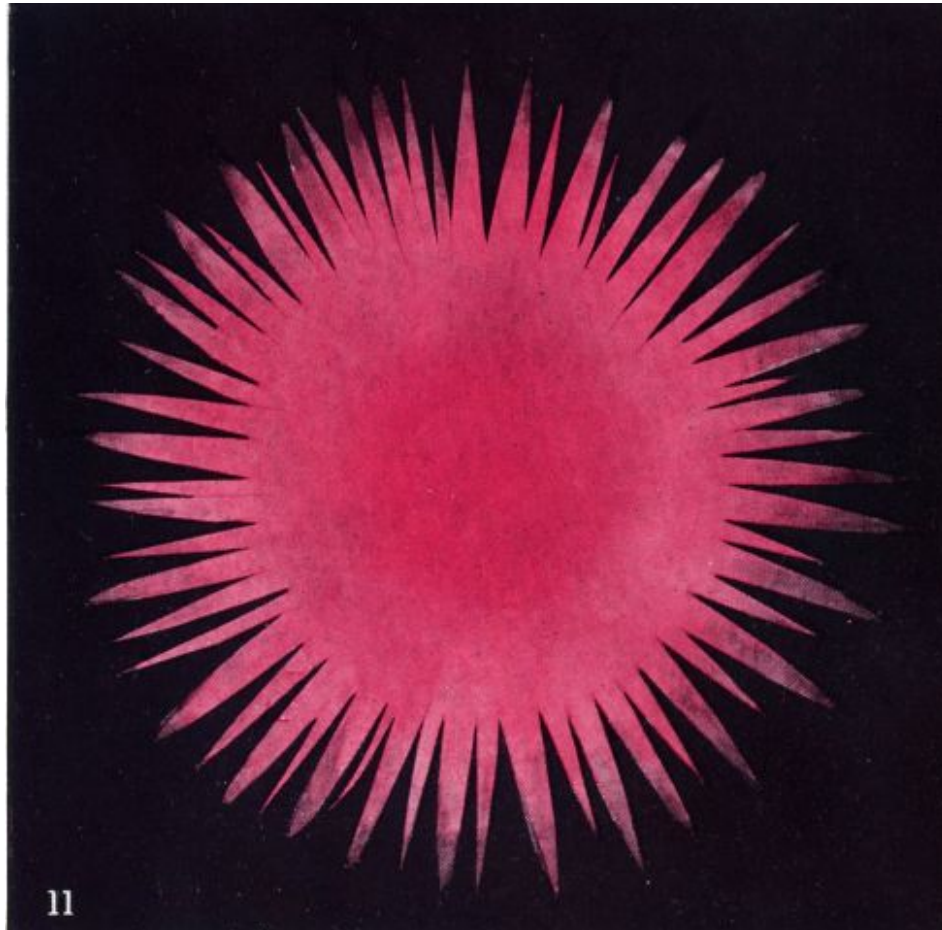


Figure 2. Affection: from *Thought-Forms* (1901), a work by Annie Besant and Charles Leadbeater, seeking to illustrate visual auras of emotions, sounds, events and ideas.

5 NEUROSCIENTIFIC THEORIES

Scientific research on synesthesia began in the mid-nineteenth century with a few psychological studies on colored hearing that culminated in Francis Galton's *Inquiries into Human Faculty and its Development* in 1883. It was Galton who first utilized the term synesthesia to designate the involuntary clinical experience of sensory crossover.

Towards the end of the nineteenth century, synesthesia was deemed a mere poetic or metaphoric notion, unworthy of scientific investigation. It was reopened as a subject of neurological inquiry in the last decades of the twentieth century, namely by Richard Cytowic and Vilayanur Ramachandran in the

US, and by John Harrison with Simon Baron-Cohen in England. These scientists define synesthesia “as occurring when stimulation of one sensory modality automatically triggers a perception in a second modality, in the absence of any direct stimulation to this second modality” (Baron-Cohen & Harrison, 1997: 3).

Within the cognitive model proposed by US philosopher Jerry Fodor, that there is a modular structure to sensation which allows for the identification of discreet senses (Modularity Theory), scientists have pointed out at least three possible causes for the symptom/phenomenon of synesthesia: 1) that it is a case of the breakdown of the normally modularized cognitive system; 2) that there may be in the brains of synesthetes an extra module with crossover functions; 3) that it may result from an incomplete process of modularization (G. Segal 1997: 211-23).

The intermodal association of synesthesia is called bimodal when occurring between two sensory modalities (which is the most common case), and multimodal when it involves at least three sensory modalities. Studies have found that the most common forms of synesthesia are “colored-hearing” (sounds associated to a particular color), and “grapheme-color” (letters and/or numbers associated to color), which are both bimodal and generally unidirectional. There are several other kinds of synesthesia, such as color-taste, color-scent, and audiomotor; the least frequent being sound-odor, temperature-color, taste-touch, touch-smell and vision-touch (Cavallaro 2013: 7). There is even voice-induced synesthesia, in which people experience colors, textures, scintillation, shapes and movements that accompany the sound of voices, such as (Moos & Simner 2013). Eagleman and Goodale (2009) consider that research on synesthesia has mainly focused on how stimuli trigger experiences of color, overlooking the fact that synesthetic experience extends to other material properties such as texture.

Estimates of the prevalence of stable/durable forms of synesthesia vary considerably. In 1880, Galton offered a ratio of 1 in 20; Cytowic (2002) estimates that it happens 1 in 20,000; Baron-Cohen and Harrison (1997) consider that it affects 1 in 2,000; Ramachandran and Hubbard (2001) indicate that the prevalence may be greater, perhaps as much as 1 in 200. In terms of gender, it strikingly seems to occur seven times more on women than on men (Bailey & Johnson, 1997: 193).

Baron-Cohen and Harrison distinguish between five types of synesthesia, namely: 1) Developmental, which begins during infancy and is vivid, automatic or involuntary, and durable (unchanging over time); 2) Neuropathological, due to damage into certain pathways and areas in the brain; 3) Metaphoric (pseudosynesthetic), which is voluntary, as in the case of most artists that compose synesthetic works; 4) Associative (pseudosynesthetic), which seems entirely due to learned associations; and 5) Drug-induced, especially by psychoactive substances such as LSD, cannabis sativa, and mescaline, which is a transient form of synesthesia that not everyone who uses hallucinogens experiences (1999: 491-504). Most recently, studies have provided evidence that synesthesia may be an inherited trait, most likely transmitted through the maternal line or passed along the X-chromosome, but further research on its types, prevalence, and transmission is required before a full-scale gene search can be instigated (Bailey & Johnson, 1997: 199).

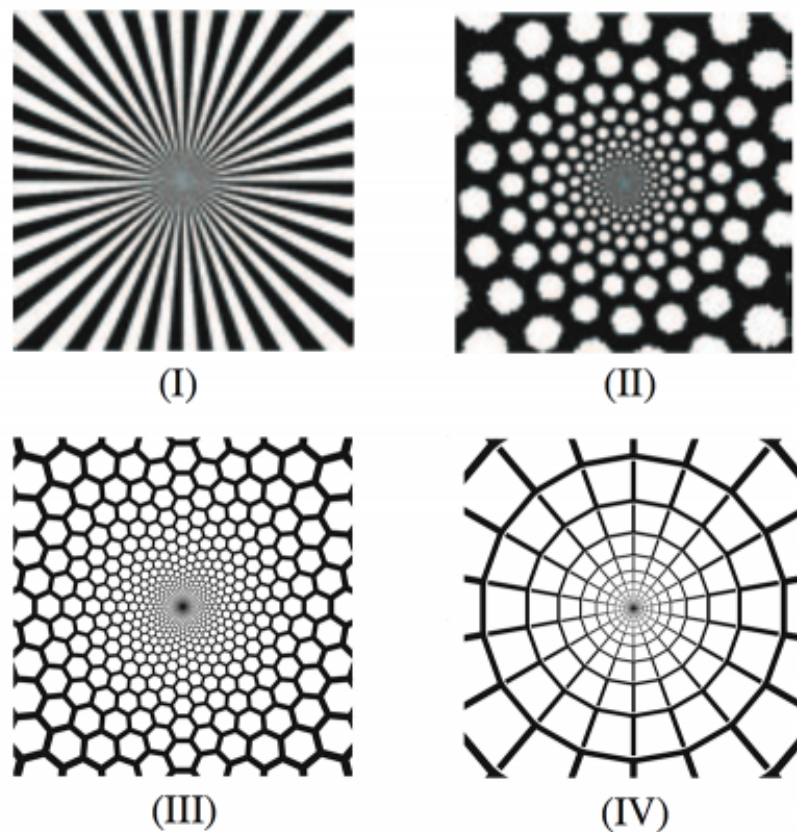


Figure 3. Form Constants, basic configurations.

6 CONCLUSION

In recent years the notion and phenomenon of synesthesia has enjoyed great popularity, as substantiated by the numerous scholarly articles published in art journals—particularly in *Leonardo Journal*, an MIT periodical that developed a “Synesthesia and Intersenses Special Project” edited by Chrétien van Campen, spanning from 1999 to 2007—as well as in journals of neuroscience, genetics, psychology and perceptual studies.

The time seems now ripe for plenty more research that may journey across disciplines, interconnecting philosophical perspectives with scientific findings, and both with aesthetic theory and practice. As evidenced in my current assessment of synesthesia across such fields of knowledge, there are significant convergences to be explored. In this regard, for the purpose of performing interactive readings of the phenomenon of synesthesia through art, science and philosophy, I want to underscore the findings from neurobiological research that seem most significant:

1) The fact that newborn children and young infants up to at least three months old are normally highly synesthetic, experiencing sensory stimuli in an undifferentiated and mingled way (Maurer 1993: 236-7) suggests that we may all be synesthetes. What this implies, as well, is that in most synesthetes the

neonatal neural pathways are kept active in maturity. As Baron-Cohen and Harrison explain, in early life the brain is “very plastic” and sensory experiences have a lasting impact upon neural structure. With a continued exposure to stimulation, the normally transient connections between auditory and visual areas become reinforced through use, and may lead to the maintenance of neonatal synesthetic pathways (1997: 116-7). Consequently, whereas the genetic theory suggests that only those biologically disposed to synesthesia will develop the condition, the epigenetic or “environmental shaping theory of synesthesia” suggests that within us all is the potential to remain a synasthete (117).

2) Richard Cytowic has postulated that the limbic system (what is usually considered the emotional brain) is central to the phenomena of synesthesia, acting as a bridge to bind the various cortical areas involved in the synesthetic experience (2002). The primacy of the limbic system, or of emotion, over more rational processes in the synesthetic phenomenon is interesting to note when we take into account the potential that artists have historically placed upon the notion of synesthesia.

3) Another remarkable fact concerns the incidence of synesthetic states of consciousness during Near-Death-Experiences (NDEs), as well as of synesthetic residual effects after such events, as evidenced by various patient reports (Seaberg 2013). In effect, among the characteristic kinds of cross-sensory perception in sound-color synesthetes are “Form Constants,” or elementary geometric patterns that also recur in near-death states of consciousness. As psychologist Heinrich Klüver remarked in 1926, there are four basic configurations of “Form Constants,” namely tunnels, spirals, lattices, and cobwebs—with attendant variations in color, brightness, symmetry, replication, rotation, and pulsation (Cavallaro 2013: 16). Remarkably, such configurations also appear in Symbolist abstract art, with comparable corresponding mystical associations.

4) Recent studies report that advanced meditators frequently experience synesthesia. Not only do ancient texts from Japan, China and India describe synesthetic experiences proposing that it can be developed to extraordinary degrees through meditation, but recent scientific tests have been carried out that indicate a heightened synesthetic sensitivity to both inner and outer stimuli during meditation. These data lend support to the claim that synesthetic processes are common to all of us, and also that it may be possible to cultivate enduring synesthesia (Walsh 2005:12).

5) The fact that non-synesthetes may experience occasional synesthetic experiences during meditation, drugs, or while falling asleep, leads Eagleman and Goodale (2009) to suggest that the connectivity may be “present anatomically in all brains,” but is not necessarily functional due to the normal inhibitory networks that keep high-frequency cortical activity confined to one region instead of letting it spread. This suggests that there is a connection between synesthetic perception and types of consciousness, and once more that there is in us all the potential to experience and cultivate synesthesia.

6) Vilayanur S. Ramachandran’s research on synesthesia has led to novel insights that link brain structure to the emergence of language, namely through the “Bouba-Kiki effect” experiment. Having asked people from distinct linguistic groups to relate the words “bouba” and “kiki” to two abstract shapes, one blobby and the other spiky, the vast majority of them connected round-sounds to circular-shapes (bouba), and cutting-sounds to jagged-shapes (kiki). Ramachandran’s test suggests that, instead of merely consisting of a system of arbitrary and conventionalized signs, human language may have evolved from a cognitive association of sounds with images, as well as sounds with ideas, as Plato had already implied in *Cratylus*, fourth-century BCE (Sedley, 2003: 23).

Hence, some contemporary trends of neuroscience share concepts of intersensory perception with Symbolist aesthetics, Sensory Theory and Phenomenology, within a similar critique of the historical hierarchization of the senses, and of the classical mechanistic view of the human mind as a logical machine/computer with discrete and compartmentalized functions. In the words of neurologist Oliver Sacks, “There is increasing evidence from neuroscience for the extraordinarily rich interconnectedness and interaction of sensory areas of the brain, and the difficulty, therefore, of saying that anything is purely visual or purely auditory, or purely anything” (Sacks 2010: 237-8).

In this light, the term synesthesia ceases to designate a condition to which only certain persons are prone, or a contrived metaphorical way of composing by particular artists, but rather alludes to a common participatory tendency and undivided experience of the senses. In effect, some current scientific views of synesthesia seem closer than ever to the Symbolists' artistic vision of the phenomenon of more than a century ago, when they sensed that "The deep structure of the human mind corresponds to the deep structure of the universe" (Gerould 2009: 81).

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