

Chapter 1

Anxiety, sexuality and dreams are the three pillars upon which psychoanalytic models of the mind are based, yet these phenomena also have a specific place in the domain of neuroscience. Evidence has been provided to demonstrate that anxiety is clearly neurobiologically based in both humans and animals. This position situates it at the intersection of various theoretical models and enables comparative analysis. The activation of the HPA axis represents the fundamental mechanism that generates anxiety. This process encompasses a range of phenomena, from excessive vigilance to the reaction to trauma. In the context of psychoanalysis, the concept of anxiety is only recognised within the field of neuroscience if it is interpreted as a form of signal anxiety. The chapter concludes with a discussion of sexuality and the oneiric, revisiting psychoanalytic theory in light of the new findings of neuropsychanalysis, and exploring lucid dreaming.

Chapter 2

The discovery of mirror neurons has furnished neuroscience with empirical evidence substantiating the view that cognition, in its multifaceted forms, including both performative and representational aspects, is inextricably linked to the sensorimotor system, which is structured around the concept of intentional motor act. The most comprehensive concept that can be derived from the literature on mirror neurons is that experiencing and understanding are part of the same functional mechanism, which could be described as embodied simulation. A debate on mirror neurons has been marked by a number of questions concerning their origins, development, control, correspondence, plasticity, connection to the emotional system and memory, as well as the possibility of their interaction with higher cognitive systems. Psychic abilities involve both 'low-level' and 'high-level' functions of the mind, and research on mirror neurons would show us how we adapt to the emotional state of others.

Chapter 3

A thorough investigation of 'Regions of Interest' (ROIs), i.e. areas of the brain involved in processing bodily sensations, unveils the intricate and complex nature of the geography of the Self. When considering the physical root of sensations, and the complexity with which they are recorded by the brain, it becomes essential to consider the physical root of the Self through which, after many steps, all this reaches our consciousness. It is the consciousness of the Self that manifests our subjectivity to the world. The chapter is a journey within the domains of the Self and its territory. The concept of the Self is no longer regarded as an isolated entity that "resides" in specific regions of the brain, body or mind. Instead, the Self consists of processes that extend beyond the boundaries of the brain and into the external world, continuously including the other-world.

Chapter 4

This chapter builds on the preceding one, exploring the study of intrinsic temporal brain dynamics (INT) and spatial topography in the determinism of the development of the Self and the Other-world. The model under consideration focuses on the spatial and temporal characteristics of the brain that constitute its dynamics and topography, and on how these, in turn, shape the cognitive, affective, and social functions of the brain, including their respective contents. Research findings on DMN circuits and INT substantiate the significance of brain neurodynamics with its intrinsic phrasing, both during the resting state and in the active response phase. The modulation of these circuits is significantly stronger in higher-order transmodal regions than in unimodal regions.

Chapter 5

If we were to place all the pages written on consciousness after Nagel's 1974 work side by side, we would end up with a strip about 200 km long. Therefore, it seems unfeasible to attempt to summarise, synthesise, quote or take a position in a single chapter or paper without inadvertently leaving something or someone out. Moreover, the advent of AI (Artificial Intelligence) – in conjunction with the evolution of AAs (Artificial Agents) furnished with neurocircuits (both artificial and biological) – has given rise to a series of investigations into the nature of consciousness, its location, and the mechanisms through which it emerges. Consequently, the scope of this debate has further expanded. A brief discussion of HOT theory (higher order theory) and research into the neural correlates of consciousness paves the way for a reflection that emphasises the awareness that "experience is impossible without an experiencer". In this chapter, the focus is on the "experimenter".

Chapter 6

The following model of the mind (Predictive Coding) is hereby proposed. This model has already produced a wide and varied body of literature in a relatively short space of time, encompassing not only the field of neuroscience, but also closely related fields such as engineering, cybernetics and AI. The chapter opens with an introduction to complex systems and subsequently moves on to the topic of predictive processing and inferential mind. In this context of mutual interaction between FEP and Markov blanket, a considerable amount of theoretical discussion has emerged regarding the application of predictive inference models in biological and non-biological systems. This chapter offers some reflections that could indicate further steps to be taken in order to continue exploring the fascinating world of mathematics and physics, delving into the workings of complex dynamic systems, both those far from equilibrium and NESS systems.

Chapter 7

Upon activation of a neural circuit, a transient map is generated, wherein nearby and distant elements are selected, with some positioned on a horizontal plane and others on a vertical plane. These elements are components of circuit systems that delineate the geographical features of the mapped territory at that particular juncture. Consequently, these maps embody a dynamic representation that perpetually adapts to the constant fluctuations in inputs and outputs. The mature brain comprises over 100 billion interconnected neurons that form networks responsible for processing information and for the formation of thoughts. Alongside neurons, there is an equally significant number of non-neuronal cells, collectively known as neuroglia. The future of cerebral cytoarchitectural organisation is still an open horizon. The chapter should be regarded as an introduction to understanding how the criteria of form, connection, and modularity all contribute precisely to the functional organisation of the brain.

Chapter 8

The allure of humanism proves challenging to resist, compelling us to perceive every form of life as a "humanoid". In the context of machines endowed with artificial intelligence, the question of life has been expanded to encompass various forms of life, including those produced by engineering. The investigation into 'AI-enabled experiences' is an ongoing endeavour that seeks to delve into the potential for augmenting its intricacy. The chapter sets its sights on an examination of the AI design, its various transformations, and the limits to which it is subject. Furthermore, it considers the transition to a new era, that of the posthuman, precipitated by the advent of the postbiotic.