

Neuroscience and Art: The Neurocultural Landscape

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Summary

Neuroscience and Art: The Neurocultural Landscape is focused on how understanding ourselves as humans is incomplete without considering both biological and cultural aspects. Using the neurocultural perspective, the book explores how everything in the world is filtered back and forth through the brain and culture. The thrust of the book, therefore, is to explore the power of art in creating a bridge between cultural and neuroscientific lines of inquiry. Looking at both clinical and non-clinical populations, the text examines historical foundations, distinguishes congenital/developmental conditions from those that are acquired, and emphasizes how the brain constructs our sensory experiences.

Several distinctive features separate this research from other publications. First, the book opens with a review of how the historical literature is still etched into the ideas we employ to explain elements across the interdisciplinary fields of art, aesthetics, our sensory experience, psychology, cognition, and well-being. Second, the research adopts a humanistic rather than a philosophical or social science perspective in demonstrating the value of coupling anatomy and physiology with the natural and social environment. In this, artists from all genres are incorporated. Among them are Iris Murdoch, Ludwig van Beethoven, Leonardo da Vinci, Cristoforo de Predis, Rembrandt, Federico Fellini, Chuck Close, and David Hockney.

Case studies demonstrate how neuroscientific research meshes with art, individual, and cultural variables in ways that range from health and well-being to physiological decline and biological traumas. These include a case study that examines how Oliver Sacks combined biology and biography in his writings. It also explores art projects in several genres inspired by his studies. Another case study is on the role of film as a useful clinical tool. Here the book also demonstrates that cinematic devices used by filmmakers intersect with perceptual and cognitive neuroscience.

A defining feature of the analysis is the integration of research on brain injuries with humanistic responses in film, literature, and the visual arts. This section outlines the lack of consensus regarding the causes and treatment of “shell shock” in World War I before introducing how research and art now work with PTSD/TBI.

Finally, the book examines therapeutic cases of professional and non-professional artists, concluding with a discussion of synesthesia and the senses.

Chapter Abstracts

Chapter 1: Historical Neuroculture

Understanding who we are as humans is incomplete without considering both biological and cultural terms, or neuroculture. This chapter and the next examine the historical foundations of contemporary views, showing how our understanding of anatomy, brain function, sensory input evaluation, and higher-order functions have changed over the course of time. Looking at historical material allows us to identify assumptions that became implicit and how they were initially interwoven into the cultural fabric before they were superseded as new knowledge emerged. This kind of comparative analysis also allows us to better comprehend current understandings of brain functions, brain injury, sensory modalities, brain plasticity, and the brain/culture exchange. A key variable here is that it was not always understood that the brain constructs our sensory experiences.

Chapter 2: Early Experimentation, Theories, and Applications

This chapter, like the previous chapter, examines historical foundations of contemporary views, showing how our understanding of anatomy, brain function, sensory input evaluation, and higher-order functions have changed over the course of time. Looking at historical material in terms of experiment, theory, and applications further allows us to comprehend current understandings of brain functions, brain injury, sensory modalities, brain plasticity, and the brain/culture exchange. A key variable here is that it was not always understood that the brain constructs our sensory experiences.

Chapter 3: Biological and Genetic Perspectives

The emphasis on biological and genetic perspectives in this chapter is intended to underscore the complexity of brain development. The next chapter explores complexity in terms of social and environmental modifications. As both chapters point out, these are not separate topics in individual lives. Individuals who are going to thrive despite genetic, congenital, and developmental conditions require social and environmental responses that meet their needs. Similarly, although an acquired condition is clearly biological and possibly related to genetics or environmental factors, it often creates a social rupture that distinguishes it from a condition one knows from birth and infancy. These topics are expanded on throughout the book.

Chapter 4: Social and Environmental Modifications: Dynamics of Change

This chapter emphasizes cases with acquired disorders, neuroatypical conditions, and adaptations later in life that change one's relationship to society and one's environment. In underscoring the complexity of brain development, it expands on the discussion of genetic and biological perspective presented in the last chapter. As both chapters point out, these are not separate topics in individual lives. Individuals who are going to thrive despite genetic, congenital, developmental conditions require social and environmental responses that meet their needs. Similarly, although an acquired condition is clearly biological and possibly related to genetics or environmental factors, it often creates a social rupture that distinguishes it from a condition one knows from birth and infancy. Case studies in this chapter include the musician/composers Ludwig van Beethoven, Maurice Ravel, Paul Wittgenstein; the painter Kurt Schwitters; the color-blind painter Jonathan Isaacs; the National Deaf Theater (NFD); the rock group Beethoven's Nightmare; and others.

Chapter 5: A Luminous Presence: Iris Murdoch

A case study of novelist/philosopher Iris Murdoch (1919–1999) is introduced in this chapter as an exemplar for bringing art, culture, and the neurosciences together. Her medical profile included the hearing loss that she initially noticed around age 35, as well as the onset of Alzheimer's disease in her seventies. Studies of her brain degeneration after her death were correlated with the syntax in handwritten manuscripts she penned for her novels over the course of her career. Her health, cultural contributions, and biography emphasize the complexity of human experience. Her academic writings also aid in offering more perspective on the historical linkages among neuroscience, the arts, and neuroculture discussed in earlier chapters.

Chapter 6: Biography and Biology: Oliver Sacks

The name Oliver Sacks (1933–2015) became a household word after he published his book *Awakenings* in 1973. This chapter introduces him as a doctor, a writer, and a neurologist who reported on his own neurological conditions. Like the previous chapter on Iris Murdoch, this chapter emphasizes the value of case studies, a methodology Sacks used to introduce his patients as more than their pathologies. This approach is also a core aim of this book. As this chapter demonstrates, Dr. Sacks' case studies allowed him to distinguish between studying neurological disturbance in terms of how the nervous system is organized and learning from the

actual people who were struggling to adapt and survive. Particular attention is given to four of his works: (1) *Migraine: The Evolution of a Common Disorder*, published in 1970, was released at the beginning his career. (2) *Awakenings*, published in 1973, made him a worldwide figure. (3) *A Leg to Stand On* (1984), a more personal book, tells of an accident Sacks had in Norway that resulted in a disturbance of proprioception and how music proved therapeutic. (4) “The Man Who Mistook His Wife for a Hat,” published in 1985, was originally presented as a case involving agnosias. The autopsy showed atypical Alzheimer’s disease.

Chapter 7: Neuroculture and Image Technology

In the nineteenth century, photography, moving images, and X-rays impacted popular culture, art, and therapeutics while also advancing studies of physiology and living systems. How these new modalities, particularly film, radically altered the neurocultural landscape is the subject of this chapter. One reason to examine technological developments neuroculturally is that each showed that the brain is creatively involved in activities that alter the world, art, and culture. Another, in neuroscientific terms, is that just as earlier adjustments to our knowledge base furthered our grasp of physiological functions but did not completely replace the value of engaging with gross anatomy and individuals, these new technologies advanced our knowledge base and cultural possibilities without fully replacing earlier methods for exploring the human brain, psychology, art, and culture.

Chapter 8: War and Art: Brain Injuries, Trauma, and Empathy

Because the activities of war are interwoven with all aspects of human life, combat has a unique position neuroculturally. Wars stimulate medical advancements, create a need for therapeutics, and foster a range of artistic reactions, such as the trauma evident in Picasso’s *Guernica*, a cry against war. All of these subjects are discussed in this chapter, along with how humanity’s urge to heal, to prevent illness, and to alleviate pain and injury led to the use of neuropsychological rehabilitation strategies in both World War I and World War II. This chapter also examines how the wounds of war bring up a range of behavioral and psychological issues for healers, those who suffer from combat, and those in the culture at large.

Chapter 9: Neurocultural Therapeutics and Applications

This chapter examines how neuroscience and art are interwoven with therapeutics. The emphasis is on applications and strategies that enhance human health and well-being. The initial section introduces a range of approaches that intersect with therapeutics: neurology, psychology, neuropsychology, psychiatry, occupational

therapy, and art therapy. Following this, topics covered include (1) how art therapy and art as a practice differ; (2) case studies that demonstrate artists with brain damage frequently continue to work professionally despite traumas, like stroke, or neurodegenerative conditions, such as dementia; (3) how art practices change after injuries; (4) the benefits of outreach programs in terms of patients, families, and communities; and (5) therapeutic controversies surrounding the use of cochlear implants.

Chapter 10: Translation and Education

What should we make of how dramatically neurological differences and neurological disturbances impact the ways in which we act, think, live, learn, and feel? This is a question that many have wrestled with throughout time. This chapter opens with Jean-Dominique Bauby's *The Diving Bell and the Butterfly*, a book in which he translated his own pathological experience with locked-in syndrome. Julian Schnabel's award-winning commercial film *The Diving Bell and the Butterfly* followed. Translations of stereopsis, strabismus, stroke, dyslexia, and other conditions into art forms are also examined. The benefits of translation and education are further discussed in terms of healing, academic projects, and outreach provided by community centers. All of these cases demonstrate that a translation of a subjective experience into another form opens a gateway for learning and communication.

Chapter 11: Faces and Face Blindness (Prosopagnosia)

Even before written documentation, faces were recorded on material objects, capturing both human behaviors and medical conditions. Some were generic faces and others were historical portraits. Now, photography and digital technologies allow us to capture faces mechanically. Within this, imaging tools have given us access to how a brain may conceptualize faces, although we still do not know precisely how an artist paints a face. Nor do we understand why some people fail to recognize faces. This chapter turns to neurotypical and neuroatypical faces in research, artistic practices, and as a medium of human communication. Topics include a summary of the face historically, research surrounding the inability to decipher faces (prosopagnosia), and the array of ways human faces influence neurocultural perspectives.

Chapter 12: Synesthesia and the Senses

This chapter demonstrates that synesthesia offers a window into our understanding of the human experience and thus serves as a potent lens through which we can

investigate human well-being. It turns to the question of what sensory experiences and documentation related to our senses offer to a neurocultural perspective. Recent analyses have revisited long-standing debates and added scientific analyses to our understanding of this topic and synesthesia. Synesthesia research shows that there are possibly over one hundred forms of synesthesia and that the range of the research includes imprinting as well as epigenetic and environmental factors. Moreover, quantitative studies are enhanced by anecdotal self-reports and artistic projects that communicate the experience. Data from the clinical and nonclinical populations also show that the mix includes lifelong synesthetes as well as those who have lost or acquired synesthesia. The compilation of contemporary and historical research demonstrates that synesthesia speaks to the idea that there is no “typical” human mind, brain, or body. Also emphasized is that synesthetic artwork and metaphors form a large and inspirational overlay to our cultural milieu, giving it a depth of expression that greatly enhances our mutual experiences.

Appendix A: The Mute’s Lament by John Carlin

Appendix B: Dulce et Decorum Est by Wilfred Owen