

## Chapter 3

# A Study on the Interface Between Arts and Sciences: Neuroesthetics and Cognitive Neuroscience of Art

**Alexandre Siqueira de Freitas**  
*Universidade Federal do Sul da Bahia, Brazil*

### ABSTRACT

*This chapter discusses issues related to two fields of knowledge: neuroesthetics and cognitive neuroscience of art. These two fields represent areas that link historically dichotomic instances: nature and culture. In the first section, the author introduces a brief discussion on this dichotomy, reified here as science and art/aesthetics. Based on a preliminary analysis of these fields, as well as potential interfaces and articulations, the author then situates neuroesthetics and cognitive science of art. In both cases, the main definitions, usual criticisms, and comments on potential expectations regarding the future of these two areas will be presented.*

### INTRODUCTION

Arts and sciences are, in their most basic senses, “two great engines of culture”, as coined by Stephen Wilson (2002, p. 5). According to Wilson, they consist of *stimuli*, sources of creativity and identity marks. However, the ways through which these engines converge, diverge, and sometimes merge present substantial and complex issues. Even though it’s possible to trace analogies (this is our intent here), relating the creative processes from both terrains (arts and sciences) or the visual aspects of its products, some qualities attributed to each field often seem to remain distinct.

In order to propose a brief illustration, the author would like to recuperate the term “engine”, used by Wilson. On one hand, we have an art object whose movement of axes, gear wheels and clock hands are the main attraction to its public. On the other hand, we have an engine that presents the exact same components, but, in this case, the public’s main interest is focused on the movement of clock hands, that indicate time. These two pictures are, at once, similar and distinct. Regarding their semantic values

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and cultural symbolism, they are quantitatively identical and qualitatively different. The first object is primarily aesthetical and ideally gratuitous, if we think from a Kantian perspective. The second one, by its turn, belongs to a primarily cognitive sphere, from all the scientific fields. However, both objects present, to varying degrees, aesthetic and cognitive elements. This example unveils some of the potential tensions and ways through which one might notice the divergences and convergences between art and science products.

In order to raise epistemological questions related to fields of knowledge focused on art and sciences – neuroesthetics and cognitive neuroscience of art –, the author believes it's important to analyze, even if briefly, the duality between arts and sciences, including thoughts on aesthetics, a central issue to the subject discussed here. These “two cultures” divided by an abyss of mutual incomprehension – as C. P. Snow (1990) presented the dichotomy between sciences and humanities in 1954 –, unveil, at the present day, signs of change in this landscape. These signs consist of small cracks in humanistic and scientific epistemologic structures, in their modern conception. Cracks that may indicate major ruptures, future transformations. And they tend to get more and more intense in our current historic moment, which some would call postmodernity. Therefore, this work aims at discussing these transformations, which are present in certain researches and new theoretical fields. The author will firstly describe some of the elements that were (and still are) used in the construction of fields we call science, arts and aesthetics – all of them embedded with signification and history. Secondly, the author will address the neuroesthetics and the cognitive neuroscience of art separately, with a brief history of each, critiques and expectations.

## **BACKGROUND: SCIENCE, ART AND AESTHETICS**

Science, as we know it today, bears great expectations about “how” and “why” general *phenomena* occur. It's primarily focused on the cognition of the “natural world” and reflects the necessity of extracting order structures from a vast, chaotic background from time to time. According to Júlio Plaza (2003, p. 38), influenced by Ortega's ideas, knowledge is the mental effort that extracts information, or language, from disorder. Plaza also argues that in order to actually know something we must reach its very “being”. This “being” is not achieved through perception, but through an intellectual model. The production of knowledge is thus the construction of intellectual models that results from a work process based on complex information (Srouf *apud* Plaza, 2003, p. 38). Scientific knowledge is grounded on the faith in empirical information, with which scientists usually create massive theoretical structures to link observation and reality (Wilson, 2001, p. 19). Science pursues ways of effectively acting upon reality and, therefore, “builds conceptual models or representations that reflect, with some isomorphy, aspects of the world's objective organization” (Vieira, 2006, p. 48).

We are facing, now, one of the great pillars of science: objectivity. In its core resides a cumulative expansion movement driven by the specificities of the operations that guide observation. Concepts, principles, and codes are combined in the quest for “objective and universal truths”, as defined by neuroscientist Jean-Pierre Changeux (2013, p. 97). Even though the history of science proves these truths are transitory, the driving forces behind scientific knowledge are not as dynamic as common sense believes – maybe due to the troubled distinction between science and technology (which is not the purpose of this work). According to Thomas Kuhn's classic and essential *The Structure of Scientific Revolutions* (1962), even truths, or better yet, scientific paradigms, are constantly changing. Such paradigms, models created to address the biggest number of observations in inside a coherent landscape, suffer the tension

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