



# Neuroaesthetic And Indian Sculpture: A Scientific Quest For Brain Response

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## Abstract

This study is an attempt to explore the neuroaesthetics of Indian sculptures within the paradigm of cognitive neuroscience. Indian sculptures acclaimed poignant position in the world as concern of art and aesthetic, but in the explorations of neurological forte is desiccated arena. Neuroscientist Semir Zeki coined the term "neuroaesthetics" to describe his pioneering investigations of the neurological mechanisms that underlie art. Neuroaesthetics is the study of how aesthetic perception, production, judgment, appreciation, and emotional response are produced and experienced from a neurobiological basis. While this area of study is relatively new to the field of neuroscience especially in Indian context. The study will opened new sights of exploration with the neuroaesthetic relation with Indian sculpture.

**Key words:** Neuroaesthetic, Aesthetic, Art, Neuroscience, Indian Sculpture

**DOI Number:** 10.14704/Nq.2022.20.17.Nq88003

**Neuroquantology 2022; 20(17):12-17**

## Introduction

A systematic endeavour has been made over the last two decades to link aesthetic enjoyment to its neurological correlates. Neuroaesthetics is a burgeoning field of cognitive neuroscience research that strives to understand the mechanics and brain underpinnings of aesthetic experience (Cattaneo, 2020). From a neurobiological standpoint, neuroaesthetics is the study of aesthetic stimuli and the aesthetic experience. Since the publication of Gustav Theodor Fechner's "Vorschule der Aesthetik" (Preschool of Aesthetics) in 1876, neuroaesthetics has functioned under a single unifying principle: that the perception of a stimulus is directly tied to its physical qualities (Fechner, 1876). Neuroaesthetics is a relatively recent area in neuroscience, with its formal definition being "the scientific study of the brain grounds for the contemplation and creation of a work of art" in 2002 by Dr. Semir Zeki. The term "neuroaesthetics" was coined by a neuroscientist

to characterise his ground breaking research into the brain systems that underpin art. Zeki is the director of the Institute of Neuroaesthetics and directs the Laboratory of Neurobiology at University College. Zeki is known for his studies about the visual brain. "In a sense, the artist is a neurologist," he argues, "exploring the potentials and powers of the brain using diverse tools." Only in neuronal terms can we fully comprehend how such constructions might elicit beautiful feelings. Zeki's work has so far been dominated by brain imaging studies using functional MRI (fMRI) techniques, as well as research that map brain regions that connect with human perception for aesthetic beauty (Kawabata and Zeki, 2004). Only in neuronal terms can we fully comprehend how such constructions might elicit beautiful feelings. Such a comprehension is now firmly within our grasp." There are connections between the organising features of art and the organisational principles of the brain when it comes to

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**Relevant conflicts of interest/financial disclosures:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest



understanding the perception of visual art. Because art is created with the intention of being perceived, it is reasonable to believe that artists, whether consciously or unconsciously, unearth evidence for the brain bases of aesthetic perception (Chatterjee, 2011). Visual artists frequently create recreations of the visual environment, which is a distinct feature of their medium. Art, as a visual representation of reality, is extremely beneficial to neuroaesthetics because it encourages artists to experiment with new methods to improve the representation. V. S Ramachandran claims to have discovered "the key to comprehending what art actually is" at the point of connective context. This key is also referred to as a "universal rule of deep structure underpinning every artistic experience" and "a common denominator underlying all sorts of art.". The aim of art, after all, is to improve, transcend, or even distort reality, not only to reflect or represent reality, which can be done very easily with a camera. The artist's goal (consciously or unconsciously) is to not only capture the essence of something, but to amplify it in order to more powerfully activate the same neural mechanisms that the original object would activate (Ramachandran, 1999). According to Ramachandran, "the original object" refers to the object represented by an artist; his hypothesis is that the works of art we enjoy activate the same neural mechanisms that are activated when we see the objects they represent, but they do so more powerfully. He explained Lord Parvati's sculpture with caricature for the sake of comprehending the rationale. Goddess Parvati is a sculpture that embodies feminine sensuality, elegance, charm, and dignity. What is the artist's method for accomplishing this? he has removed the average male form from the average female form and amplified the difference, according to a first-pass answer. The ultimate effect is a thin yet sensuous woman with enlarged breasts and hips and an attenuated hourglass waist. However, the aesthetic sense of Indian art absorbed this quite divergent logic.

Another intriguing element is that the works of art are not photocopies; instead, they employ deliberate hyperbole and reality distortion. Those who can't just modify an image at random and call it art. Are there any guidelines that the artist uses to transform the image in a

methodical fashion, whether deliberately or unconsciously? And, if that's the case, how general are these guidelines? While people converse and study old Indian texts on art and aesthetics, an ancient Indian philosopher observed that the word aesthetics is similar to the word *rasa*. This Sanskrit term is difficult to explain, but it essentially translates to "catching the very essence, the very spirit of something" in order to elicit a specific feeling or emotion in the viewer's mind. In Ramachandran's similarity understanding, he understood that if you want to understand art, you must first understand *rasa* and how it is represented in the brain's neural circuitry. He laid out eight universal rules of aesthetics, which is a fascinating neuroaesthetic principle. These are general guidelines that an artist can use to generate aesthetically appealing images that titillate the visual parts of the brain more effectively than he might with realistic images or real objects. This is most likely accomplished through the deliberate exaggeration of art (sculpture), which may trigger hyperactive mirror neurons in the superior temporal sulcus. When a person sees changing postures and movements of the body, as well as changing facial expressions and the hyperactive logic of the sculpture, these cells respond dramatically.

### **Neuroaesthetics and Logic of Perceiving Art**

Neuroaesthetics seeks to extend the neurophysiological basis for identifying works of art as happy or dissatisfied by analysing the effects of emotions that shape our individual aesthetic judgments on the body and mind. Semir Zeki started with the hypothesis that the goal of art should be to expand brain function and focus on the study of artistic effects. So the study of how humans understand art can help us better understand how our brains work. Zeki emphasizes the artists debt to the artist. The latter actually has no special knowledge of the brain but intuitively expects a lot of recent discoveries on how to understand the shape of perspective color distance etc. Zeki Neuroaesthetics aims to programmatically offer new aesthetic theories based on biology that allow us to understand the neurological basis of aesthetic experience. This is an ambitious goal that allows the participation of various fields of knowledge (theoretical but more technical) that really give rise to interdisciplinary research. In summary



Zeki's theory of neuroaesthetics includes two basic principles: 1) the theory of functional specialization which assumes that different features of the visual cortex are spatially controlled in different areas of the visual cortex and that there are different treatment systems for different cortex characteristics. 2) The principle of modularity that balances the idea that the brain processes different visual field features into different sub-regions (i.e. the subsystem has relative freedom) ... organized according to a parallel modular system. Zeki's first work published in the late 1990s has made great strides in neuroaesthetics and empirical aesthetics often in an attempt to overcome the complexity of understanding. Zeki in his argument that art derives from brain physiology in order to understand neurological tendencies. Ramachandra was heavily criticized for overlooking other factors that contribute to the formation and evaluation of art. John Hyman, professor of philosophy at Oxford, described Ramachandra's theory as shameless reductionism and stressed his failure to cite the basic idea that art is a product of his time created by certain material tools and techniques. To understand what art really is it is necessary to understand that the ability of works of art to express meaning, ideas and emotions depends on these materials and technologies (Hyman, 2008). The boundaries of Zeki and Ramachandra's theories have been expanded to focus mainly on certain periods of painting in the western world, one of the many in the art world. Ramachandra explained in a series of interviews that he wanted to serve as a starting point for his work and admitted that he did not have a whole theory of art but hoped that his dissertation would create a useful dialogue between neuroscientists and artists. Cognitive psychologists, art historians, C.P. Snow's *Two Cultures* (Ramachandra, 2001). It is undeniable that the field of neuroscience has created a dialogue between the two cultures and the greatest potential for innovative work lies in the greater connection between the arts and neuroscience. However, artists and scientists need to appreciate the complexity of the topic and accept that neuroscience is not an adequate theory of art but it can enrich our understanding of art by adding another dimension.

## **Methodology and its Approaches in Neuroaesthetic Study**

Neuroaesthetic research develops and uses human neuroscience to develop cognitive and emotional investigational approaches such as magnetic resonance imaging (fMRI), electroencephalogram (EEG), memory and transcranial magnetic excitation. He was promoted to using these tools, cognitive neuroscientists on a wide range of topics such as comprehension, emotion, attention and behavior have begun to develop ways in which aesthetic experiences appear in the human brain (Kirsch, et al. 2016). Semir Zeki's analysis and several other scientists is mostly limited to the use of magnetic resonance imaging capabilities as a means of understanding aesthetic neural correlations. However, fMRI is not an excellent tool for empirical aesthetic studies, especially for ecological experiences. Alternating or using additional neurophysiological measurements can provide a truly aesthetic experience. Skin electrical response (EDA) and heart rate variability (HRV) are two neurophysiological symptoms that indicate variability in the excitability and coherence of the autonomic nervous system as a symptom of an emotional state. This is the latest element. Magnetic Brain Imaging (MEG), Positron Emission Tomography (PET), Electroencephalography (EEG), Measurements, Electrocardiography and EDA were performed by combining various devices to improve neuroaesthetic cognition research (Cocagna, et al. 2020). The approaches of neuroaesthetic studies are well established in the above-cited canvas; moreover, these methods are viably used by the researcher to map the beauty-centred correlative experiences in the brain.

## **Art and Neural Response in Brain**

The last decades have seen a systematic effort to incorporate aesthetic appreciation into its neural correlations. Neuroaesthetics is an evolving field of research in cognitive neuroscience aimed at studying the mechanisms and neural basis of aesthetic experience (Chatterjee and Vartanian 2014, Nadal and Skov 2015, Pelowski et al. 2017). Nadal and Pearce (2011) provide a more detailed definition of neuroaesthetics when studying the neural and evolutionary basis of the cognitive and emotional processes involved



when an individual (Western or non-Western) adopts an aesthetic or artistic approach to work. Art therefore meta-analysis conducted by Bokia et al. 2016 found that aesthetic decisions regarding visual artefacts are mediated by clusters of activity in a broad bilateral network of brain areas extending from the vocal lobes to the frontal lobes. Specific class activation was also observed (especially in the ventral visual stream) based on different categories of considered artwork (Boccia et al. 2016, Vartanian and Skov, 2014). Neurocognitive mechanisms that mediate visual aesthetic evaluation for different stimulus classes (body-face images). The first review looked at studies exploring the ventral and dorsal visual pathways (such as the V5 / MT lateral occipital complex and the extra-right area of the body sensitive to the movement of the posterior parietal cortex). To evaluate their role in aesthetic assessment TMS and tDCS studies focused on primitive and motor regions as well as other areas involved in the processing of body and facial expressions (such as temporal upper sulcus and somatosensory cortex). The area chosen for best image search by operating magnetic resonance imaging (fMRI) is the para hippocampus gyrus (PHG) or adjacent lateral cord (CoS). This area is called the para-hippocampal region (PPA Epstein and Kanwisher 1998) when better-detected discrepancies between isolated images. Many studies have reported an increase in activity in or near the PPA at the preferential stage but the evidence does not support it. Another reported more activity in the right but not left PPA for preferential-non-preferred (mixed indoor-outdoor). Studies of spectacles showed an increased activity in the fusiform gyrus (Ishizu and Zeki, 2014) with increased PHG over a large portion of the ventral occipital temporal cortex (VOT) at the base of the hippocampus. Local activation was not clear as the selector effect was not compared to PPA. Most research aims to identify neurones in aesthetic diagnostic centres in the brains supply chain. The mesolimbic dopamine pathway which includes dopaminergic projections from the taginal abdominal area (VTA) to the nucleus (NAc) is the backbone of the brains transmission pathway. When a positive attitude or stimulus is created this rewards via activation increases which creates an enjoyable rewarding

experience. Predictions from VTA to the amygdala hippocampal cortex of the individual prefrontal cortex (PFC) are also included in reward development and behavioral improvement (Ikemoto, 2007). The visual artists often produce recreations of the visual world, a unique trait to their medium. Art, as a visual representation of reality, is incredibly useful to neuroaesthetics, because it encourages artists to discover new techniques to enhance the representation. At the point of connective context, V. S Ramachandran claims to have discovered “the key to understanding what art really is”. He also calls this key “universal rule or ‘deep structure’, underlying all artistic experience” and “a common denominator underlying all types of art”. The purpose of art, surely, is not merely to depict or represent reality for that can be accomplished very easily with a camera but to enhance, transcend, or indeed even to distort reality. What the artist tries to do (either consciously or unconsciously) is to not only capture the essence of something but also to amplify it in order to more powerfully activate the same neural mechanisms that would be activated by the original object (Ramachandran, 1999). According to Ramachandran “the original object” means the object represented by an artist, his hypothesis is that the works of art we enjoy activate the neural mechanisms that are normally activated when we see the kinds of objects which they represent, but they activate these mechanisms more powerfully. For the sense of understanding the logic, he explained with caricature to Lord *Parvati's* sculpture. The *Goddess Parvati* sculpture, which conveys the essence of feminine sensuality, poise, charm, and dignity. How does the artist achieve this? A first-pass answer is that he has subtracted the average male form from the average female form and amplified the difference. The net result is a woman with exaggerated breasts and hips and an attenuated hourglass waist: slender yet voluptuous. In contrast, Indian art is not only this slight erotic imbibe we have great tradition of art and sculpture our aesthetic has infinite invisible sense of appeal to attract spectators which not yet explore in Indian scientific context. Recent studies are vibrant to trace the intermediation and the relative neural network contemplation and the aesthetic determination in human brain.



## Conclusion

Aesthetics of art is universal, on the Indian subcontinent, sculpture seems to have been the favoured medium of artistic expression. The expression in the aesthetic sense is explained and experienced in multiple way, different studies ponder the beauty and its creative constraint. But how the beauty of Indian sculpture's experience in the human brain is a challenging task. Because beauty is deeply encoded in the brain, and that external stimulation can cause a series of changes in the cerebral cortex. In-depth exploration of the neurological mechanisms of aesthetics will help uncover the mystery of beauty is very challenging task in the Indian scientific context. Semi Zeki, V. S. Ramachandran and Anjan Chatterji narrate the aesthetic experience in the intellectual context. During the aesthetic experience of art, right anterior insula is activated and that different parts of the orbitofrontal cortex are occupied in different types of aesthetic experiences and also find different area in the brain respond vigorously while experience the aesthetics of sculpture. Perhaps, the beauty of Indian sculpture and its neuroaesthetic are discussed very limited, however the nature of neuroaesthetic response has long been debated by scientist philosopher and scholar but the exact logical contemplation and the relative brain mechanism towards the aesthetic is remains elusive.

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