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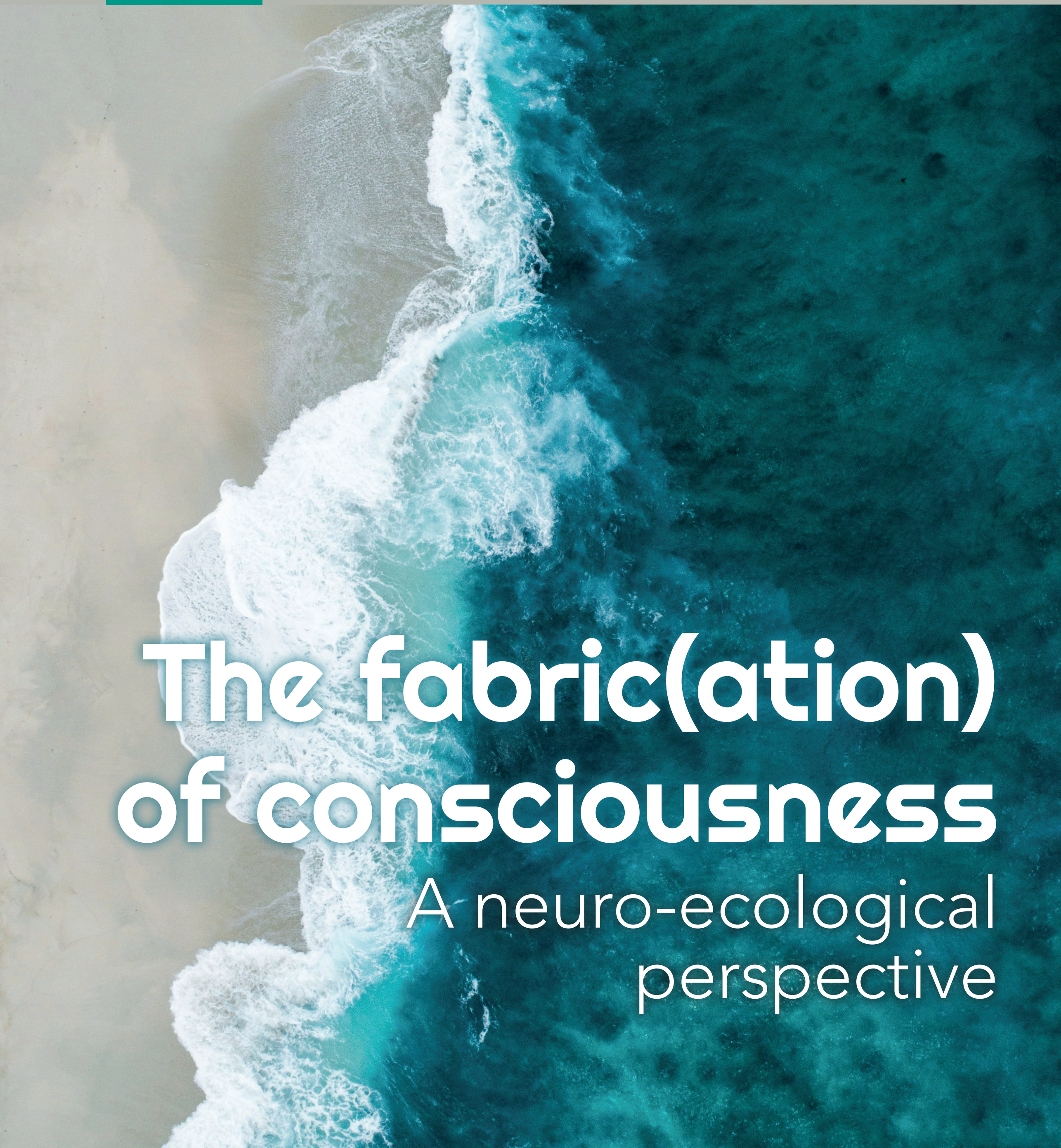

The fabric(ation) of consciousness

A neuro-ecological perspective

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Peer-review declaration

The publisher (AOSIS) endorses the South African 'National Scholarly Book Publishers Forum Best Practice for Peer-Review of Scholarly Books'. The book proposal form was evaluated by our Theological and Religious Studies editorial board. The manuscript underwent an evaluation to compare the level of originality with other published works and was subjected to rigorous two-step peer-review before publication by two technical expert reviewers who did not include the author and were independent of the author, with the identities of the reviewers not revealed to the author. The reviewers were independent of the publisher and author. The publisher shared feedback on the similarity report and the reviewers' inputs with the manuscript's author to improve the manuscript. Where the reviewers recommended revision and improvements, the author responded adequately to such recommendations. The reviewers commented positively on the scholarly merits of the manuscript and recommended that the book be published.

Research justification

'What is consciousness?' is widely regarded as the ultimate scientific question of the 21st century. It concerns the very nature of what it is to be human, what human beings are made of and what kind of creatures we are, and, for many, it also includes the question about what the world is made of. The mystery of consciousness is about the very fabric of the universe. What we take to be human has far-reaching implications for, and is fundamental to, not only our understanding and explanation of religion, ethics, medicine and other cultural practices but also for how we live and order our societies, how we treat other animals and how we think about life.

However, there is no agreement on precisely what consciousness is, where to find it or how to study it. In fact, there is a growing concern about both the ontology and concepts of consciousness, and this domain of research is characterised by the proliferation of concepts and theories of consciousness. Three incommensurable research traditions can be identified in the literature and are referred to as mainstream neuroscience of consciousness, theories of nonlocal consciousness and a neuro-ecological perspective on consciousness. These can be represented by the common slogans 'you are your brain', 'you are without your brain' and 'becoming you'. It cannot be the case that these can all be true at the same time, and this calls for a critical and constructive engagement. A conceptual analysis of the three research traditions shows that they are built on identifiable sets of theoretical and metaphysical assumptions and present as clear patterns.

Two ideas in this book are completely novel. One is the description of the diversity in consciousness research as constituting a crisis. The second is the development of a neuro-ecological perspective as an alternative to what are argued to be the problematic traditions that are the source of the crisis. The conceptual analysis of consciousness research is based on my own reading of numerous sources and is built on the research results available to scholarship. The identification of a crisis and the development of the neuro-ecological perspective are my own creation. This book contains my own original research, and every sentence taken from another scholar is duly acknowledged.

This book engages with voices from diverse scholarly disciplines on consciousness, which include the neuroscience of consciousness, philosophy of mind, neuropsychology and neuro-anthropology, and it represents a transdisciplinary analysis that participates in all these scholarly discourses, as well as contributes to the interdisciplinary creation of knowledge on consciousness. It participates in the cutting edge of consciousness research with regard to the central question of what consciousness is, but its extensive analysis of the field will be of value to all scholars working in the field of consciousness.

Pieter F Craffert, Biblical and Ancient Studies, School of Humanities, University of South Africa, Pretoria, South Africa; Faculty of Theology and Religion, University of Pretoria, Pretoria, South Africa.

Dedicated to Dr Jacques Kriel, conversation partner on consciousness.

There is no such 'thing' as consciousness.

There are only conscious animals.

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Biographical note

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Abbreviations and acronyms and tables appearing in the text and notes

List of abbreviations and acronyms

4E	embodied, embedded, enacted, extended
4EA	embodied, embedded, enacted, extended, affective
AI	artificial intelligence
ASC	altered or alternate state of consciousness
ASCs	altered or alternate states of consciousness
AST	Attention Schema Theory
BRAC	basic rest–activity cycle
DMC	difference makers of consciousness
DMR	difference-making relation
DMRs	difference-making relations
EEG	electroencephalogram
EM	electromagnetism
EM ToC	Electromagnetic Theory of Consciousness
ESP	extra-sensory perception
fMRI	functional magnetic resonance imaging
GWT	Global Workspace Theory
HE	higher education
HEI	higher education institution
HEIs	higher education institutions
HPC	hard problem of consciousness
HOT	Higher-Order Theory
HOTs	Higher-Order Theories
IIT	Integrated Information Theory (of consciousness)
NCC	neural correlates of consciousness
NDE	near-death experience
NDEs	near-death experiences
NDErs	near-death experiencers
NMDA	N-methyl-D-aspartate
NOE	nonordinary experience
NOEs	nonordinary experiences
NREM	nonrapid eye movement

NRF	National Research Foundation
OBE	out-of-body experience
OBEs	out-of-body experiences
REM	rapid eye movement
RPT	Recurrent Processing Theory
SOMA	Self-organising Metarepresentational Account
ToM	theory of mind
TTC	Temporospatial Theory of Consciousness
Unisa	University of South Africa
UP	University of Pretoria

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Preface

This research started as a chapter in a book on altered states of consciousness (ASCs). If an ASC is a *state of consciousness*, what does the 'C' in 'ASC' refer to? What is the 'consciousness' that is altered in ASCs, and by extension, what is *consciousness* in any *state of consciousness*? 'Consciousness' is widely regarded as the ultimate scientific challenge of the 21st century. It concerns the very nature of what it is to be human and what human beings are made of, and, for many, it also includes the question as to what the world is made of, whether it consists of one or more substances. The *mystery of consciousness* is about the very fabric of the universe.

What started as an investigation into the fabric (nature) of consciousness turned into a study of the scholarly fabrications of many different consciousnesses; what started as a study of different theories of consciousness turned into the discovery of many different concepts and phenomena being labelled 'consciousness'. Three popular slogans about the nature of being human, *you are your brain*, *you are without your brain* and *becoming you*, represent three distinct traditions made up of different configurations of nested assumptions that dominate the current landscape of consciousness research. It cannot be the case that all three are true at the same time. If theories of consciousness tell us what it is to be human, there should be some concern if such diverse notions emerge regarding what it is to be human. Taken together, these point towards a crisis. The *crisis* is not only that there are different concepts of consciousness being treated as the same but that different theories and concepts of consciousness are not even about the same phenomenon. Progress in consciousness research is not possible without dealing with the crisis in consciousness research.

This book maps the search for the 'C' in three different research trajectories and offers a critical analysis of their nested theories and assumptions. Given the current dominance of the neurosciences in consciousness research, as well as the advances and impressive findings over the last few decades in neuroscientific research, it was a natural place to start to clarify the 'C'. However, what started as a simple search for 'consciousness' in the neuroscience of consciousness turned into a journey of several years with several significant discoveries and insights about what

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is called ‘consciousness’. I am not a neuroscientist but a scholar of (the neuroscience of) consciousness.

Instead of an agreed-upon concept and competing theories of consciousness, today, there are many different concepts and theories of consciousness, but they are not about the same phenomenon. A study of *different theories* of consciousness in what is called *mainstream neuroscience of consciousness* soon turned into the identification of theories of *different phenomena* being called ‘consciousness’. The word ‘consciousness’, which, to begin with, is a complex cultural concept that refers to a complex neurobiocultural phenomenon, has many different meanings and referents. The same word is being used for many different concepts.

Two clearly identifiable research traditions with completely different concepts and theories of consciousness exist in direct opposition to mainstream neuroscience of consciousness. *Theories of nonlocal consciousness* grew in direct opposition to mainstream neuroscience of consciousness, but inadvertently, as its flip side, with two notable exceptions: these theories are not brain-based (not neurocentric) and propose nonlocal consciousness as a new or nonmaterialist entity in the world. Compared to both mainstream and nonlocal theories of consciousness, bio-neuro-ecological theories of consciousness fall on the opposite side of a whole range of fault lines and consequently fabricate completely different notions of consciousness. They depart from the phenomenology of consciousness and present consciousness as a multiplex neuro-ecological process and not a thing in the world.

A journey that started with the intention of describing the ‘C’ turned into a critical analysis of different research traditions and their nested assumptions on consciousness. It resulted in a third-person perspective on consciousness research as a critical analysis of the nested theoretical assumptions underneath each of these research traditions and not just a description or summary of what proponents themselves say. The different research traditions not only represent different theories of consciousness but also theories about different things being called consciousness.

Introduction

Understanding the mystery of consciousness goes to the heart of the human condition. Consciousness is what makes us human and understanding its nature is to know what it is to be human and what the world is like. Consciousness does not make us special among the animals, but human consciousness captures the essence of our being as animals. What we take to be human has far-reaching implications for and is fundamental not only to our understanding and explanation of religion, ethics, medicine, and other cultural practices but also for how we live and order our societies, how we treat other animals and how we think about life and death.

However, in consciousness research, there is widespread agreement on three things only. Firstly, there is agreement on the significance of solving the mystery of consciousness, which goes to the heart of what it is to be human. Secondly, consciousness is regarded as the last surviving scientific mystery of the 21st century, and many see on the horizon a Nobel Prize for solving it (see e.g. Koch 2019, loc 2039; Miller 2005, p. 79).[1] Thirdly, despite all of this, there is as yet no agreement on what that mystery is. There is no agreement on precisely what consciousness is, where to find it or how

1. This sentiment arose already with the first proponents of the so-called consciousness revolution: 'The explanation of consciousness is one of the major unsolved problems of modern science. After several thousand years of speculation, it would be very gratifying to find an answer to it' (Crick & Koch 1998, p. 105). The implicit argument is that philosophers speculated, but the sciences will give the answer.

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to study it. In fact, there is a growing concern about both the ontology and concepts of consciousness. It is the contention of this study that consciousness research is in a crisis.

Unlike most other research areas where mistaken theories are abandoned or eventually replaced, theories of consciousness, even when mistaken, impact human life in profound ways. From ancient soul theories of consciousness to modern brain theories of the self, their impact on social, religious, and individual life is remarkably clear.

Clarifying three concepts in the book

Three terms are central to the argument of this book.

Firstly, the key term *neuro-ecological* refers to an emerging perspective in the neuroscience of consciousness. The term 'perspective' suggests that there are also other perspectives in consciousness research. In fact, at least three research traditions, to be referred to as *mainstream neuroscience of consciousness*, *theories of nonlocal consciousness* and a *neuro-ecological perspective on consciousness*, can be identified that represent distinct and incommensurable interpretive traditions that are based on different sets of theoretical assumptions.

Neuro-ecological brings together the insights of the neurosciences and the phenomenology of human experience of consciousness with an alternative way of examining, understanding and explaining consciousness as a body–mind–environment complex. In this study, it serves as the theoretical benchmark for presenting and evaluating consciousness research.

Secondly, the term *crisis* suggests that the scholarly disagreements in current consciousness research contain more than the usual variation of opinion and contest of theories about the same phenomenon but have developed into divergent concepts and theories about different phenomena. I am neither the first nor the only one to claim that there are serious problems in consciousness research in that the term does not have a single meaning; it is used for different phenomena, and theories of consciousness are not about the same thing. The dilemma is evident in the popular slogans used to describe consciousness. It cannot be the case that *you are your brain*, *you are without your brain* and *becoming you* can all be true at the same time. As a reflection of current consciousness research, these slogans point towards the problem that the term refers to incommensurable explananda and ontologies. 'Consciousness' cannot be an entity generated by the brain, a special feature of matter and a biological process all at once. The mystery (often called the *problem* or *puzzle*) of consciousness is variably conceptualised, from a biological to an informational or a material phenomenon of some sort. The contribution of this study is to emphasise that this state of affairs constitutes a crisis and to show the extent and depth of the crisis. No progress in consciousness research is possible without confronting this problem head-on. Put differently, progress in consciousness research is an illusion if theories of consciousness are about different explananda. The success in substantiating the claim of a *crisis* depends on the detail of the critical analysis in the rest of the book.

Thirdly, the term ‘fabric(ation)’ suggests a close relationship and, in fact, a mutual interaction between what is claimed to be the nature (the ‘fabric’) and the theories (‘fabrication’) of consciousness. Both terms are loaded and carry dual meanings. On the one hand, there is the fabric and fabrication of consciousness as a feature of human beings. Traditionally, it is a word used to describe an essential feature of what makes us human. ‘Consciousness’ is the word used to describe certain features of the human organism (*awareness* and *awakeness*) and is closely related to the ‘self’, and on all accounts, it consists of a certain ‘fabric’.

However, depending on perspective and scholarly theories, it can be a feature of the brain (or parts of it), of the human organism or of matter itself. Thus, on the other hand, the fabric of consciousness depends on its fabrication, the scholarly gaze on what is taken to be consciousness. What is taken as the very fabric of consciousness is differently fabricated depending on the scholarly gaze. Thus, the term ‘consciousness’ is as much the product of its natural as its scholarly fabrication; it is first and foremost a feature of living (human) organisms but also the positive knowledge about that ‘entity’. In this sense, the fabric and fabrication are mutually interdependent because what consciousness is depends not only on its fabric but also on its fabrication. In each of its fabrications, some kind of fabric is postulated. And there is no agreement on the fabric of consciousness, as there are diverse research traditions with incommensurable fabrications. Disagreement about the mystery of consciousness results in the fabrication of distinct phenomena *as consciousness*.

One of the findings of a critical analysis of consciousness research is that there are not only many different theories about consciousness, but so-called theories of consciousness are about different phenomena altogether, and thus the term has different meanings. Thus, neither the fabric (nature) nor the fabrication of consciousness (in the dual sense of producing it and explaining it in scholarly theories) display a unified field. The term ‘consciousness’ does not only lack a single meaning, but very different concepts are treated as the same, and this, the suggestion is, constitutes a crisis.

The aim of the book

The aim of the book is a critical analysis of contemporary consciousness research with a twofold objective: firstly, highlighting and explaining the extent of the crisis in consciousness research, and secondly, offering the solution of a neuro-ecological perspective. This suggests the term *critical* is itself used in a dual sense. It is critical in the sense of placing contemporary research on consciousness under an analytical and comparative spotlight to identify the underlying nested theoretical assumptions. To use a phrase that is common in the neuroscience of consciousness, it provides a third-person perspective on consciousness studies themselves. That means it will not just echo what scholars are saying but place their fabrication of consciousness in a critical gaze.

The second meaning of *critical* is evaluative. Consciousness research is not only described but analysed as to the underlying assumptions, theories and perspectives, and these presuppose a comparative perspective. The suggestion of this study is that a neuro-ecological perspective provides such a yardstick.

Historically, the neuro-ecological perspective is the latest development in the theoretical history of consciousness research, but, at the same time, the perspective to be employed in the critical analysis. The storyline of consciousness research will keep to the historical development, but it should be kept in mind that the critical analyses are carried out with the neuro-ecological perspective in mind. Put differently, it is from the theoretical insights of a neuro-ecological perspective that the critical tools emerge to analyse current consciousness research. As suggested above, the crisis is literally *man-made* (neuroscientists are mostly male) in that the scholarly fabrication is proliferating concepts and theories of consciousness that are no longer in touch with the human experience (the fabric) of consciousness, and this insight follows precisely from the nested theoretical assumptions of the neuro-ecological perspective.

Thus, this book is not, in the first instance, a direct investigation of human consciousness itself (as humans are the only creatures we know for certain to be conscious) but of the scholarly fabrications of consciousness. It is more about the scholarly answers given to the question of what 'consciousness' is and what it is about than analysing (human) consciousness itself. The focus is on the scholarly fabrications of how humans allegedly fabricate consciousness, and it is from the scholarly fabrications of consciousness that its fabric emerges.

Very little of what is presented here is not yet out there in the research domain. An acknowledgement of the lack of agreement on the concept of consciousness; the proliferation of concepts and theories of consciousness that have little to do with human or animal consciousness; the reaction against the reductionisms in mainstream neuroscience of consciousness; and a return to consciousness as a biological phenomenon are well-known. However, this does not prevent the proliferation of theories and concepts of consciousness as if they share agreed-upon notions.

The term *neuro-ecological* is, as far as I know, my own, but it is based on the theoretical insights of various scholars who argue for an embodied and enacted view of consciousness. The *neuro* is deliberately added to *ecological* (which originated from scholars in embodied and enacted circles who talk about an *ecological model* of consciousness that stands opposed to *sandwich models* – see Fuchs 2018, pp. 127, 134) and emphasises that a neuro-ecological perspective takes seriously the importance of the brain in the complexity of consciousness as a multiplex phenomenon. What is new is putting all of this together in a comparative manner to present consciousness research as a *crisis* to be overcome.

While cultural factors, such as a tendency for cultural relativism that promotes mutual respect but inadvertently avoids critical engagement, might play a role in the toleration of diverse concepts as if they are the same, the acknowledgement of a crisis could be the way to promote the advancement of consciousness research. An acknowledgment of the crisis, instead of the proliferation of concepts and theories of consciousness as if they are about the same explananda, is a better way to advance consciousness research. The future of consciousness research lies not in the proliferation of more theories claiming to be about consciousness but in recovering the complexity of the phenomenon in need of theorising. In short, the suggestion is that the fabric of consciousness should be determined more by its natural than by its scholarly fabrications.

The logic and outline of the book

The internal structure and logic of the book are simple, while the details and presentation are less so. The logic consists of the following arguments.

The first is setting out a case for a crisis in consciousness research. It is based on scholarly views that identify either conceptual or ontological factors.

The second is that the *fabric* of consciousness (in consciousness research) depends on both its natural occurrence and on its scholarly fabrication; 'consciousness' is bodily as well as scholarly fabricated.

The third is that the fabrication of consciousness is carried out by means of three distinct interpretive traditions that can be identified by means of the three slogans used above: *you are your brain*, *you are without your* *brain* and *becoming you*. The three interpretive traditions are *mainstream neuroscience of consciousness*, *nonlocal theories of consciousness* and a *neuro-ecological perspective on consciousness*.[2]

The fourth argument is that these interpretive traditions are constituted (and separated from one another) based on clearly identifiable sets of nested assumptions. These sets of nested assumptions are described by means of the following components:

- four fundamental fault lines (consciousness as an entity or a process, as a [neuro]biological or a nonbiological phenomenon, as a feature of brains or of organisms and as unidimensional or multidimensional phenomena)
- two distinct sets of theoretical frameworks (a binary or a nonbinary theoretical framework)
- distinct brain models and notions of how the brain works.

The book consists of four major parts, with a final concluding chapter seeking to bring all the strings together.

Part 1 contains a justification of the claim of a crisis in consciousness research, supplemented by a brief overview of the most important reasons for it. An explanation of these reasons will simultaneously serve as the parameters to map the different research traditions in current consciousness research.

The critical analysis and comparison of the distinct traditions in consciousness research presupposes a theoretical framework for comparison. There is a fine line between the manifestation of consciousness research and the theoretical frameworks from which they emerge. The detailed characteristics of each tradition will be given in the subsequent parts. The challenge in Part 1 is an exposition of the theoretical framework in terms of which a critical analysis and comparison can be done. The fabric(ation) of consciousness is subject to various brain models and theories, broader theoretical frameworks and ontological assumptions.

Chapter 1 consists of a justification that there is indeed a crisis in consciousness research. I am not the first to highlight the problems, but bringing the different lines of criticism together as a crisis is a novel claim. Chapter 2 deals with the fact that consciousness is a complex cultural concept, and Chapter 3 deals with consciousness as a multiplex

2. As with consciousness research in general, within the domain of the neuroscience of consciousness there is not a single position but a whole spectrum of theoretical positions. Scholars disagree and present theories with a wide range of features. Many years ago, Varela already provided an overview of theoretical positions within the neuroscience of consciousness (see 1996), while Zeman offers an equally interesting map of consciousness theories (see 2008, pp. 310–313).

bio-neuro-ecological phenomenon. In Chapter 4, the most important theoretical factors, namely the mind–body problem and its binary theoretical framework that dominate consciousness research, will be discussed. Chapter 5 provides an overview of the other important fault lines in consciousness research that underlie the distinct research traditions. Four fundamental fault lines, together with an overview of the brain models and theories in consciousness research, are introduced. Contrary to the impression that consciousness research in general and the *neuroscience of consciousness* in particular is a monolithic enterprise about the same phenomenon, there are clear fault lines in consciousness research that constitute the incommensurable theoretical frameworks.

Part 2 contains a critical analysis and exposition of *mainstream neuroscience of consciousness*. The term refers to the conglomerate of hybrid theories that are linked to the cognitive and consciousness revolutions and are based on shared assumptions about the brain. The cognitive revolution is to be credited not only with the revival of interest in consciousness after many decades of neglect but also with placing consciousness research on the track as a mental phenomenon. After consciousness and other mental aspects were excluded from scientific investigation for the better part of the 20th century, they returned during the cognitive revolution as cognitive categories. The rapid growth in neuroscientific research towards the end of the 20th and beginning of the 21st centuries also focused on consciousness and introduced what is called the consciousness revolution in the neurosciences. A hallmark of this revolution is the reduction of consciousness to some mental function, and in its neurocentric jargon, consciousness can be described with the slogan *you are your brain*.

Within mainstream neuroscience of consciousness, a large variety of neurocentric concepts and theories of consciousness are being produced. Concepts of consciousness that vary from cognition to attention and from affect to information are ascribed to different brain locations in a process that produces more and more incompatible theories of consciousness that are kept together primarily by the claim to be about consciousness. The mereological fallacy (the part–whole conflation) is responsible for the proliferation of not only concepts and theories of components of consciousness as consciousness but even things being called consciousness. All of this is the result of not departing from the question of what consciousness is but claiming what it is based on theorising; theorising about consciousness is different from theorising producing consciousness.

Chapter 6 considers the historical antecedents of consciousness research in the neurosciences. A remarkable feature of the neuroscience of consciousness is that consciousness has never been a central focus or object of study but is engaged in the study of cognition and other mental functions. Therefore, mainstream neuroscience of consciousness can be characterised as cognicentric.

Chapter 7 deals with the brain models and theories of how the brain functions in producing ‘consciousness’ in a mainstream neuroscience of consciousness perspective. While there is no unified or singular notion about the brain or how it works, it is characterised by three prominent features: corticocentrism, neurocentrism and neuroreductionism.

Chapter 8 looks at the search for the neural correlates of consciousness as the one focal point in mainstream neuroscience of consciousness. Brain models and particular concepts of consciousness come together in fabricating claims about the mystery of consciousness.

Chapter 9 takes a critical view of the fabric(ation) of ‘consciousness’. The great variety of ontological theories of what consciousness is, more than anything else, illustrates the crisis when inappropriate categories are employed to deal with complex phenomena.

Chapter 10 deals with the functional and mechanistic theories of consciousness. More theories of consciousness are fabricated in mainstream neuroscience of consciousness than in all other traditions combined. This is not necessarily an indication of a vibrant research tradition but an indication of the crisis.

Part 3 focuses on theories of nonlocal consciousness. While sharing many of the nested assumptions of mainstream neuroscience of consciousness, *theories of nonlocal consciousness* propose that consciousness is a fundamental feature of nature and can thus exist independently from a brain or a body. These theories represent not only a reaction to mainstream neuroscience of consciousness but also a rejection of its conclusions and conceptions. Ironically, it shares many of the basic assumptions, most notably the binary theoretical framework, and in many respects represents just the reverse side of the same coin. This perspective is also producing a variety of theories on consciousness.

Theories of nonlocal consciousness share with mainstream neuroscience of consciousness the research strategy of not engaging consciousness itself but claiming to revolutionise our understanding of consciousness based on the study of other aspects. Again, theorising producing consciousness is different from theorising consciousness itself.

Theories of nonlocal consciousness come in two versions: theories of human or cosmic nonlocal consciousness. In different ways, these theories promote the idea of nonlocal consciousness, and in neurocentric jargon, they go by the slogan *you are without your brain*. Historically, these theories are older than the cognitive and neuroscientific theories, as in many respects, they are a revival of the age-old folk theories based on monistic duality (the inherent experience of ourselves and the world in dualistic terms). Theories of nonlocal consciousness are, in many respects, monistic duality on steroids, so to speak.

Three sources that are often interlinked are used for the fabrication of nonlocal consciousness. One source is philosophical arguments on the idealism side of the popular dual-aspect monism concept. Most prominent here is the revival of panpsychism, which emerges directly from developments in the philosophy of mind and represents developments in the mind–body problem. Panpsychism, as an attempt to explain what consciousness is, results from attempts to answer the brain–mind problem and not from the study of consciousness itself. In fact, it is a revival in the philosophy of mind of the very old notion of animism. These studies do not start with the question of what consciousness is but with how to solve the age-old mind–body problem. It is important to note that the mind–body problem itself (in whichever version) is not in the first instance an investigation into the nature of consciousness but an attempt to address the common-sense mind–body dualism (which is turned into a *problem*). I will explain this below as monistic duality.

The second is the elevation of the first-person perspective and first-person experiences as a source for the fabrication of nonlocal consciousness. It comes in different versions, from anthropological studies of nonordinary experiences or ASCs to the invocation of psi phenomena.

Another kind of theory in this perspective is not only a reaction against the neurocentrism and especially the materialism of mainstream neuroscience of consciousness research but also a return to specific first-person experiences that are taken as paradigmatic for understanding consciousness. These theories primarily depart from the first-person reports on nonordinary experiences.

Chapter 11 focuses on the fabric(ation) of theories of human nonlocal consciousness in the context of nonordinary experiences, in particular, that of near-death experiences (NDEs).

Chapter 12, on theories of cosmic nonlocal consciousness, introduces three examples: notions of panpsychism, dual-aspect monism and what is referred to as the theory of the *cosmic human*.

Chapter 13 contains a third-person critical analysis of the nested theoretical and philosophical assumptions of theories of nonlocal consciousness. Most remarkable is that despite the strong objection to mainstream neuroscience of consciousness, these theories mostly operate within the same theoretical framework as that which they object to.

Most prominent is the binary theoretical framework, with its mind–body problem as the central formulation of the problem of consciousness.

Part 4 introduces the neuro-ecological perspective on consciousness. A neuro-ecological perspective on consciousness is based on what Fuchs calls a 'systemic-biological perspective on the organism' (Fuchs 2018, p. 111) and is concerned with the quest to explain how organisms are conscious.

In contrast to the other two trends, the neuro-ecological perspective emerged some three decades ago as a reaction against the theoretical and philosophical assumptions of mainstream neuroscience of consciousness, and it falls on the other side of the identified fault lines in consciousness research. This perspective is made up of contributories from a variety of disciplinary perspectives that share some common insights: consciousness is a process, not a thing; it is an organismic and not primarily a brain phenomenon; and the biggest question of all is not the mind–body question but how organisms are conscious. In three specific ways, a neuro-ecological theory deviates from the above theories.

Firstly, it does not depart from the prestructured dualism of the mind–brain problem. The problem of consciousness in this perspective is not the relationship between the body, brain, and mind but how certain organisms are conscious. The questions 'what is mindedness?' or 'what is the nature of conscious organisms?' are different from those seeking to explain the relationship between two entities, mind and body (or mind and brain, or the mental and the physical).

Secondly, a neuro-ecological perspective avoids the mereological fallacy of conflating consciousness with one of its mental aspects. Consciousness in a neuro-ecological framework is seen as a multiplex phenomenon that is a feature of living organisms; 'consciousness' is an embodied and enacted phenomenon emerging from the engagement of organisms in the world. In short, consciousness is a more complex phenomenon than what most other theories acknowledge.

Thirdly, it rejects neuroreductionism that limits consciousness to brain processes. Thus, it rejects both the cognicentrism and neurocentrism of mainstream consciousness research and instead describes consciousness as a multiplex phenomenon: multileveled, multidimensional and multifaceted. To be sure, a neuro-ecological perspective does not reject the importance of the brain in concepts of consciousness but resituates it as an organ of translation, to borrow Fuchs's phrase.

In summary, neuro-ecological theories of consciousness deviate from the nested assumptions in these theories and maintain that consciousness is a systems phenomenon related to living organisms and not to brains only.

It was only from the discovery of the neuro-ecological perspective, a revolution in the neuroscientific study of consciousness itself, that I realised it is not only the proliferation of concepts and theories of consciousness in mainstream neuroscience of consciousness that are falling short but that the very nature of those theories suffers from serious shortcomings. The three most prominent insights emerging from this revolution have to do with the re-embodiment of consciousness, a recovery of its (neuro) biological substrate and the rejection of the reification of consciousness that sees it as a thing instead of as a process.

Chapter 14 describes the antecedents and development of the neuro-ecological revolution in four different disciplinary areas that all see consciousness as an embodied and enacted phenomenon that is not located somewhere in the brain or body but is distributed among the brain, body and environment.

Chapter 15 focuses on the fabrication of consciousness based on nested assumptions from three sets of theories. These are the nonbinary theoretical framework, a systems view of reality and a set of brain models and theories that go beyond neurocentrism and localisationism.

Chapter 16 describes the fabric of consciousness as a multiplex phenomenon characterised by consciousness as a biological process and not a thing, an organismic and not a material phenomenon, and it is a distributed ecological phenomenon with a multiplex of dimensions.

Chapter 17 contains a brief introduction to the most significant dimensions of consciousness as a bio-neuro-ecological phenomenon: these are the modes, domains, cycles, levels and states of givenness.

This brief summary of the main research trends in consciousness research supports the claim of a crisis in consciousness research. When scholars set out to solve the *last surviving scientific mystery of the 21st century*, there is no agreement on what the actual mystery is or how to study it. The most remarkable feature is that not even within the above traditions is there an agreement on the nature of consciousness. If there is no common meaning of the word ‘consciousness’, what are solutions to the last scientific mystery solutions of? Not only within the neuroscience of consciousness but also between different traditions, there are disagreements on at least three important issues: what consciousness is, where to find it and how to study it.

The future of ‘consciousness research’ is not in more cooperation and interdisciplinarity but, first and foremost, in conceptual clarity and theoretical sophistication. Put differently, it is not only the solutions to the mystery of consciousness that are being disputed but the very formulation of the mystery itself. The suggestion of this study is that the solution to the mystery of consciousness is to explore the complexity of consciousness as a feature of certain organisms and to promote a neuro-ecological concept of consciousness that is based on bodily views of consciousness; it is first and foremost a feature of certain living organisms and not of brains only.

Part 5 consists of a single chapter in which the lines are pulled together.

PART 1

Consciousness and consciousness research: Complexity and crisis

In consciousness research, there is disagreement not only about the definition and conceptualisation of consciousness but also about the very phenomenon denoted by the term. When looking at the growing list of what shall be called the ‘consciousness is (just)’ definitions or concepts, it is evident that there is no agreement on what consciousness is, where to find it or how to investigate it. An incomplete list of definitions includes *cognition*, *awareness*, *experience*, *awareness of cognition*, *affect*, *feeling*, *when a self-process is added to a mind process*, *a fundamental aspect of nature* and a *process of inference*. Each of these and many more function in theories and definitions of consciousness as the single (and definitive) descriptor of the fabric of consciousness. ‘Consciousness’ is many different things, and consciousness research is extremely diverse.

Both the explanations (theories) and explananda (phenomena) of consciousness are variously conceptualised in the different scholarly fabrications. Consequently, consciousness research is not a monolithic enterprise seeking explanations for the same phenomenon but rather a series of distinct research programmes on different phenomena, all claiming the term ‘consciousness’. The suggestion that this constitutes a crisis will, in this part, be justified by means of five chapters.

Chapter 1 will look at the direct evidence in consciousness research of a widespread dissatisfaction with both the concept and the nature of consciousness. Instead of a healthy and vibrant scholarly discussion, it is rather the case that consciousness research seems paralysed by a form of cultural relativism that tolerates, instead of debating, the sources of the differences.

The sources of and terrain for this crisis are multiple and diverse. On the one hand, ‘consciousness’ is a concept with an intricate historical record and functions as a complex cultural concept. That is the topic of Chapter 2, which will trace some of the significant conceptual developments and constraints that impact consciousness research. The proliferation of concepts is a result of both its complex phenomenological fabric and the history of the fabrication of consciousness in various disciplinary and theoretical settings.

Chapter 3 provides a preliminary overview of the complex nature of the fabric of consciousness under the label of a multiplex composite phenomenon. Historically, consciousness is a word used for being aware and being awake but also for the feature of experience and the awareness of experience, as well as a perspective on all of that; it also has to do with self and subjectivity. But it is not just that the same word is used for different phenomena but that the very thing, consciousness, has many different components; in short, it is a complex composite phenomenon. Consciousness is made up of many different dimensions. The result is that within and between publications, the word 'consciousness' is often used for many distinct mental and organismic phenomena as if they are all about the same *thing*.

What is happening in consciousness research is more than just a display of the expected complexity that results from the conceptual and ontological conditions. It also includes a long history of theoretical and philosophical influences that characterise the fabrication of consciousness. Nothing impacts consciousness research more than the age-old mind–body problem and, as will be argued, its binary theoretical framework. These are the topics introduced in Chapter 4. Very little of what is going on in the specific research traditions on consciousness is understandable without a realisation and acknowledgement of these tacit assumptions. And while they are not part of the actual discussions and presentations of consciousness in current research, the latter cannot be understood without them. They only become visible from a third-person perspective – they are only revealed through a critical analysis of consciousness research.

Such a gaze also reveals that consciousness research is characterised by many fault lines that demarcate this field of research. Some of the fault lines run through views on the fabric of consciousness, while others are the product of the fabrication of consciousness. The result is that identifiable research traditions that fall on either side of these fault lines started to develop. These research traditions are all the product of nested assumptions that are somewhere implicated in these fault lines. Consequently, there are even fault lines within some of these identifiable traditions. These fault lines in consciousness research are the topic of Chapter 5.

Given the background in these sets of factors, it is suggested that there can indeed be a concern about a crisis in consciousness research.

The diversity of views and theories is not merely the healthy disagreements characteristic of academic work but also signs of a real divide in the domain called consciousness research. On all three aspects of the mystery of consciousness, *what it is*, *where it is to be found* and *how it is generated*, there is no agreement, and it is unlikely one will develop. The term does not only lack a single meaning, but very different concepts are treated as the same while theories and definitions of consciousness do not only differ but are about different phenomena altogether. In short, most of consciousness research is not about 'consciousness' but scholarly fabrications called consciousness.

Chapter 1

A crisis in consciousness research

Introduction

The claim that consciousness research is in a crisis can be illustrated by means of three distinct indicators. The first is the growing number of scholars expressing concern with fundamental aspects of consciousness research. The second is the fact that there is no agreement on what the mystery of consciousness is. Despite the widespread agreement on the significance of consciousness, there is no agreement on what the significance is about. The third is that the crisis in consciousness research will be illustrated by means of an issue of growing interest, namely that of animal consciousness.

A reflection on these will set the scene for a critical analysis and description of consciousness and current consciousness research. But first, a word about the significance of consciousness.

The significance of consciousness

The significance of consciousness research is more wide-ranging than many suspect.

Firstly, it is widely accepted that consciousness is a (or even *the*) defining feature of what it is to be human. If we want to understand what makes

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human nature special, if we want to understand the *human condition*, the key lies, Donald (2001, p. 8) says, in 'our capacity for consciousness'.[3] Without beating the drum of human superiority over other species, the known features of human consciousness are a good place to start in describing what makes us human. These include language, culture and our ability to reason, think and reflect about the world and ourselves, but especially self and subjectivity. Unravelling the mystery of consciousness thus has the advantage of not only solving the 'biggest question of all' (Kripal 2019, p. 45) but also illuminating the very essence of what it is to be human. What is at stake here, so to speak, is 'nothing less than the nature of our souls' (Dietrich 2007, p. 9). Making sense of consciousness is making sense of what in previous times was called the 'soul'. Consciousness is what makes us human, and the way in which we understand and conceptualise consciousness is fundamental to what we think it is to be human and how we study human beings.

Secondly, the nature of consciousness is nowhere more pertinent than in the notions of 'person' that are emerging from the different research traditions on consciousness. There is widespread agreement that the reduction of personhood to a soul entity, which characterises much of human history, is no longer viable. But, in current research, there is no agreement on how to conceptualise the human person (being). In mainstream neuroscience of consciousness, the person is reduced to neural processes and mechanisms; in some theories of nonlocal consciousness, the person is elevated to a unique and fundamental entity or substance of nature; and yet, in a neuro-ecological perspective, a person is seen as just a neuro-bio-social agent with desires, intentions, beliefs, interests and emotions. We are because we are conscious, but what we are as conscious beings very much depends on the scholarly fabrications of consciousness. Expressing personhood in slogan terms of the 'self' as arguably an essential component of consciousness, current views vary from *you are an illusion* and *you are your brain* to *you are without your brain* or *becoming you*.

Thirdly, the nature of consciousness is not only central for understanding human life in general but also, as Zeman says, 'what kinds of things and properties does the world contain' (2002, pp. 6–7); or in the words of Dietrich, the question of what the universe is made of (see 2007, p. 7). Does the world contain one or two kinds of substance? Broadly speaking, the study of consciousness deals with the question of whether human beings are made of a single or two (or more) kinds of things and whether the universe has a single or dual structure. Therefore, there is a common

3. The reason is that who we are as persons 'is determined by the nature and content of our mental states' (Glannon 2007, p. 29).

agreement that the mystery of consciousness contains the answer to the quest for human nature as well as the deepest secrets of the nature of reality. And yet, not everybody agrees with such dualistic formulations of the mystery of consciousness.

Fourthly, our understanding of consciousness has many important ramifications in that notions of consciousness impact most human phenomena. Answers to the question of consciousness are fundamental to how we bring up (see Metzinger 2009; Rose & Abi-Rached 2013, p. 202):

> [*O*]ur children, run our schools, organise our societies and structure social policies, how we treat those who commit crimes or are deemed mentally ill, those that are terminally ill or arrive in the world unplanned, how we think about life and death and how we treat animals and our fellow human beings. (p. 213)

This means that the kind of theories about consciousness not only characterise consciousness but reflect on the practices and societies we create based on such theories. This can be illustrated by means of a few examples.

It is nowhere better illustrated than the emergence over the last few decades of what has been called 'brainhood', the 'cerebralization' of personhood to brainhood (Vidal & Ortega 2017, p. 17). As the psychiatrist Thomas Fuchs (2018) points out about the negative impact of such neurobiological concepts of consciousness:

> The neurobiologically informed concept of human beings affects the lifeworld and changes our self-understanding in everyday life. As a result of a gradual process of self-reification we start to see ourselves less as human beings taking decisions based on reason or motives, but rather as agents of our genes, hormones, and neurons. (p. viii)

One of the implications of this notion of consciousness and the human being is that mental illness is being replaced with brain illness, with all the therapeutic and political implications of such a view. How we understand consciousness plays a significant role in how we treat people who suffer from mental illnesses (diseases of consciousness). Another illustration is that understanding the nature of consciousness is important not only in the quest to be human but also in questions about ending the lives of humans, the so-called end-of-life decisions (see e.g. Owen 2013, pp. 125–126).[4] Notions of consciousness in theories of nonlocal consciousness have direct implications for understanding traditional religious beliefs of immortality. Many theories of nonlocal consciousness seek to affirm

4. The implications of adopting brainhood as the dominant descriptor of selfhood result in imagining that states of the brain will establish the beginning and end of life, and personhood can be considered from 'brain life' to 'brain death' (see Vidal & Ortega 2017, p. 37).

traditional religious beliefs, and in various versions of these theories, the old idea of an immaterial soul that continues post-mortem is being replaced with the notion of nonlocal consciousness and claims that bodily death is not the end of consciousness. Instead of the traditional 'soul', consciousness is seen as a nonlocal entity of substance with no natural death.

In summary, the study of consciousness has to do with the very core questions that haunt the study of humanity. Thus, our fabrications of consciousness, whether we have them right or wrong, have consequences.

A growing concern about consciousness research

Despite optimism in some circles that great progress is being made in consciousness studies (see e.g. Block et al. 2014), more and more voices of concern can be heard. The modern concept of consciousness, Fuchs (2018, p. 5) remarks, 'emerged as that of a container, into which everything qualitative and subjective could be inserted'. The warning is clear: without a clear notion of the phenomenon to be explained, little progress can be made, and no meaningful discussion is possible (see Kotchoubey 2022, p. 34). Brown, Lau and LeDoux (2019), who consider the science of consciousness as a vibrant and thriving area of research, however, remark that:

> [*T*]here is no generally accepted theory of the phenomena being studied, and the phenomena themselves often do not include many of the kinds of complex experiences that we normally have in the course of day-to-day life, such as of our emotions and memories. (p. 754)

These remarks point towards a problem both with the concept and the phenomenon. These are not the normal disagreements about theories and results but concerns about the very ontology and conceptualisation of consciousness.

Concerns about the ontology of consciousness

Scholars do not agree on the very fabric (ontology) of consciousness. In his reflection on mainstream neuroscience of consciousness, Hohwy (2007, p. 469) points out that it is hard to think of other areas of science 'where people agree on the fundamental methodology for empirical inquiry yet have wildly different opinions about the metaphysics of the phenomenon under scrutiny'. And almost a decade later, another voice raises a similar concern: the biggest hurdle in the scientific study of consciousness is not only the lack of consensus on what consciousness is but the insufficient clarity on precisely what should be or is being studied (see also Klink et al. 2015, p. 20).

Instead of calling it a *crisis*, more and more scholars are concerned that consciousness research is misconceived. For example, more than a decade ago, Zeman (2008, p. 313) raised a concern that stops short of identifying a crisis: ‘One has to wonder whether a question that receives quite such varied answers might be misconceived: are we absolutely sure that we know what we are trying to explain?’. In a recent overview of neuroscientific research on consciousness, neuroscientist Anil Seth (2018, p. 1) echoed this in asking whether the problem of consciousness currently set forth in the neurosciences is ‘simply misconceived’. In other words, there is no agreement on what explanations of consciousness should be explaining. In a recent overview of mainstream neuroscience of consciousness, Lamme argues that the competing theories are at a stalemate because they are about different explananda (see Lamme 2018, p. 9).

There are also concerns regarding the fabrication of consciousness: ‘The sheer number of theories of consciousness, an abundance that may be unprecedented in the history of science, suggests a profound problem in this domain’ (Katz 2013, p. 43). The problem is that different theories of consciousness are not different theories about the same phenomenon but about different phenomena altogether. Blackmore (2005, p. 8) reminds us rather concretely of the dilemma when saying it is no good talking about cognitive awareness and claiming to have explained consciousness: ‘It is no good talking about perception, memory, intelligence, or problem-solving as purely physical processes and then claiming to have explained consciousness’.[5] The same applies to numerous other aspects being conflated with consciousness.

Concerns about the concepts of consciousness

What I call a ‘crisis’ is expressed by others through concerns about the concept. The conceptual issues are even more complicated because it is true that as a multidimensional phenomenon, the question of what consciousness is can be about its phenomenology, the things taken to be denoted by the term (such as attention, perception, awareness, experience, affect and the like) or its ontology as a feature of the world (how does consciousness fit into the physical universe?). For example, Block points

5. In a similar vein, Banks (1993, p. 255) argues that one cannot talk about consciousness without also considering the self and volition (will). Samuel (2010, p. 37) also warns that reducing everything to cognitive categories ‘allows for a considerable elegance and simplicity, but at the expense of excluding much of what appears to be significant about the human condition’.

out that 'very different concepts are treated as a single concept' (Block 2007a, p. 275).[6] This is more clearly expressed by Hutto (2006, p. 77), who points out that the advocates of new theories of consciousness do not provide adequate and convincing characterisations of the phenomenon they hope to explain.

Despite many concerns, most scholars continue as if somehow consciousness research is unified by its object of study because of the shared terminology. This illusion is perpetuated in many ways, not least the thousands of publications with 'consciousness' in the title that are about distinct phenomena altogether. The endless stream of publications with 'consciousness' in the title creates the impression of a fledging domain of research with steady progress and agreed results. The reality is far from this. The problem is evident in collective volumes on consciousness, where chapters with diverging views on what consciousness is about are published side by side under the impression that they are about the same phenomenon. For example, in a volume that covers multiple exclusionary definitions of consciousness, the authors state that a 'unitary definition of consciousness was neither sought nor provided' (Perry et al. 2010, p. xxii). If the term 'consciousness' is used, it belongs to the domain. It is also perpetuated by funding bodies that request 'adversarial collaborations' (Hohwy & Seth 2020, p. 2) among consciousness theories as if they are about the same phenomenon.[7]

One of the contributions of this study is to suggest that a first step in dealing with the crisis is an acknowledgement of why different research traditions in consciousness research talk about distinct phenomena and what it is that they talk about. There is no agreement on the reason for this situation. Verschure (2022, p. 50), referring to a specific theory of consciousness, calls it an instance of ironic science: 'an ironic science emerges where hyperbole obscures understanding'. Others label that same situation as an instance of preparadigmatic science where agreement has not yet settled because of the 'early stages' of the neuroscience of consciousness (see Merker, Williford & Rudrauf 2022, p. 1). However, this is not an instance of rival theories about the same phenomenon but of theories about different phenomena.

6. Frith and Rees (2017, p. 12) similarly state: 'Different people use the term to mean different things' (see also Cardeña 2011, p. 2; Searle 2000, p. 559; Zeman 2008, p. 290). Similarly, others think consciousness remains after all 'one of the most ill-defined concepts in science and philosophy' (De Graaf, Hsieh & Sack 2012, p. 192).

7. Such an apology is effectively voiced in a response to a study that overtly argues that certain theories of consciousness are not about consciousness. The reaction is that given the young stage of the neuroscience of consciousness, the search should be for collaboration and sharing (see Eagleman et al. 2022).

Holvenstot (2010) suggests that a general atmosphere in scientific circles might be responsible for the current state of consciousness research. He points out in a rather perceptive remark about consciousness research:

> The current atmosphere of cultural relativism is meant to promote mutual respect but inadvertently encourages each of us to defend and cement our disparate positions of belief rather than to struggle toward a unified world-view of the sort we know is required for advancement in cooperative endeavours. (p. 211)

Many scholars seem hesitant to accept or acknowledge that the word 'consciousness' is used for different phenomena and that theories of consciousness are not about the same things but instead seek to find harmonisation where there is none. In an excellent apology for consciousness as a neurobiological phenomenon, Feinberg and Mallatt (2016, p. 124), for example, conclude that 'neurobiological naturalism is consistent with many other neurological theories of consciousness'.[8] This is despite the fact that most of the theories they list have completely different notions about the fabric of consciousness.

The conceptual problem is not limited to specific theories of consciousness but pervades all aspects of this research, including the very issue of the *mystery of consciousness*.

■ What is the mystery of consciousness about?

In his recent book, the neuroscientist Christoff Koch (2019) writes:

> My lifelong quest is to grasp the true nature of being. I have struggled to comprehend how consciousness, so long estranged from science, can fit within a rational, consistent, and empirically testable worldview informed by physics and biology. I have come to a measure of understanding of this question, within the limitations unique to me and to my kind. (loc. 4395)

For him, as for many others, the *mystery of consciousness* constitutes the ultimate scientific challenge, with few competitors left in the 21st century.[9] Thus, while there is widespread agreement on the significance of consciousness for understanding what it is to be human and the importance of solving its mystery, there is no agreement on either what that significance

8. Similarly, Tononi and Koch (2008, p. 255) suggest that the Integrated Information Theory (IIT) 'converges with other neurobiological frameworks' on key facts.

9. See, for example, Kallio and Revonsuo (2003, p. 112), Damasio (2010, p. 262), Ramachandran (2011, loc. 4874), Móró (2017, p. 11), Lamme (2018, p. 1), Glattfelder (2019, p. 395), Kripal (2019, p. 114), and Williams (2021, p. 145). For Searle (2000, p. 576; see Baars & Gage 2010, p. xv), it is merely the most important problem in the biological sciences.

is about or on what the very nature of consciousness is. As Dietrich (2007, p. 3) points out, 'unlike the Big Bang or the origin of life, consciousness is truly a mystery in the sense that we do not yet even know how to think about it'. Everybody claims 'significance' for their own fabrication of consciousness.

The *mystery* (or *problem* or *puzzle*) of consciousness is variously defined, depending on a host of nested theoretical and philosophical assumptions. Essentially, Williams (2021, p. 146) says, it can be formulated as 'how to fit inherently subjective experiences into our scientific comprehension, which is based on an objective understanding of the world'. However, the specific mystery of consciousness is variably conceptualised from a biological to an informational or a material problem. This 'subjective experience' needs some ontological basis and there is no agreement on how it links to or emerges from a material body.

In the three research traditions, there is no agreement, neither on the mystery nor the fabric and the fabrication of consciousness. In mainstream neuroscience of consciousness, the mystery of consciousness is formulated as a neurocentric problem of the brain (*how does the brain create consciousness*); in new materialist and non-materialist theories of consciousness, the mystery is about a (new) material entity with nonlocal properties, and in a neuro-ecological perspective, the mystery of consciousness is about how organisms are conscious (*how a systemic-biological organism produces consciousness*).

Not only between but also within these research traditions, there is a mind-boggling diversity of views on the nature of consciousness that vary from consciousness as cognition to cognitive experience and from affect to a self that comes to mind. The seat of consciousness varies from the cortex to the brain stem, the whole brain or the brain within a body, and even outside the brain or body, as an essential feature of matter. It is a domain of study without an agreement on the explanandum; it is a domain of study that lacks some basic conceptual clarity and agreement on what research should be about. And that is the result of too little attention to (and debate about) the foundational assumptions that make consciousness research happen.

■ Animal consciousness

The impact of the crisis can be illustrated by means of a specific example, that of animal consciousness. If there is any doubt about the crisis in consciousness research then one should consider the question: 'What else, besides humans, possesses consciousness?' Who or what can be considered conscious?

That humans somehow possess consciousness is a *sine qua non* – it is the term used for something we experience the moment we open our eyes in the morning. What else, besides humans, is or could be conscious? Animals, plants, machines or, for that matter, the universe itself? The importance of notions of consciousness is clearly illustrated in the issue of animal consciousness that, in recent years, has emerged as a bone of contention in consciousness research. Against the background of belief in human exceptionalism and the denial of animal consciousness (or an 'immortal [animal] soul', as Koch light-heartedly complains about his dog; see 2014, p. 1), the quest for consciousness greatly impacts our understanding of nonhuman animals. By extension, the quest for consciousness other than in humans is finally central to one of the fastest-growing areas of research, namely that of artificial intelligence or machine consciousness. Can machines be conscious, and if so, do they have rights, and do they deserve special privileges?

Here, the impact of the question of animal consciousness will be used to illustrate the crisis. The question of animal consciousness is important in the debate about animal rights and the humane treatment of animals. It is particularly important in food industries that depend on animals. Animal rights activists often claim animals are conscious, while others deny that point. But what is significant in this debate is that the answers completely depend on the definition of consciousness (and ideology of the researcher) adopted.

Simply adopt a reductive definition or concept of consciousness that can fit the features of other animals or plants, and they all can become conscious. Some are rather explicit about this (Biolsi & Nolan 2021):

> There is no need to formulate one agreed-upon definition of consciousness, but rather to argue that differing definitions serve differing operational purposes and stating that one species 'has consciousness' while another does not is counterproductive to the advancement of knowledge. (p. 36)

Based on such a reductive definition of consciousness, it is easy enough to claim that humans are not the only species to possess consciousness (see e.g. Van den Heever & Jones 2020).[10] It is difficult to avoid the impression in the above examples that if a complex definition of consciousness

10. This problem is eloquently illustrated in a recent debate about plant consciousness. A group of scholars responded to an article that states plants are not conscious (see Calvo, Baluška & Trewavas 2021). Their objection is that an anthropocentric theory of consciousness is used, and there are at least six alternative theories of consciousness that could be considered to determine whether plants are conscious. They find such a definition in the reductive version of IIT of consciousness which claims human consciousness is essentially information. The 'anthropocentric' study they respond to is meticulous in doing two things. One is that consciousness is not reduced to single features (such as awareness or information processing) but is taken as a complex phenomenon (see Taiz et al. 2019). Consciousness is not only awareness but includes feelings and experiences, intentionality and subjectivity. Even 'primary consciousness' is more than cognitive awareness. The second feature is that consciousness is associated with 'higher levels of biological organization and complexity' (Taiz et al. 2019, p. 682), which means that consciousness is grounded in living processes which are features of complex nervous systems that create consciousness.

(describing the features of biological or organismic consciousness) does not apply to animals and plants, then it is easy enough to simply replace it with another definition and set of concepts of consciousness.

What kind of knowledge is this, one could ask, if it is merely a confirmation of the definitional features used to delimit a study? If the answer as to whether animals (or machines) have consciousness could be manipulated by means of the specific concept of consciousness to determine the outcome, there must be something fundamentally wrong with the way in which consciousness research is being conducted. Any research tradition where one can pick and choose definitions and concepts to reach the desired or preferred outcome is in serious trouble.[11]

The discussions of whether other animals, plants and machines are conscious or have consciousness are as much a function of what consciousness is taken to be (its ontology) as of the specific concepts employed to describe consciousness. To answer the question, 'Who or what is conscious?' it is obvious that there should be some agreement on what the 'consciousness' is that one is looking for. Central to the question about animal, plant, machine or universal consciousness is knowing what consciousness is.

Concluding remarks

It is precisely because of the significance of consciousness in understanding the human condition and what the world is made of that the claim of a crisis in consciousness research is such a bold claim. The above picture should be of grave concern to anybody interested in the *mystery of consciousness*.

The obvious question is: what are the causes of this situation in consciousness research? Why is there a crisis? As with the crisis itself, which is not a simple but a multidimensional crisis, the causes are also complex and multiple. Four sets of conditions that mutually influence one another can be identified in the scientific production of an increase in theories and explanations of consciousness. The first two have to do with the fabric of consciousness: one is the fact that consciousness is a complex cultural concept, and the other is that it is a multiplex composite phenomenon. The other two are more related to the fabrication of consciousness: one

11. When turning towards the question whether of either animals, plants, machines or the universe is conscious, examples can be multiplied in which the answer depends on the definition adopted. Could machines be conscious? Yes, say Dehaene and Naccache (2001, pp. 491–492; see Dehaene, Lau & Kouider 2017), as consciousness results just from certain information-processing computations. Others say no (Carter et al. 2018; Spatola & Urbanska 2018). And the main difference between them is their definitions of consciousness.

relates to the history of consciousness research, and the other to the nested theoretical assumptions that impact consciousness research. These reasons are not all on the same level. Some have to do with the complex nature of the phenomenon to be studied and others with the specific theoretical assumptions that drive this research. Little can be done about the complex nature of the explananda; a great deal can be done to clearly define it.

We turn to these sets of conditions in the following two chapters. However, all of this is no excuse to continue as if these problems do not matter or will disappear. And that includes clarification on what consciousness research is about. Given the picture that is emerging, it is premature to talk about the last surviving mystery of the 21st century if there is no agreement on what the mystery is about or what the fabric of consciousness is.

Chapter 2

Consciousness: A complex cultural concept

Introduction

More than a century ago, James remarked that we all know what consciousness is until asked to define it (see [1891] 1952, p. 147). A remarkable feature of current consciousness research is the widely accepted acknowledgement that consciousness 'remains as elusive as ever' (Frith & Rees 2017, p. 11).[12] Nothing is more natural than our being conscious, and as James also pointed out, while we intuitively know that humans possess consciousness (or better, are conscious), there is a lingering uncertainty as to what consciousness, or being conscious, entails (see also Kihlstrom 1984, p. 150). For James, this was the case because of the complexity of consciousness. Nothing has changed in this regard because consciousness remains a complex composite phenomenon. But it is also a complex cultural concept.

12. Despite tremendous advances in neuroscience and clinical technology, Glattfelder (2019, p. 397) also remarks that 'the nature of consciousness is as elusive as ever'. The reservations about our actual grasp of what consciousness is and how to go about it are staggering (see e.g. Block et al. 2014; Dietrich 2007; Frith & Rees 2017, p. 12; Hobson 2001, pp. 17–18; Klink et al. 2015, p. 17; Laughlin & Rock 2013, p. 261; Schlinger 2008; Tinnin 1990). Many aspects of consciousness elude current research, and at this stage, knowledge on the conception of states of consciousness escapes verification and agreement (see Kokoszka 2007, p. 61). See also the examples in Bennett and Hacker (2022, p. 265).

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Almost 60 years ago, Miller (cited in Biolsi & Nolan 2021) pointed out:

> Consciousness is a word worn smooth by a million tongues. Depending upon the figure of speech chosen it is a state of being, a substance, a process, a place, an epiphenomenon, an emergent aspect of matter, or the only true reality. Maybe we should ban the word for a decade or two until we can develop more precise terms for the several uses which 'consciousness' now obscures. (p. 27)

And two decades of the proliferation of concepts of consciousness in the neurosciences have passed since Block (2001, p. 206) suggested that we would be better off not using words like 'consciousness' and 'awareness' as there is so little terminological agreement about them. But avoiding the word is of little help if we want to understand and explain the mystery that it connotes. A differentiation and complexification of concepts, rather than reduction, is long overdue.

Although the concept and phenomenon of consciousness are closely interconnected, they independently provide explanations for the crisis in consciousness research. In this chapter, some of the intricacies of the concept itself will be considered. Consciousness is a complex cultural concept referring to a multiplex phenomenon.

Being conscious, awareness, experience

The English word 'consciousness' has been in use since the 17th century, when it entered the English language from Latin, in which it carried the sense of sharing (guilty) knowledge with another person and oneself (see Natsoulas 1983, pp. 17–18; Tague 2021, p. 4). Over the years, the sense weakened to simply mean the waking state (see Zeman 2002, p. 15), and it developed into a scientific concept with a variety of meanings and emphases, and the number is growing.

When we say someone is conscious, there are two common meanings in colloquial English: 'awake' or the waking state (that is, as opposed to sleeping, dead drunk or in a comatose state) and 'aware' (that is, someone perceives, feels, thinks, etc.). Therefore, traditionally in neurology a distinction is made between two meanings of the word consciousness: the level (awakeness) and the content (awareness) of consciousness (see Laureys 2005, p. 556; Tononi & Koch 2008, p. 242).[13] Each of these has

13. Storig (2007, p. 707) explains this as the difference between an organism being in a conscious *state* (in this sense, consciousness is what is altered, reduced or even lost when we faint, undergo deep general anaesthesia or fall into a coma) or consciousness as 'a trait, an *attribute* of a psychological process'. The latter refers to the content of consciousness experience. Referring to the same two consciousnesses, Koch (see 2019, loc 1355) turns the concepts around and distinguishes between *conscious state* as the transitive form of consciousness (conscious of things) and state of consciousness as the intransitive form (as in losing consciousness or during sleep). Northoff (2013, p. 727) calls this the bi-dimensional view of consciousness and is referred to as 'transitive' and intransitive consciousness (see Bennett & Hacker 2022, p. 263 for a comprehensive discussion of all the issues involved in this distinction).

unique features and is based on distinct bodily and neural processes, and in everyday life, they most often function in complete harmony and unison. Wakefulness derives from arousal, while awareness assumes subjective experience (see Bennett & Hacker 2022, p. 270f.; Faw 2011, p. 253).

Thus, when it comes to brain processes during awakeness, at least two separate levels can be identified (Jeeves & Brown 2009):

> [*B*]eing conscious versus being unconscious. This basic form of consciousness is based on interactions between structures of the lower brain (brainstem and midbrain) and the upper brain (particularly the cerebral cortex). Damage to areas of the lower brain can render a person unconscious and functionally vegetative. (p. 50)

Someone being conscious displays a stream of mental life that can be described in many ways, but two are central to the idea of consciousness: awareness and experience. Therefore, for example, Rosenthal (1993, p. 355) distinguishes between *creature consciousness*, *transitive consciousness*[14] and *state consciousness*.

Consciousness as awareness also has many dimensions. It is closely related to alertness, attention, perception, cognition and experience, to mention a few (see Rosenthal 1993, p. 355; Zeman 2005, p. 3). Consciousness as a relational property refers to being conscious *of* and is related to perceptual abilities; someone is not only conscious but conscious *of* things; in other words, the content of consciousness in the sense of sensory or perceptual content (see Zeman 2002, pp. 17–18). It should be kept in mind that being conscious of things can be caused by different sources: either because one is thinking of something or imagining it, paying attention to it in some way or because of some sensory perception of it (see Rosenthal 2000).

However, the term ‘consciousness’ has another essential meaning, namely *experience*. Consciousness as experience has to do with *what it is like* (see Block 2007a, pp. 275–276). This phrase goes back to the formulation of Nagel (1974), who says:

> But fundamentally an organism has conscious mental states if and only if there is something that it is like to be that organism – something it is like for the organism. (p. 436)

That is, the redness of an apple or the sweetness of chocolate, which are often referred to as *qualia*. Consciousness as experience is also referred to as *phenomenal consciousness*.[15]

14. ‘Creature consciousness’ refers to the feature of an organism as awake and responsive, while transitive consciousness refers to being conscious of something, either through perception or thought. ‘State consciousness’ is used for a mental state, as when someone is conscious in contrast to states that are not conscious (see Rosenthal 1993, p. 355).

15. ‘Phenomenal consciousness’ (also referred to as ‘phenomenality’, ‘subjectivity’ or simply as ‘experience’ or ‘subjective experience’) is a crucial aspect of living beings and refers to what something is like for a human being. Chalmers ([1995] 2017a, p. 33), for example, suggests that phenomenal consciousness should simply be referred to as ‘conscious experience’ or just as ‘experience’.

Many agree that phenomenal consciousness is the one quality that makes human consciousness unique. This is also the aspect that is often emphasised when the mystery or puzzle of consciousness is considered. Therefore, it can be said that the 'ultimate target of the neuroscience of consciousness is an account of "what it is like to be"' (Kitchener & Hales 2022, p. 3).

However, consciousness as experience is the most elusive type of consciousness. Many will depart from the claim that consciousness is experience, just to switch to the features of awareness or awakeness to fill in the details. This, for example, happens in the search for the neural correlates of consciousness, which will be discussed later. Another feature is that even when claimed as the essential concept of consciousness, there is no clear definition of what it means. Some take it as an aspect of the mental, especially perceptual, cognitive functions; in other words, in the sense of the experience of having a perception – *consciousness* is experiencing conscious cognition or perception (this is the case with the majority of cognitive scientists and neuroscientists). Others realise that experience, *what it feels like*, is *a* (or *the*) fundamental ground of being of the human organism; for them, *what it feels like* is one of the two interlinked components of consciousness itself (embodied views of consciousness). It varies from 'just experiencing' to 'experiencing as part of conscious cognition' and 'experiencing as a mode of being of an organism'. But in terms of the domain of consciousness as a multiplex phenomenon, phenomenal consciousness (consciousness as experience) clearly constitutes a third type of consciousness.

To summarise this point: the term *consciousness* (as experience) and the term *experience* itself have three distinct meanings, depending on the theoretical frameworks within which they are used.

But consciousness is much more complex than this for at least two more reasons. One is that neither awareness nor awakeness is static, and the relationship between them varies. For example, we can be conscious without being conscious (aware) *of* something (see Stoerig 2007, p. 708). While wakefulness and awareness are intimately connected, they are often dissociated (see Gawryluk et al. 2010, p. 2). For example, in non-rapid eye movement (NREM) sleep that is normally referred to as a state of consciousness (or at least an altered state of consciousness [ASC]), one is neither aware nor awake – therefore, technically, it cannot be considered a 'state' of consciousness (see Móró 2017, p. 17) – but one is still conscious.[16]

16. The complexity of both these components and their intricate relationship is clearly discussed by Laureys (2005).

The second reason is that a conscious organism (mind) has several more important traits. For example, Damasio argues a conscious subject is awake, displays background emotions, exhibits attention and shows evidence of purposeful behaviour (see e.g. Damasio 2018, p. 144; Damasio & Meyer 2009, p. 3).

But there is more to the concept.

Consciousnesses: Types, kinds, modes or forms

Following from the previous point, Block (2007a, p. 276; see also Block 2001) lists four 'different consciousnesses': *access consciousness*, *phenomenal consciousness*, *reflexive consciousness*[17] and *primitive self-consciousness*. While there is no agreement on the categories or their labels, many types, modes, kinds or forms of consciousness can be identified in the literature – a list of anything from three to eight (and the number is growing) is identified. But there is no uniformity.

Some distinguish four 'types' or 'kinds' of consciousness: 'self-awareness, higher-order awareness, medical awareness, and consciousness as experience' (De Graaf, Hsieh & Sack 2012, p. 192). A more comprehensive list gives an indication of what is meant by the different consciousnesses (Lutz & Thompson 2003):

> 1. Creature consciousness: Consciousness of an organism as a whole insofar as it is awake and sentient. […] 2. Background consciousness versus state consciousness: Overall states of consciousness, such as being awake, being asleep, dreaming, being under hypnosis, and so on versus specific conscious mental states individuated by their contents. […] 3. Transitive consciousness versus intransitive consciousness: Object-directed consciousness (consciousness-of), versus non-object-directed consciousness. […] 4. Access consciousness: Mental states whose contents are accessible to thought and verbal report […] 5. Phenomenal consciousness: Mental states that have a subjective-experiential character (there is something 'it is like' for the subject to be in such a state) […] 6. Introspective consciousness: Meta-awareness of a conscious state (usually understood as a particular form of access consciousness) […] 7. Prereflective self-consciousness: Primitive self-consciousness; self-referential awareness of subjective experience that does not require active reflection or introspection. (pp. 34–35)

This list is unlimited, and as Lutz and Thompson also point out, the relationships of these concepts to one another are unclear (see 2003, p. 35; see also Carruthers 2000, pp. 254–255). What is clear from this is that

17. 'Reflexive consciousness' refers to when 'the subject not only has a phenomenal state but also has another state that is about the phenomenal state, say a thought to the effect that he has a phenomenal state' (Block 2001, p. 203).

consciousness is a multiplex phenomenon, and a science of consciousness should not only account for these dimensions but also acknowledge the different consciousnesses. Consequently, as pointed out by Bennett and Hacker (2022, p. 284ff.), who arguably provide the best analysis of these consciousnesses, consciousness is polymorphous.

This list is growing, not necessarily in terms of different consciousnesses but different labels for the old consciousnesses. For example, in the proposal of a recent neurocognitive theory of consciousness (to be discussed later) called Attention Schema Theory (AST), Graziano proposes a distinction between i-consciousness (i for *information*) and m-consciousness (m for *mysterious*) (see Graziano et al. 2020, p. 156). What is significant here is that most of his fellow scholars interpret and understand this to be the same as access and phenomenal consciousness (e.g. see Brown & LeDoux 2020; Frankish 2020; Gennaro 2020; Masciari & Carruthers 2020; Vernet et al. 2020). Thus, it turns out not to be identical or similar because within the framework of the specific concept of consciousness (as attention), these terms have unique meanings. As will become clear, the proliferation of concepts results from many circumstances, one being the unique concept of consciousness employed.

This much is widely shared in consciousness research. Consciousness has many dimensions, and as a way of speaking about them, many consciousnesses are identified. But this very practice of talking about different consciousnesses has some unintended consequences. One is the mereological fallacy, which refers to a part–whole conflation where features of a part are attributed to the whole (see Fuchs 2018, p. 45; Glannon 2011, p. 27; Panksepp 2017, p. 142).[18] Another consequence following this is the distinction between a view of many consciousnesses versus consciousness as a multiplex phenomenon with many dimensions. The way in which these dimensions or forms, types, modes or kinds of consciousness (terminology is not standardised) are conceptualised (consciousnesses versus a multiplex phenomenon) constitutes a fundamental fault line in consciousness research.

It should be noted that these aspects of consciousness not only function to identify different consciousnesses, but they are often used in what will be referred to as unidimensional or *consciousness-is-just* definitions (which are to be discussed later). Aspects of consciousness are turned into ‘consciousness’ as such. An alternative theoretical approach (on the other side of the fault line) is to treat all these features as *dimensions of consciousness*.

18. The part–whole relation is known as ‘mereology’, and the misattribution of features that belong to the whole to its parts has been labelled the ‘mereological fallacy in neuroscience’ (Bennett & Hacker 2022, p. 18). This is a leitmotif in their book and essential reading for anyone who wants to pronounce on consciousness.

A complex cultural concept: A cluster or mongrel concept

An indication of the complexity, or multiplexity, of the phenomenon was already given. It will further be considered in the following chapter. It became clear that historically, the term has always carried an ambiguity and referred to many consciousnesses. Thus, on a linguistic level, the term ‘consciousness’ carries a heavy burden.

It is not a straightforward scientific term but belongs to a network of associated terms that have evolved over centuries (such as ‘mind’, ‘self’, ‘soul’ and ‘spirit’; see Zeman 2005, p. 2). As will become apparent, within different research traditions, the relationship between these concepts varies and, one could say, is even distorted. Part of the trouble with the concept is that ‘in many languages on this planet we do not even find an adequate counterpart for the English term “consciousness”’ (Metzinger 2003, p. 3). In other words, it does not refer to some-*thing* that is widely recognised.

Given this picture, it is not surprising that some describe it as ambiguous,[19] and it is ambiguous in more than one respect. In fact, Block (2007c, p. 141) suggests that the word consciousness should be seen as a mongrel rather than a cluster concept[20] in that it picks out ‘a conglomeration of very different sorts of mental properties’. He points out that as a mongrel concept, the word ‘connotes a number of different concepts and denotes a number of different phenomena’ (Block 2007b, p. 159). My suggestion is that as a complex cultural concept, consciousness is both a cluster and a mongrel concept; it is a cluster concept because of its multiplex nature and a mongrel concept because of the fabrication of concepts in unidimensional definitions and theories. This remark has profound implications for the way in which the word is used: in some research traditions on consciousness, it is used as a mongrel concept and subject to the mereological fallacy.

In consciousness research, the mereological fallacy manifests in at least three formats. Firstly, features that belong to an organism are attributed to an organ (the brain); secondly, aspects of consciousness are taken as the whole of consciousness; thirdly, and consequently, theories of types or aspects of consciousness are treated as theories of consciousness writ large (to be referred to as spark plug theories of consciousness).

19. For example: ‘“Consciousness” is an ambiguous term, referring to many different phenomena. Each of these phenomena needs to be explained, but some are easier to explain than others’ (Chalmers [1995] 2017a, p. 32).

20. A cluster concept means the term contains several components, some of which need not be present to identify an instance. Religion is a typical cluster concept in that it could refer to ritual, supernatural beings, sacred objects, prayer, worship and the like, but some religions do not present all the components.

The different consciousnesses (such as access consciousness, phenomenal consciousness and creature consciousness) previously described point towards its multiplex nature and present as a cluster concept. Different kinds of consciousness describe components of the multiplex phenomenon.

As a cluster concept, consciousness is taken as componential, and as a mongrel concept, it is reduced to specific mental functions. The latter takes place in the scholarly fabrication of consciousness and does not necessarily reflect the nature of consciousness itself. In other words, the fabric of consciousness itself contributes to its cluster nature and the fabrication to its mongrel properties. This difference becomes obvious in the different kinds of definitions of consciousness and the way concepts are used in the distinct research traditions. It is found as a mongrel notably in mainstream neuroscience of consciousness. In a neuro-ecological perspective, the word is rather treated as a cluster concept that is used for the variety of dimensions of a multiplex phenomenon.

Block (see 2001, p. 206) suggested that we would be better off not using words like 'consciousness' and 'awareness' as there is so little terminological agreement about them. Given the previously described picture, there is merit in his concern. However, Chalmers (see [1995] 2017a, pp. 32–33) suggests that one way of avoiding ambiguity is to restrict the term consciousness for experience and distinguish it from 'awareness', which can be used to refer to the cognitive abilities and functions (such as information integration, attention or thinking) that are also often labelled as 'consciousness'. It is precisely the aforementioned realities of the multiplex phenomenon and the features of the concept highlighted in this section that give support to this suggestion of diversifying terminology and introducing conceptual demarcations that more clearly reflect these realities. Put the other way around, it is the impact of the mereological fallacy that is largely to be blamed for the crisis in consciousness research. The argument of this study is that the crisis forces us to develop more precise terms instead of using the same term for distinct concepts and phenomena.

Concluding remarks

The term consciousness is inscribed in a network of ancient and modern concepts, of which the relationships between them are not clearly defined.[21] It is related to more archaic terms such as soul and spirit but also closely

21. Current cognitive research is aptly described as in its 'pre-Copernican stage' (Århem & Liljenström 2008, p. 4) because of the absence of a clear classification system for concepts.

linked to modern psychological concepts of mind,[22] self, cognition, experience and feeling.[23] In fact, it will become patently clear that the scholarly fabrication of consciousness is directly dependent on these relationships, and at least these terms are central to the debates.

To set the bar against which these discussions will be measured, the following is a summary of the neuro-ecological perspective to be presented later. In the hierarchy of terms, consciousness is a multiplex concept that contains and covers the other five concepts in the following way. Consciousness is when self comes to mind and, at the same time, is the subjective feeling or experience of life itself. Cognition is one function of mind and, therefore, embedded in consciousness.[24] In this view, consciousness encompasses mind, self, subjectivity, feeling and experience of life and is much broader than cognition (which, together with many other mental functions, make up mind). Put differently, consciousness is mind plus self plus subjectivity plus feeling plus experience. The description of Revonsuo (2010) comes close to capturing all of this:

> [*Consciousness research*] is to study the fundamental nature of our personal existence, our subjective existence, our life as a sequence of subjective experiences. In this new field of science, we want to understand ourselves not only as entities that are alive and behave or interact with their environment, like bacteria or trees or dragonflies do, but also as beings who directly experience or feel or sense their own existence, who are alive in a sense fundamentally different from the ordinary biological notion of 'being alive'. (p. xx)

This view stands opposed to those who conflate consciousness with cognition or subsume it under cognition, as well as those who see it as embedded in the mind and those who treat consciousness as divorced from self and subjectivity. Consciousness as experience and feeling is also

22. Unlike Kriel (2002, p. 145), who sees mind and self-consciousness as identical and at a higher level than consciousness, others see mind and consciousness as identical (Laughlin, McManus & d'Aquili 1990, p. 13). Mind can be regarded as involving at least the following cognitive functions: 'sensation, perception, imagination, emotion, memory, thinking, cognition, and reasoning' (Århem & Liljenström 2008, p. 4). Dietrich (2007, p. 6) points out that this is not correct, because the mind 'does not only perform mental operations that are conscious but also ones that are unconscious. So "mind" is a broader term that encompasses consciousness as one aspect' or mind includes consciousness (see Earl 2014, p. 2). If mind is taken as the ability to 'think, plan and remember' (LeDoux 2019, p. 329), then consciousness is not only different but also more comprehensive. Consciousness entails these together with other mental functions (see also Manzotti and Moderato 2014, pp. 2–3 for a description of mind).

23. Velmans (2009) insists that 'soul', 'mind' and 'consciousness' are clearly distinct in that the first refers to an entity in a dualistic framework while mind refers to psychological processes, such as thinking and language. 'Consciousness', for him, refers to the awareness *of* something and thus is synonymous with 'conscious awareness' (Velmans 2009, p. 23).

24. An embodied and enacted view of cognition is that it is one aspect of consciousness, 'a process that runs from the brain through the body, to the world, and then back again' (Glannon 2011, p. 16).

different from notions of consciousness as feeling and experience that are based on reductive definitions of feeling and experience. All these options will become apparent in the detailed discussions later.

'Consciousness' is an ambiguous, even a mongrel, concept and functions as a cluster concept in that it refers to different phenomena and sometimes collective features of the phenomenon. But because of the mereological fallacy, it takes on yet another characteristic in that the concept is reduced to one of its features or instances. The result is that in many instances, consciousness is presented as a unidimensional phenomenon while it is a multidimensional phenomenon.[25]

Both the history of the term and the multiplex nature of the phenomenon point towards the fact that consciousness is a complex cultural concept. If used, it must be done with care and an awareness of the nuances. Avoiding the term is one way of dealing with the conceptual problem, but it will not make the multiplex phenomenon go away. Consciousness is a multiplex composite phenomenon, and therefore, we need ways of accounting for that.

The very fabric of consciousness contains certain fault lines that make it a complex phenomenon to analyse and understand. There is a fault line between the phenomenology and ontology of consciousness. The things called consciousness and the thing consciousness are distinct. And different views on each impact on views on the other.

Before mapping the theoretical framework and landscape within which consciousness research takes place, some more mitigating circumstances that characterise consciousness and consciousness research need to be kept in mind. That is its fabric as a multiplex phenomenon.

25. Not all neuroscientists fall prey to the mereological fallacy. Many (as will be seen in the discussion of the neuro-ecological perspective) see consciousness as a multiplex phenomenon. See, for example, Stoerig (2007, p. 708) who has 'Consciousness as a state of an organism' as one of the headings of her study. With that, she clearly classifies consciousness as an organismic phenomenon.

Chapter 3

Consciousness: A multiplex composite phenomenon

Introduction

Consciousness is a complex composite multiplex phenomenon that is being investigated from a variety of perspectives and disciplinary frameworks. Keeping these in mind provides some mitigating circumstances for this situation of conceptual confusion. The most important insight from this is the realisation that within different disciplinary traditions, the term is used in well-meant ways but often with incommensurable meanings. However, not all 'consciousnesses' are consciousness.

The detail of consciousness as a neurobiological process that takes place within the world will be given later. Here, three aspects will briefly be introduced that contribute to the conceptual quagmire.

The first relates to phenomenological descriptions of the only animal or thing that we know for certain to possess consciousness: the human being. On all accounts, consciousness is a multidimensional phenomenon. The second aspect deals with the special nature of consciousness as a subjective phenomenon and the third deals with the disciplinary history of consciousness research. The latter contains two aspects: the different disciplines studying consciousness and a brief discussion of what can be considered fundamental fault lines that characterise the study of consciousness.

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Consciousness is studied in many different disciplines from various theoretical viewpoints, focusing on consciousnesses. Consequently, consciousness research is more a domain of study investigated from many different viewpoints than a definite object of study. This also means that, depending on the disciplinary angle, distinct definitions of consciousness as awareness, awakeness or experience can become the subject of investigation.

A complex composite phenomenon

Most descriptions of consciousness, or what it is for a human being to be conscious, illustrate that it is a complex composite phenomenon. For example, for Searle (2000), consciousness consists of inner, qualitative, subjective states and processes of sentience or awareness. So described, it:

> [*B*]egins when we wake in the morning from a dreamless sleep and continues until we fall asleep again, die, go into a coma, or otherwise become 'unconscious'. It includes all of the enormous variety of the awareness that we think of as characteristic of our waking life. It includes everything from feeling a pain, to perceiving objects visually, to states of anxiety and depression, to working out crossword puzzles, playing chess, trying to remember your aunt's phone number, arguing about politics, or to just wishing you were somewhere else. Dreams on this definition are a form of consciousness, though of course they are in many respects quite different from waking consciousness. (p. 559)[26]

There is considerable agreement that what we refer to as human consciousness can be identified by means of a set of phenomena that include many dimensions. Another example, the description of Velmans (2009), illustrates some of them:

> Consciousness is the term used to describe my experience and awareness of the laptop in front of me, the cat on my lap and the pain I experience in my leg while writing these words. It is the most intimate companion, surfaces every morning when I wake up and fades away when going to sleep. In this sense the term refers to perception itself rather than an experience of something. (p. 291)

Most descriptions of consciousness make it clear that it is a multiplex phenomenon. The above descriptions both refer to the two most common aspects of consciousness, namely, awakeness and awareness. But they also mention perception and experience as distinct components. Tague (2021, p. 2), on the other hand, suggests that consciousness is senses and sensations, personal feelings, emotions, instincts, memories, projections (whether plans, goals or fantasies), attention and thoughts. Again, the

26. Searle describes the *essential feature of consciousness* as the combination of three aspects: qualitativeness, subjectivity and unity as different aspects of the same feature or processes in a biological organism (see Searle 2000, p. 560). See also the *thick description* by Hutto of the phenomenology of conscious experience (see 2011, pp. 36–38) and the list of things consciousness *refers to* (see Garcia-Romeu & Tart 2013, p. 123).

notion of a multiplex phenomenon is apparent. Consciousness or being conscious fundamentally has a modal nature. Consciousness, or as it will be referred to in this study, *consciousness as such*, is a multiplex (human) organismic phenomenon. The future of consciousness research depends on clarity about the 'constitutive aspects of consciousness' (Merker, Williford & Rudrauf 2022, p. 14), and that starts with clarity on *consciousness as such*. To be sure, there is a difference between the things consciousness *refers to* and its fabric or constitutive aspects. Most would agree that as experience and subjective awareness, consciousness refers to many internal and external phenomena and dimensions; what it is as a phenomenon is, however, highly disputed.

Consciousness as such has a first-person ontology

A first feature to consider is the unique nature of consciousness as a subjective phenomenon which gives rise to the common distinction between first-person and third-person perspectives. While these are commonly regarded in consciousness research, it will become apparent that this dualism is part of the history of the fabrication of consciousness that itself needs to be reconsidered.

A subjective phenomenon

We all know that human beings are conscious; it is there every morning when we wake up. It is the most real 'thing' in our everyday experiences. But for all its subjective clarity ('I am conscious') and importance, Humphrey (2011, p. 13) reminds us, it is '*physically featureless*; it *does not show*'. It cannot be found, as Brier points out, when opening the skull (see 2013, p. 98). Instead, consciousness has a subjective ontology; it is a *subjective* phenomenon (Metzinger 2009, p. 62). A characteristic feature (or mistake, as Searle [1993, p. 317] suggests) in consciousness research is to disregard its essential subjectivity[27] and treat consciousness as an objective third-person phenomenon.

Consciousness is different from other material and biological phenomena. As a first-person phenomenon, consciousness is not an object in the world. It is different from most other objects, entities or concepts (see Metzinger 2009, p. 62; Searle 2000, p. 557). Consciousness is not only different but much more complex than rocks, desks and sunsets for the simple reason of subjectivity. Unlike rocks, chairs and sunsets, consciousness is inextricably

27. 'Subjectivity' refers to the 'what-it-is-likeness' of being. The classical example to illustrate 'what it is like to be' this is that of the bat who perceives the world with a sonar system; its subjectivity must be completely different from that of humans (see Nagel 1974; Varela & Shear 1999, p. 2).

bound to subjectivity or the first-person experience (see Gruzelier 2005, p. 1). For this reason, Kitchener and Hales say it requires 'a categorically distinct, novel kind of explanandum' (2022, p. 3). Although not an object itself, as will be argued later, consciousness is an exceptional physical object (topic) of study. As Holvenstot points out, it has 'its own unique intrinsic properties', and a major fallacy in consciousness research is the assumption that 'reality can only be described by material properties and spiritual concepts' (2010, p. 194) – basically the fallacy of ontological dualism. Consciousness research needs to recover the very nature of its explanandum.

Consciousness cannot be studied directly but only by means of first-person reports. In this view, consciousness is a private, first-person phenomenon that is generated by means of a range of complex processes and subprocesses (see Hirsch 2005, p. 39). However, consciousness has both '"subjective" (first-person) and "objective" (third-person) aspects' (Pereira et al. 2010, pp. 213–214).[28] The implicit dualism of this view is not immediately apparent because, as Fuchs argues, within an embodied theory, consciousness is the word used to denote properties which do *show* by means of the living person (see Fuchs 2018, p. 291).

First-person and third-person perspectives

The subjective ontology gives rise to the traditional distinction in consciousness research between the first-person and third-person perspectives (see Dietrich 2007, pp. 9–20 and Zeman 2002, pp. 4–5 for an overview of the different viewpoints).[29] As will be seen later, these two perspectives and the alternative of a second-person perspective constitute one of the fault lines in consciousness research. They belong to two different theoretical frameworks.

28. The following is a typical expression of this view: 'consciousness must be considered from two standpoints: the external (behavioural) and the internal (cognitive, mental). From the external standpoint, the human organism is said to be conscious when it exhibits signs of wakefulness, background emotions, sustained attention towards objects and events in its environment, and sustained, adequate, and purposeful behaviour relative to those objects and events. From the internal standpoint, a human organism is said to be conscious when its mental state represents objects and events in relation to itself, that is when the representation of objects and events is accompanied by the sense that the organism is the perceiving agent' (Damasio & Meyer 2009, p. 6).

29. Cognitive and neurobiological perspectives are based on the distinction between the first-person and third-person perspectives or, as it turns out, a 'mental' and 'physical' divide (or a subjective mind versus objective body perspective): 'Cognitive neuroscience is still based on the principal divide between the "mental" and the "so-called first person perspective, the other only accessible from without, or from a third person perspective. Thus, mind and world are also treated separate from each physical," or between the subjective mind and the objective body, the one only accessible from within, or from tother, with the outside world mirrored by the mind as a representational system inside the head' (Fuchs 2009, p. 221). This view is not inevitable.

The so-called first-person perspective goes back to the basic feature of consciousness as a subjective phenomenon. The first-person perspective is a derivative from this feature, but there are many misunderstandings that accompany it. One is the distinction in psychological research between so-called first-person, second-person and third-person methods.[30]

Another misunderstanding is that the first-person perspective equals phenomenology.[31] In some circles, it is indeed the case that phenomenology is seen as just a description and representation of a first-person perspective.[32] One reason is that the phenomenological project is not similarly understood everywhere.[33] *Phenomenology* is a term used for at least three distinct entities: 'a philosophy, a research approach, and (in a looser sense) to the study of subjective experience' (Cardeña & Pekala 2014, p. 35). For Varela, phenomenology is not mere introspectionism but an approach that departs from the irreducible nature of conscious experience – lived experience is irreducible as a first-person ontology (see Varela 1996, p. 334). Apologies for the first-person perspective are nowadays widely present in what will later be discussed as new-materialist and non-materialist theories of consciousness (e.g. see Kripal 2019, p. 81). But that is not what is meant by either phenomenology or a first-person perspective in the

30. Although related to the first-person versus third-person perspectives, the emergence of first-person, second-person and third-person *methods* in clinical psychological research is not contributing to an understanding of consciousness. There are today many first-person, and third-person methods (see Velmans 2017b, p. 769) and even advocacy for second-person methods in psychological research (see e.g. Olivares et al. 2015). These are methods, based on the neurophenomenological revolution, that seek to develop methods of psychological research that account for the lived experience and the subject's conscious reality (see Bitbol & Petitmengin 2017) but do not share the theoretical assumptions of monism. For example, Olivares et al. (2015, p. 1) state: 'Second-person methods refer to interview techniques that solicit both verbal and non-verbal information from participants in order to obtain systematic and detailed subjective reports'. This 'method' operates with things like the neurophenomenological interview and distinguishes between the number of people involved in an interview. This point is apparent in the following remark: 'We would like to briefly clarify that the distinction of persons that neurophenomenology makes can be done not only by the mode of accessing lived experience, but also by distinguishing how many persons are involved in an investigation about consciousness' (Olivares et al. 2015, p. 7). A second-person method is not the same as a second-person perspective but is parasitical on the fact that the 'phenomenology' in neurophenomenology can refer to either a 'research program for the study of human consciousness' or a 'specific disciplined method for describing lived experience' (Olivares et al. 2015, p. 2).

31. Laughlin and Throop (2009, p. 132) refer to this position as naive phenomenology.

32. 'Phenomenology is an attempt to describe the basic structure of human experience and understanding from a first-person point of view, in contrast to the reflective, third person perspective that tends to dominate scientific knowledge and common sense. Phenomenology calls us to return, as Husserl put it, "to the things themselves" [...] Phenomenology is thus a descriptive, not an explanatory or deductive enterprise, for its aims to reveal experience as such, rather than frame hypotheses or speculate beyond its bounds' (Carman 2012, loc 104).

33. See Spichard (2011) for an overview of the different views and trends in phenomenology.

neuro-ecological perspective on consciousness. In this perspective, phenomenology, rather, is about the form and content of things to arrive at a second-person perspective (Fuchs 2002):

> Instead, phenomenology should be conceived as the methodical effort to describe the basic structures inherent in conscious experience, such as embodiment, spatiality, temporality, intentionality, intersubjectivity, etc., and to analyse their possible deviations and derailments. Thus, it starts with first-person accounts, but it arrives at substructures of consciousness such as the formation of perceptual meaning, action planning, temporal continuity or implicit memory. It focusses on the form and building-up rather than on the contents of experience. (p. 320)[34]

Another misunderstanding is that the gap between the first-person and third-person perspectives can be overcome by switching between them. A typical feature of those who accept the reality of the first-person perspective is to argue for the complimentary use of first-person and third-person perspectives (see Velmans 2017b, p. 769). For example, given the nature of consciousness, Damasio and Meyer (2009) suggest that consciousness studies require a dual perspective:

> One perspective is internal, first-person, subjective, and mental. Another perspective is external, third-person, objective, and behavioural. The latter, of course, is the observer's perspective, an observer who, incidentally, may be a clinician or a researcher. (p. 4)[35]

For many, the goal of the science of consciousness is to connect first-person data to third-person theories. But, as Hutto (2006, p. 76) argues, that is altering the concepts until the problem disappears. An alternative solution is neither a choice between nor collation of the first-person and third-person perspectives but the development of a second-person perspective.

Be that as it may, the subjective nature of consciousness as such is non-negotiable, and the first-person versus third-person perspectives are not necessarily the most appropriate way to do so. The unique nature of consciousness as a biological systems phenomenon, a physical process, is lacking in most of these discussions.

34. This goes back to the phenomenological tradition of Merleau-Ponty's idea of experience or consciousness as *being-in-the world* (e.g. see Thompson & Stapleton 2009, p. 26).

35. Both perspectives are right, Robbins (2003, p. 495) says: 'one from the perspective of an experiencing person and the other from the perspective of an experiencing scientist [third-person perspective] examining another experiencing person from the outside'.

The disciplinary landscape of consciousness research

Although consciousness research is in its infancy,[36] it is being studied from a range of disciplines as well as theoretical frameworks.

Given the multiplex nature of consciousness, it is not surprising that it is not only the object of study of many different disciplines, but it is more a domain of study than a specific discipline (see e.g. Dehaene 2005, p. ix). But that does not mean they all study the same phenomenon.

At first, it was the topic of study of psychology and philosophy, specifically the philosophy of mind, but it has shifted to several other disciplines, including psychiatry, anthropology, neurology and, more recently, the cognitive and neurosciences. From the very beginning, these disciplines focused on different consciousnesses, and consequently, some were about the loss of creature consciousness while others were about consciousness as experience. All these developments did not necessarily contribute to a better understanding of consciousness as such but to the proliferation of concepts of consciousness.

Also, within the different disciplines, theories and concepts developed in accordance with theoretical assumptions and research practices. For example, the development of neuro-imaging technologies partnered up with older notions of brain localisation to create a strong neurocentric tradition of consciousness research.

Some, like Zeman (2005, p. 9; see also Pereira et al. 2010, pp. 213–214), view this positively, as when he remarks that the topic of consciousness is so 'rich because it lies at the intersection of several intellectual domains'. Others claim that in its most basic sense, consciousness research 'is an interdisciplinary field' (Dietrich 2007, p. 8). Yet another response is to pay lip service to multidisciplinarity as a magic wand to solve the issues in consciousness research. Therefore, it is claimed that only a 'coordinated multidisciplinary effort' (Móró 2017, p. 17; see also Zelazo, Moscovitch &

36. The study of consciousness is in its infancy, or as Katz (2013, p. 46) indicates, 'in theory-years, consciousness is still an infant in the crib'. In the words of Metzinger (2009, pp. 19–20): 'Scientifically, we are at the very beginning of a true science of consciousness [...] The conscious brain is a biological machine – a reality engine – that purports to tell us what exists and what doesn't'. For many, it is seen as one of the major remaining scientific challenges of the 21st century. Compared to some other disciplines, it is factually true that neuroscientific consciousness research is a latecomer, but the claim of its infancy is often an ideological claim. It carries the implication that given time, current mainstream neuroscience of consciousness will solve the problem of consciousness (see Noë 2009, p. 12 for this criticism).

Thompson 2007, p. 2) is needed to understand consciousness.[37] There are also those who suggest that not a single theory but a collection of theories is developing to do justice to the complexity of consciousness. In the words of a group of leading researchers on consciousness (Pereira et al. 2010, p. 218), 'It would be fair to conclude that a science of consciousness may need a complex of theories to address different contributing factors requiring independent explanation'.[38]

The reality, however, is that it did not develop into an interdisciplinary space where consciousness research created a new and unique set of concepts and theories to deal with consciousness. This is clearly captured in Noreika's (2014) description:

> Consciousness science is a multidisciplinary field in the intersection between philosophy, experimental psychology, neuropsychology, and cognitive neuroscience. Given a large number of competing theories and approaches, it is natural that many of the key concepts used in consciousness research, such as awareness, access consciousness or unconsciousness, are often used in different and partly controversial meanings. (p. 15)

Consciousness research remains a multidisciplinary enterprise where different concepts of consciousness are treated as the same. No amount of multidisciplinary research can make up for the lack of conceptual clarity of its unique fabric. Therefore, currently, the most challenging issues in consciousness research are terminological and conceptual and not empirical. Put differently, empirical progress cannot be made unless the conceptual issues are being addressed.

No clear interdisciplinary research tradition developed in consciousness research where some standardisation of terminology and harmonisation of concepts took place. This situation contributes to the fact that concepts and theories of consciousness are not about the same phenomenon but about different phenomena. This is particularly evident in the many cognitive and neuroscientific theories of consciousness to be considered later. Consciousness research remains primarily the study of consciousness from particular disciplinary interests and definitions, and the many meanings of the term are the direct results of this.

37. In the words of Móró (2017, p. 17), 'Contemporary consciousness science is thus an increasingly coordinated multidisciplinary effort that currently includes a wide range of conceptual, philosophical, neural, cognitive, computational, quantum physical etc. approaches'.

38. Velmans (2009, p. 5) points out that the problem of consciousness can be separated into empirical, conceptual, theoretical and even pre-theoretical assumptions. In this regard, Móró (2017, p. 15) adds: 'The issue relates to such perpetual and fundamental questions as the concept of the soul, the mind–body problem, and other metaphysical considerations concerning the nature of reality – all of these have been subjects of philosophical enquiry for centuries'.

No amount of multidisciplinary research can address (let alone solve) the scientific mystery of consciousness without taking into account the diverse concepts being employed and the range of theoretical assumptions that determine theories on the nature of consciousness.

Concluding remarks

The aforementioned examples suggest that consciousness is a complex cultural concept that refers to a complex composite phenomenon, but it is treated as a simple phenomenon by means of simplistic concepts and unidimensional theories. However, it is to be suggested that in addition to these two aspects, a third factor, namely the history of consciousness research, should be accounted for in any reflection on the phenomenon.

It is precisely because of the significance of consciousness in understanding the human condition and what the world is made of that the claim of a crisis in consciousness research is such a bold claim. In view of the overview given in this chapter, the briefest formulation of the *crisis in consciousness research* has two sides. One is the fact that not only are there different conceptualisations and theories of 'consciousness', but they are about different things altogether being called 'consciousness'. The second is that because of conceptual reductionism, most theories of consciousness are not about consciousness but about dimensions of consciousness, and consequently, there are many concepts and theories of consciousness available. These are like two sides of a coin: different concepts are not only treated as a single concept but each of the diverse concepts is taken as if it were the whole. In other words, there is the illusion of progress in 'consciousness research' while it is little more than the proliferation of the concepts and theories *called consciousness*. The scholarly fabric(ation) of consciousness, in many instances, has lost contact with the very mystery it is supposed to solve, namely *the mystery of (human) organismic consciousness*. A great deal of the reason for this is to be found in the research history of consciousness.

Chapter 4

The fabric(ation) of consciousness: The mind–body problem and the binary theoretical framework

Introduction

Consciousness research is subject to many influences and constraints that strongly impact it. Besides the intricate history of the term and the multiplex nature of consciousness as such, discussed previously, there are also the impacts of certain historical developments, such as the cognitive and consciousness revolutions (to be discussed later).[39] However, the most significant influence in consciousness research remains the mind–body problem.

Almost three decades ago, Searle (1993, p. 311) pointed out that most consciousness research does not depart directly from the question of what consciousness is but seeks to address the *mind–body problem*. Today, this is still the case, as very few studies, even with 'consciousness' in the title, directly start from or address the question of what consciousness is or what

39. Two other important historical features that impact consciousness research, the *revolutions* in the neuroscience of consciousness (the so-called cognitive and consciousness revolutions as well as the *neuro-ecological revolution*) will be discussed later in the book.

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the fabric of human consciousness is. Instead, the mystery of consciousness in mainstream consciousness research is basically an investigation of the mind–body problem. This implies, as will be shown, that it ensures it is a dualistically prestructured problem.

In a very neutral formulation, the mind–body problem (or the mystery of consciousness) is how the physical and the mental elements of the human being are related. Historically, this kind of thinking is related to the Cartesian influence that serves as a beacon in solving the problem but also as the lighthouse to warn against the dangerous rocks. Nevertheless, the Cartesian legacy – or better, its philosophical underpinning – continues to spread its legacy in consciousness research.

The mind–body problem is based on a distinct theoretical framework[40] that itself is under pressure. In fact, what will be called the *binary theoretical framework* of mainstream consciousness research is itself being challenged by a *nonbinary theoretical framework*. Each is made up of three distinct components. These frameworks are hardly ever directly discussed in consciousness studies because they are the lenses, so to speak, through which the research takes place. They are mostly invisible to the observers themselves but become important from a third-person perspective if one wants to understand what is going on in consciousness research and why. Both of these frameworks are subject to various assumptions.[41] The objective here is not to discuss any of the options in detail but to show that there are two incommensurable theoretical frameworks that govern current neuroscience of consciousness.

Both frameworks are grounded in what will be referred to as the *human condition*; each framework offers a distinct description and explanation of the human condition. The *mystery of consciousness* and the *mind–body problem* all speak to the same reality: the *human condition*. Therefore, it is hard to find a neutral formulation of the human condition because the language is coloured by these frameworks. Nevertheless, the human condition is foundational to the theoretical formulation of the mystery of consciousness and the mind–body problem. Put differently, the mind–body problem (or the mystery of consciousness) that is so central in mainstream consciousness research is already a theory-specific formulation of the human condition, and the latter can hardly be described as divorced from

40. A 'theoretical framework', as Samuel (1990, p. 4) describes it, is something 'underlying and more basic than a specific theory'. It provides the language and vocabulary within which theories may be framed.

41. Velmans (2009, p. 3) points out that many background elements that make up the sets of nested assumptions inform theoretical positions in consciousness research: 'Is the universe composed of one thing (monism) or are there two (dualism)? Does the world have an observer-independent existence (realism) or does its existence depend in some way on the operations of our own minds (idealism)? Is knowledge of the world "public" and "objective," and knowledge of our own experience "private" and "subjective"?'.

a theoretical framework. On top of that, the mind–body problem is itself grounded in the binary theoretical framework and is materially linked to the human condition. One of the fault lines in consciousness research today is therefore, between studies that depart from the mind–body problem and those that avoid it.

The way to proceed with this analysis is to first present the human condition as neutrally as possible while keeping in mind that the very description is made with theory-laden language. Secondly, the classical description of the mind–body problem will be given, keeping in mind that it is grounded in the binary theoretical framework that will only be described subsequently. However, a full appreciation of the impact of the binary theoretical framework on consciousness research can only be reached once it is contrasted with the features of the nonbinary theoretical framework.[42] Both frameworks go back to the human condition, of which they give distinct explanations, in yet another instance of a catch-22 in presenting a complex issue.

The human condition

Damasio (2018, p. 14) argues that the 'distortion' of our understanding (or misunderstanding) of consciousness is deeply ingrained in the stance from where we are as human beings. This is most evident in the mind–body problem as an expression of the human condition. The human condition will here be presented by means of three components: common-sense duality, common-sense realism and representationalism.

Common-sense dualities

There is widespread recognition of the fact that in ordinary life, most people on the planet are dualists of some kind. In fact, common-sense duality[43] is an operating system most of us use on a daily basis (see Jasanoff 2018, p. 38; Jeeves & Brown 2009, p. 54; Zeman 2002, p. 313), and it finds expression in two kinds of dualism, the mind–body and the body–world dualism. Together, they constitute the view that both human beings and the world are made up of at least two components each, but together they form a harmonious unity, a monism.

42. The terms *binary* and *nonbinary* will be used to avoid concepts such as dualism and monism that are overused and often have different meanings, depending on the framework. 'Binary' simply means *something that is made of two things or parts that are diametrically opposite*.

43. The term *duality* is used instead of *dualism*. The latter is probably the result of a long history of Cartesian dualism. Even though many folk beliefs operate with what many call a *dualism*, the term *duality* better captures that reality (as is to be explained here).

On the one hand, there is the mind–body duality that finds expression in the common ways in which we talk about 'my body' and 'my brain' as if the 'my' and the 'body' are two separate things and is supported by the idea that when the body is destroyed after death, some entity (the soul, spirit or consciousness) lives on (see Antony 2006, p. 463; Jasanoff 2018, pp. 21, 38). In addition to the way humans talk about their selves and their bodies as separate things, certain phenomena such as out-of-body experiences (OBEs) or spirit possession most probably are responsible for supporting and reinforcing the common-sense duality that emerges from intuitive dualism.[44]

Common-sense duality is a universal feature of human societies (see Barrett 2011, p. 81).[45] Throughout history, most people, cultures and religious traditions therefore have also adopted a dualist stance regarding nature: there are two substances and realms in the world, matter and spirit (see Blackmore 2005, p. 3). Anthropologists routinely report on dualist ontologies, and experiencing the world in dualistic terms is probably the default position of most people in history (see Chudek et al. 2018, pp. 354–355; Laughlin 2012, p. 25).[46] In short, history is filled with dualist folk explanations that postulate two distinct substances in the world: physical and mental (matter and spirit). The mind–body duality is the foundation of the mind–body *problem*. Taken together, matter and spirit in the world and body and soul in humans will be referred to as *monistic duality*. On an everyday basis, most humans are monistic dualists.[47]

44. Cognitive psychologist Barrett mistakenly argues that mental constructs explain certain physical or bodily experiences. He claims (Barrett 2011, p. 82): 'This *intuitive dualism* arguably helps explain the cross-cultural recurrence of various notions of mental disembodiment as in soul flight, out-of-body experiences, the persistence of minded ghosts or spirits after death, and even forms of spirit possession'. It is more likely the other way around, as others have argued that embodied experiences resulted in the belief of intuitive dualism. For example, Kemmerer and Gupta (2006, p. 479) argue: 'Taking all of these factors into consideration, it is not surprising that OBEs have been widely regarded throughout history as confirming the intuition that every human being has an ethereal soul that can literally detach from the physical body, most importantly when that body expires'.

45. This connection is explained by Pyysiäinen (2009, pp. 66–67) in this way: 'As natural-born dualists, we humans separate agency from the body, think that "we" direct the movements of "our" bodies, and feel that "we" are going to outlive the body [...] We should thus regard the various conceptions of the "soul" as perfectly natural, culture-specific ways of conceptualizing these panhuman intuitions'. Surveys of undergraduate students, for example in Edinburgh, provide examples of this belief (see Zeman 2008, p. 294).

46. The idea of mind or soul as the nonmaterialistic component of the self or mind is widespread in folk beliefs (see Graziano et al. 2020, pp. 157–158). Damasio (2018, p. 14) claims that given the very way in which 'we see the mind [consciousness] with eyes that are turned inward; and we see biological tissues with eyes that are turned outward', it is not surprising that consciousness tends to have a nonphysical nature.

47. Mauss (1985, p. 3) reminds us that there never existed a human being who has not been aware not only of their body but also of self or personhood. Cross-cultural research shows that even though there are great differences in how they see the relationship, virtually all societies conceive of the self and the body to be separable to some extent (see Laughlin 2013, p. 105). A mind–body dualism that ranges from minimal to extreme is a human universal. In fact, for most of history, humans cherished the idea that the self (soul) is a separate, immaterial part of each of us.

Thus, one could say, according to folk theories, an energy-like essence[48] is the kernel of being human, and in human history, it has been described by many terms: auras, mind, soul, chi, spirit and consciousness, to mention the most common ones. Firstly, this energy-like entity can hold information (like having a subjective experience); secondly, it is a fluidic substance that resides inside a body (or brain) but can move through space and time (sometimes outside the body); and thirdly, it has an energy-like property in that it can physically affect the world (see Graziano et al. 2020, pp. 3–4).

It is called *monistic* because, within the experiential world, things hang together and form a holism of experience. In these views, neither the mind–body duality (the 'souls' or 'spirits' and body distinction) nor the body–world duality are seen as anything other than natural and normal. Souls, spirits, self, consciousness (by whatever name) and other realms are not supernatural (or even unnatural) but coherently part of the experiential lifeworld. These features simply represent how humans and the world are experienced. Like sunsets, even though some components have been debunked by science, they are unlikely to be replaced as experiential reality – humans will probably not stop experiencing them because of theoretical disconfirmation. The human condition, so to speak, is dualistically experienced. But things are not always what they seem.

Common-sense realism and representationalism

The flip side of common-sense duality is common-sense realism[49] or the fact that most people, daily, take their perceptual engagement with the world as true and real. One of the most normal and common things of everyday experience is the remarkably obvious fact that we experience the material world 'out there' and ourselves as conscious beings 'in here' (see Kripal 2019, p. 109). In short, people take perception literally. In our everyday awareness of the world, we obtain knowledge via our senses and organise it in such a way that we are convinced we are experiencing the *real world*.[50]

48. What some call the 'ghost theory' of the mind proposes that humans possess 'an invisible, energy-like or plasma-like mental essence' (Graziano et al. 2020, p. 3).

49. The term *common-sense realism* is preferred to *naïve realism* because the latter carries the impression that it is an aberration only to be found among naïve people, while it is a universal feature of being human.

50. 'The tendency to attend to our mentally perceived surroundings instead of to our bodily senses, at least in post-Enlightenment/Cartesian milieus, creates the illusion that our mental perceptions are independent of our unnoticed bodies. Paradoxically then, our everyday concept of a disembodied mind arises from embodied experiences' (Loubser 2010, p. 187). In the words of Metzinger (2009, p. 42): 'you have the illusion of being directly in contact with the world. And that is how you become a *naïve realist*, a person who thinks she is in touch with an observer-independent reality'. In the words of Solms (2014, p. 178): 'Common sense dictates that reality is identical with what we see. Seeing is indeed believing, but it is not reality. Seeing takes place in the mind'.

Despite the fact that we experience the world through our sense organs, we interpret it as if it is objectively real.[51]

Naïve realism, as this is also known, is the conviction that 'the world is independent of mind or cognition and that things generally are the way they appear in perception or cognition' (see Varela, Thompson & Rosch 1991, p. 16). Most people are understandably *naïve realists* who think they are in touch with an observer-independent reality (see Metzinger 2009, pp. 1, 42; Solms 2014, p. 174). Common sense dictates that objects of perception exist ontologically in the forms in which they are presented by our mental processes (such as perception and cognition).[52] In other words, common-sense realism is not only the basis for the subject–object distinction but also for the common notion of mental representation. The independent world becomes represented in the brain; the world and self are object and subject, and the world is represented by the subject (see Freeman 2000, p. 13ff for a discussion).

In common-sense realism, not only does the world appear as independent from the self, but the self (or consciousness) also seems to be independent from the body. One can say common-sense realism is the mechanism that confirms the double body–world as well as mind–body dualisms. Within this model, things work in all directions. Perceiving an object in the world confirms that it exists and is real, but having a perception of an object can also function to confirm its existence in the world.

In everyday life, common-sense dualism, common-sense realism and representationalism often function as a triad in affirming the existence of things as perceived. This is how humans ordinarily get by in everyday life. In folk or monistic dualisms, there is no mind–body *problem* and no subject–world *problem*. Such dualisms are merely expressions of the given, the experienced, and are not experienced as a *problem*. It is the basis of many folk beliefs about human beings, but in folk traditions it is not a problem.

51. Slingerland (2008, p. 24) talks about the 'empirical prejudice' as the human tendency to take what is experienced as empirical and to base beliefs and decision on such empirical evidence. Following Husserl, Mishara and Schwartz (2011, p. 329) refer to it as 'the natural attitude' as the 'attitude we naturally assume in our everyday experience' (see also Thompson & Zahavi 2007, p. 68). 'The latter is shaped or informed by "common sense" as our default, everyday approach to experiencing the world. Common sense has a protective function in maintaining an unquestioned, "natural" relationship between internal experience and external "reality"'. In the words of Barrett (2011, p. 94): 'Until I have reason to think otherwise, I trust my cognitive faculties and regard their deliverances in nonreflective beliefs as true and justified'.

52. Or in the explanation of Laughlin (2011, p. 65): 'Most people on the planet, even those in monophasic cultures, rarely if ever make a distinction between experienced reality and extramental reality'.

This experienced duality, however, was turned into one of the oldest philosophical problems known to humankind, the mind–body problem. But things are not always what they seem. It is a mistake to assume the ontological reality of the outside world is precisely like that presentation – in many respects, it is not, because consciousness provides a culture-specific and species-specific representation of (or response to) the world (see Merker 1997).

Our understanding (or misunderstanding) of consciousness is indeed deeply ingrained in the stance from where we are as human beings. The mind–body problem goes back to the existential experience of human beings daily, namely that of a body that contains an immaterial 'soul', essence or consciousness. Folk explanations simply, one way or another, affirm this given, and folk explanations of this experience typically echo the content of such experiences and therefore postulate a duality of entities making up the world and human beings. Therefore, monistic duality expresses the rationale for folk explanations of a body–mind (or body–soul) duality and contains the folk explanations for it. But again, things are not always what they seem.

Things are not always what they seem

Scientists in general, as well as neuroscientists, quite correctly point out that often our intuition and common-sense views are wrong, because things are not always what they seem. What looks like white light is really a composition of all the colours of the rainbow, and what humans genuinely experience as sunrises 'really are earth-turnings' (see Spurrett 2002, p. 192). It is a fallacy to accept that vision takes place as the projection of an image onto the visual cortex of the brain (see Ramachandran 2004, p. 24; see also Damasio 2010, p. 15 and Jeeves & Brown 2009, pp. 54–55 for more examples). The advice is to never take the obvious for granted.

At the top of the list are *naïve dualism* and *naïve realism*. The very use of the term 'naïve' here is an indication that consciousness researchers often seek to distance themselves from monistic duality. However, consciousness research is characterised by a rejection of Cartesian substance dualism ('rather dead than a dualist') as well as folk theories of a soul or an energy-like entity (because you are not in touch with an observer-independent reality). But the advice that things are not what they seem cuts much deeper. Science is also under no obligation to explain phenomena in the terms in which they are reported or experienced. In other words, it challenges not only common-sense intuition, such as monistic duality, but also its underlying logic. This can be illustrated by means of the example of sunsets.

Things are not always what they seem, and therefore what we experience as sunsets are earth-turnings, and what we experience as sunsets cannot be explained by means of a sun-movement theory. In other words, not only is the experience of sunsets mistaken, but its logic of sun movements needs to be replaced. However, denying that sunsets are sun movements will not make the experiences go away, and explanations cannot be based on the logic of the experience. Retaining the underlying assumptions of a sun-movement theory does not explain why we, in the first instance, experience the sun as setting. The experience of sunsets need not, and should not, be scientifically explained by means of the sun as setting but also not by an alternative theory about the movement of the sun.

As far as I know, no sun-movement theories exist for sunsets, but that is not the case in consciousness research, where numerous theories of the sun-movement type seek to explain experiences of consciousness in terms of the experiences themselves. In theories of consciousness, many reject the experience of substance dualism but not necessarily the logic of such a dualism. This argument has implications for our understanding of monistic duality as well as consciousness research that departs from the mind–body problem.

Monistic duality is neither an explanation nor a confirmation of either a mind–body or a body–world duality. Just as the sun is setting in our subjective perception and everyday experience, monistic duality is an expression of what is experienced and not an explanation thereof. Monistic duality is the product of the experience of a mind–body and a mind–world duality, and for most people on the planet, they are not a *problem* but merely an expression of lived reality. Just as most people have no problem with experiencing sunsets, they have no problem with common-sense duality or common-sense realism. And just as scientific explanations of sunsets do not remove the experience of sunsets, scientific and philosophical explanations of monistic duality will not make such experiences disappear. It is also important to realise that just as sunset experiences by scientists or even Nobel laureates cannot serve as evidence for the sun-movement explanation of sunsets, the experiences of a mind–body duality by such experts are no evidence of any form of dualism.

Sunsets, flat earth and mind–body duality can all be seen as pseudo-problems if the assumption is that explanations should be provided in their own terms. In other words, it is just as much a fallacy to think monistic dualism should be explained in dualistic terms as it is to think the explanation of sunsets should somehow include the movement of the sun. The monistic duality of our common-sense intuition and 'naïve' realism, which include an energy-like or plasma-like mental essence, are likely distortions because things are not necessarily what they seem. But so is the tacit dualism underneath the mind–body problem.

The mind–body problem and its historical solutions

The beginning of the systematic scientific study of consciousness can arguably be linked to the solution of René Descartes, in the 17th century, of the mind–body problem. He formulated it in what is today known as Cartesian substance dualism. The link between the human condition (monistic duality) and Cartesian substance dualism is unmistakable. However, today, very few scholars still accept the Cartesian solution of substance dualism, and most reject it outright.

This is evident in the various monisms that serve as correction to it. These monisms include physicalism, idealism, panpsychism and dual-aspect monism (to mention the most prominent). While most consciousness researchers reject the Cartesian substance dualism (because there is no such thing as a *soul* entity!), they do not escape the mind–body problem with its dualist logic as such. The reason is because the conceptualisation of the mind–body problem is fundamental to consciousness research in more than one respect. It is not only a formulation of monistic duality as a 'problem', but it reinforces a way of thinking about the 'problem' that is more significant. As Holmes (1993, p. 202) points out: 'Descartes galvanized the discussion of the problem of mind by analyzing it in the terms of dualism with which modern discussion usually begins and, unfortunately, ends'.[53] Rejecting substance dualism is not parting with dualistic logic; a farewell to Descartes is not a rejection of the dualistic logic that created that solution in the first place.[54] And because most consciousness research is not about consciousness but seeks to address the mind–body problem, most solutions carry an implicit dualism.[55] To be sure, Descartes did not invent monistic

53. Zeman (2008, p. 290) points out that the history of consciousness research implanted powerful but potentially misleading notions and assumptions about consciousness. Graziano et al. (2020, pp. 158–159) argue that folk notions have infiltrated the science of consciousness and led to mistaken assumptions. Also, Fuchs (2018, p. 137) argues that Cartesian dualism lives on in both idealism and physicalist materialism.

54. The most comprehensive discussion of how this legacy influenced and is still influencing the neuroscience of consciousness is to be found in Bennett and Hacker (2022, pp. 21–55).

55. How much mainstream neuroscience of consciousness is immersed in the mind–body problem will be shown later. Here, the concern is with two other aspects: firstly, its nature and classical solutions, and secondly, its nested philosophical assumptions.

duality, but substance dualism is his solution to what is perceived as the *problem* of the human condition, monistic duality (see Frith & Rees 2017, p. 3; Glattfelder 2019, pp. 400–401; Ravenscroft 2011, pp. 4–6). His legacy is rather that of dualistic thinking.

The classical solutions

The most significant historical influence on the mind–body problem is without a doubt the Cartesian solution. But, over the years, literally hundreds of answers or solutions have been proposed to the mind–body problem (see e.g. Frith & Rees 2017, p. 3ff.; Seager 2007),[56] most of them seeking to solve the pseudo-problem of the *relationship* between the mental and the physical, mind and body. It is called a *pseudo*-problem because the search for the relationship between the mental and the physical is itself the result of the binary theoretical framework.

In the history of Western thought, the mind–body problem has, broadly spoken, been resolved in one of two ways: dualism or monism. Confirming this schema, Kripal points out that in historical order, the answers that dominated in the last half-millennium of Western intellectual thinking was dualism, idealism and materialism – the latter two both monist positions (Kripal 2019, p. 113; see also Kriegel 2007, pp. 38–39).[57] Both dualism and monism come in at least two versions each.[58]

Dualism comes in two forms: substance dualism and property dualism. Substance dualism, of which the Cartesian formulation is the best known, takes it that there are two independent substances in the world, mental and material, or non-physical–mental entities and non-mental–physical entities. *Mind*, in this view, is a 'non-physical object' (Levine 2017, p. 393). Property dualists think there are only physical entities, but that some of them have two kinds of properties: non-mental–physical and non-physical–mental properties (see Goff 2017, p. 108). The main problem and shortcoming of dualism is to find an explanation for how the two

56. There are many good overviews of all the available theoretical positions (e.g. see Dietrich 2007; Fuchs 2018; Ravenscroft 2011; Velmans 2009).

57. As an alternative map, Freeman (2000) suggests that a distinction between materialists, cognitivists and pragmatists can be drawn. Materialists view consciousness (mind) as physical flow of either matter, energy or information. Cognitivists see it as collections of representations, and pragmatists see consciousness as dynamic structures that result from action in the world (Freeman 2000, pp. 22–26).

58. The difference, in Shermer's (2011, p. 128) explanation, is that 'monists believe there is one substance in her head – brain. Dualists, by contrast, believe that there are two substances – brain and mind [...] Monism is counterintuitive, dualism is intuitive'. The differences are much more complex than this.

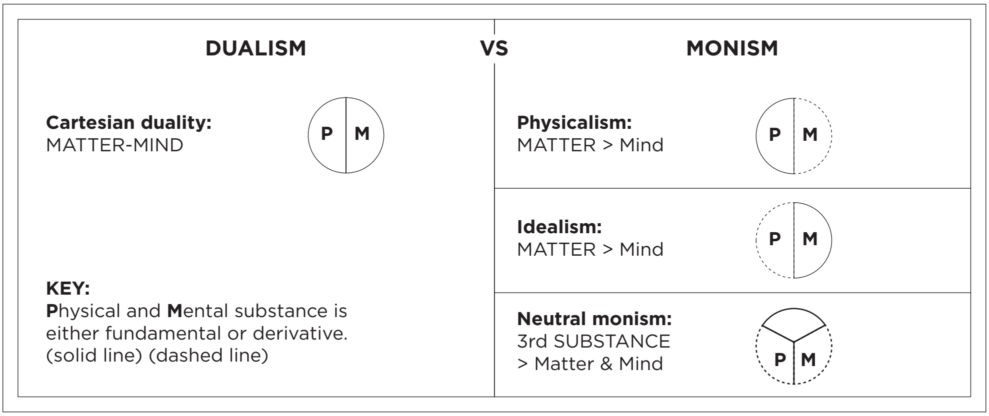
substances, the mental and the material, interact (see Dietrich 2007, pp. 38–39; Glannon 2007, p. 14). This is known as the 'binding problem'.

If 'dualism', at least Cartesian dualism, posits two substances (matter and mind) making up the person, then 'monism' would seem to be the appropriate contrasting term.[59] Monism also appears in two basic versions: a mentalist or idealist sort or a materialist or physicalist sort, and one can be a monist either way (Murphy & Brown 2007, p. 7). Idealism is the position that the mind is fundamental, and matter is a function or expression of the mind (thus, the material world is an illusion), while materialism takes matter as fundamental and the mind as a secondary function or surface expression of matter (see Kripal 2019, p. 113). A more nuanced position of materialism, Kripal (2019, p. 113) says, is *physicalism*:[60] 'the thesis that "the complete nature of fundamental reality can in principle be captured in the vocabulary of the natural sciences," particularly physics'. For some, *physicalism* is used synonymously with *monism* in views that take humans as entirely physical, but the brain is complex enough to support the emergence of mental properties and experiences that have a real influence on behaviour (see Jeeves & Brown 2009, p. 111). It should be noted that idealism is the exact opposite in that mind or consciousness is taken as fundamental and thus represents a completely different kind of monism.

A diagram on the 'Difference Between' web page (see Figure 4.1) clearly illustrates the customary way of thinking about the solutions to the mind–body problem as monisms opposed to dualism. But all are patterned on the physical–mental or the matter–mind duality as either 'matter > mind' (physicalism), 'matter < mind' (idealism) or 'matter and mind' (neutral monism). Very few scholars nowadays subscribe to Cartesian substance dualism but claim to be monists. However, most theories on consciousness share the binary theoretical framework. The reason for this is that, as consciousness researchers often quite correctly point out, things are not always what they seem. A rejection of Cartesian substance dualism is neither a rejection nor a replacement of its binary framework of thinking.

59. See, for example, Sperry (1995, p. 23): 'I have described this new form of mentalism from the start as a quite different intermediate position that is monistic, not dualistic. In my view, mental phenomena as dynamic emergent properties of physical brain states become inextricably interfused with, and thus inseparable from, their physical substrates'.

60. Physicalism is the thesis that 'all human thought and behavior are determined by the laws of neurobiology' (Murphy 2011, p. 1; see also Levine 2017, p. 393).



Source: Redrawn from a figure originally published on Difference Between, http://www.differencebetween.net/language/difference-between-monism-and-dualism/.

FIGURE 4.1: Dualism versus monism.

The binary theoretical framework of the mind–body problem

Despite the rejection of Cartesian substance dualism, insofar as the neuroscience of consciousness remains trapped in the mind–body problem, it continues to display what I will refer to as a *binary theoretical framework* that is based on three pillars: a dualistic logic and a metaphysical realism, together with the notion of representationalism. The rejection of dualism in consciousness research requires more than a confession of monism when the monism itself is steeped in a binary setting. That is the case, as the mind–body problem is an expression of a binary logic that underlies and does not replace Cartesian dualism.

Dualistic logic manifests in consciousness research in two very specific and related features: the mental–physical and the monism–dualism explanatory maps. What Fuchs refers to as the dualistically prestructured framework of consciousness research (see 2018, p. 82) and Velmans the 'dualist vision' (2009, p. 292) that separates the world into two realms, the material and the mental continues to dominate most theories of cognition, perception and consciousness (see also Frith & Rees 2017, p. 3; Velmans 2017a, p. 349).

This mental–physical dualism is the first pillar of the binary theoretical framework. The notion of a *mind* and *body* (or *mind* and *matter* or the *mental* and the *physical*) presupposes two entities in a relationship. For this to happen, the mind (or consciousness) must be reified; it must be seen as a *thing*.[61] This binary is the basis for all the monist and dualist solutions to

61. This is clearly illustrated by Barrett, who maintains that minds are embodied, but that only means they are not identical to bodies, because 'it may be that my mind could leave my body … and even be placed in another body' (2011, p. 24).

the mind–body problem. From the beginning of consciousness research, Walach (2020, p. 3) points out, it was accepted that 'there are both material and spiritual entities in the world'. The very formulation of the mind–body problem presupposed two such entities.

The second component of this binary framework is based on a rejection of common-sense realism (or naïve realism, as some refer to it) but without an avoidance of its binary logic. The relationships between brain and mind, as they present themselves today, according to Fuchs (2018):

> [*E*]merge from a short circuit between the level of natural scientific, in this case, especially neurobiological constructs, and the level of intersubjective, lifeworld experience, from which the neurobiological special practice has developed and with which it remains always bound. (p. 62)

He calls this metaphysical realism (Fuchs 2018):

> [*T*]here is an objective, material world 'out there' which is independent of our process of observation and of our anchoring in the lifeworld, and of which there must, in principle, be a complete, and, in fact, physical description (even if this description must use certain constructs and we can only approximate completeness). (p. 62)

Given these features, it is not surprising that the third component of the binary framework is the notion of representation. The metaphysical realism is at the base of two extreme views on the pregiven world that is *represented* in perception and cognition. These are (Varela et al. 1991):

> [*T*]he Scylla of cognition as the recovery of a pregiven outer world (realism) and the Charybdis of cognition as the projection of a pregiven inner world (idealism). These two extremes both take representation as their central notion: in the first case representation is used to recover what is outer; in the second case it is used to project what is inner. Our intention is to bypass entirely this logical geography of inner versus outer by studying cognition not as recovery or projection but as embodied action. (p. 172)

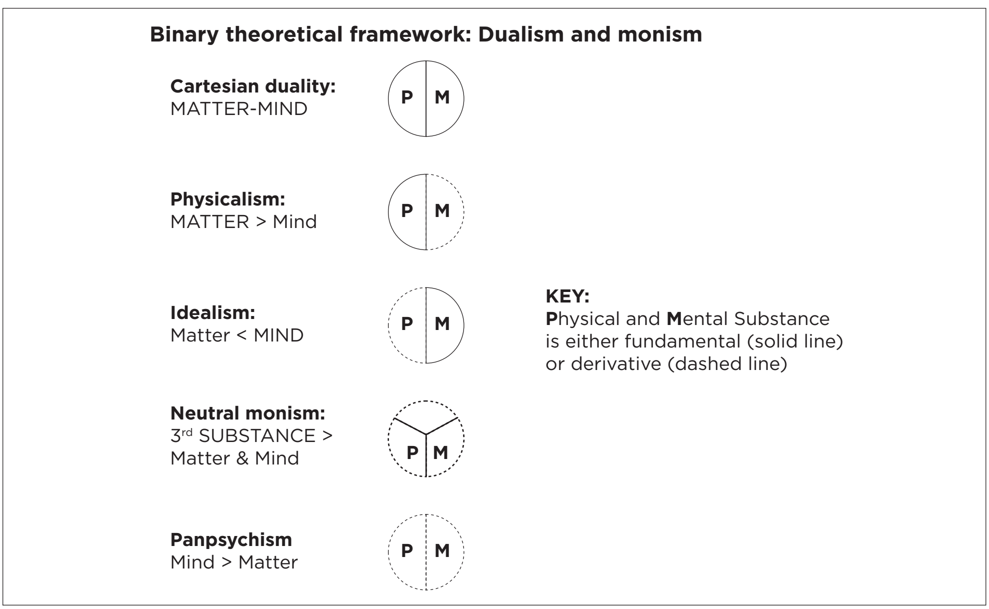
It is this binary thinking that results in the dualisms that characterise mainstream consciousness research and the search to bypass it that characterise the neuro-ecological perspective. Ontologically speaking, this line of thinking results in either (naïve) realism (a pregiven outer world) or idealism (reality is a brain-generated representation). Epistemologically speaking, it is at the base of the body–world dualism (the real world is pregiven independently from the subject).

In view of this, the monism versus dualism diagram in Figure 4.1 is rather misleading because a rejection of substance dualism and the claim of monism are not a replacement for the binary theoretical framework. In different ways, the so-called monist options remain dualisms in disguise. The monist options are also dualistically prestructured.

Instead, the spectrum of so-called dualisms and monisms should rather be presented as different configurations within the binary theoretical framework, as can be seen in Figure 4.2.

In this adjusted and extended diagram of the possible solutions to the mind–body problem, all the solutions, even those claiming to be monist, are dualistically prestructured. They all share a dual structure of two entities (things) in a relationship. They are variations of dualism or monism within a binary theoretical framework. All are configurations of dualism.

Two more remarks should be made in conclusion. Firstly, an acknowledgement of monistic duality is not an endorsement of the mind–body problem or its Cartesian solution of substance dualism. Secondly, the mind–body problem and Cartesian dualism are a solution to monistic duality and not a natural fact. It is not the only way in which the mystery of consciousness can be formulated. The strongest argument against the binary theoretical framework is not an alternative version of the mind–body problem but a complete replacement of it with what I will refer to as a *nonbinary theoretical framework*, which is an alternative for expressing and explaining monistic duality. In fact, from such a perspective, the features of the human condition can be described rather differently.



Source: Author's own work.

FIGURE 4.2: The binary theoretical framework of dualism and monism.

A nonbinary theoretical framework

Despite the significance of the mind–body problem in consciousness research, the latter is not to be restricted to the binary theoretical framework. A nonbinary framework rejects not only substance dualism but questions the value of all versions of dualism (even those disguised as monism) that seek to explain consciousness based on the binary theoretical framework. In other words, it does not depart from the dualistically prestructured mind–body problem with its mental–physical divide. Instead of the three pillars of the binary theoretical framework, a nonbinary framework consists of three interrelated pillars on the other side of the fault lines. The details of this framework will only be discussed in Part 4. This is merely an outline to introduce it.

The term *naturalistic monism* will be used to label the viewpoint that consciousness is a concrete physical process but not based on the outdated standard use of 'physical' (see Jylkkä & Railo 2019, p. 2) and therefore also rejects the traditional mental–physical map. It is physical (naturalistic) in the sense of being the product of the interactions in a concrete biological system.

In the never-ending tug of war between realism and antirealism (or idealism), this framework secondly adopts what is called *integrated realism*. It is a realism based on the acceptance of extramental reality as the world apart from our knowing it, plus the interactions that emerge from the engagement of an organism with that world.

The third set of assumptions contains a replacement of the notion of representation with world-modelling functions that contain sense-making through responding to the world. In a nonbinary theoretical framework characterised by an embodied and enacted view, perception and cognition are not events (representation) happening inside the system; they are the relational process of sense-making that takes place between the organism and its environment (see Thompson & Stapleton 2009, p. 26). *Responding* is unlike *representation*, not just a mental or cognitive process but an embodied one in which neuronal and hormonal reflexes, so to speak, combine.

Things, indeed, are not always what they seem.

Summary remarks

While consciousness is rarely taken as the direct object of investigation, it is present in scholarly discussions via its embeddedness in some disciplinary and historical frameworks. It is of interest to scholars from many different disciplinary fields but, in most instances, carries the heavy historical baggage of the mind–body problem that continues to haunt modern discussions.

TABLE 4.1: A comparative summary of the different frameworks.

Human condition: Monistic duality	Binary theoretical framework: Mind–body problem	Non-binary theoretical framework
Dual entity: Mind and body	Dualistically prestructured	Naturalistic monism
Naïve realism, or realism rooted in the shared life world: Self–world	Metaphysical realism	Integrated realism
Representation	Representation	Responding by means of sense-making
Examples: Folk models	Examples: Substance dualism, monisms (disguised dualisms): physicalism, panpsychism, dual-aspect monism, idealism	Examples: Aspect duality

The crisis of consciousness research is characterised by the term 'consciousness' with a deep-seated history of ambiguity. Some of it has to do with the fact that, in some disciplines, it has a technical meaning, for example, in clinical settings where it is used to identify and describe responsiveness (or the lack thereof) in awake individuals. Other reasons for the complexity of the term have to do with the complexity of the phenomenon at stake. Yet more reasons come from the fact that the term is subject to deep-seated philosophical and theoretical assumptions in its fabrication. The distinction between a binary and a nonbinary theoretical framework is one such constraint that causes a fundamental fault line in current consciousness research. A summary of the two theoretical frameworks is given in Table 4.1.

Rejecting (as in the neuro-ecological perspective) and not just adjusting configurations of the binary theoretical framework constitutes some of the major fault lines in consciousness research (the details will be discussed in Part 4). Therefore, there is a fundamental fault line between studies that depart from the mind–body problem and theories that reject that framework and are non-dualistic to begin with. To be concrete, there is a clear fault line between all theories based on a binary theoretical framework (mainstream neuroscience of consciousness and nonlocal theories of consciousness) and the neuro-ecological perspective that is based on a nonbinary theoretical framework.

Chapter 5

Fault lines in the fabric(ation) of consciousness (research)

Introduction

The heart of the crisis in consciousness research is the fact that the term is used for different concepts, and different theories of consciousness take different explananda as their subject. They theorise different phenomena. Fault lines exist both in the fabric and the fabrication of consciousness and play out in notions of consciousness as well as research traditions. And one way of avoiding and solving the crisis is an awareness of what the fault lines are within theories of consciousness, as well as the fabrication of consciousness in research traditions. In addition to the two theoretical frameworks discussed earlier, several other fault lines characterise it. These vary from notions about the brain and how the brain functions within an organism to ontological and methodological assumptions.

Not acknowledging these fault lines can result in what Jylkkä and Railo (2019, p. 1) call 'false disagreements between theories of consciousness', and one can add false agreements that consciousness research and theories of consciousness are really about the same thing. It is not only the complexity of the phenomenon but also the scholarly fabrication of consciousness, which includes conceptual confusion, the history of consciousness research and theoretical assumptions and research practices, that constitute a crisis. All these result in several fault lines in the fabrication of consciousness that separate approaches from one another.

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Some of the fault lines are more porous than others and should probably be seen on a continuum rather than as opposite poles. These are not topics or features often discussed within consciousness research or among theorists of consciousness but emerge from a meta-analysis. They appear from a third-person perspective, from a critical and comparative analysis of consciousness research as such.

The objective here is merely to draw the most important (fundamental) fault lines and not to fill in the details. That will take place in the presentation of the three distinct research traditions in consciousness research later in the book. In short, these fault lines are the basis of the identification of the three research traditions that characterise the landscape of current consciousness research. Nested theoretical and methodological assumptions that fall on various sides of these fault lines make up these traditions. And to complicate this picture, there are not only fault lines between the distinct research traditions but even minor fault lines within them. 'Consciousness' is something completely different, depending on the specific research tradition or where it falls between these fault lines. The detailed impact of these fault lines will become apparent in the discussion of the three research traditions. These lines often criss-cross each other and appear in unique combinations. The important point, however, remains that views on either side of each of these lines represent ontologically distinct phenomena.

Four fundamental fault lines characterise the landscape of consciousness research.

Consciousness: An entity or a process

Friston remarks that he finds it hard to engage with conversations on consciousness because many who pose the questions often assume that the mind (and thus consciousness) is 'a *thing* whose existence can be identified by the attributes it has or the purpose it fulfils' (2018, p. 1). This remark alludes to a first fundamental fault line in consciousness research: consciousness as an entity or a process. It cannot be better formulated than in the words of Fuchs (2018):

> The basic problem of neurobiological research into consciousness consists, when all is said and done, in the reification of consciousness itself. It then no longer appears as an activity of living organisms, no longer as a relationship between subject and the world which transcends the boundaries of the body. It is rather transferred into the objective world, as if it were an object in spatiotemporal reality which could be physically described or, at least, made indirectly visible by physical means. (p. 45)[62]

62. In this regard, Laughlin (2011, p. 19) also points out that 'Indo-European language tends to reify events which are essentially processual in nature'.

The importance of these observations can hardly be overemphasised. This fallacy (reification of consciousness) forms the basis of a leading assumption in much of consciousness research: if consciousness and the self were to exist, they would have to be independent entities or things (see Thompson 2015, p. 322).

The reification of consciousness is based on a Newtonian legacy that all complex entities are either mere aggregates or mechanisms. Murphy and Brown (2007) explain this in the following way:

> Aggregates are collections of parts that do not interact (e.g. marbles in a bag). Mechanisms (e.g. mechanical clocks) are entities made of inert and separate parts that move one another in a determined order and are not themselves affected by their relations with the other parts. This assumption is at the heart of causal reductionism, the view that the behaviour of the parts of an entity (or the laws governing the behaviour of the parts) determines the behaviour of the whole unilaterally. (p. 10)

At the heart of this view is a notion of causation that has a much longer history in Western thinking and which Juarrero takes back to Aristotle, which is the principle that 'nothing moves or changes itself' (Juarrero 2000, p. 25). It can metaphorically be explained with the 'billiard ball collision' conception of causation. In this atomistic reductionism, it is thought that atoms have priority over the things they constitute (see Murphy & Brown 2007, p. 48).

This is part of the theoretical framework within which both mainstream neuroscience of consciousness as well as new-materialist and non-materialist theories of consciousness operate in treating consciousness as a thing. A neuro-ecological perspective falls on the opposite side of this fault line in operating with a completely different ontology, a systems ontology. Two major shifts in the biological sciences away from these views hugely impact our understanding of consciousness. One is a different view on causation that takes place in complex systems, and the other is a shift from mechanistic to systems thinking (see Murphy & Brown 2007, p. 67). This will be discussed later.

The fallacy of reification draws one of these basic fault lines in consciousness research between consciousness as a thing or as a process. This fault line separates mainstream neuroscience of consciousness and, ironically, nonlocal theories of consciousness from neuro-ecological theories that see consciousness not as a thing but as a process. Consciousness is not something you have but something you do – it is not something you experience but the way in which you engage with or experience the world. This is the difference between phrases such as *our experience of consciousness* and *consciousness as the way in which we experience*.[63]

63. While Friston distances himself from the idea of consciousness as an entity, he does not share the other assumptions of a neuro-ecological perspective. Seeing consciousness as a complex brain process, as he does, is not the same as seeing it as a complex ecological process of which the brain is only a part.

A (neuro)biological or a nonbiological phenomenon

In the previously quoted description of Fuchs, the second fundamental fault line is already visible, namely between those who see it as a (neuro)biological[64] and those who see it as an antibiological phenomenon. In theoretical terms, the fabric of consciousness is based either on the model of the dynamics of meaning and being of sentient processes in living systems or a physics-based reality model (see Holvenstot 2011, p. 244).

The first is based on the fact that humans are the only organisms that we know for sure to be conscious or to display consciousness, and therefore, it is taken as the starting point for reflection about consciousness. One thing we know for sure is that *we are because we are conscious*. In this view, consciousness is a biological phenomenon, and any explanation should account for this fact.

However, consciousness research displays a deep fault line between those who depart from its (neuro)biological substrate and those with a nonbiological or even an antibiological stance. Equating consciousness with information-processing, Searle (2000, p. 576) calls these views 'profoundly antibiological'[65] and points out that in these views, brains do not really matter because any hardware that could carry out the information processing would be equally conscious.[66]

The antibiological side contains many more versions than just views on consciousness as information-processing. Thus, there is yet another fault line between (neuro)biological concepts of consciousness and those who see it as a fundamental aspect or entity (such as mass and energy) of the universe (as in panpsychism) or of human beings (as in new-materialist theories). Notions of nonlocal consciousness or consciousness as a feature of matter are fundamentally antibiological. In the first instance, its existence does not depend on a biological organism, and in the latter instance, it is taken as a (yet unrecognised) feature of matter.[67] In the summary of Feinberg and Mallatt (2018):

64. The term *(neuro)biological* is deliberate to cover neurocentric views that link consciousness exclusively to the brain as well as theories that resituate the brain within an organism.

65. Computational models of consciousness suggest it is independent of both neural structure and subjective experience (see Feldman 2022, p. 27).

66. For an evaluation of the computational theory of mind, see also the discussion of Gabriel (2012).

67. Although some argue that it requires an alteration of our view of matter and could thus be seen as material (in the sense of a new materialism), this view is imbued with additional assumptions that need consideration.

> [*W*]e must distinguish purely computational mechanisms – for example, those of computers or any other known nonliving computational device – as well as the cognitive theories of consciousness that likewise center on information-processing, from theories that invoke the biological and neural properties of a living brain. (loc 2169)

The Holy Grail of consciousness research, or the question as to what consciousness is (the *problem* or *mystery* of consciousness), is formulated as either a 'biological problem' (Searle 2000, pp. 557, 558) or a nonbiological one steeped in the logic of a physical model.

Consciousness: A feature of brains or of organisms

In the neuroscience of consciousness, a third fundamental fault line divides researchers who agree that consciousness is closely linked to brain functions as a feature of an organism that also harbours a brain. This fault line separates neurocentric from embodied and enacted studies on consciousness.

On the neurocentric side, the brain is not only sufficient but all that is needed for consciousness, while on the other side, consciousness is seen as a systemic-biological phenomenon that belongs to organisms with brains. On the one hand, consciousness is seen as grounded in brain processes – thus, neurocentric. Further, embedded in neurocentric views, there are clear fault lines between the whole brain and particular parts of the brain as well as between the specific parts of the brain that are credited with consciousness. A recurring accusation in neurocentric studies of consciousness is that 'the others' are completely mistaken in localising consciousness in particular brain areas only (the cortex or the brain stem) or between these and whole-brain views. If consciousness is a feature of organisms with brains, most of those debates are misguided, irrespective of how fiercely they disagree or claim to have located consciousness in some specific brain area or function.

On the other hand, consciousness is seen by other neuroscientists as not limited to the brain but invokes the body and the environment as the location of consciousness. In other words, the location of consciousness can be found in either neuro processes, neurobiological processes and neuro-bio-ecological processes. In each one of these views, consciousness is something fundamentally different from the others.

These fault lines criss-cross in strange ways. For example, some see consciousness as a process – either of the brain or of an embodied being (with a brain) that is situated in the world – rather than as an entity. Brain and embodied notions of consciousness represent completely different notions of the fabric of consciousness.

Consciousness: A unidimensional or a multidimensional phenomenon

The phenomenology of consciousness as a complex composite phenomenon consisting of different kinds, types, modes and so on gives rise to yet another fundamental fault line between those who see it as unidimensional and those who regard consciousness as such as a multiplex phenomenon with many different dimensions.

What the many consciousnesses share is that as a multiplex phenomenon, it includes being awake and aware, perceiving, feeling, thinking, remembering, paying attention, focusing and experiencing, to mention the most obvious components. Thus, one can say consciousness as a multiplex phenomenon is awareness *and* awakeness *and* attention *and* affect *and* perception and cognition and so forth, but as a complex composite phenomenon. However, none of these aspects in themselves constitute *consciousness*. In other words, consciousness contains many dimensions, but none of these in themselves necessarily equals consciousness. Consequently, there is a fault line between consciousnesses and dimensions of consciousness or between unidimensional and multidimensional concepts and theories of consciousness.

Unidimensional and multidimensional concepts correspond to mongrel and cluster concepts, respectively. Multidimensional definitions of consciousness seek to account for consciousness as a multiplex phenomenon and accommodate the clustered features. Most definitions of consciousness nowadays are, however, unidimensional. In a previous chapter, it was remarked that consciousness is a mongrel concept as it represents many different concepts of consciousness. With a mongrel concept, a different dynamic is at work than with a cluster concept. The mongrel features follow from the mereological fallacy and the consequent proliferation of concepts of consciousness. Consequently, there is a clear fault line in consciousness research between unidimensional and multidimensional definitions of consciousness.

Multidimensional definitions aspire to account for consciousness as a multiplex phenomenon and are rather described than defined with a single denominator. This is, for example, illustrated by the multiplex definition of Porath (2008, p. 649): 'By "consciousness" I mean the continuing reconfiguration of the body's perceptual awareness of its environment and the body's reconfiguration of awareness in relation to itself'. Trying to define consciousness as a multiplex phenomenon, Tague (2021, p. 2) says, is like 'describing how a cloud feels'. The real challenge in consciousness research is not to privilege some constituting components but to acknowledge and theorise the complexity of the many constituting dimensions and mechanisms.

Multidimensionality is a feature of neuro-ecological theories of consciousness. From this perspective, consciousness is a complex neurobiocultural phenomenon and reducing it to single aspects or components takes away its essential characteristics. Many consciousness definitions nowadays are, however, unidimensional, suffer from the mereological fallacy and take it that consciousness is not that difficult to understand and explain. They are characterised by the *consciousness-is-just* type of concepts and definitions.

Unidimensional definitions theorise 'consciousness' but also contain a concept of what each is a theory about. In other words, the fabrication of consciousness in a unidimensional manner result in the fabric of consciousness as a unidimensional phenomenon. The dimensions of consciousness become 'consciousness' with the result that definitions of different phenomena and not different definitions of the same phenomenon characterise the neuroscience of consciousness. The list, as indicated earlier, contains many of the following: *cognition*, *awareness*, *experience*, *awareness of cognition*, *affect* and *feeling*.

More than anything else, the distinction between unidimensional and multidimensional definitions of consciousness illustrates the crisis in that they produce theories about different phenomena and not different theories about the same multiplex phenomenon.

■ Fault lines on the fabric(ation) of consciousness

The fabric of consciousness can be dealt with by means of four related aspects: how it functions, what it is, where it comes from and how it is generated. As with almost everything in this complex domain of research, there is no agreement on what consciousness is or where it comes from. Consequently, the kind of things referred to as consciousness and the kind of thing consciousness is taken to be are in mutual interaction. What one thinks about the one influences the other – hence the term fabric(ation). Thus, the terms *theory* or *theories of consciousness* are ambiguous and have more than one meaning. A theory of *consciousness* can be about its functions and features, its fabric or nature or even its origin and generation. They overlap in that in some explanations, such as panpsychism, what it is taken to be at the same time explains where it comes from.

Consequently, the question 'what is consciousness?' can be answered in different ways. It can be dealt with by looking at the phenomenology of consciousness – that is, describing (and theorising) the features and functions of consciousness, what consciousness does and where and how it functions. I will refer to these as functional theories of consciousness.[68] It can also be answered by looking at two related aspects, namely, the nature and origin of consciousness.

Theories that seek to explain what consciousness is as a feature of human beings, of brains or of nature will be referred to as ontological theories of consciousness. They typically address the mystery of consciousness (or the mind–body problem) and speak to the kind of things that consciousness is taken to be in the world, or what I call the fabric of consciousness, and include such theories as epiphenomenalism and panpsychism. Closely related to the nature of consciousness is the question of where consciousness comes from or how it is generated. These will be referred to as mechanistic theories of consciousness. They can be separated into two classes: there are broad range theories and very specific theories about the mechanism that generates consciousness. There are, therefore, clear fault lines not only between the different classes but also within them.

Most scholars do not bother to make the above distinctions. In fact, many claim that an answer to the one is an answer to the other.[69] It will be illustrated that in the neuroscience of consciousness, claims about the function of consciousness are used to postulate about the ontology (fabric) of consciousness. Theories on nonlocal consciousness also do not speak on this distinction and completely avoid any theory on the function of consciousness.

The fabric of consciousness can vary from a fundamental feature of nature to an illusion created by the brain or just an emerging property, either of the brain or of its functions, and can even be seen as only a systems phenomenon that is produced by living organisms. Theories of consciousness that fall on either side of these fault lines fabricate quite distinct notions of consciousness. In different configurations, these all parade in the wider field of consciousness research in the three research traditions.

68. Within the cognitive and neurosciences, there are numerous theories of consciousness that seek to explain the processes of how the brain produces consciousness. Most cognitive theories of consciousness are functional theories. Function is used in the sense of explaining how the cognitive system performs certain functions like reporting on awareness (see Chalmers [1995] 2017a, p. 34). Varela argues that what he refers to as the 'functionalist' versions of naturalistic explanations in the cognitive sciences are probably the most popular and dominant (see Varela 1996, p. 333). For a historical view on *functionalism* see Kelly (2007, loc 501ff.).

69. Frankish (see 2016a, p. 11), for example, mistakenly remarks that typically theories of consciousness address the hard problem of consciousness – that is to say, explain the mystery of consciousness. That is not entirely true, because most 'theories of consciousness' do not even address the mystery of consciousness but seek to explain the functions and operation of consciousness.

Fault lines in implicit brain models

The relationship between consciousness and the brain is not only extremely complex but variously conceptualised. There is general recognition that, somehow, consciousness is related to brain states. In the explanation of Flohr (2006; and see Salzberg 2019, pp. 1–2):

> It is undisputable that the processes in the brain and the phenomena of consciousness are somehow connected. By intervening in the brain's normal functioning, consciousness can be eliminated (e.g. by the administration of anaesthetics), modified (e.g. by psychedelic drugs) or even generated (e.g. by electrical stimulation of the cortex). It can also be shown that conscious states are correlated with certain physiological events. For example, it has long been known that EEG [*electroencephalogram*] frequencies during states of unconsciousness, as in non–REM [*rapid eye movement*] sleep or anaesthesia, differ from those registered during awake states or phases of REM sleep. (p. 12)[70]

However, how consciousness and the brain are connected is neither clear nor agreed upon. Several fault lines characterise the role of brain models and the function of the brain in consciousness research. These fault lines affect either the way in which the brain itself functions or in its role as an organ in the body.

The first fault line is between theories that make a causal link between consciousness and the brain and those that see consciousness as independent from the brain. Most consciousness theorists see a close connection between consciousness and the brain: *no brain, no consciousness*. A smaller group of theorists argue that consciousness can exist independently of a living brain or see it as a feature of matter (that is not necessarily related to brains) or a separate entity. Thus, they maintain that somehow consciousness is not produced by the brain but only related to it as an independent feature or an undiscovered element of nature. Often, the metaphor of a radio receiver is used to explain that the brain is not a producer of consciousness but merely a receiver. This is known as the filter model of brain and consciousness.

A second fault line exists between neurocentric (brain-based theories) and non-neurocentric (embodied and enacted) theories of consciousness. Many neuroscientists see consciousness as a brain and brain-only phenomenon (mainstream neuroscience of consciousness), while a small but growing number see it as a combined brain–body–environment phenomenon (neuro-ecological theorists).

70. The neural involvement in consciousness is undeniable, given the overwhelming body of evidence linking consciousness to brain activities, but at the same time, its neural basis remains elusive (see Giacino 2005, p. 381).

A third fault line appears between localisationism and holism. Localisationism links mental functions to specific brain areas, and holism sees them as distributed across different neural areas.[71] This fault line between localisationism and holism goes back to the 18th century (see Fuchs 2018, p. 46) and is variously labelled.[72]

In the 19th century, functional specialisation was dominated by the theory of Franz Gall (1758–1828), who proposed that cognitive faculties are localised in specific brain regions. This was the beginning of a movement known as phrenology.[73] This fault line is widely recognised, with the added acknowledgement that localisationism is the dominant view in the neuroscience of consciousness. It forms the backbone of the main experimental research programme in mainstream neuroscience of consciousness, namely the search for the neural correlates of consciousness (NCC). To be sure, neither localisationism nor holism is how the brain is or functions, but they are models about it. While most neuroscientists will admit to a holistic perspective, it is the localisation fallacy that drives its main experimental project, the search for the NCC.

Within the spheres of neurocentrism and localisationism, a fourth fault line separates theories based on which brain areas are involved in the creation of consciousness: the cortex, the brain stem or some other areas. In the discussion of mainstream neuroscience of consciousness, it will become apparent that many different brain areas are suggested as the seat for consciousness.

The fifth fault line on brain models and consciousness is related to views on how the brain functions internally. There is a long history of disagreement on whether the brain functions reflexologically (as an input–output system in response to the senses) or self-referentially (based on an internal state

71. I follow the terminology of Vidal (Vidal 2009, p. 16), who shows that there is a fluctuation in the neurosciences between localisation and holism. The same fault line is differently labelled by others and will be described in detail in Part 2.

72. Current labels differ considerably for the same divide. Searle (2000, p. 563) describes it as the difference between a 'building block approach' and an 'unified field approach'. Negrao and Viljoen (2009, p. 265) call it the 'neuronal specificity approach' versus the 'holistic approach to consciousness', while localisationism is also described as the 'Lite-Brite model' of the brain (see Klein, Hohwy & Bayne 2020, pp. 5–9) or by others as theories of modularity (see Fuchs 2018, p. 46). Figdor (2010, p. 422) distinguishes between localisationism and integrationists.

73. The history of Gall and phrenology is well-documented (see e.g. Jasanoff 2018, p. 17ff.) and goes back to the 18th century (see ffytche 2005, p. 168).

TABLE 5.1: Fault lines in brain models.

Brain-dependent	**Brain-independent**
Neurocentric	Non-neurocentric: Embodied and enacted or nonlocal
Localisationism: Cortex – brain stem – other	Holism: Brain in body
Reflexological: Input–output	Self-regulating: Intrinsically
Representation	Response

of the brain).[74] In the description of Raichle (2010; see also Hobson 2009, p. 809):

> One view [...] posits that the brain is primarily reflexive, driven by the momentary demands of the environment. The other view is that the brain's operations are mainly intrinsic involving the acquisition and maintenance of information for interpreting, responding to and even predicting environmental demands. (p. 180)

This gives rise to yet another fault line between views that see the brain as functioning inferentially and representationally or as responding to the environment.

The fault lines on brain models can be captured in a basic template that merely sketches the potential options (see Table 5.1).

In summary, views on consciousness and the brain display a huge variety. These fault lines on brain models also criss-cross one another in numerous configurations as well as with other fault lines. On the one hand, there is a spectrum of views that link consciousness to the cortex, to the brain stem, to the whole brain or to the brain as just an organ within a body (organism). In unidimensional theories, brain models often pair with numerous other assumptions (such as cognition or affect) to arrive at positions attributing consciousness to very particular brain areas. On the other hand, there is also a divide between studies that see consciousness as a feature (or entity) of the brain itself (or parts of the brain) and those that see the brain as merely involved in the production of consciousness. There are also models that see the brain merely as a receiver that registers and transmits consciousness. And, as will become clear, all these views find support in brain-scanning studies.

74. Llinás (see 2001, p. 6) shows that since James, there were two opposing views on the working of the central nervous system. James himself viewed the central nervous system as fundamentally reflexological, which means it is essentially a complex input–output system driven by the momentary demands of the environment. Sensations drive movement, which is fundamentally a response to a sensory cue. Another view, championed by Graham Brown, believed that the spinal cord is not organised reflexologically but as a system organised on a self-referential basis by central neuronal circuits that provide the drive for the electrical pattern generation required for organised movement. Here the brain is conceived as a closed system. This distinction is also referred to as the brain being stimulus-driven or spontaneous (see Shermer 2008, p. 69).

Neuroconstructivist versus embodied epistemologies

The entangled philosophical assumptions that characterise the field of the neuroscience of consciousness can also be considered from the fault line between neuroconstructivist and embodied epistemologies. The neuroconstructivist position contains two sets of elements that are closely related: reality is an illusion, and phenomenal consciousness does not really exist but is an illusion created by the brain. Based on a combination of materialism and an idealist epistemology, neuroconstructivism promotes the idea that the outside world is radically different from its representation in consciousness and that all that exists are material things (atoms, waves, etc.) that are constructed as representations of the world. All that we can know are the representations in our minds. Similarly, the brain is a material object with electrical and chemical reactions and experiences, or phenomenal consciousness is one of the illusions it creates. This has become a leading epistemology in mainstream neuroscience of consciousness.

As will become clear, an embodied epistemology is, in short, a reference to an embodied and enacted epistemology that defends a diametrically contrary view of the world and consciousness. A real world exists and comes into presence through the active engagement of living bodies with it. Consciousness is the process through which the world becomes present for a subject. These epistemologies display the residues of the binary and nonbinary theoretical frameworks, respectively.

Concluding remarks

The fault lines in consciousness research confirm the picture presented by the conceptual analysis: 'consciousness' is about many different things. These fault lines really show that within consciousness research, distinct phenomena and explananda are taken as the subject of investigation. It can be illustrated with the popular slogans used to describe consciousness – *you are your brain*, *you are without your brain* and *you have a brain* are all manifestations of these fault lines. They cannot all be true at the same time because they represent contradictory and incommensurable beliefs and assumptions about the brain, human beings and consciousness.

Table 5.2, listing the main fault lines, gives an impression of the complexity that the *fabric(ation) of consciousness* faces.

While the previous overview strongly suggests that theories and concepts of consciousness really are theories about different phenomena and not different theories about the same phenomenon, it is not yet the

TABLE 5.2: Main fault lines.

Consciousness an entity	**Consciousness a process**
Nonbiological phenomenon	Biological phenomenon
Feature of brain (neurocentric)	Feature of organism (embodied and enacted)
Unidimensional phenomenon	Multiplex phenomenon
Fabricated by nature (panpsychism)	Generated by the brain or body
Fundamental element of nature	Fabric: Emerging or epiphenomenon
Brain model:	Brain model:
• Brain-dependent	• Brain-independent
• Neurocentric	• Non-neurocentric: Brain in body or nonlocal
• Localisationism: Cortex – brain stem – other	• Holism: Brain–mind in body
• Reflexological: Input–output	• Self-referential
• Representation	• Response
Neuroconstructivist epistemology	Embodied epistemology

Source: Author's own work.

full picture of what is going on in consciousness research. One of the contributions of this book is to describe and analyse the major research traditions on consciousness in terms of these fault lines. In each instance, what consciousness is taken to be and what is taken to be consciousness are conceived in completely different ways. Disagreements in consciousness research regarding what it is follow not only from different theories of the same phenomenon but also from different theories about different phenomena being labelled by the same word.

In view of this picture, the landscape and fault lines in consciousness research can be drawn more clearly. On a broad canvas, at least three research traditions can be identified in consciousness research. Each is made up of nested assumptions and comes up with its unique fabric(ation) of consciousness. Consequently, there also are clear fault lines between these traditions. The fault lines run not only between research traditions but sometimes also within them.

One of the objectives of this book is to show that current consciousness research can be presented by means of three distinct and mutually exclusive research traditions – each one claiming to present and explain what consciousness is, where it comes from and where it is to be found. But they operate with distinct concepts of consciousness, are based on unique sets of nested assumptions and come up with completely different notions on the ontology (fabric) and phenomenology (fabrication) of consciousness.

The three distinct research traditions are *mainstream neuroscience of consciousness*, the *nonlocal theories of consciousness* and the *neuro-ecological perspective on consciousness*. They differ on at least three fundamental issues: the fabric of consciousness (what consciousness is), the fabrication of consciousness (how consciousness is generated) and where to find it (how to study it).

The most significant fault line in consciousness research that emerged over the last three decades is, on the one hand, between neuro-ecological theories that conceptualise consciousness as a systems feature of living organisms and neurocentric theories that see consciousness either as a function in the brain or outside of brains in matter itself. This fault line separates cognicentric and neurocentric theories from embodied and enacted theories but clearly separates neuro-ecological theories from all neurocentric and nonlocal theories.

Amidst widespread agreement on the importance of consciousness and its significance for understanding the human condition, there is no agreement on what that significance is or what consciousness is, where to find it or how to study it. One of the central claims of this study is that consciousness research is, in fact, in a crisis. This is not a normal case of concern or of scholarly disagreement about theories or research findings but an indication of a crisis in research of the last surviving scientific mystery of the 21st century. The crisis is evident in both the fabric and the fabrication of consciousness. In other words, the crisis manifests on conceptual, ontological and theoretical levels. To say it again, the problem is that not only are there different conceptualisations and theories of 'consciousness', but they are about different things altogether being called 'consciousness'.

While most consciousness researchers take it for granted that the majority view of mainstream neuroscience of consciousness is also the correct view, let it be said once more that things are not always what they seem. Consciousness research, if it were to progress, should at least take note of the tacit factors that play a role in the fabric(ation) of many different versions of consciousness.

PART 2

The fabric(ation) of consciousnesses in mainstream neuroscience of consciousness: *You are your brain*

Not without reason, Rose (2012, p. 54) refers to consciousness as the ‘hottest theme in brain research’. While they also study various other aspects of the brain, for many neuroscientists, ‘consciousness’ has become *the* central topic of interest over the last few decades (see Damasio 2010, p. 17; Lau 2017; Searle 1993, p. 310). In fact, many neuroscientists nowadays claim to represent *the* actual scientific study of consciousness, and the mainstream neuroscience of consciousness promotes itself as the champion to solve the last scientific mystery of the 21st century (e.g. see Baars & Gage 2010, p. xv; Klink et al. 2015). Thus, because consciousness is such a ‘thriving industry’ and a ‘buzzing business in neuroscience labs and brain institutes’ (Paulson 2017, p. 1), it is an opportune place to start an investigation of what ‘consciousness’ means. A general overview of this complex domain of research with many different viewpoints, theories and concepts of consciousness is hard to come by.

‘Mainstream’ in the title of Part 2 does not at all suggest a unified or monolithic approach to or concept of consciousness in the neurosciences. Instead, it is ‘mainstream’ because of its numerical domination of publications within the neuroscience of consciousness. Within the neuroscience of consciousness, there are also other research patterns, most notably the neuro-ecological perspective, which comes up with a different fabric(ation) of consciousness.

Even though many neuroscientists nowadays claim that consciousness is easy and straightforward to understand, it is not easy to say what ‘consciousness’ in mainstream neuroscience of consciousness is. The two main reasons are, firstly, the proliferation of concepts of consciousness and, secondly, the large number of ‘theories of consciousness’. Within the neuroscience of consciousness, more concepts of ‘consciousness’ exist than in all other research trajectories together. Not only are there many 'theories of consciousness' but different kinds of theories, all claiming to explain what 'consciousness' is. Thus, the suggestion of this critical analysis is that in mainstream neuroscience of consciousness, more theories about reductive notions of consciousness are produced than in all other consciousness studies together. However, despite the variety and spectrum of theories, mainstream neuroscience of consciousness shares a remarkable uniformity. Irrespective of the many concepts and theories, they display similar features.

These concepts and theories of consciousness will be presented by means of six features: they are cognicentric, unidimensional, corticocentric, neurocentric, neuroreductionistic and trapped in dualistic thinking. This characterisation of mainstream neuroscience of consciousness is based on a critical analysis that contains the spectrum and diversity of concepts and theories of consciousness, as well as the search for the underlying nested assumptions. In other words, it is not only presenting what is on offer in mainstream neuroscience of consciousness but also seeks to determine and explain why that is the case; this is a third-person perspective on mainstream neuroscience of consciousness. The claim is that the crisis in consciousness research is more strongly fed from this trajectory with its numerical domination of publications than any other single research tradition. The aim is not so much to echo what scholars are saying but also what they are *not* saying, as well as why they say what they say.

This will be explored by looking at five aspects that impact this stream of research:

- the historical and theoretical framework of mainstream neuroscience of consciousness
- brain models and notions about how the brain works
- the two focal points of mainstream neuroscience of consciousness, namely the hard problem of consciousness and the search for the NCC
- the many theories and kinds of theories of consciousness in mainstream neuroscience of consciousness.

While it seems logical to start with the two main focal points in the neuroscience of consciousness, a critical analysis needs to first look at the building blocks of the approach. Therefore, the interpretive framework and the brain models and theories are considered prior to an analysis of the search for the NCC and discussions on the hard problem of consciousness. The final chapter will, however, turn towards the dominant public presence of the neuroscience of consciousness, namely the many functional and mechanistic theories of consciousness.

For reasons that will hopefully become clear in the analysis, the word 'consciousness', when written below in italics as *consciousness*, carries the suggestion that it is not really about consciousness as such but is used for one of its many fabrications. This is a bold claim to make about the dominant research tradition in consciousness research. However, it is hard to avoid the conclusion that much of mainstream consciousness research is not really about consciousness, and many of the different theories of *consciousness* are not different theories about human consciousness but about differently fabricated phenomena altogether.

In Chapter 6, the historical antecedents of consciousness research in the neurosciences are discussed. A remarkable feature of the neuroscience of consciousness is that 'consciousness as such' has never been a central focus or object of study. Instead, it entered as the co-lateral topic of the cognitive and consciousness revolutions to which the neuroscience of consciousness is deeply indebted. A first prominent feature of consciousness in the neuroscience of consciousness emerges from this, namely its cognicentric nature.

Chapter 7 focuses on the brain models and theories of how the brain functions in producing 'consciousness' in a mainstream neuroscience of consciousness perspective. The most important insight is that in the neuroscience of consciousness, there is no unified or singular notion about the brain or any aspect of how it works. Three more prominent features of mainstream neuroscience of consciousness are identified that directly impact the fabric(ation) of consciousness: corticocentrism, neurocentrism and neuroreductionism.

It is widely agreed that in the neuroscience of consciousness, the search for the NCC and the hard problem of consciousness constitute the two focal points of research on consciousness. A critical analysis of these two areas of research highlights the fabric(ation) of consciousness. Chapter 8 looks at the search for the NCC as the site where most of the experimental research on consciousness is conducted. It will illustrate how brain models and particular concepts of consciousness come together in fabricating claims about the mystery of consciousness. Chapter 9 takes a critical view of the fabric(ation) of consciousness in the neuroscience of consciousness. Together with the discussion of functional and mechanistic theories of consciousness in Chapter 10, these chapters illustrate the proliferation of theories called 'consciousness'.

Chapter 6

The historical landscape of *consciousness* research in the neurosciences

Introduction

What *consciousness* is in mainstream neuroscience of consciousness is directly dependent on its research landscape. Two sets of historical factors previously identified dominate this landscape: firstly, the binary theoretical framework and, secondly, its historical and disciplinary features. The impact of the former will be considered subsequently. Mainstream neuroscience of consciousness is, however, also directly linked to two significant aspects of the landscapes that shape its outcomes. One is the disciplinary landscape, and the second is the cognitive and consciousness revolutions.

Although it deserves more attention, the disciplinary landscape will only briefly be introduced. The two main historical beacons from the previous century that shape the landscape of consciousness research in the neurosciences are the cognitive revolution and the consciousness revolution in the neurosciences. These historical developments, to this day, very much contribute to the theoretical framework of consciousnesses and provide the basic concepts and ideas about *consciousness*.

What *consciousness* is taken to be is, first and foremost, the result of the disciplinary developments of the previous century.

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What is the neuroscience in the 'neuroscience of consciousness'?

Neuroscience in 'neuroscience of consciousness' does not refer to a specific discipline but to the scientific study of the nervous system, and the term dates back to 1962. Historically, it started, Manzotti and Moderato (2010, p. 1) point out, as a branch of biology and eventually spawned a series of subdisciplines with closer bonds with psychology, computer science, mathematics and philosophy. Today, it does not refer to a unified field of study (see Rose & Abi-Rached 2013, p. 4) but to an 'uneasy alliance of many subdisciplines' including neurogenetics, neuroanatomy, molecular neurobiology, neurophysiology, neuropharmacology, neuropsychiatry, and cognitive neuroscience (see Rose 2012, p. 53). *Cognitive neuroscience* itself represents the convergence of psychiatry, psychology and neurology into the so-called cognitive sciences[75] (see Hobson 2001, p. 23), while computational cognitive neuroscience refers to a further development where artificial intelligence and information sciences are included in the mix. Today, the neuroscience of consciousness can be seen as the convergence and interaction between three conceptual domains that include the cognitive sciences, neurosciences and computational sciences (and their subsections). The neurosciences are not focused on consciousness, but the latter emerged as a topic of interest. While cognitive scientists traditionally focus on consciousness as a cognitive function of the brain, neuroscientists focus on brain structures and, in particular, the cerebral cortex. Despite other differences between them, they share more nested assumptions than what could divide them.

Another important feature closely linked to this is that consciousness research in the neurosciences does not directly start from the question of what consciousness is. This is perfectly illustrated by an incident Ramachandran (2011) reports on at a conference at the Salk Institute where a philosopher asked Francis Crick about his definition of consciousness:

> But Professor Crick, you say you are going to talk about the neural correlates of consciousness, but you haven't even bothered to define the word properly. Crick's response: 'My dear chap, there was never a time in the history of biology when a group of us sat around the table saying let's define life first. We just went

75. The cognitive sciences refer to the collection of disciplines focusing on cognition. In the explanation of Miller (2003, p. 141; see also Varela, Thompson & Rosch 1991, pp. 4–6): 'Cognitive science is a child of the 1950s, the product of a time when psychology, anthropology and linguistics were redefining themselves and computer science and neuroscience as disciplines were coming into existence. Psychology could not participate in the cognitive revolution until it had freed itself from behaviorism, thus restoring cognition to scientific respectability'.

> out there and found out what it was – a double helix. We leave matters of semantic distinctions and definitions to you philosophers.' (loc 6422)[76]

Not defining life is no excuse for not defining consciousness, because in not defining it, (neuro)scientists do not proceed without a definition or concept of consciousness. On the contrary, neuroscientists operate with concepts that have intricate research histories. And as this critical overview will show, many different concepts and definitions of consciousness are at work in mainstream neuroscience of consciousness.

When Crick and Koch said that the time was ripe for an assault on consciousness (see the section titled 'The consciousness revolution in the neurosciences'), they not only had a very specific concept in mind but also provided an impetus for a specific neurocentric (and corticocentric) concept to take hold in neuroscientific consciousness research.[77] From the very beginning, their definition of consciousness limited their research to activities of (visual) cognition and to processes in the neocortex. In other words, *consciousness* was about awareness.

This process repeated itself over and over in the rapidly expanding field of neuroscience of consciousness, where dimensions of *consciousness* are centred. Concepts and theories of consciousness proliferate at an astonishing speed but without reflection on the essential nature of what consciousness is. In fact, it will become apparent that one of the dominant features of the neuroscience of consciousness is a lack of agreement on the explananda that requires theorising. Consciousness research in the neurosciences exploded without reflection on what consciousness is. To put it differently, consciousness research in mainstream neuroscience of consciousness did not and does not depart from an investigation of consciousness as such.

The cognitive revolution and its impact on concepts of consciousness

The second aspect that fundamentally impacts the concepts and theories in mainstream neuroscience of consciousness is the historical developments in this area of research.

76. This is part of a larger project of negating the influence of philosophical ideas on consciousness research, as if the scientific enterprise can be conducted divorced from such commitments. For a discussion and refutation of this fallacy, see Noë and Thompson (2004), Neisser (2012), Zahavi (2018) and Bennett and Hacker (2022).

77. At the outset of the neuroscience project on consciousness in the 1990s, Crick and Koch (1990, p. 264) said that a precise definition of consciousness should be avoided because of the 'dangers of premature definition'. This view is echoed by others (see Århem & Liljenström 2008, p. 14), and most commentators have avoided the definitional problems ever since (e.g. see Fitch 2022, p. 21).

The cognitive revolution is widely acknowledged as the starting point for the revival of consciousness research in the middle of the previous century, after its demise in the first part of the century. It serves as the source for the emergence of cognition and other mental functions to find their way into notions of consciousness. It can also be seen as the impetus to one of the most fundamental metaphorical developments in consciousness research, namely the comparison of the brain to an information-processing computer.

At the end of the 19th century, 'consciousness' was at the heart of psychological research (see James [1891] 1952),[78] and altered states of consciousness (ASCs) were considered of great significance in psychology (see James [1902] 1994). However, what constituted almost the whole field of psychology at the time was eclipsed during the first half of the 20th century when behaviourism became the dominant force in the behavioural sciences in general and in psychological research in particular (see Kihlstrom 1984, p. 149; Solms and Panksepp 2010, p. 170; Sperry 1987, pp. 37–39, 50–52; Velmans 2017b, p. 769). Behaviourism defined psychology as the science of behaviour, and because mental events are not observable, it became a science by focusing on observable behaviour with the exclusion of consciousness. However, consciousness returned as a cognitive category during what is commonly known as *the cognitive revolution*.

The cognitive revolution started in the 1950s, and slowly but surely, mental concepts like cognition, consciousness, memory and attention found their way back into mainstream (psychological) sciences (see Baars 2005, p. 45; Cardeña, Lynn & Krippner 2017). The cognitive revolution not only restored cognition and consciousness to scientific respectability (see Barsalou 2008, p. 619; Jasanoff 2018, pp. 151–159; Kihlstrom 1999, p. 174) but also provided the metaphors and framework for defining them.[79] It also carried the seeds of multidisciplinarity (Miller 2003):

> By 1960 it was clear that something interdisciplinary was happening. At Harvard we called it cognitive studies, at Carnegie-Mellon they called it information-

78. In fact, Kihlstrom (1987, p. 1445) states: 'Scientific psychology began as the study of consciousness'. See also the discussion of Walach (2013, pp. 64–66) on the history of psychology as a discipline.

79. Exceptions include Roger Sperry and John Kihlstrom. Sperry paid attention to consciousness long before neuroscientists like Crick and Koch occupied the field. In fact, he refers to the cognitive revolution as the '"consciousness," "cognitive," or "mentalist" revolution' (Sperry 1988, p. 608) because of the recovery of the 'subjective' instead of only cognition. Although consciousness and cognition are closely related, cognition excludes aspects like experience that belong to consciousness. The focus of his research, however, is to show that an alternate mind–brain theory is emerging which allows causal power to consciousness in the mind–brain interaction (see Sperry 1987, pp. 42–45). He shows that this revolution has played out in psychology already in the mid-1970s (see Sperry 1988, p. 607; see also the positive remarks about Sperry in Seth 2018, p. 1). In two ways, Kihlstrom confirms the rule by being an exception in, as a cognitive scientist, paying attention to consciousness – but still as a cognitive category; consciousness is conflated with cognition. For example, he describes the components or elements of consciousness as attention, perception, memory, judgement, categorisation and action planning (Kihlstrom 1984, p. 160) – the typical features ascribed to cognition.

> processing psychology, and at La Jolla they called it cognitive science [...] I argued that at least six disciplines were involved: psychology, linguistics, neuroscience, computer science, anthropology and philosophy. I saw psychology, linguistics and computer science as central, the other three as peripheral. (p. 143)

While the cognitive revolution succeeded in reviving the use of concepts like consciousness, it came at the price of what can, broadly speaking, be described as cognitivism. This is the view where cognition takes the central spot in reflection on mental matters and consciousness becomes conflated with it. Consequently, for the next 50–60 years, cognitive approaches dominated views on consciousness (see Frith & Rees 2017, p. 9ff.). However, most of these studies, Kihlstrom (1999, p. 173) says, had no interest in consciousness itself. They nevertheless started a process whereby cognition or other mental aspects were labelled as *consciousness*.

With immediate effect, after the cognitive revolution, there were three direct consequences for the concepts of consciousness.

Computation, information processing and representation

The multidisciplinary engagement with the newly emerging computer sciences provided the concepts and metaphors to see cognition as information processing of some sort. In the explanation of Revonsuo (2010):

> [*C*]ognitive science was not a science of consciousness nor a science of our subjective mental life. Instead, it was founded on the computer metaphor of the mind. The grand idea behind this was that the mind is just like a computer program, and the mind relates to the brain just like a computer program relates to the computer hardware. (p. 62)

The central assumptions of classical cognitive sciences (or cognitivism,[80] as it is referred to) is based on a computational model of mind and the idea that both cognition and consciousness are seen as the internal representation of the outside world (see Froese & Fuchs 2012, p. 211; Menary 2010, p. 459). In the explanations of Kiverstein and Miller (2015):

> The classical conception of the human mind as working according to the same principles as a digital computer encourages us to think of the body and the environment as providing at best inputs to, and receiving outputs from cognitive processes. (p. 1)[81]

80. There are many descriptions and overviews of traditional cognitivism and its roots in the computational models that became popular since the cognition revolution in the 1960s (e.g. see Froese & Fuchs 2012, pp. 206–208; Varela et al. 1991; Ward, Silverman & Villalobos 2017, p. 365).

81. The division of labour between cognitive psychology and cognitive neuroscience confirms this view: the former analyses the cognitive operations needed to be performed to perform cognitive tasks, and the latter seeks to determine the neural processes in the brain to do so. The body and environment play a limited role in such an input–output process.

The central intuition behind cognitivism 'is that intelligence – human intelligence included – so resembles computation in its essential characteristics that cognition can actually be defined as computations of symbolic representations' (Varela et al. 1991, p. 40). The result of this is that 'in practice almost all of neurobiology (and its huge body of empirical evidence) has become permeated with the cognitivist, information-processing perspective' (Varela et al. 1991, p. 44).[82]

Representation, one of the pillars of the binary theoretical framework, is clearly at work here. But the other pillars, especially the physical–mental divide, are also visible.[83]

Cognitivism or cognicentrism: Consciousness a subset of cognition

A second significant impact of the cognitive revolution is the easy conflation of consciousness and cognition in many of these studies. In this framework, consciousness and cognition are used almost synonymously with the dominant meaning of consciousness as 'awareness' or, if you will, cognitive awareness. And as it turns out, this implies a concept of consciousness as simply sensory-perceptual consciousness (see also Panksepp 2000, p. 26 and Varela et al. 1991, pp. 51–53 for discussion).[84] In other words, consciousness is seen as just another cognitive phenomenon, and consequently, many, if not most, neuroscience theories of consciousness, in actual fact, are theories of cognition (or another mental function) labelled so. From this distinction, together with the need for what are called operational definitions that are amendable to empirical research on cognition (see McGovern & Baars 2007, p. 178), consciousness is simply conflated with cognition.

While awareness of perceptions (cognition) is part of consciousness, conscious awareness is not equal to consciousness. Also, cognitivism does not address the biological underpinnings of mental events but treats

82. This is clear in an early example of a cognitive definition of consciousness: 'In an important sense all human beings also know what consciousness is: It is those sensory, endogenous, and action-related brain events that we experience in a steady subjective flow during the waking state, and whose contents we can report with high accuracy' (Baars 2012a, pp. 40–41).

83. The physical–mental or matter–mind dualism govern this tradition: 'The cognitivists argue that minds are made not of energy or matter but of collections of representations that constitute symbols and images. [...] Plato [...] Descartes [...] Kant [...] Processes that rely on the senses prevent us from knowing the world as it is. Therefore, we know the world only in terms of the representations synthesized in our minds. Categories are as close as we can get to the world as it really is' (Freeman 2000, p. 24).

84. Solms (2013, p. 11) points out that Freud is to be credited for wrongfully promoting the conflation of consciousness with cortical monitoring.

cognition as an aspect of the mind.[85] In many definitions of consciousness, it is merely a feature of the mind or cognition. For example, two cognitive scientists, Bering and Bjorklund, start a study on the cognitive definition of consciousness with the disclaimer that their definition of consciousness will 'almost certainly strike some readers as too narrow' (2007, p. 598). It is, in fact, very narrow: 'we define consciousness as *that naturally occurring cognitive representational capacity permitting explicit and reflective accounts of the – mostly causative – contents of mind*' (Bering & Bjorklund 2007, p. 598; [*italics in the original*]). Why is that not a definition of cognition or conscious awareness?

It is important to note that in these circles, conscious awareness, consciousness, experience of awareness and conscious cognition are often used synonymously. Within this framework, concepts like 'consciousness', 'experience' and even 'what it is like' receive their meaning from this mentalistic or cognitivist framework. Even *what-it-is-likeness* as well as experience (what has been called phenomenal consciousness) are determined by being features of cognition. Having experiences (in this sense of consciousness) is having a cognitive brain function. As Panksepp (2017) points out, a traditional view is assumed here:

> The traditional view is that primitive, unconscious, emotional information must interact with higher cognitive circuits to emerge into 'awareness', without much concern with the more basic issues about the nature of qualia. (p. 144)

Again, in cognitive theories of consciousness, the latter is either equated with or conflated with cognition; for example, memories and consciousness, Newberg and Waldman (2006, p. 21) say, 'are part of cognition'.[86]

The conscious–unconscious distinction

The third feature that emerged from the cognitive revolution to influence concepts and theories of consciousness is the distinction between conscious and unconscious information-processing in the brain. The basic

85. Hirsch (2005, p. 26) illustrates it with a few examples: 'Dorland's Illustrated Medical Dictionary (1988) defines cognition as "operations of the mind by which we become aware of objects of thought or perception; it includes all aspects of perceiving, thinking and remembering." The American Heritage Dictionary (2000) offers a similar definition for cognition as "the mental process of knowing, including aspects such as awareness, perception, reasoning and judgment, and that which comes to be known, as through perception, reasoning, or intuition, and knowledge" [...] Ulrich Neisser (1967) defines cognition as "all processes by which the sensory input is transformed, reduced, elaborated, stored, recovered, and used"'.

86. While consciousness is closely associated with cognition, there is no agreed notion of what cognition is. The term 'cognition' itself is ambiguous, with diverse meanings throughout its history (see Frith & Rees 2017, p. 10). In a later chapter on the brain models in cognitive neuroscience, it will become clear that diametrically opposing views on cognition operate in these circles.

insight is that there are cognitive processes that are conscious and others that take place unconsciously. In fact, Frith and Rees (2017, p. 9) claim that the discovery or recognition of unconscious psychological processes (the *cognitive unconscious*) is the major development in consciousness research over the last part of the 20th century.[87]

Firstly, a word about terminology. Just as the term ‘conscious’ covers several modes and concepts, its opposite conditions are not easy to capture in words. The term ‘unconscious’ is used in three distinct meanings,[88] and it is the third that emerged from the cognitive revolution that is of interest here, namely the notion that some cognitive processes are *not conscious*. In the cognitive sciences, it is generally believed that the bulk of cognitive processes are not conscious, thus *unconscious*,[89] or, as others say, *nonconscious*.[90] Thus, ‘mind’ encompasses unconscious processes as well as conscious awareness or consciousness.[91] In the explanation of Solms (2014):

> The fact of unconscious mental processes applies equally to perception and cognition. It is possible to see without awareness (blindsight), recognize without awareness, read without awareness, learn without awareness, remember without awareness, make decisions without awareness and so on. In fact, just about every perceptual and cognitive task can be performed without awareness. (p. 176)

It is this distinction between conscious and unconscious cognition that largely impacts concepts and notions of consciousness in that the word

87. The fact is most brain processes are unconscious – we are not even aware of them – while many that manifest in bodily experiences (such as imagery or a shiver down the spine) have specific neural correlates (see Zeman 2005, p. 1).

88. In everyday awake life, to be conscious is to be in a conscious mental state which is different from mental states that are not conscious (which is not the same as unconscious) or when asleep – thus, for unconscious states (see Velmans 2009, p. 291). The second meaning is for not being conscious (i.e. being in a coma). The first meaning of unconscious functions as the opposite of one of the cycles of consciousness (awake) while the second functions as the opposite of creature consciousness.

89. It should be noted that the term ‘unconscious’ as used in cognitivism refers to processes that cannot be brought to consciousness at all, whereas the more common meaning is that it refers to things that can be brought to consciousness either through self-reflection or psychoanalysis. Cognitivism, on the other hand, postulates processes that are mental but that cannot be brought to consciousness at all (see Varela et al. 1991, p. 49). Unconscious is also a medical term as the opposite of wakefulness (see Garcia-Romeu & Tart 2013; Móró 2017, p. 17; Whitley 1998, p. 25).

90. Collerton (2010, pp. 180–181), for example, says: ‘The bulk of cognitive processes are, and always will be, non conscious. A limited number of nearly conscious processes are maintained so as to be readily accessible for the task in hand and form the subsystems of working memory’. See also Koch’s (2019, loc 757) use of ‘nonconscious’ to avoid the term ‘unconscious’ with its strong Freudian connotations. ‘Non-conscious’ is also different from not conscious; it is the difference between ‘unconsciousness’ and ‘loss of consciousness’ (see Flohr 2006, p. 16).

91. Most operations of the mind are nonconscious and even inaccessible to consciousness. You do not feel the metabolising processes in your gut, the bacteria in your intestines or the immune system fighting off some bugs (see Koch 2019, loc 794). In addition, there are, for example, many proprioceptive movements, reflexes and eye movements that are hidden from consciousness (see Koch 2019, loc 764).

'consciousness' became reduced to the conscious parts of perception or cognition. For example, Århem and Liljenström (2008; see also Århem & Liljenström 1997, p. 607) state:

> [*W*]e believe that consciousness is a central feature of higher cognitive processes. This means that studies of cognition without taking consciousness into account will be rather sterile, and even misleading. (p. 2)

This is an example of consciousness as conscious awareness in a theory that departs from cognition as the main mental process. Consciousness not only equals cognition but is reduced to a subset of cognition, the conscious part of it. In this view, 'consciousness' is completely conflated with one aspect of cognition or perception, and this drives most cognitive theories of consciousness. It is an easy and simple step to identify conscious cognition with consciousness and to see the latter as a significant evolutionary development.[92]

A rejection or alteration of this terminology for *consciousness* is not to discard the fact that some brain processes are conscious and others are not, but it is an attempt to rescue the word 'consciousness' from being equated with cognition or conscious awareness as such. This is what became known as the cognicentric view of consciousness. The cognitive revolution thus gave us the conscious–unconscious distinction in cognition but also transferred conscious cognition to the word 'consciousness'.

There is no doubt that regarding cognition, there are processes that are conscious and others that take place unconsciously.[93] But conscious awareness or conscious cognition is not the same as human consciousness.[94]

92. In the explanation of Århem and Liljenström (2008, p. 2): 'we find it reasonable to believe that conscious cognition, in principle, differs from unconscious cognition, that the emergence of conscious cognition was a major transition in the evolution of life'.

93. This distinction can be maintained while other words are used. For example, it will become apparent that in a neuro-ecological perspective, a distinction is made between reflective and prereflective processes and components of consciousness.

94. While cognitive theories of consciousness thus contain various modes of conflation between consciousness and cognition, nobody has done more than the philosopher Ned Block to show that this is fundamentally mistaken. Block argues that consciousness and cognition do not belong to the same categories. In his view, consciousness and cognition 'can causally interact, and of course cognition can be conscious, but they fall on opposite sides of a joint in nature' (Block 2015, pp. 161–162). According to this view, there is a fundamental distinction between consciousness and cognition, which he explains with the difference between nonconceptual perceptions and conscious perceptual judgments involving concepts – he refers to them as *percepts* and *concepts* which need to be kept separate. A concept is a constituent of a thought or judgement that applies to something, whereas a *percept* can be a subjective experience that is precognitive. 'Percepts are iconic; concepts are parts of thoughts or judgments that are "propositional" – they have a structure analogous to that of a sentence. Another difference is computational role: percepts are, to a first approximation, elements in a modular system, whereas concepts have a much wider role in thinking, inferring, deciding, and the like' (Block 2015, p. 171). This also seems to be the view expressed by Kihlstrom (1987, p. 1450) many years ago: 'One thing is now clear: consciousness is not to be identified with any particular perceptual-cognitive functions such as discriminative response to stimulation, perception, memory, or the higher mental processes involved in judgment or problem-solving. All of these functions can take place outside of phenomenal awareness'.

Two other lines of criticism of cognitivism that are of interest here will later be introduced. The first goes under the name of *predictive coding* or *predictive processing* and represents a reversal of traditional cognitivist thinking about cognition. That will be introduced when brain models are discussed (ch. 7). The second is a more radical alteration of cognitivism and a rethinking of cognitive science and goes under the banner of 4EA (embodied, embedded, enacted, extended, affective) (to be considered in Part 4). The latter removes cognition from the brain and places it in organisms.

The consciousness revolution in the neurosciences

The current dominance in consciousness research by neuroscientists can be directly attributed to what is known as *the consciousness revolution in the neurosciences*[95] that started around the 1990s with what was known as the 'decade of the brain'. For this reason, it became fashionable for neuroscientists to conduct empirical or experimental *consciousness* research (see Lau 2017, p. 1; Miller 2005, p. 79; Móró 2017, p. 16).

The popular version of this revolution[96] is that in 1990, two neuroscientists, Francis Crick and Christof Koch (1990; see also McGovern & Baars 2007, p. 177), pointed out that:

> [*M*]ost of the work in both cognitive science and the neurosciences makes no reference to consciousness (or 'awareness'), especially as many would regard consciousness as the major puzzle confronting the neural view of the mind and indeed at the present time it appears deeply mysterious to many people. (p. 263)

Thus, they continued: 'the time is now ripe for an attack on the neural basis of consciousness' (Crick & Koch 1990, p. 263; see also Searle 1993, p. 317; Seth 2018, p. 1). In contrast to the millennia of 'philosophical speculation' (Tononi & Koch 2008, p. 256) about the mind and consciousness, as they call it, neuroscientists turned towards the experimental 'scientific' study of consciousness. Despite the gist of hubris in these remarks, this programme remains squarely stuck in its own set of metaphysical and philosophical

95. The progress in brain research is, for example, explained by Damasio (2010, p. 263): 'The idea that we have a firm grasp of what the brain is and what it does is pure folly, but we always know more than we did the year before and much, much more than one decade ago'. This progress itself is often referred to as *the revolution in the neurosciences* (e.g. see Wolpe 2002), not to be confused with the *consciousness* revolution in the neurosciences.

96. Others refer to it as the *neurorevolution*, which insinuates the notion of the neurosciences as the new source for deciding on the nature of being human (see Choudhury & Slaby 2012, p. 4).

assumptions that do not safeguard it from speculation but introduce yet another level of speculation.[97]

However, the modern neuroscientific interest in consciousness research can more properly be ascribed to 1949 with the discovery of the 'cerebral activating and alerting functions of the brainstem's reticular formation' (Merker, Williford & Rudrauf 2022, p. 1). From the 1970s onwards, there was an increase in neurological studies dealing with *consciousness* or aspects thereof, ranging from studies on split-brain and blindsight to dissociation and sleep (see Århem & Liljenström 1997, pp. 608–609; LeDoux 2019, pp. 263–267; Seth 2018, pp. 2–3). Móró (2017, p. 16) refers to these as the 'classical' consciousness-related research, to be distinguished from the consciousness revolution.

Be that as it may, while recognising that 'awareness' needs to be added to cognition, the consciousness revolution did not alter the cognitivist framework within which it originated.[98] In other words, this was not only a revolution confirming cognicentrism but an attempt to find consciousness within the neural structures of the brain. In hindsight, it also did not (yet) deliver on its revolutionary promise of solving the *mystery (fabric) of consciousness*. It nevertheless revolutionised consciousness research in that in addition to the close association with cognition, it introduced three additional features: awareness (or experience), corticocentrism and neurocentrism. In many respects, the consciousness revolution was just a further intensification of the cognicentric views on consciousness.

However, before Nobel accolades can be dished out for solving the mystery of 'consciousness', it is important to establish what is meant by 'consciousness' in mainstream neuroscience of consciousness after this revolution. It is impossible to give a comprehensive description of the complexity and the variety of viewpoints that emerge from these beliefs. More detail will become available in the chapters to follow. Here, only two features of this neuroscientific enterprise will be mentioned: the focus on visual perception and the mixing of concepts.

97. See, for example, the analysis of Zahavi (2018) on the implicit philosophical assumptions that accompany the neuroscientific enterprise and the extensive analysis of Bennett and Hacker (2022).

98. The common feature of cognitive and neurobiological theories is that consciousness is equated with awareness, which Damasio and Meyer (2009, p. 4) point out is rather circular, as the latter is simply a synonym of consciousness.

The focus on visual perception

To understand the specific take on consciousness in neuroscientific studies, it should be realised that consciousness is seen through the lens of visual perception. That is the case because a great deal of neuroscientific research on consciousness is about visual perception but claims to be about 'consciousness'. For example, Koch's definition of consciousness is derived not from a reflection on consciousness but stems from his research on visual perception or awareness. In fact, it is a feature of a great deal of the neuroscience of consciousness that whatever is claimed about consciousness stems from research on visual perception. The focus of this research is not the experience or awareness but the relationship between an awareness (or lack of an awareness) and certain brain conditions or functions.[99] The term *experience* therefore features merely as an experience of perceptual awareness. This position is clearly expressed in Salzberg's (2019) summary:

> Consciousness is 'what it is like' to be something [...] Definitions of consciousness also include what one is conscious of, so both the feeling of having experience and the contents of that experience are fundamental aspects of consciousness. (p. 1)

This concern is confirmed by the central focus of visual perception in the neuroscientific study of consciousness in general.[100] Consequently, a cognitive definition of consciousness of awareness or conscious cognition serves to identify the percepts to be correlated, and *consciousness* in this programme refers primarily to sensory percepts, and therefore, it could be exchanged for 'visual awareness' (their primary topic of research). All these examples illustrate that in this mental framework, the view of consciousness is closely linked to perceptual awareness and, in fact, to visual awareness[101] and experiencing it.

Cognition, subjective awareness or experience and information computation

In this hybrid domain of neuroscientific research, concepts from at least three distinct areas are employed to explain the fabric(ation) of consciousness. They are cognition, subjective awareness (experience) and information processing. Theories about the features and functions of consciousness based on these concepts (such as cognition or computation of information) consequently display a remarkable variety.

99. This view is related to the neo-Kantian tradition which sees experience and consciousness essentially as 'thought, and thought is bounded by the limits of language' (Blum 2014, p. 151).

100. A recent overview of neuroscientific research on consciousness confirms this trend: 'Note that the paper will focus almost entirely on visual consciousness' (Lamme 2018, p. 2). And the reason is the dominance of research on visual awareness.

101. Even though Koch (2019, loc 639) recognises that perception includes the transcendental five senses – sight, sound, smell, touch and taste – as well as pain, balance, heartbeat, nausea and other epigastric sensations, this research is dominated by visual perception.

The focus on visual perception highlights the emphasis on cognition or conscious awareness as the key to consciousness. But there is also an acknowledgement that consciousness is about experience.[102] Thus, for some, thought is the mental process of cognition and consciousness is the mental process of experiencing cognition.[103] Therefore, they define consciousness as subjective awareness or experience. This is, for example, visible in Collerton's (2010) definition of consciousness:

> I will use consciousness to mean subjective awareness of, for example, a perception, a memory, or an emotion i.e. 'the component of waking awareness perceptible by an individual at a given instant'. (p. 180)

This uncertain relationship between awareness and experience makes for a recognition that consciousness has a dual structure. There is, however, no agreement on how to label it or how to demarcate between the modes or levels. For example, based on an evolutionary analysis of REM sleep, Hobson (2009) distinguishes between primary and secondary modes of consciousness:

> Primary consciousness can be defined as simple awareness that includes perception and emotion. As such, it is ascribed to most mammals. By contrast, secondary consciousness depends on language and includes such features as self-reflective awareness, abstract thinking, volition, and metacognition. (p. 803)[104]

102. In his presentation of consciousness as a systems phenomenon, Tart anticipates the turning upside down of the conflation of cognition and consciousness by explaining them as components on a continuum. In his words (Tart 2001, pp. 26–27): 'Awareness and consciousness, then, can be seen as parts of a continuum. I would use the word awareness to describe, for instance, my simple perception of the sound of a bird outside my window as I write. I would use the word consciousness to indicate the complex of operations that recognizes the sound as a bird call, that identifies the species of bird, and that takes account of the fact that the sound is coming in through my open window. So, consciousness refers to a rather complex system that includes awareness as one of its basic ingredients but is more complex than simple awareness itself'. Elsewhere, Tart (in Garcia-Romeu & Tart 2013, p. 123) describes this *consciousness* aspect by means of the term *subjective awareness*: 'consciousness refers to the subjective awareness and experience of both internal and external phenomena. These phenomena may include but are not limited to internal sensations, perceptions, thoughts, emotions, and the sense of self, as well as perception of all classes of external objects, events, and other stimuli'.

103. Within the cognitive model of mind or mentality, this position is explained by Goff (2017, p. 107): 'We can usefully divide human mentality into two aspects: *thought* and *consciousness*. Thoughts are sophisticated concept-involving representations of reality [...] Consciousness, in contrast, is simply the property of having some or other kind of experience'.

104. Edelman also makes a similar distinction between primary (sensorimotor) and higher-order (symbolic, abstract and language-dependent) consciousness (Baars & Edelman 2012, p. 290; Edelman 2007, p. 92). As with all other aspects of consciousness, there is no agreed-upon set of concepts to denote this dual structure. Examples include 'primary' and 'reflective consciousness' (Izard 2007, p. 97) and 'creature consciousness' and 'phenomenal consciousness' (Piccinini 2007, p. 103; see also Hobson & Voss 2010; Merker 2007, p. 73; Tague 2021, p. 3). Similarly, Panksepp (2017, p. 143; see also Panksepp & Biven 2012, p. 8) says: 'We must distinguish between affective and cognitive forms of consciousness'.

Here, the distinction clearly fits into 'the head', so to speak; these modes of consciousness are different mental functions in the brain. Fuchs (2018, pp. 117–120) points out that this distinction often also still carries the representationalist assumptions that characterise mainstream neuroscience of consciousness. Another feature is that 'primary' is most often associated with affect or emotion and 'secondary' with reason and cognition. A neuro-ecological perspective offers a radical alternative view on this structure of consciousness.

Summary remarks

The impact of the cognitive and consciousness revolutions on consciousness research is immense. The above revolutions provide some of the most significant constraints on and theoretical framework for the kind of concepts that are employed in mainstream neuroscience of consciousness. Given the hybrid nature of the neuroscience of consciousness, the kind of concepts of consciousness that emerged after the cognitive revolution can, broadly speaking, be classified along an axis from *cognition* to *subjective awareness* (*experience)* and *information*.

Mainstream neuroscience of consciousness after the consciousness revolution can be characterised as cognicentric. But that is only part of the story because it is also characterised by three other features: corticocentrism, neurocentrism and neuroreductionism.

Chapter 7

Brain models and how the brain functions

Introduction

Except for proponents of nonlocal theories of consciousness, it is widely accepted that the brain is intricately involved in consciousness. Like most other consciousness researchers, neuroscientists agree that there is a close relationship between processes in the brain and phenomena of consciousness.[105] For most neuroscientists, consciousness is produced by the brain. In fact, the fabric(ation) of *consciousness* in mainstream neuroscience of consciousness is directly related to the brain models and theories about how the brain functions. In mainstream neuroscience of consciousness, this relationship is not only causal and direct, but concepts of consciousness are very much dependent on assumptions about the brain and the world.

Within the neuroscience of consciousness, two incommensurable research trajectories can be identified: mainstream neuroscience of consciousness and a neuro-ecological perspective. They fall on different

105. As Koch (2019, p. 1461) says, 'No matter what you believe about the mind, there is no doubt that it is intimately related to the brain'. The exception in this regard is new-materialist and nonmaterialist theories of consciousness that promote the notion of nonlocal consciousness, which does not depend on brain functions.

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sides of the fault lines on brain models previously identified.[106] Although the focus here is on the brain models in mainstream neuroscience of consciousness, these can only clearly be understood when also seen in conjunction with those in the neuro-ecological perspective. Nevertheless, the focus here is on mainstream neuroscience of consciousness.

Mainstream neuroscience of consciousness does not display a unified or monistic view of what the brain is or how it functions. These can be characterised in a twofold way: they are significantly diverse and, at the same time, remarkably uniform. They are diverse because they are made up of configurations of various assumptions and will be described by means of five sets of features: corticocentrism, neurocentrism, neuronocentrism, computationalism and neuroreductionism. These features are not the description of proponents themselves but emerge from a critical, third-person perspective on mainstream neuroscience of consciousness. One of the biggest fallacies in the neuroscientific study of consciousness is the assumption that because the same term is used, research is about the same phenomenon. It is not, and brain models illustrate that as clearly as anything else.

These features are not only closely associated with the two historical beacons – the cognitive and the consciousness revolutions previously discussed – but also the residues of dualistic thinking that pervades the neuroscience of consciousness. Given these historical beacons and features, mainstream neuroscientific consciousness research is, despite its diversity, also remarkably monolithic. This is especially visible in the fact that the term ‘consciousness’ is used unreservedly for different modes as if they are all about consciousness.[107]

The shared features do not mean the differences within are to be negated. In some instances, there are strong internal divisions and debates on how the brain works to give rise to cognition and consciousness. Thus, there are not only disagreements between mainstream neuroscience of consciousness and a neuro-ecological perspective, but also disagreement within this trajectory. From an outsider perspective, these differences are

106. Previously, six fault lines in brain models and how the brain functions have been identified. Five of them are relevant here: brain-dependent versus brain-independent; neurocentric and non-neurocentric (which means embodied and enacted or nonlocal); localisationism (either in the cortex, brain stem or somewhere else) versus holism (a whole brain or a brain in a body); a reflexological (input–output process) versus a self-regulating brain (that is also intrinsically stimulated), and finally the brain’s working as representing versus responding. Individually, but especially in nested configurations, these positions characterise brain functions and brain models in the neurosciences.

107. In a later chapter, it will be indicated how easily the jump between different modes and concepts of consciousness takes place within the argument of the same scholar or theorist. Here, the focus is on identifying the different concepts of consciousness at work in the historical frameworks.

often just more of the same types of models and theories. While it might seem like a healthy and vibrant scholarly debate, on a deeper level, mainstream neuroscience of consciousness shows a remarkably monolithic character.

Corticocentrism

Few cognitivists or neuroscientists, Merker (2007, p. 64; see also Panksepp 2007, p. 102; Varga & Heck 2017, p. 77) remarks, would today object to the assertion that 'cortex is the organ of consciousness'. The terms 'corticocentric' and 'corticocentrism' are used to refer to the dominant view that the cerebral cortex is playing in current understandings of cognitive functions. Consequently, because of the conflation of consciousness with cognition, consciousness is also closely linked to the cortex.[108]

At least three factors with historical roots in brain research contribute to corticocentrism or the emergence of what is described as *homo cerebralis* (see Menzel 2018, p. 14). These factors clearly illustrate how the fault lines in brain models impact actual consciousness research.

The consciousness–cognition conflation

There is a close association between localised views of consciousness in the brain and cognitive science models of mind – they are placed in the cerebral cortex (see Glannon 2007, p. 16). For example, Crick and Koch (1990, p. 266) claim that consciousness is to be found in the 'cortical system'.[109] While some admit that the entire brain is sufficient to give rise to consciousness (see Mormann & Koch 2007), the reality is that the cerebral cortex[110] is the brain area most neuroscientists pay attention to (see Damasio 1994, p. 27; Solms 2013, p. 10).

Thus, consciousness is restricted to neocortex activities of rational and cognitive processes. Others identify it with the thalamocortical system (see Edelman 2001, p. 111; Tononi 2005, pp. 110, 115–117).

108. Others use the term 'cerebrocentrism' (Fuchs 2018, p. 111) to refer to this, what Solms calls the 'corticocentric fallacy' (Solms 2013, p. 9).

109. The main areas of the cortical system include the neocortex and the cerebral cortex, whereas structures in the midbrain or hindbrain, such as the cerebellum, are in their view not essential for consciousness (see Crick & Koch 1990, pp. 265–266).

110. The term 'cerebral cortex' refers to the roughly three-millimetre 'multilayered blanket' (Damasio 1994, p. 27) that covers the whole brain and is traditionally seen as the most important brain structure for cognitive functions. It should, however, also be considered that different definitions of the 'cerebral cortex' are operative among neuroscientists (see Crick & Koch 2003, p. 119).

The hierarchical brain myth

The second factor contributing to corticocentrism is the triune brain theory.[111] This theory promotes an evolutionary story about the human brain that ended up not only with three layers – one for surviving, one for feeling and one for thinking – but a brain that is hierarchically ordered. In the summary of Feldman Barrett (2020):

> The deepest layer, or lizard brain, which we allegedly inherited from ancient reptiles, is said to house our survival instincts. The middle layer, dubbed the limbic system, supposedly contains ancient parts for emotion that we inherited from prehistoric mammals. The outermost layer, part of the cerebral cortex, is said to be uniquely human and the source of rational thought; it's known as the neocortex ('new cortex'). One part of your neocortex, called the prefrontal cortex, supposedly regulates your emotional brain and your lizard brain to keep your irrational, animalistic self in check. Advocates of the triune brain note that humans have a very large cerebral cortex, which they see as evidence of our distinctly rational nature. (pp. 19–20)

The 'scientific' support for this theory is flawless. It is widely perpetuated in psychology and psychiatry handbooks (see Reiner 1990, p. 304) and in some sectors of science, notably much of popular science (see Feldman Barrett 2020, p. 21), but also in neurology handbooks (see Parvizi 2009, pp. 354–355). While the model is famously associated with Paul MacLean (see Reiner 1990),[112] it has antecedents that go back to evolutionary thinking, where a hierarchical brain fit into the ideology in the 19th-century view of the evolution of the human mind. The highly evolved cerebral cortex served well to keep the 'animal' emotional impulses in check and fit into the hierarchical view of humans on top of the developmental ladder (see Feldman Barrett 2020, p. 21; Kiverstein & Miller 2015, p. 3; Parvizi 2009, p. 355).[113] The triune brain idea, Feldman Barrett (2021, p. 4) says, 'has tremendous staying power because it provides an appealing explanation of human nature'. It also infiltrated consciousness research as the explanation for conscious cognition, as opposed to unconscious cognitive processes, as illustrated with the following remark: 'Normal consciousness has its

111. Tinnin suggests that what he calls 'normal' consciousness has its origin in the triune brain – it is the product of a biologically generated process – and that altered states of consciousness similarly generate states organised in a different way (see Tinnin 1990, p. 154). For him, the seat of consciousness is in specific language areas of the neocortex.

112. MacLean's limbic system concept has been criticised on several grounds and has been rejected by many scientists. Arguments include the fact that the limbic system and neocortex are not unique features of the human brain and that there is no evidence that the limbic system functions as an integrated system for emotions (see LeDoux 2012, p. 433). His ideas were already understood to be incorrect by the time he published his 1990 book (see Cesario, Johnson & Eisthen 2020, p. 258).

113. The following is another common description: 'The oldest, the "reptilian complex," controls basic functions such as movement and breathing; next, the limbic system controls emotional responses; and finally, the cerebral cortex controls language and reasoning' (Cesario et al. 2020, p. 258).

origin in the development of the "triune brain"' (Tinnin 1990, p. 154). As will be seen below, the triune myth is also foundational to the notion in affective neuroscience of affect as, evolutionarily speaking, an earlier layer and development than cortical cognitive processes.

However, this idea, which Feldman Barrett (2021, p. 3; (2020, p. 20)) calls a scientific myth, is 'one of the most successful and widespread errors in all of science'. This myth lacks 'any foundation in evolutionary biology' (Cesario et al. 2020, p. 255), is unpersuasive to another neurobiologist (see Reiner 1990) and is basically 'flawed' (LeDoux 2012, p. 439).[114] In short, the triune brain model is not supported by current scientific research. Arguments vary from the understanding of the function of the limbic system[115] to the development of nervous systems,[116] the function of neurons and comparative neurobiology. Feldman Barrett's (2020) summary says it all:

> So you don't have an inner lizard or an emotional beast-brain. There is no such thing as a limbic system dedicated to emotions. And your misnamed neocortex is not a new part; many other vertebrates grow the same neurons that, in some animals, organize into a cerebral cortex if key stages run for long enough. Anything you read or hear that proclaims the human neocortex, cerebral cortex, or prefrontal cortex to be the root of rationality, or says that the frontal lobe regulates so-called emotional brain areas to keep irrational behavior in check, is simply outdated or woefully incomplete. The triune brain idea and its epic battle between emotion, instinct, and rationality is a modern myth. (p. 26)

An alternative view, nowadays represented by embodied theories (among others), sees the brain as a closed system in which sensory input modulates rather than informs the intrinsic system. Corticocentrism is found wanting in the face of the whole brain view (brain holism, also referred to as brainweb), which is fundamental to the neuro-ecological perspective.

Localisationism: The localisation fallacy

A third set of factors that uphold corticocentrism is related to the localisation fallacy, which is situated opposite holism on one of the major fault lines in the neuroscience of consciousness.[117] Localisationism is the fallacy that the

114. The most comprehensive discussion of the development of the triune brain idea and its antecedents in evolutionary biology is to be found in LeDoux (2019, pp. 179–191).

115. LeDoux evaluates the arguments on the limbic system and its alleged role in emotion. He states LeDoux 2012 (p. 433): 'it has been criticized on a number of grounds and has been rejected by many scientists'.

116. The common wisdom of nervous system evolution today is that animals radiated from common ancestors (see Cesario et al. 2020, p. 257) according to a single manufacturing plan (see Feldman Barrett 2020, p. 24).

117. As indicated earlier, and following the terminology of Vidal (2009, p. 16), one of the major fault lines in the neuroscience of consciousness is between localisationism and holism.

brain specialisation points towards a direct link between brain structures or areas and mental functions. It is functional specialisation in overdrive, as it contains the stronger assumptions of a direct association between mental functions and specific brain areas. In practice, localisationism is just the ‘new phrenology’ (Figdor 2010, p. 422), because careless interpretation of brain localisation results, Jasanoff (2018, p. 84) shows with numerous examples, leads to claims that regional brain activity stands for or equals particular cognitive processes. These assumptions are fundamental to the search for the NCC.

Two sets of features contribute to this fallacy and serve as the backbone of a neurocentric perspective: functional localisation and brain imaging technologies.

From functional specialisation to localisationism

Localisationism emerged as a mongrel from functional specialisation.

In the 20th century, functional brain specialisation found strong support from two, if not three, sources. One is the case of patients with brain injuries, which confirmed the link between brain regions and mental functions. The best known is the case of Phineas Gage, who experienced a total personality change after a serious brain injury (see Jasanoff 2018, p. 84ff.). After the brain injury, Gage was no longer the person he used to be. These cases confirm that lesions to specific brain areas can result in the loss of certain functions, as well as that activity in certain areas could point towards certain mental or nervous functions. This manifests in the NCC project to be considered.

Without denying neural specialisation, two arguments counter localisationism. One is that for all mental functions, most cortical areas linked with different networks[118] are involved. It is apparent today that the same cortical areas may be involved in a variety of functions, but the networks within which they participate differ from function to function (see Cacioppo et al. 2003, pp. 652–653). For example, as Jeeves and Brown (see 2009, p. 47) point out, ‘most of the cortex is active to some degree during most mental states’. And as explained by Negrao and Viljoen (2009):

> It is obvious that, even at the lowest level of consciousness, the different areas considered essential for consciousness cannot function in isolation. It is therefore reasonable to accept that consciousness involves widespread brain activity. (p. 267)

118. In the localisation discussions, it remains important to realise that also the terms ‘area’, ‘region’ and ‘network’ are ambiguous. They can either be individuated on anatomical or functional grounds (see Figdor 2010, pp. 423–424). For example, the well-known Broca’s area and Wernick’s region associated with language were defined differently, the first anatomically and the latter functionally (see Cacioppo, et al. 2003, p. 654).

It is not so much the activation of specific areas but the functional connectivity between areas that the holistic view claims to be the real insight from these localisation data (see Kaan 2001, p. 414). This is the gist of Searle's critique of the modular or building-block approach.[119] He argues that it is a mistake to think that a conscious field is made up of various parts (building blocks) that are linked to specific neurons (or clusters of neurons) and instead suggests looking for consciousness as a feature of the brain emerging from the activities of large masses of neurons (see 2000, p. 563).

The second argument is that the same function can be associated with more than one brain area and that one brain area can be associated with more than one function – referred to as 'multiple realization' (Figdor 2010, p. 419) of cognitive functions. The modular model is increasingly being replaced by (Fuchs 2018):

> [*O*]verarching functional systems and highly flexible brain connectivity patterns, where the same cortical or subcortical area may be co-opted into different functions depending on which of its interconnected networks is activated. (p. 48)

Brain imaging technologies

There is a close relationship between brain imaging technologies and localisationism. Brain imaging results, Farah (2008, p. 623) points out, 'are the scientific icon of our age'. The empirical results of brain localisation are visible in the colourful brain images of scanning technologies, and they certainly show a connection between certain brain areas and mental functions. And because brain-scanning techniques are not suited for the study of subcortical structures (see Parvizi 2009, p. 356), localisation is also corticocentric.

The shortcomings of brain imaging technology in identifying mental activities in specific brain areas are widely known today (see Botvinik-Nezer et al. 2020; Margulies 2012; Shermer 2008). A recent and updated evaluation can be found in Jasanoff (2018, p. 82), who remarks that 'brain activity maps are so indistinct that we can imagine almost anything going

119. Most neurobiologists, Searle (2000, p. 563) points out, 'take what I call the building block approach: Find the NCC for specific elements in the conscious field, such as the experience of color, and then construct the whole field out of such building blocks. Another approach, which I call the unified field approach, takes the research problem to be one of explaining how the brain produces a unified field of subjectivity to start with'. It is still the case today, as Fuchs (2018, p. 46) argues, that what he calls a *modularity* of the mind, in which consciousness is constructed from separate single functions, is the preferred model in cognitive science.

on behind the scenes'.[120] Ultimately, brain imaging can, at best, show correlations and not causation (see Azari 2006, p. 41).

Affective consciousness and the whole brain

From a different angle, within the neuroscience of consciousness itself, there is a strong reaction to corticocentrism. In a branch of neuroscience called 'affective neuroscience', Panksepp argues that mainstream neuroscience has failed to account for the primary-process emotional mechanisms that all mammals share and that could be considered fundamental to consciousness.[121] This refers to the development that comes from studies highlighting the fact that many neurobiological studies point towards consciousness as a deep-brain or whole-brain feature instead of a feature of the cerebral cortex. In the view of Panksepp (2007):

> A cortical view of consciousness has become so prevalent that several generations of research related to the subcortical foundations of consciousness almost disappeared from reasoned discourse during the last few decades. Merker provides a long overdue corrective. He envisions how brainstem functions are foundational for phenomenal experience. (p. 102)

In one of the most significant publications on consciousness without a cortex, Merker reviews studies on the removal of the cortex as well as clinical reports about children born without a cortex (called anencephaly; when the skull is filled with cerebrospinal fluid, it is referred to as hydranencephaly),[122] which show that such persons are still conscious. These data speak against the corticocentric view of the cerebral cortex as the 'organ of consciousness' (Merker 2007, p. 80; see also Solms 2013, pp. 10–12). There is strong support for the rejection of the corticocentric reduction of consciousness and an appreciation for the brain stem as the location where conscious experience originates (e.g. see Aboitiz, López-Calderón & López 2007, p. 80; Collerton & Perry 2007, p. 87; Edelman 2007, p. 91; Piccinini 2007, p. 103).[123]

Over many years, Panksepp championed the idea of affective consciousness as the grounding of all consciousness and a feature shared

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120. Also, Vidal (2009, p. 23) remarks: 'Even Ramachandran recently observed that "98% of brain imaging is just blindly groping in the dark"'. See also Bennett and Hacker (2022, pp. 49–54) for a systematic and cautionary review of the use of functional magnetic resonance imaging (fMRI) to localise mental functions.

121. Panksepp (2000, p. 24) himself refers to these ideas as 'radical' and not entertained at the time.

122. Remarkable examples of adults with hydrocephalus leading normal lives support these findings (see Feuillet, Dufour & Pelletier 2007).

123. In a recent study, Solms (2013, p. 9) strongly argues for the replacement of a cognicentric and corticocentric (which he calls the 'cortical fallacy') view with a view of consciousness as affect, originating from the brain stem. But this remains a neurocentric view and merely substitutes a cognicentric with an affect-centric view instead of locating consciousness in the whole brain.

by many organisms. It is based on innate affective feelings that arise from subcortical brain regions (see Panksepp 2000, p. 26f.; Panksepp & Biven 2012, p. 476). In his explanation (Panksepp 2017):

> Neuro-evolutionary evidence suggests that primary-process affective consciousness emerged long before organisms had enough brain matter to speak or to cognitively experience or reflect on their experience. Abundant evidence supports the conclusion that primary-process affective experiences emerged in brain evolution much earlier than cognitive processes that allow us to think and talk about our internal experiences. (p. 141)[124]

Damasio (2010, pp. 22, 75) also supports the view that conscious minds are built not at the level of the cerebral cortex but rather at the level of the brain stem. While it is known that damage to the brain stem is a cause of coma and persistent vegetative state (thus, a reduction of attention and awareness), it is also the location where consciousness originates. Parvizi and Damasio (2001) argue that brain stem structures are essential for the core processes that exist prior to perception and the self, recognising such sensory perceptions. An organism's own state of existence at the level of the brain stem structures is responsible for the interaction with the world of objects and things on the level of the cerebral cortex, where the sensory areas are located (Parvizi & Damasio 2001, p. 140ff.). The evidence they present also points towards another important feature to be considered later in the neuro-ecological perspective, namely that activities of consciousness are distributed across multiple levels and areas of the brain.

However, both Panksepp and Damasio remain neurocentric in that consciousness is still clearly a brain function.[125] The brain, Panksepp and Solms say, 'has some special properties, and central among these is consciousness' (Solms & Panksepp 2010, p. 171). Panksepp (2000, p. 27) nevertheless readily admits that his idea of primary-process consciousness envisions consciousness as a deeply 'embodied organic function' of the brain. There is a sense in which sensory-perceptual consciousness and primary-process consciousness are two varieties of consciousness (see Panksepp 2000, p. 25),[126] but it is also the case that when concepts of

124. Integrated affective states and corresponding actions existed long before cognitive and reflective capacities, Fuchs (2018, p. 126) points out. Or, in the explanation of Ray (2013, p. 315): 'The affective mind of humans predates the cognitive mind (developmentally and evolutionarily) and is ancient, complex, subtle, rich, and capable of knowing and understanding the world, based on feelings alone'.

125. The minor differences in nuance or emphasis between Panksepp and Damasio do not take away the major agreement on core consciousness as the foundation of *consciousness*. Both authors identify idiosyncratic notions in their respective versions (see Damasio 2010, pp. 322–323, n. 17; Panksepp 2017, p. 476; Panksepp & Biven 2012, p. 67; and see the analysis of Anderson 2019).

126. Just as a distinction should be maintained between perception and cognition, Ray points out that it is important to realise that cognition and affect are closely connected but distinct (see Ray 2013, p. 313).

consciousness privilege only one of them, the notion of consciousness is skewed.[127] A first step in correcting the shortcomings of existing unidimensional theories is to add the affective part to the cognitive part of *consciousness*.

Neurocentrism

The second general feature of mainstream neuroscience of consciousness is neurocentrism. In the words of Hutto (2017, p. 377), neurocentrism is the notion that cognition and consciousness are 'primarily a heady, brain-bound affair of manipulating representations'. Just after the turn of the millennium, the neuropsychologist Adam Zeman (2005) warned that mainstream neuroscience of consciousness is 'excessively neurocentric'. In his critical overview of consciousness research, he remarks:

> [*P*]erhaps, we need to broaden the horizon of our explanation, to consider the mind as 'embodied, embedded, and extended' – embodied in the wider frame of our biological being, embedded in the culture in which it has developed, and extended in space and time through which our transactions with the physical world proceed. (p. 8)

While he correctly identifies the problem, it is not clear how broadening the very framework that is at the root of the problem can solve it. The brain-based view cannot just be supplemented with an embodied view but requires a reconceptualisation in which the brain is resituated as to its role in creating consciousness.

Nevertheless, as far as it goes, neurocentrism is the default position in mainstream neuroscience of consciousness. This is evident in the casual and common way in which consciousness is equated to brain processes: *you are your brain*. It is also exemplified in what is known as the computational theory of mind.

You are your brain

Mainstream neuroscience of consciousness is not only corticocentric but can be described as neurocentric; *homo cerebralis* is today hailed as *homo neuralis* [brain man]. Most neuroscientists will agree with the formulation of Searle (1993, p. 312; see also Changeux 2002, p. 73) that 'brain processes cause conscious processes'; some are rather explicit: 'Just as kidneys produce urine, the brain produces mind' (Swaab 2014, p. 3).[128] Crick and

127. The anatomical foundations of human consciousness, Blum (2014, p. 151) correctly says, 'appear to be far less conceptual and linguistic – and far more emotional and qualitative – than previously thought'.

128. Eagleman (2015, p. 5) is in awe of this hunk of unremarkable stuff (the brain) that 'creates' mental processes and consciousness. Elsewhere, Swaab (2014, p. 169) says 'Consciousness can be seen as an emergent characteristic generated by the joint functioning of the enormous network of nerve cells'.

Koch (2000, p. 3) not only say that within the neuroscience of consciousness it is universally agreed that the brain 'produces consciousness' but also that the brain 'is all that is necessary' to produce it. Thus, most will agree with the neurocentric slogan: *you are your brain!*[129]

This notion, as Frith and Rees (2017, p. 6) point out, goes back to the 19th century German (neuro)scientist Helmholtz, who was instrumental in ascribing consciousness to the brain instead of a *soul*. It was an attempt to avoid Cartesian substance dualism but, in the process, did not escape the dualistic legacy of the binary theoretical framework. Neurocentrism thus harbours a brain–body distinction which Jasanoff refers to as 'scientific dualism' and others call 'Cartesian materialism' and is considered a corollary of the mind–body dualism; it is substance dualism minus the mind (see Murphy & Brown 2007, p. 15). It refers to the tendency to separate the brain from the body and to credit the brain with abiotic features.[130] It harbours the thought, rhetoric and practice that the brain and body are separate, with the brain being an abiotic, special entity. Thus, what earlier dualists ascribed to the soul or the immaterial mind, modern neuroscientists apply to the brain (see Manzotti & Moderato 2010, pp. 19–20). In a clear instance where the rejection of sunsets is replaced with another sun-movement theory, substance dualism is replaced with another binary theory, an abiotic brain instead of a soul in the body.[131]

Ironically, as Jasanoff argues, the scientific dualism that has characterised the neuroscience of consciousness ever since results in a situation where 'modern psychology and neuroscience appear to be so compatible with traditional Western concepts of the soul' (Jasanoff 2018,

(footnote 128 continues...)
The metaphors used in these theories to describe the brain are 'rational, information-processing, organic machine' (Swaab 2014, p. 7) and a 'complicated command center' (Swaab 2014, p. 8; see also Manzotti & Moderato 2010, p. 2; Rose 2012, p. 57f.; Salzberg 2019, pp. 1–2 for more examples).

129. Most who repeat this slogan fail to see that it equates the brain with the person it supposedly controls (see Jasanoff 2018, p. 92).

130. In the explanation of Fuchs (2018, p. 26): 'This thesis is ultimately based on a still dualistic division of the world into a bodiless and worldless subjectivity on the one hand, and a physically reduced material world on the other hand. Subjectivity is conceived of idealistically – though in the new robe of constructivism – while it is, at the same time, ascribed as a construct to purely material processes in the brain. The result is a peculiarly hybrid doctrine, composed of a disembodied mind and a disembodied brain, which could rightly be called "Cartesian materialism"'. Or, in the words of Jasanoff (2018, p. 39): 'Scientific dualism provides a mechanism for keeping our minds sacred – distinguishing the functions and processes of the brain from those of mundane bodily processes like digestion or cancer, and perhaps even guarding our brains from being eaten'.

131. The evolutionary development of attributing psychological functions to the brain from Descartes's notion of the mind (soul) to what is called the third generation of current neuroscientists is clearly documented (see Bennett & Hacker 2022, pp. 33–84).

p. 159).[132] This is so because the brain functions like the soul in the same dualistic framework. Or, in the words of Manzotti and Moderato (2010, p. 5), the brain 'is now carrying the burden of the soul'. In this view, brains recognise faces, identify objects, perceive alcohol and the like – things that living organisms do (see Fuchs 2018, p. 43) and that, in previous times, were the functions of the *soul*.

This neurocentric confusion results from conceptual confusion that predates any experimental activities. One cannot find a pole of the earth unless one knows what a pole is, and embarking on a journey to the East Pole is based on a conceptual confusion. Based on this illustration, Bennett and Hacker (2022) argue:

> The question we are confronting is a philosophical question, not a scientific one. It calls for conceptual clarification, not for experimental investigation. One cannot investigate experimentally whether brains do or do not think, believe, guess, reason, form hypotheses, etc. until one knows what it would be for a brain to do so – that is, until we are clear about the meanings of these phrases and know what (if anything) counts as a brain's doing these things and what sort of evidence would support the ascription of such attributes to the brain. (p. 82)

Thus, these neurocentric notions of consciousness end up with not only a skewed notion of the mind and consciousness but also a mysterious conception of the body (see Zeman 2008, p. 299). While claiming to be materialists and profusely denying that brain and body are materially separable, most neuroscientific research operates with this scientific dualism of a body containing an abiotic brain.

Computation and information processing

The dominant brain model and metaphor that permeates modern (Western) culture since the cognitive revolution is that of the brain as a computer.[133] But as Rescorla (2020, p. 4) indicates, it is more than a metaphor, as most computational theories describe mind and consciousness not *as a computer* but *literally* as a computing system.

During the 1960s and 1970s, what is referred to as the *computational theory of mind* played a central role in the cognitive sciences (see Rescorla 2020 and Kelly 2007, loc 519ff. for extensive overviews). The brain does what a computer does, namely, the computation of information and the transfer of bits of information between computers. Thus, humans are seen to communicate brain to brain (see Marchand 2010, S5). Together with this

132. See also the analysis and criticism of Malafouris (2013) on neurocentrism and the notion that the mind and consciousness are all *in the head*.

133. Gabriel (2012, p. 20) says that most psychologists agree that cognitive psychology describes the mind as a computational device.

trend, the tendency developed to explain the mind by means of the computer metaphors of hardware and software. Mind is the software that runs by means of input–output, and the brain is the hardware.

Criticism of these metaphors rejects them because they do not do justice to the biological processes that take place in a brain where hardware and software are intertwined (e.g. see Llinás 2001, p. 3). The mind impacts the brain and vice versa in ways that hardware and software do not (see Fuchs 2018, p. 139). This metaphor also inevitably leads to an unavoidable dualism (see Bartra 2014, p. 101) in which information replaces the mental as the counterpart to the physical (brain). Despite its widespread popularity (and uncritical repetition in some circles), information is not a physical thing that is transmitted but an epiphenomenal entity. Just as an envelope with a letter in it does not contain a piece of paper plus information, but just a piece of paper, neither a computer nor the brain contains 'any extra elements, no extra juice, no spirit, no *elan vital*, and no information' (Manzotti & Owcarz 2020, p. 70).[134]

How the brain works: Bottom-up or top-down?

Within these shared features of the brain, there is, however, a great disagreement on how all of this works. The classical cognitivist paradigm is based on the assumption that cognition is an internal information process and computation of the neural representation of the external world, while the subject of cognition is a detached observer and not embodied or engaged in the world (see Fuchs 2018, p. 108);[135] in short, it operates with an input–output computational model (see Kiverstein & Miller 2015, p. 1).[136] In view of the above, it is not surprising to also find here a reflexological understanding of the brain, which sees it as essentially an

134. Manzotti and Owcarz (2020, p. 70) conclude their critical analysis of the notion of 'information' as the magic potion in many theories of consciousness with the following remark: 'Taking information to be a real thing is committing the fallacy William James called "vicious abstractionism" or "vicious intellectualism" […] scholars who take information as if it were real […] bamboozle us into believing in the physical existence of something abstract'.

135. For example, consciousness is now considered to be a primary function and activity of the brain itself, with the implication that it is taken as 'the brain's interpretation and integration of all information being made available to it at any given point in time' (Mahowald & Schenck 2001, pp. 274–275). See also the criticism in Laughlin (2017, p. 51): 'Cognition in the sense used by cognitive science, cognitive neuroscience, and more specifically by cognitive style-oriented psychology always refers to information processing within the individual mind or brain'.

136. Cognitivism, representationalism, computationalism and internalism in this context all refer to the same notion where the mind (consciousness) is to the brain as a computer program is to the hardware, good for representing the outside world (see Malafouris 2013, p. 26). The corresponding brain model is that of a *brain in a vat* – a disembodied input–output device characterised by information computational processes.

input–output system.[137] Within this computational model of how the brain works, there is no agreement among supporters of how it happens. The classical view of perception in the cognitive sciences is that it is a bottom-up process with a view of the perceiving brain as receiving inputs from the senses and turning them into percepts.

In recent years, there has been a reversal of this bottom-up approach of cognitivism, which represents a retreat from this passive input process and ascribes an active role to the brain as predictive processing. In this model, the basic flow of information is top-down and not bottom-up, and the flow of information is replaced by the process of prediction error (see Clark 2015, pp. 1–2). It is not a unified approach but goes under different labels (predictive coding, predictive processing and predicting error minimisation).[138] Underneath predictive coding models is a fundamental understanding of the brain as 'an inference machine that continuously generates predictions about the surrounding world' (Van Elk & Aleman 2017, p. 362).

Predictive coding reverses traditional thinking of passively receiving information from the senses and considers the core business of cognition to make proactive probabilistic Bayesian predictions about likely sensory perturbations (see Hutto 2017, p. 382).[139] Like all other aspects in the science of consciousness, the different versions of predictive coding are embedded in various other theoretical assumptions supported by the binary theoretical framework. But they all seem to be heirs to the Helmholtzian view on brain functioning: 'Most neuroscientists are Helmholtzian and would endorse the idea that the neural processes underlying perception are inferential and representational' (Gallagher 2017a, p. 160).[140]

137. This view on cognition is also called a '"sandwich style" layer of cognitive processing, involving input, computation, and output' (Menary 2015, p. 1; and see Choudhury & Slaby 2012, pp. 10–11). Hutto (2017, p. 379) adds that 'making free use of the notions of information, algorithm, and representation only tends to obfuscate our accounts of cognition'.

138. These approaches all emphasise 'the importance and ubiquity of top-down predictions or inferences in generating perception' (Gallagher & Allen 2018, p. 2629).

139. The *predictive processing framework* maintains that 'humans use prior cognitive models to predict and perceive the world, and these models are updated in case of conflicting predictions or sensory information' (Van Elk & Aleman 2017, p. 361). This is easily illustrated with the example of visual perception discussed in the previous section. It is well-known today that most visual percepts are really cognitive constructions based on very limited sensory information.

140. Helmholtz is the father of predictive coding ideas in that he proposed that perception is a hypothesis-driven process. Theoretically, it was also a turn towards the Kantian idea that we can have no cognition of an object in itself, only as an appearance. But that is to introduce some of the dualisms inherent in the binary theoretical framework. Some early critiques of Kant already pointed out that his appeal and reference to 'things in themselves' were violating his own critical system. By adopting Helmholtz, they also became, Zahavi (2018, p. 53) argues, 'neo-neo Kantians'.

Hutto points out that predictive coding, although a reversal of traditional views on cognition, is still based on a form of representationalism, namely representational content. Radical enactivism questions the assumption that cognition involves content. Hutto (2017, p. 383) argues that it remains a version of idealism that calls into question the very idea of an external world (as assumed by realism). An alternative approach to cognitive processes and consciousness does not change the direction from bottom-up to top-down but to the view of ongoing dynamical interactions between brain and the environment that loop through brain, body and environment (see Menary 2015, p. 16). It is also not based on just a different kind of representation but on a completely nonrepresentational account of mind and cognitive processes (see Hutto 2017, pp. 379–380). The detail of such a view will be presented as the neuro-ecological perspective on consciousness.

■ *Neuronocentrism* and computationalism

The neurocentric and corticocentric view of consciousness harbours another closely associated assumption about how the brain functions. That is *neuronocentrism*. A model of the brain based on neurons and neuroelectricity also lends itself best to computational analogies. But that is not a complete story about the brain.

Mainstream neuroscience of consciousness falls on the other side of the fault line on consciousness as a (neuro)biological phenomenon. More than two decades ago, Searle (2000) had already pointed out that for decades, consciousness research had been impeded by two mistaken views:

> [*F*]irst, that consciousness is just a special sort of computer program, a special software in the hardware of the brain; and second, that consciousness is just a matter of information-processing. (p. 576)

Both are the product of a nonbiological view of consciousness. This is so because, as previously pointed out, the neuroscience of consciousness program was not designed to investigate consciousness, but in the words of Revonsuo (2010, p. 62), 'it was founded on the computer metaphor of the mind'. And the grand idea behind that was 'that the mind is just like a computer program, and the mind relates to the brain just like a computer program relates to the computer hardware' (p. 62). This metaphorical use found good support in neuronocentrism.

Neuronocentrism is the term Jasanoff uses to describe the curious feature that brain activity and processes are predominantly described by means of the working of neurons. The neuronocentric view takes it that the role of neurons and neuroelectricity is sufficient to describe and explain the workings of the brain. Neuroelectricity has become the 'lingua franca of the brain' (Jasanoff 2018, p. 44) and is exemplified in the scientific icon of brain imaging pictures. It is hard to hear any other message in the orbit of such a dominant language.[141]

But Jasanoff (2018, p. 41) points out that neurons make up only about half of all the cells in the brain, and in the cortex, glial cells outnumber neurons by up to a factor of ten to one. They operate on a chemical basis and are, in received wisdom, taken as merely supporting neuronal activity. However, a 'conception of the brain that doesn't include a role for glia is like a brick wall built without mortar' (Jasanoff 2018, p. 41). A growing body of research points towards the importance of these cells. From an alternative *chemocentric* view in which the neurotransmitters are the main players, Jasanoff (2018, p. 44) says 'electrical signaling in neurons enables the spread of chemical signals, rather than the other way round'. Seen through this 'murky chemical stew, the electrical properties of neurons seem almost irrelevant' (Jasanoff 2018, p. 46). Perhaps more important is that a chemical brain is a biologically grounded brain in that it is linked to and responds to the chemical signals from the rest of the organs in the body.[142] Not only does it relativise the abiotic notion of the brain, but it is also a counterpoint to the 'shining technological brain of the computer age' (Jasanoff 2018, p. 46).[143]

Several nested assumptions and supporting metaphors uphold these ideas. These include the input–output model of perception, the information and hardware–software metaphors and inference models of representation.

Neuroreductionism

The involvement of the neurosciences in consciousness research was the beginning of a legacy that turned the cognicentric notion of consciousness into a neurocentric one. Consciousness as cognition was focused onto the cerebral cortex. The story of mainstream neuroscience of consciousness contains a reductionism of mental aspects and human actions that belong to conscious individuals to be attributed to brains. This story contains a neuro-ontology that excludes the human person or organism and attributes everything to the brain (see Rose & Abi-Rached 2013, pp. 20–22). Earlier, this was referred to as the mereological fallacy. Here it is at

141. See, as an example, the 'nervous system depends on electrical events rather than on other physical-chemical reactions' (Århem & Liljenström 2008, p. 7).

142. Fuchs (2018, p. 172 n 2) explains that the focus on the functional and computational theories in the cortex results in a lack of attention to the embedding of brain functions in 'biochemical, humoral, and endocrine processes taking place in liquor and blood'.

143. There are interesting examples of other creatures where it is apparent that electrical signals are much weaker than the chemical process in the nervous system (see Jasanoff 2018, p. 46).

work in that together, the above features result in what can be called a neuroreductionism – that is, properties that belong to the organism or person are attributed to the brain (see Glannon 2011, p. 27). Two features of this process need to be highlighted.

One is that the reductionist claim of being your body is neither the result of neuroscientific breakthroughs and discoveries nor of empirical research. Instead, as Vidal and Ortega (2017) argue, the idea of brainhood (*I am my brain*) developed historically as a redefinition of personhood and goes back to the Enlightenment. In their summary (Vidal and Ortega 2017):

> [*C*]ontrary to what neuroscientists often assert or imply the conviction that 'we are our brains' is neither a corollary of neuroscientific advances nor an empirical fact. Rather, it is a position, philosophical and metaphysical, even if some claim it is dictated by science, which depends on views about what it is to be a human person. (p. 38)[144]

Being your brain is an assumption of and not a conclusion from neuroscientific research.

Neurocentrism as well as its antecedent, corticocentrism, are not the result of neuroscientific research but its nested assumptions. Nowhere was consciousness investigated and discovered as being in the cortex. Instead, the search for consciousness in the dominant correlates-of paradigm is based on the presupposition of corticocentrism and does not confirm it.

Neuroreductionism is based on the methodological step of reductionism, which is widespread in the sciences,[145] and in the case of consciousness studies departed from the notion of computational neuroscience. The first step was the introduction of computer metaphors to explain how the brain works. The second step was to ascribe all mental functions to the new computer, the brain.

144. About the brain–self identification, Vidal and Ortega (2017, p. 18) state: 'Neither resulted from neuroscientific breakthroughs nor depend on knowledge about the brain but was made possible by early modern scientific and philosophical developments that affected notions of personhood and personal identity. [...] The corollary the first historical and historiographical point is that while later neuroscientific research bolstered the "cerebralization" of personhood, it did not, despite many claims, substantiate it either conceptually or empirically'. Also, Velmans (2009, p. 302): 'No scientific discovery has yet been made which *demonstrates* consciousness to be nothing more than a state of the brain'. Also compare the criticism of Kastrup (2012, p. 6) on the identification of correlation with causation in mainstream neuroscience of consciousness; correlates of consciousness explain it no more than a speedometer explains the working of a car.

145. Most experimental work cannot be performed without reductionism (see Rose 2012, p. 57).

Concluding remarks

The fabric(ation) of *consciousness* in mainstream neurosciences is characterised by a complex set of theoretical assumptions. While *consciousness* is, according to many neuroscientists, straightforward and easy to explain, an analysis of mainstream neuroscience of consciousness reveals a rather complex picture of diverse brain models and neuro-assumptions that contribute to the many theories of *consciousness*.

Individually and collectively, the five features refer to sets of nested assumptions that determine notions about the brain and how it functions, as well as determining the concepts and theories of consciousness that are possible. As will become apparent, none of these are to be taken for granted or as established. Together, these views form part of a perspective referred to as neuroreductionism, whereby features that belong to an organism are attributed to the brain or parts of the brain.

Chapter 8

The fabrication of *consciousness* and the search for the neural correlates of consciousness

Introduction

Together with the so-called hard problem of consciousness (see next chapter), the search for the NCC is considered one of the two focal points of research in mainstream neuroscience of consciousness (see Frith 2007, loc 2885). The crisis in consciousness research is highlighted in that several different concepts of consciousness are at work here.

The search for the NCC is commonly regarded as the flagship of the neuroscientific research on 'consciousness'[146] and considered by many as the surest way to solve the mystery of consciousness. Therefore, mainstream science of consciousness, Klein, Hohwy and Bayne (2020, p. 1) quite correctly point out, 'is currently structured around the search for the neural

146. Many scholars agree that the search for the NCC is *the* central aspect of the neuroscience of consciousness. Hohwy (2007, p. 461) points out that most consciousness researchers in the neurosciences agree that the first step in a science of consciousness is the search for the NCC. The search for the NCC, the neurophilosopher Chalmers (2000, p. 17; and see Glattfelder 2019, p. 396; Hohwy 2009, p. 428; Owen & Guta 2019, p. 1) points out, is 'arguably the cornerstone of the recent resurgence of the science of consciousness'.

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correlates of consciousness'. It is also at the heart of the computational theories seeking to identify the brain mechanisms that process information.

From the outset, it should be kept in mind that the search for the NCC, like concepts of consciousness, emerges in the first instance not from an inquiry about consciousness itself but follows from other concerns that are related to it and is based on varying concepts of consciousness. The objective here is not so much an explication of the NCC project but to investigate how this major programme in mainstream neuroscience of consciousness impacts the fabric(ation) of consciousness.

While the term 'the NCC' is commonly used, it is not at all easy to say precisely what it refers to. The reasons are that it has many different meanings; each of the words in the term is ambiguous, if not problematic; and it does not refer to a single or unified research programme. The 'correlates-of paradigm', as Kitchener and Hales (2022, p. 3) refer to the search for the NCC, harbours several different research programmes based on different definitions of 'consciousness' and particular assumptions about the brain and how it functions. Most importantly, for some, the search for the NCC serves to address the fabric of consciousness and promises to solve its mystery. Thus, in a very definite way, the correlates-of paradigm opens a window onto the fabric(ation) of 'consciousness' in mainstream neuroscience of consciousness.

What is the search for the neural correlates of consciousness about?

The concept of the 'NCC' and each of its components are ambiguous. As with every aspect of consciousness research, one should expect terminological confusion in this programme. If consciousness is a mongrel concept that is variously used for different mental functions, one should expect nothing less from the concept of the NCC. Even though Koch (2019, loc 1563 n 14) says that over the years the concept NCC has been 'refined [...] dissected, [...] extended, transmogrified, and dismissed', it is not a single concept, and *consciousness* has several different references. The first result is that many kinds of NCC are found in the literature, and there is no agreement either on terminology or on how they are constituted. In short, the term *NCC* does not have a singular meaning. However, in many respects, it is the face of contemporary mainstream neuroscience of consciousness.

In operational terms, the search for the NCC as the main experimental branch of the neuroscience of consciousness also constitutes the bulk of studies on *consciousness* research in the neurosciences. And in some circles, it is considered *the* ultimate approach in solving the mystery of consciousness.

In its most elementary form, the search for the NCC is about which brain areas are involved in consciousness. Formally, the concept is defined as 'the minimal neural mechanisms that are jointly sufficient for any one conscious percept, thought or memory, under constant background conditions' (Tononi & Koch 2015, p. 2).[147] Broadly speaking, its research strategy 'involves relating behavioural correlates of consciousness to the neural mechanisms underlying them' (Koch et al. 2016, p. 307; see also Århem et al. 2008, p. 77). The search assumes that for every experience, there is an associated NCC (for each mental state or percept, there is a corresponding brain state): one for seeing a red patch, another for seeing a grandmother and a third for hearing a siren, and so on (see Tononi & Koch 2008, p. 247). It is not the case that the brain is merely *involved* in consciousness but that a given neural activity is either sufficient or identical to a given phenomenal experience.

Some theorists take conscious states to be identical to brain states, others as constituted or realised by brain states, and still others merely hold that the two are correlated with brain states (see Klein et al. 2020, p. 5). Thus, the neural activity can be 'identified' with, seen as 'realising' phenomenal experience or 'causally interacting' in consciousness (see Hohwy 2007, p. 468). And even if exact correlates were to be found for a particular phenomenal experience (pain or colour, etc.), the correlation thesis is compatible with a variety of ontological theories about the fabric of consciousness. For example, *correlation* cannot decide between substance dualism, neutral monism, emergentism or panpsychism (see McLaughlin 2017, p. 416).

The search for the NCC goes together with a whole range of assumptions about the brain and how it works, and it has never been about whether neural activity just has a role to play in enabling and tuning conscious experience but 'whether there is a given neural activity that is either sufficient for or identical with a given phenomenal experience' (Manzotti & Moderato 2014, p. 83). This is where one sees how this paradigm is driven by assumptions (not conclusions) about the brain and how the search for correlates fits into a localisation framework. For example, Koch (2019) explains:

> When defining the NCC, the qualifier 'minimal' is important. For the brain as a whole can be considered an NCC: after all, the brain generates experience, day in and day out. But Crick and I were after the specific synapses, neurons, and circuits constitutive of experience. (loc 1463)

147. The NCC is defined as 'the minimal neuronal mechanisms jointly sufficient for any one specific conscious percept' (Koch 2019, loc 1443; see also Crick & Koch 1990, pp. 266–267, 1998, p. 97, 2003, p. 119; Koch et al. 2016, p. 307). With Tononi, a slightly adjusted definition is given which adds thoughts and memories to perception (see Tononi & Koch 2015, p. 2).

Thus, the correlates-of paradigm also claims to solve the mystery of consciousness. But the concept is ambiguous. As with the word 'consciousness' that is turned into many 'consciousnesses', several types of NCC are available. For example, there is the *full NCC* as the overall state of being conscious and *content-specific NCC* that refers to the particular phenomenal experiences of a perception (see Koch et al. 2016, p. 308). Others distinguish between 'content-NCCs', 'state-NCCs' (as in awake, asleep, etc.) and 'generic NCCs' (as in being conscious as opposed to being unconscious) (Klein et al. 2020, p. 3). The main reason for this is that each term in the concept is challenging. But also, the second 'C' in NCC is challenging.

Consciousness in the neural correlates of consciousness

In the NCC literature, at least three different definitions of consciousness are used: consciousness as having an experience, conscious perception or awareness, and being conscious, also referred to as the general level of consciousness (see Boly et al. 2017; Koch et al. 2016; Tononi & Koch 2008). Based on these concepts of consciousness, together with the explicit definitions of consciousness employed in the NCC paradigm, at least two different consciousnesses are targeted in this research.

From the point of view of different consciousnesses, it is easy to say not only what the search for the NCC is about but also what it is not about. To start with the latter: the NCC are not about consciousness as such.

Neural correlates of consciousness are not about consciousness as such

Despite claims to solve the mystery of consciousness, the search for the NCC is not about consciousness as such.

The consciousness revolution started with the objective of solving the mystery of consciousness through the search for the NCC. One of the objectives of the NCC programme was to provide a neurobiological theory of consciousness (see Crick & Koch 1990) that would solve this mystery. This ideal is confirmed in a recent update on the search for the NCC, where it is explicitly claimed that it attempts to understand the origins of consciousness and how it fits into a physical account of the universe (see Koch et al. 2016, p. 307). If nothing else, this is an assault on consciousness as such. To put this in nontechnical language, the notion of the NCC is to show that consciousness as such is completely a brain phenomenon and that dualism has been defeated (see Owen 2019).[148]

However, despite the often-used definition of consciousness as 'subjective experience' (Tononi & Koch 2015, p. 1),[149] no study is designed to identify the NCC as such. In a recent evaluation of the potential of IIT to address the mystery of consciousness, the authors clearly show that 'the minimal set of neuronal events jointly sufficient for a specific conscious percept' is a very different matter from 'the minimal set of neuronal events jointly sufficient for consciousness as such', (Merker, Williford & Rudrauf 2022, p. 11). It is only with the conflation of consciousness as awareness (the psychological features of being conscious) and creature consciousness with consciousness as such that the fallacy arises that the mystery of consciousness is being addressed. The *consciousness* in NCC studies switches between different meanings of consciousness but in each instance is also a reductionist concept of consciousness. The reality today is that most, if not all, studies on the NCC are not at all interested in the mystery of consciousness; research in the 'correlates-of' paradigm is about access and creature consciousness. Despite the repetition of the definition of consciousness as such in NCC literature, it is not the topic of research in this programme.

The neural correlates of being conscious and 'states' of consciousness

Coming from a neurobiological point of view, Kitchener and Hales (2022, p. 1) claim that neuroscience research (on consciousness) is dominated by research into disorders of the nervous system. Whether or not it is empirically true that the bulk of NCC research is about being conscious (as opposed to being unconscious or, say, in a coma), it is true that together with the search for the neural correlates of perceptual awareness, the search for the neural correlates of being conscious constitutes another chunk of experimental research on consciousness.[150]

148. To be sure, this research program does not depart from the question of what consciousness is but is an attempt to identify the neural correlates or mechanisms that give rise to specific conscious percepts or to consciousness as an aspect of awareness. In the practice of this approach, research is not limited to percepts but to conscious content in general (see Klein et al. 2020, p. 3). Each instance of conscious awareness of things, it is assumed, has a particular neural pattern.

149. For example, when reviewing progress in the NCC, subjective experience features prominently (see Boly et al. 2017, p. 9603; Koch et al. 2016, p. 307). Phenomenal consciousness or consciousness as such is explicitly included in this review: 'Being conscious means that one is having an experience' (Koch et al. 2016, p. 307) – the 'what is it like' of a perception.

150. In this framework, it is not surprising that consciousness is seen as just another mental or cognitive function (next to cognition, memory, reflection and the like) and refers to awareness or 'having an experience' (Tononi & Laureys 2009, p. 376) of such awareness (see also discussion in Varela, Thompson & Rosch 1991, p. 51).

The search for the neural correlates of being conscious originated from the clinical setting of diagnosing whether a subject is conscious or not (creature consciousness). Loss of consciousness occurs in disorders of consciousness as well as in general anaesthesia or some sleep conditions. Consciousness research in disorders of consciousness departs from the notion of consciousness as awakeness and for a long time relied on behavioural criteria to determine consciousness. Traditionally, the assessment of whether someone was aware and/or awake took place in clinical settings by means of behavioural and verbal tests. Brain imaging techniques offer an alternative test, and the search for the neural correlates of being conscious in this area is growing rapidly as an alternative attempt to determine whether an organism is conscious (creature consciousness).

The search for the full NCC (as some refer to this) is looking for the neural mechanisms that determine and regulate states such as sleep, being under anaesthesia and disorders of consciousness such as coma and vegetative states – often referred to as loss of consciousness.[151] At best, this could be seen as the neural correlates of (consciousness as) awakeness or responsiveness.

While a great deal is known about the neural processes that are responsible for being conscious (and for those that are responsible for loss of consciousness), they tell us nothing about consciousness as such. These neural correlates are a prerequisite for being able to experience at all but are not responsible for consciousness as such.[152]

Neural correlates of perceptual awareness

The second domain in which the search for the NCC is prominent has to do with perceptual awareness. Broadly speaking, this includes the research programme that seeks to identify the neural correlates of perceptions (seeing red, smelling an apple or hearing a siren) and, in fact, the neural correlates of any stimulated conscious percept. However, since its inception, this paradigm has been dominated by research on specific visual contents (see Crick & Koch 1990, p. 266ff.; Tononi & Koch 2008, p. 247). Thus, this is a search for the neural correlates of conscious perception or conscious

151. This focus area in the search for the NCC has to do with 'the contrast between the *presence* and the *absence of consciousness* – for example, between being awake and being under anesthesia' (Thompson 2015, p. 6). Losing consciousness is equated with losing awareness (as in general anaesthesia) or losing awakeness (as in general sleep) or whether consciousness is at all present in the diseases of consciousness (as in the vegetative state) (see Owen 2013, p. 111) – also referred to as 'state-NCCs' (Klein et al. 2020, p. 3).

152. Koch points out that 'no single brain area seems to be necessary for being conscious, but a few areas, especially in the posterior cortical hot zone, are good candidates for both full and content-specific NCC' (Koch et al. 2016, p. 317). While being conscious is a prerequisite for awareness of specific contents, these are two different processes.

awareness, access consciousness or content consciousness (e.g. see Kaan 2001, p. 414) and is believed to reside in cortical areas.

From research on visual perception, which is the most popular area of neuroscientific research on 'consciousness', it is known that different areas of the brain are responsible for different features of visual perception. For a long time, it was thought that vision is located in one area of the brain, but nowadays, it is known that it is distributed in more than 30 brain areas (see Ramachandran 2004, p. 16). Zeki (2003, p. 214) talks about the 'functional specialization in the visual brain', which distinguishes between colour, shape, motion and the like in visual perception. These he refers to as 'micro consciousnesses' and suggests that the search for the NCC can only progress once the many components or levels of consciousness (micro, macro and unified) are acknowledged. As with vision, most other complex mental and behavioural processes cannot be localised to single brain areas (see Glannon 2011, p. 6ff. for a discussion).

But more importantly, the neural correlates of conscious vision or of its constituting 'consciousnesses' are not the same as the potential correlates of consciousness as such (see Vidal & Ortega 2012, p. 348). Instead of thinking about these consciousnesses as constituting consciousness as such, it would be more appropriate to label these the 'neural correlates of specific awarenesses', respectively. If anything, this is a search for the neural correlates of cognition.

The neural correlates of consciousness and nested brain models and assumptions

The correlates-of paradigm is not a natural investigation of consciousness as such but is fabricating *consciousness* or *consciousnesses* based on at least two sets of assumptions and features associated with the brain. They are localisationism and neurocentrism, and the correlates-of paradigm is only possible once these assumptions are in place. To contextualise it in terms of the fault lines identified earlier, the correlates-of paradigm falls on the localisationism side in the localisation versus holism fault line and the neurocentric side of the neuro versus embodied (or ecological) fault line. Put differently, an investigation of the correlates (causes) of *consciousness* is only possible on specific sides of these fault lines.

The first brain assumption that enables the correlates-of paradigm is localisationism. In fact, the correlates-of paradigm is so closely associated with brain localisation that Figdor can claim that localisationism is the 'dominant research program in contemporary cognitive neuroscience' (Figdor 2010, p. 421; see also Klein et al. 2020, pp. 6–7). However, on a theoretical level, most neuroscientists support some form of holism and no longer accept localisationism or its supporting building-block view of the brain. Ironically, localisationism remains the dominant research paradigm in the neuroscience of consciousness. As explained earlier, localisationism is the notion that for each mental function, particular neural sites or neurons can be identified. As seen above, no such location has been (or can be) identified. And as indicated, in many instances, 'correlates' mean 'causes'.

The first two problems with localisationism have already been mentioned above. One is the over-interpretation of functional specialisation and the other unwarranted conclusions drawn from brain imaging pictures. A third shortcoming relates to the way in which such experimental research is conducted. Studies seeking the correlates of perceptual awareness are mostly based on a stimulus-response (awareness) process and thus divorce the specific response from the pre- and post-stimulus activity that makes any such response possible (see Northoff & Zilio 2022, p. 2). The underlying fallacy in these procedures about consciousness, as Searle (see 2000, p. 572) points out, is that during such experiments, brains are already conscious (see also Hohwy 2009).[153]

While functional specialisation and imaging technologies in the diagnosis of brain damage or illness have made remarkable progress over the last few decades, consciousness as such is not to be localised. That specific brain areas involve mental features and functions is hardly disputed. In fact, the evidence for localisation of certain functions in brain areas is widely accepted. But localisationism is coupled with neurocentrism.

The second neuro-assumption that enables the correlates-of paradigm is neurocentrism. Knowing that a spark plug is necessary for an engine to run does not mean it propels the vehicle. That is unless it is mistakenly assumed from the start. Neuro-research and brain imaging results cannot prove that consciousness is generated by the brain just because certain brain areas are implicated in mental functions unless it is assumed that all that is necessary for consciousness is a brain. That is the essence of neurocentrism. It seeks to find the cause of consciousness in the brain. However, as critics point out, consciousness 'does not happen in the brain. That's why we have been unable to come up with a good explanation of its neural basis' (Noë 2009, p. 21). The search for the NCC is directly the product of neuroreductionism. Put differently, NCC and *consciousness* as defined in the neuroscience of consciousness are not the result of neuroscientific research on consciousness as such but the presuppositions thereof. And even if any correlates can be identified, such correlates still do not explain how the brain creates consciousness. Such identified areas of

153. A recent attempt to address these problems suggests the idea that explanation is done by citing not correlations but difference-making relations (DMRs). At the core of a DMR 'is the idea that manipulating one aspect of a system enables one to manipulate other aspects of it' (Klein et al. 2020, p. 9).

neural specialisation are, at best, *necessary* and not *sufficient* conditions for consciousness (see Fuchs 2018, p. 49). As Glannon (2011) explains:

> [*N*]euroscience does not tell us how the brain enables mental processes. Knowing that certain regions of the brain mediate certain cognitive and affective functions does not mean that we know how the brain makes these functions possible. Neuroscience does not offer a complete explanation of enabling mechanisms in the brain–mind relation. (p. 8)

Given the overwhelming evidence for whole-brain activity for mental functions, localisationism no longer has theoretical support, but it remains the dominant research practice in mainstream neuroscience of consciousness.

Concluding remarks

After 30 years of active research, 'no unequivocal "correlate" has emerged' (Hohwy & Seth 2020, p. 2). The flip side of this is that, given the many different concepts and definitions of consciousness, numerous 'correlates' in different brain regions have been identified.[154] Within a corticocentric framework and supported by the atmosphere of cultural relativism, it is inevitable to seek convergence between these proposals.[155]

But even more remarkable is that so many questions about the actual viability of this approach are being asked. Some seek to improve it in one way or another (see discussions in Hohwy 2009; Hohwy & Seth 2020; Merker et al. 2022, p. 11), but the correlates-of paradigm remains trapped in its constituting assumptions. Not only the 'Cs' in the phrase *NCC* but also the 'N' are ambiguous, if not problematic. Given the wide spectrum of views and lack of agreement on where to find the NCC and what they are, this should perhaps be described as the search for the neural correlates of *what happens to be called consciousness*, because most of these studies are about the neural correlates of *components of consciousness* such as perception or cognition. The complexity and multiplex nature of consciousness are remarkably absent from these discussions. Three reasons suggest this paradigm is doomed to failure when it comes to *consciousness as such*.

154. The following incomplete list give an impression of the identified brain regions: 'Extended reticular-thalamic activation systems, re-entrant loops in thalamo-cortical system, neural assemblies bound by NMDA [N-methyl-D-aspartate], higher level of activations at dedicated perceptual areas, dorsal prefrontal, and parietal areas' (see Manzotti & Moderato 2010, p. 15). See also the discussion on whether the NCC are at the front or the back of the cerebral cortex (Boly et al. 2017; Northoff & Lamme 2020, p. 571).

155. One such suggestion is that the different neuronal features and their corresponding NCC ('preNCC, proper NCC, and NCC con') are supposedly sufficient because 'consciousness concern distinct time points of stimulus-related activity including prior time points in prestimulus (preNCC), at stimulus onset and early on (proper NCC), and later (NCC con)' (Northoff & Lamme 2020, pp. 581–582).

The first reason is that despite the rhetoric of a single programme that could solve the mystery of consciousness, the search for the NCC is about at least two different research programmes based on different things being called consciousness and is not at all about consciousness as such. But not only are the mechanisms for creature consciousness completely different from those for phenomenal consciousness,[156] the candidates identified in the search for the NCC are not phenomenal consciousness but cognition.

The second reason is that the concept of the NCC and each term within it are ambiguous and confusing. Despite Koch's claim that it has been refined over the years, it is rather the case that it has constantly been redefined to suit new study conditions. Consequently, it is rather unsurprising that, to date, no single correlate of consciousness has been identified.

The third and perhaps most important reason is that the correlates-of paradigm is based on brain models and notions of how the brain works that are no longer universally accepted. The search for the NCC is not a universally agreed-upon approach to consciousness, as such, but a very specific research programme that reflects the prior assumptions of localisationism together with the assumptions of neurocentrism and neuroreductionism. The correlates-of paradigm is based on the neurocentric assumption that consciousness as such is exclusively a brain function – an assumption that can no longer be accepted uncritically. Instead, the neural substrates of consciousness are diversely distributed in the brain (see Feinberg & Mallatt 2018, loc 1270). Critics point out that consciousness as such is distributed and that, in principle, neurocentrism cannot settle the mystery of consciousness as such. In fact, few scholars still support the localisationism that underlies this project.

More than anything else, the search for the NCC illustrates the crisis in consciousness research. If consciousness is not created somewhere in the brain but is the manifestation of the 'integral' of the process of life which encompass the whole organism, then it is not to be localised anywhere in the brain. That the brain is involved in conscious experience is a given, and

156. Neural correlates of awareness and neural correlates of awakeness are quite different from one another, and each arguably depends on different sets of neurons and different neuronal processes (see Stoerig 2007, p. 708). Both the content and the level of consciousness are multiplex and depend on various anatomical (neuronal) structures. Blumenfeld calls it the consciousness system: 'The consciousness system at minimum includes regions of the frontal and parietal association cortex, cingulate cortex, precuneus, thalamus, and multiple activating systems located in the basal forebrain, hypothalamus, midbrain, and upper pons. Some would also include the basal ganglia and cerebellum due to their possible roles in controlling attention' (2009, p. 19).

a great deal of knowledge has been generated over the last few decades mapping such correlations (see Manzotti & Moderato 2014, p. 87). More than a decade ago, Noë (2009, p. 11) pointed out that despite all the technology and the animal experimentation, 'we are no closer now to grasping the neural basis of experience than we were a hundred years ago'. That is still the case today. The identified neural areas are numerous.

Chapter 9

The fabric of consciousness in mainstream neuroscience of consciousness: Ontological theories of consciousness

Introduction

Together with the search for the NCC, solving the *mystery of consciousness* constitutes a main focal point of research in mainstream neuroscience of consciousness. The mystery of consciousness has to do with the question of what consciousness is. If anything, views on the fabric of consciousness display, more than anything else, wildly different opinions about the metaphysics of the phenomenon under scrutiny. And as seen above, despite claims to the contrary, the search for the NCC has not yet and probably never will explain the mystery of consciousness.

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Ontological theories[157] are supposedly about phenomenal consciousness, the *what-it-is-likeness* to experience things or, if you like, consciousness as experience, and are associated with the so-called *hard problem of consciousness* (HPC). Solutions to the HPC pertain to the Holy Grail of consciousness research, the nature of consciousness as an entity in the world. Knowing what consciousness is as a *thing in the world* sits at the helm of our quest for the human condition. When scientists are striving for Nobel accolades, this mystery is considered the ultimate scientific challenge of this century: what are human beings and the world made of?

From a third-person perspective, several features characterise these theories. Regarding the fabric (or mystery) of consciousness, two features are significant. One is that consciousness is a brain (if not a cortical) phenomenon and the second is that Cartesian substance dualism is seen as a mistaken way to describe it. Therefore, they see themselves as *monists*. But on the one hand, there is a remarkable diversity of 'monist' views and, on the other hand, a conspicuous uniformity in the kind of 'monist' answers given. The focus here is not so much on the content of these theories but on an analysis of the similarities. What is significant is not so much their solutions to the mystery of consciousness but how that mystery is conceptualised to begin with. To capture this, descriptions of the fabric of consciousness in mainstream neuroscience of consciousness are extremely diverse but, at the same time, remarkably monolithic in being all of the same kind. While claiming to be monist views, they all share in the fundamental dualistic nature of the binary theoretical framework. This is the result of both the neurocentrism and a fixation on the mind–body problem.

Neuroscientists pride themselves on how a scientific approach to consciousness is replacing the old philosophical discussions (such as the mind–body problem). However, as Noë (2009; see also Zahavi 2018, p. 59) clearly points out:

> [/]t is a mistake to think that the new neuroscience of consciousness has broken with philosophy or moved beyond it [...] Crick and other neuroscientists have simply taken a specific family of philosophical assumptions for granted, so much so that their own reliance on them has become all but invisible to themselves. (p. 22)

This invisible family of assumptions has a name: the binary theoretical framework. And it is visible not only in the theories but also in the very formulation of the mystery of consciousness.

157. As already indicated, the question of what consciousness is can, for analytical purposes, be separated into different categories of theories: functional theories that seek to explain mental functions, mechanistic theories that focus on how consciousness is generated and ontological theories that supposedly explain what the thing *consciousness* is. Functional theories are predominantly influenced by the historical revolutions. Brain models mostly impact mechanistic theories. Ontological theories of consciousness are predominantly shaped by two features: neurocentrism and the binary theoretical framework.

The 'mystery' of consciousness: Neurocentric, dualistic and reified

The mystery of consciousness is really about phenomenal consciousness,[158] and in its neutral formulation, it is the 'puzzle of subjective experience' (Tononi & Koch 2008, p. 239); the experience of the red of an apple or the sweetness and coldness of an ice cream. This, in short, is a version of the traditional mind–body problem, but in the neuroscience of consciousness, the formulation of the mystery is characterised by three features: it is completely neurocentric; it carries the residue of the dualistic logic and metaphysical realism of the binary theoretical framework; and it displays the reification of consciousness as an entity or a thing. This will be explained by means of the second focus point in mainstream neuroscience of consciousness research, the HPC.

The hard problem of the brain

The mystery of consciousness is most often discussed in mainstream neuroscience of consciousness under the banner of the HPC, a formulation attributed to the philosopher David Chalmers. It is better formulated as the *hard problem of the brain*.

The original formulation by Chalmers[159] of the HPC was how certain organisms can experience subjectivity or consciousness.[160] But in mainstream neuroscience of consciousness, that has been turned into a neurocentric problem and in its very specific formulation is about the question as to how something immaterial can arise from a material brain. In the recent formulation of Koch (2019, loc 2043): 'how is the water of the

158. In this regard, Frith and Rees (2017, p. 12) point out that studies on the NCC address mostly access consciousness, or consciousness as awareness, while the HPC operates with the notion of consciousness as experience (or phenomenal consciousness). In Carruthers's (see 2000, p. 255) formulation, it is how the *what-it-is-likeness* could emerge from the neural processes in the brain.

159. It is important to note that when first formulated in 1995, Chalmers ([1995] 2017a, p. 33) was rather specific about the hard problem of consciousness, namely that it is 'the problem of *experience*. […] There is *something it's like* to be a conscious organism. […] It is undeniable that some organisms are subjects of experience. But the question of how it is that *these systems* [italics mine] are subjects of experience is perplexing'. That he called the 'hard problem of consciousness'.

160. Some still maintain a cautious formulation that recognises the organismic basis of consciousness: 'How *exactly* does strong, consciously experienced subjectivity emerge out of objective events in the natural world? Today, I believe, this is what we need to know more than anything else' (Metzinger 2003, pp. 1–2). In the words of Humphrey (2011, p. 4): 'The hard problem is to explain how an entity made entirely of physical matter – such as a human being – can experience conscious feelings. The problem is *hard* because such feelings appear to us, who are the subjects of them, to have properties that could not possibly be conjured out of matter alone […] it *is* […] unlike anything else out there in the material world'.

brain turned into the wine of experience?'.[161] The HPC in this formulation has become the *hard problem of the brain*.

The question as to how an 'organism' produces consciousness is potentially different from asking how a material object ('the brain') creates immaterial consciousness (cognition, thinking, memory, etc.). Even though the problem remains the question about the conscious experience of organisms, in mainstream neuroscience of consciousness research, it also became a neurocentric issue. How, in addition to the information processing that the brain engages in, does it also generate experience or the way things feel?

From its inception, the quest for consciousness in the neurosciences was formulated as a brain problem, and consequently, it is not surprising that the mind–body problem was turned into the mind–brain problem. When this is merged with the binary theoretical framework, subjectivity or subjective experience is sought to emerge somewhere from the physical object, the brain. It is seen as the non-physical (mental) component of the material brain. The very formulation of the hard problem of the brain presupposes that only a neurocentric and dualistic answer can be given.

A dualistically prestructured 'mystery'

The second feature is already visible in the foregoing remarks in that it is not only neurocentric but also dualistic. The prestructured nature of the mind–body problem is fundamental to most positions explaining the fabric of consciousness.[162] As said earlier, most neuroscientists of consciousness would rather be dead than dualists – most claim to be monists of some sort. However, the reality is that, as Velmans (2009, p. 291) quite correctly points out that 'most theories of consciousness are either explicitly dualist or implicitly so'. In fact, Manzotti and Moderato (2014, p. 81) show that they

161. Koch (1989, p. 350) paraphrases McGinn, who remarks: 'Somehow, we feel, the water of the physical brain is turned into the wine of consciousness, but we draw a total blank on the nature of this conversion'. Examples can be multiplied: 'How on earth can the electrical firing of millions of tiny brain cells produce this – my private, subjective, conscious experience?' (Blackmore 2005, p. 1); or 'the hard problem deals with explaining how phenomenal consciousness or the nature of conscious experience arises from a physical system such as the brain' (Klink et al. 2015, p. 18). Also, 'How is it possible that with 1.5 kg of mainly fat and protein enclosed in a bony shell we have conscious experiences?' (Lamme 2018, p. 1). In the formulation of Glattfelder: 'How do our brains conjure up subjective, conscious experiences?' (Glattfelder 2019, p. 396; and see Glattfelder 2019, p. 400). For Eagleman (2015, p. 33), the question is: 'What is the relationship between our mental experience and our physical brains?'. Macphail (2008, p. 97) describes it rather neutrally and physically but still not ecologically and systemically: 'it remains a mystery how living cells, supposedly nonconscious entities, can be assembled to produce a conscious being'.

162. Kastrup (2012, p. 7) quite correctly argues that the mystery of how consciousness is reduced from matter (the mind–matter problem) is the precondition for the HPC.

actually 'embrace dualism'. This will be illustrated below in the actual 'monistic' solutions to the mystery. It suffices to point out two general reasons (or arguments) in support of this view.

One reason is that the problem of consciousness in mainstream research is mostly regarded as identical to the mind–body problem (see also Cvetkovic 2011, p. 1). The HPC (or rather, of the brain), as Glattfelder (2019, p. 401) points out, is essentially a reiteration of the mind–body problem: how can an immaterial mind emerge from the material brain?[163] The implicit duality that characterises folk beliefs has been transported into the mind–body problem, which is dualistically prestructured and can only produce dualistic answers, namely on how mind and matter are related (see Atmanspacher 2017, p. 298).

Another argument has to do with the fact that the older soul–body dualism that was rejected has been replaced by the dualism of the brain and the rest of the body, referred to previously as scientific dualism or Cartesian materialism. This new mutant dualism manifests in two versions: epiphenomenalism (popular among neuroscientists) or causal conflict between different levels of reality (as in theories of nonlocal consciousness). What earlier dualists ascribed to the soul or the immaterial mind, modern neuroscientists apply to the brain and new-materialist and nonmaterialist theorists of consciousness ascribe to nonlocal consciousness.[164]

The way in which the brain–mind problem is customarily formulated shows that it is not only trapped in a dualistically prestructured frame but also presupposes the reification of mind or consciousness. Different mind–body theories, Fuchs points out, are all made up of three elements (mental phenomena are non-physical; mental phenomena can have physical effects; and physical phenomena are causally closed), and all theories seek to solve this trilemma by eliminating one or more of the constituting sentences. The trilemma itself is formulated as a problem that is dualistically prestructured (see Fuchs 2018, p. 209). And not surprisingly, it is the product of the binary theoretical framework.

Consciousness reified: An energy-like essence

The understanding of the mystery is deeply embedded in the antibiological features of mainstream neuroscience of consciousness. In the above

163. Metzinger (2003, pp. 1–2) formulates the mystery or *problem* of consciousness in this way: 'How *exactly* does strong, consciously experienced subjectivity emerge out of objective events in the natural world? Today, I believe, this is what we need to know more than anything else'.

164. See the introduction of Cartesian materialism earlier in this study.

formulations, one sees the residue of the energy-like essence or entity that characterises the folk versions of dualistic monism. It is time to realise, Graziano et al. (2020, p. 4) argue that the hard problem of the brain belongs to the residues of the ghost model with its energy-like entity. It is 'an effort to find the scientific basis', they say, for how the brain generates 'a subjective experience that, itself, has no physical attributes' (Graziano et al. 2020, p. 4).

In rejecting substance dualism, most neuroscientists of consciousness assume that they have also debunked the folk ghost theory of an energy-like entity. But, as indicated, that theory is made up of several components. And most have certainly done away with the idea that consciousness is a fluidic substance that can be parted from the body or brain and that it can impact the world. However, a residue of that theory, the notion that consciousness (the mind) can hold information, is still alive and well. In fact, it continues to haunt mainstream neuroscience of consciousness in more than one way. It is not surprising that the dualistic prestructured question results in dualistic answers. The abiotic brain has indeed just replaced the soul in former theories.

Ontological theories of consciousness

The crisis in consciousness research is not only highlighted by the incommensurable solutions to the fabric of consciousness but also in the perpetuation of the legacy of the binary theoretical framework. In mainstream neuroscience of consciousness, the discussion of ontological theories of consciousness does not depart from consciousness, as such, as found in conscious organisms, but explains 'consciousness' within the binary theoretical framework. The diverse claims about the fabric of consciousness are remarkable. Hutto talks about the 'plethora of theories of consciousness' (2011, p. 38) that equate consciousness with properties of other phenomena, such as with features of brains themselves or brain processes, as a fundamental feature of matter or, in some instances, even belonging to a new kind of entity in the world. These theories are united in their general rejection of Cartesian substance dualism and an endorsement of monism, but there is not a single but a plethora of unidimensional monist solutions that, ironically, are all dualisms in disguise.

On paper, most neurobiologists and neuroscientists have a strong aversion to Cartesian dualism and instead believe that 'the mind somehow emerges from the physical properties of the brain' (Frith & Rees 2017, p. 3). They consider themselves monists and explicitly reject a Cartesian substance dualism,[165] but there is little clarity in how this is to be conceptualised. The confession of monism is not the same as avoiding dualism, and the rejection of dualism is not the same as a non-dualistic stance.

The dilemma is clearly expressed by Hobson in his attempt to find a solution for the close interdependence of subjective experience and brain activity: 'I use the hybrid term brain–mind as a temporary compromise between dualism (which I reject) and monism (which I can't quite prove)' (2001, p. 18). To avoid substance dualism, care is taken to reject the substance part (the idea of a 'soul'), while little attention is paid to the avoidance of dualistic logic. However, if mind or consciousness is not a substance, what is it, and how is it related to the brain? Hobson's dilemma is a product of the binary theoretical framework.

Mapping the ontological theories that seek to solve this dilemma is virtually impossible, as is illustrated by the following remarks about physicalism, emergentism, epiphenomenalism, panpsychism and idealism as potential solutions. It is hard to know which correctly characterises mainstream neuroscience of consciousness.

As anti-Cartesians, *most neuroscientists* believe that somehow, consciousness emerges from the brain[166] but reject any form of a second substance in the brain. Nothing is more anathema than the idea of a soul, entity or consciousness that exists as a substance somewhere in the brain.[167] Emergentism is a popular and common explanation for the production of consciousness.[168] The notion of emergentism carries the idea that it is a

165. It is also clear that the rejection of dualism is often motivated by a reaction against folk dualisms. See, for example, the rejection of the belief of 'some supernatural substance interacting with the brain' by Salzberg (2019, p. 2). In other words, neuroscientists distance themselves from the folk explanations as manifested in common-sense dualism.

166. For example, Swaab (2014, p. 169) states: 'Consciousness can be seen as an emergent characteristic generated by the joint functioning of the enormous network of nerve cells'. Also, Eagleman (2015, p. 214) maintains: 'Although the theoretical details are not yet worked out, the mind seems to emerge from the interaction of the billions of pieces and parts of the brain'.

167. For example, Greenfield and Collins (2005, p. 11) say that consciousness is not a different property of the brain, 'some magic bullet', but 'it is a consequence of a quantitative increase in the complexity of the human brain: consciousness will grow as brains grow'. According to these views, consciousness is related to brain size. As brain size grows within the animal kingdom, so does consciousness (see Blackmore 2018, p. 6). According to this logic, animals with brains larger than humans should be more conscious than humans.

168. As a theory in the philosophy of mind, emergentism has a long history (see e.g. Ganeri 2011; Murphy & Brown 2007, pp. 78–84 for discussions). Mental properties supervene the physical properties of the brain. The idea of emergence assumes that complex systems may display novel properties that are not possessed by their parts.

property of (brain) matter. It implies epiphenomenalism, the notion that consciousness is just an epiphenomenon of material brain processes (see Dietrich 2007, pp. 45–46).

However, the neurophilosopher Thomas Metzinger (2000, p. 5) claims that *most neuroscientists* today ‘would rather be epiphenomenalists than dualists’. Epiphenomenalism proposes that consciousness is merely a by-product or side effect (and epiphenomenon) of neural processes but has no physical effects (see Blackmore 2005, p. 13; Jeeves & Brown 2009, p. 110). In other words, neural states are the cause of conscious states, but the latter are ineffective regarding the neural states (see Owen & Guta 2019, p. 9). The idea that consciousness is a by-product most easily results in the idea that it simply emerges from the brain.

Yet Lamme (2018) argues that *many neuroscientists* nowadays could be seen as endorsing high degrees of panpsychism. Panpsychism, championed mostly by philosophers, will be discussed later as the revival of an old theory of animism. It maintains the idea that consciousness is a fundamental feature of nature. It is impossible to tell which of these four views (or all of them) is the most common theory. But more importantly, these theories form the building blocks of larger theoretical frameworks.

On the most difficult question in all of science, of how consciousness can be squeezed out of the physical, there is in mainstream neuroscience of consciousness no agreement on the larger theoretical framework. Currently, two kinds of monist reactions to substance dualism (with subcategories within them) partake in the binary theoretical framework as a basis for solving this question: *materialism* and *idealism*. On the continuum between materialism and idealism, there is *dual-aspect monism*, which has become popular in mainstream neuroscience of consciousness. Because few in mainstream neuroscience of consciousness consider themselves idealists, the two prominent views are materialism (physicalism) or versions of dual-aspect monism.

Each of the following solutions displays, in different ways, configurations of the nested assumptions of the neurocentric and binary theoretical framework.

Weak and strong physicalists

Materialism (or physicalism, to use the modern description) is the most widely held general theoretical theory of the nature of the world (see Montero 2011, p. 92). It is also widely supported in mainstream neuroscience of consciousness. Broadly speaking, most neuroscientists of consciousness are neurocentric physicalists who take it that consciousness is closely linked to the brain. Consequently, there are a plethora of theories:

epiphenomenalism, emergentism, panpsychism and so on. However, a distinction can be made between 'soft-core' (weak) and 'hard-core' (strong) physicalism (see Meese 2018, p. 1).[169]

Soft-core physicalism: Emergentism and epiphenomenalism

Soft-core physicalism is widespread in the neuroscience of consciousness in the search for the NCC, which presupposes that somehow conscious experience is linked to neural processes. The two terms most used to describe the view of neuroscientists on consciousness are emergentism and epiphenomenalism. As seen above, they are often conflated or connected.

A distinction can be drawn between weak and strong emergence (see Fuchs 2018, p. 220ff.). In weak emergence, the novel properties are part of the phenomenon and merely unexpected. This kind of emergence is often explained with the example of physical phenomena or systems, for example, water as an emerging property of two gases binding together in a sufficient quantity (see Dietrich 2007, p. 46; Koch 2014, p. 27).[170] Applied to consciousness, it results in consciousness being described as a higher-level property of the brain. In the case of strong emergence, the features do not belong to the parts in any way but arise out of their interaction. There is circular feedback between parts and the whole in such a way that even the parts find their features in the interaction of the system.[171]

There is a long and extensive discussion of epiphenomenalism in the philosophy of mind literature (see Robinson 2019 for an overview). It is also characterised by many different versions. Epiphenomenalism is based on the fundamental distinction between the mental and the physical as two distinct domains, and in conceptions of consciousness as (in one way or another) an entity and not a process, epiphenomenalism results in a kind

169. Ravenscroft's (2011, p. 24ff.) distinction between *optimistic*, *pessimistic* and *uncommitted* physicalism contains this one.

170. Water functions in different ways as metaphor to explain emergence. One is the scientific explanation of 'phase transitions' that underlies emergentism. Ramachandran (2011, p. 527) explains that nature 'is full of phase transitions. Frozen water to liquid water is one. Liquid water to gaseous water (steam) is another' (p. 527). Consciousness is a weakly emergent phenomenon not dissimilar to water, which has the property of wetness, but wetness is not a property of either the oxygen or hydrogen molecules – it emerges from their combination (see Pigliucci 2019, p. 5). Searle (2000, p. 566) uses the example of water as a liquid or a gas to make a similar point about consciousness as not a separate substance but a 'state of the brain'.

171. Jeeves and Brown express it in the following way: 'The possibility that complex entities (like organisms) can have properties that do not exist within the elements (such as molecules) that make up the complex entity' (2009, p. 112).

of dualism. This view is most strongly represented in the trend in mainstream neuroscience of consciousness that considers consciousness an illusion.

Weak versions of emergentism are also common in the neuroscience of consciousness, as can be seen in the following formulation (Glannon 2007):

> The mind is an emergent feature of the brain in the same way that digestion is an emergent feature of the stomach, or that liquidity is an emergent feature of the system of molecules that constitutes our blood. (p. 15)

At least two features characterise the notion of emergence as an explanation for consciousness. Firstly, it is sufficiently vague and indistinct – which also relegates it to a meaningless category. It is common to find vague and nonspecific explanations of the nature of consciousness in neuroscience of consciousness circles. For example: 'Conscious processes seem not identical with any known physical process. It may simplest be regarded as an emergent phenomenon, or even as a unique property of the universe' (Århem & Liljenström 2008, p. 21). If it is the one, it cannot be the other. Harris (2019, p. 70), however, quite correctly points out that calling consciousness 'emergent' explains nothing: 'Calling consciousness an emergent phenomenon doesn't actually explain anything because to the observer, matter is behaving as it always does'. And why does this matter (brain), and no other forms of matter, produce consciousness?

Secondly, as Fuchs (2018) points out, applying weak emergentism to consciousness amounts to a category mistake:

> A living system is not assembled under specific environmental conditions like water molecules to ice only to disintegrate again under different conditions. Rather, the living form and function precedes the parts which do not 'organize themselves' as a system. Instead, the organic system is the form in which the living being organizes and maintains its own material basis. (p. 223)

In this sense, consciousness is not a property of anything (the brain) but 'the *integral activity of living beings*' (Fuchs 2018, p. 225; [*emphasis in original*]).

Weak forms of emergence are close to epiphenomenalism and supervenience in that higher-order properties simply supervene over lower levels (see Fuchs 2018, p. 220). Or, as Dietrich points out, emergentism is a form of property dualism and, therefore, subject to the same criticism (see 2007, pp. 43–45, 48). Not surprisingly, some of these versions of emergentism and epiphenomenalism are considered antiphysicalist because of their dualistic nature.

It should be noted that some scholars offer a notion of emergence not of (brain) matter but as a systems phenomenon. For example, in the formulation of Searle (1993; see also Sperry 1995, p. 24):

> Brain processes cause consciousness but the consciousness they cause is not some extra substance or entity. It is just a higher-level feature of the whole system.

> The two crucial relationships between consciousness and the brain, then, can be summarised as follows: lower level neuronal processes in the brain cause consciousness and consciousness is simply a higher-level feature of the system that is made up of lower level neuronal elements. (p. 312)

In the standard corticocentric view, emergence is a one-way process from neural events to consciousness (see Thompson & Varela 2001, p. 418).

The above positions all accept that phenomenal consciousness (consciousness as such) exists and therefore struggle with the HPC (how a material object or, for some more specifically, a brain can be conscious). There is, however, a growing number of consciousness researchers who hold that consciousness is an illusion and maintain that the real problem of consciousness is just to explain why it seems to exist.

Hard-core physicalism: Illusionism, the neuroconstructivism in consciousness research

Frankish quite correctly points out that ontological theories of consciousness typically address the hard problem. That is, their supporters accept that 'phenomenal consciousness is real and aim to explain how it comes to exist' (Frankish 2016a, p. 11). Those are the emergence and epiphenomenalist theories discussed above. A group of neuroscientists, however, reject the very idea of the HPC (see Dennett 2018) and argue that those theories, containing a relic of an energy-like entity that is alive and well in mainstream neuroscience of consciousness, need to be given up. It is the residue of the folk theories of an energy-type essence or entity (see Graziano 2020, pp. 1–5). It is being replaced by an ever-growing resistance in the form of *illusionism*. There are many versions of illusionism today (see Frankish 2016a), with Dennett (see 2016) and Metzinger (see 2009) as some of the main proponents.

Illusionism represents the hard-core physicalists who take dualism minus the mental. According to the illusionist position, there is no subjective experience or consciousness – somehow, it is merely false beliefs or an illusion[172] created by the brain (see Lane 2020, p. 195).[173] Reality is merely the material substances, and everything is explained in terms of material substances, while mental aspects of belief and decision play no role in human behaviour (see Goff 2017, pp. 108–109; Jeeves & Brown 2009, p. 110). According to these theories, there is no problem of where to locate

172. The term 'illusion' does not mean things do not exist but that they are not what they seem (see Blackmore 2020, p. 1).

173. In consciousness research, proponents of illusionism typically address three issues: consciousness is an illusion, the self is an illusion, and our perceptions are illusions; everyday life experiences are relegated to an illusion (see Blackmore 2005, p. 13), and reality is what can be recorded by physics.

consciousness in the material world because there are no conscious properties (see Ravenscroft 2011, p. 27). They take materialism to its logical conclusion and therefore deny the reality of subjective experience. Consciousness, in this view, is a purely chemical or physical phenomenon in the brain (see Swaab 2014, p. 170). Evidence for this view comes from neurobiology[174] as well as the nested theoretical and philosophical assumptions provided by the binary theoretical framework.

The theoretical arguments all emerge from the binary theoretical framework. Illusionism is a response to the mind–brain problem as formulated in mainstream neuroscience of consciousness and therefore, not surprisingly, partakes in the rolling effect of different configurations of the binary theoretical framework. The convoluted features (dualistic thinking, metaphysical realism and representationalism) will presently be illustrated by means of the favourite example of colour vision as an illusion. In this view, our thoughts and behaviour can be explained completely in terms of the neurons, synapses and neurotransmitters that regulate all brain functions.[175] This reductive materialism is explained by Dietrich (2007; see also Solms 2014, p. 174) in the following way:

> The physical universe does not contain colors, sounds, or smells; it contains frequencies, amplitudes, and certain types of molecules. Perceptual systems decode physical energies and build representations that reflect reality. So, colors and sounds are not inherent features of the physical world; they are mental properties that exist as a result of us experiencing certain forms of energy. (p. 16)

To be concrete, in this view, perception of colour, taste, smell, heat and the like takes place in the head and is not given in the world. It starts with the observations and results generated by cognitive science over the last few decades that we perceive much more than what is available or what our senses relay to us (among others due to the blind spot). Thus, in this idealist perspective, there are no colours in the world, only different lengths of waves

174. The neurobiological arguments centre on the fact of the blind spot in our field of vision.

175. Popular formulations of this view include the famous words of Crick (1994, p. 3): 'You, your joys and sorrows, your memories and ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules'. Similar sentiments are expressed by Eagleman (2015, p. 5): 'Our thoughts and our dreams, our memories and experiences all arise from the strange neural material. Who we are is found within its intricate firing patterns of electrochemical pulses'. Swaab (2014, p. 3; [*author's added emphasis*]) goes further: 'Everything we think, do, and refrain from doing is determined by the brain. The construction of this fantastic machine determines our potential, our limitations, and our characters; *we are our brains*'. This view goes right back to the Greek doctor Hippocrates (cited in Zeman 2005, p. 2), who states that 'from the brain, and from the brain only, arise our pleasures, joys, laughter and jests, as well as our sorrows, pains, grief, and tears'. However, most often these words are taken out of context where they did not have the same meaning (see Vidal & Ortega 2017, p. 41 for a discussion).

(see Eagleman 2015, p. 37).[176] These 'secondary' qualities are subjective or anthropomorphic and merely our impressions of the world. This viewpoint is based on a merger of idealism and materialism and is based on the classical dualist view of perception and representation of the world in the brain (see Fuchs 2018, p. 3ff. for a critical discussion of this view).

In this idealist conception of perception, there is only the idea or image. What we perceive are images and not the things in themselves. As already indicated when the idea of predictive coding was discussed, this is a philosophical position that goes back to the distinction between a pregiven outer world that is internally represented together with its consequent view that science gives access to this pregiven world (while naïve realism only distorts it). The criticism against this is fundamental to an evaluation of illusionism as well as to understanding the necessity for a nonbinary theoretical framework.

The neuroscientific view that phenomenal reality (colour, sound, smell, etc.) is just the internal perception of neuronal processes is a materialism that carries the legacy of its greatest opponent, idealism or an idealist epistemology, which sees perception as mere representation in the brain[177] and, on top of that, never escaped the mind–brain and body–world dualisms it strongly rejects.

This idealist epistemology stands opposed to realist ones. A particular realist version will be presented from the neuro-ecological perspective by means of the notion of *integrated realism*. Suffice it to say that from a realist perspective, there are serious concerns with this idealist epistemology on perception and consciousness. For example, Manzotti (2019) argues:

> Color scientists often state that colors do not exist in the physical world. [...] However, how could brains create something that is not part of the physical world? When neuroscientists claim that colors do not exist in the physical world and yet are created by (or exist in) the brain, they contradict themselves. The mystery of how experiences (e.g. of something green) can have the qualities we experience is explained by taking those experiences to be identical to external objects. The mystery stems from looking for the property of being green in the wrong physical place – the brain – where nothing is green. If we had looked in the external objects from the start, the notion of phenomenal character would have never been put forward. Green peas and red apples are more obviously green and red than neural activity can ever hope to be. (p. 8)

176. Another example is our experience of colour, which is a neural creation, and time, which is perceived in terms of motion, that have no necessary or inherent relationship to what these phenomena are in terms of physics (see Loubser 2010, p. 184). Many of the complexities of something like face recognition and visual perception in general also illustrate this point.

177. The idealist legacy of this Cartesian view of consciousness studies is documented by Fuchs (2018, pp. 4–8). In his summary (Fuchs 2018, p. 8): 'Thus, materialism and subjective idealism paradoxically extend hands to each other as they ascertain the point they have in common: namely, that the subject has no part in the world'.

It is often pointed out that eliminative or reductive materialism explains consciousness (or all mental phenomena) away, only dismissing the explanandum instead of explaining it (see Dietrich 2007, p. 66; Glannon 2007, p. 14; Manzotti & Moderato 2010, p. 11).

In summary, soft-core and hard-core physicalism operate with different versions of the fallacy of reification. In soft-core physicalism, consciousness is transferred into the objective world as if it were an object in spatiotemporal reality which could be physically described or made indirectly visible by physical means. In hard-core physicalism, the fallacy functions only indirectly but no less effectively: if it were to exist, it would have to be an independent entity or a thing.

Hard-core physicalism is called an astonishing hypothesis. What is, however, astonishing, Noë (2009, p. 23) points out, is that we are being told that consciousness is something that happens in us, like digestion, while we should be thinking about it as something we do, as a kind of living activity; he refers to it as the grand illusion (p. 216). It is an illusion in that it only sees 'consciousness' within the parameters of the binary theoretical framework.

It is, however, not clear how some physical objects (the human brain or body) somehow display mental features. In the ensuing sections, some of these explanations will be considered. Suffice it to say that this solution, like many others, remains trapped in the dualistically prestructured question it seeks to answer. We will turn towards the actual descriptions of what such a dual-aspect monism could look like.

Flirting with idealism: Dual-aspect monism and panpsychism

Idealism as an ontological theory (as opposed to the idealist epistemology referred to previously) stands opposed to materialism (physicalism) in that the relationship between matter and mind, the physical and the mental, is turned around. Instead of seeking how mind fits into matter, idealism takes it that mind has priority and that matter follows from mind. While idealist theories take *mind* as fundamental (see Kripal 2019, p. 112), there are, as with physicalism, many different theories that flirt with idealism. Three instances of ontological theories that sit on the idealist side of the continuum will briefly be mentioned.

Dual-aspect monism

The scene in consciousness research is currently strongly determined by an aversion to and rejection of substance dualism but without clear support for classical monism. The most common reaction to physicalism is *dual-aspect monisms*, which claims that the mental and physical are two aspects of the same substance.[178] Also known as reflexive dual-aspect monism (associated with Velmans 2009, p. 349ff.), which is 'a modern version of an ancient view that the basic stuff of which the universe is composed has the potential to manifest both physically and as conscious experience' (Pereira et al. 2010, p. 214), it has many versions. Therefore, it is regularly adopted as the theoretical solution to the mind–body problem (see e.g. Hobson & Friston 2014, p. 6; Panksepp 2017, p. 144).

Dual-aspect monism emphasises that the physical description of the neurosciences must add a mental description which represents subjective experiences, while *emergent dualism* takes the physical reality as primary, from which a new entity, consciousness, mind or soul emerges (see Jeeves & Brown 2009, p. 111; Pereira et al. 2010, p. 214). For example, in the description of Glannon (2007):

> It is important to emphasize that the mind and brain are not distinct and independent substances. Rather, they are higher-level and lower-level aspects of a single entity, a human organism. (p. 12)

Ramachandran refers to the same theory as 'neutral monism'.[179] In most instances, it is, however, an empty term because neither aspect is clearly defined. However, it is difficult to avoid the impression that, for most neuroscientists, it is a physicalist theory flavoured with idealism.

☐ Naturalistic dualism

Chalmers develops a position that he calls 'naturalistic dualism' and explicitly claims that it is based on concepts in physics rather than biological sciences. Physics postulates entities that are called *fundamental* – those are entities that are not explained in terms of anything simpler and include concepts such as electromagnetism and gravity (see Chalmers [1995] 2017b, p. 363). In the same way, he takes *experience* as fundamental.

178. See, for example, how Hobson explains this as an attempt to avoid Cartesian dualism while still not being convinced about its power to address the issue (see Hobson & Friston 2014, p. 27).

179. Ramachandran (2004, p. 32) describes it thus: 'There is no separate "mind stuff" and "physical stuff" in the universe; the two are one and the same. [...] Perhaps mind and matter are like the two sides of a Möbius strip that appear different but are in fact the same'. He dismisses both epiphenomenalism, consciousness as a by-product of the brain, and panpsychism, the belief that everything in the universe is conscious, but sees brain and consciousness (mind) as two sides of same coin (see Ramachandran 2004, p. 98; Ramachandran & Blakeslee 1998, p. 228).

Integrated panpsychism

One prominent example of idealism is proponents of the IIT who dabble with panpsychism.

As with all other categories, there is no agreement among those who see consciousness as some extra ingredient. Proponents of IIT see consciousness as a basic feature of complex systems. It is a feature of complex systems and does not emerge from matter. For them, it is an alternative to the stalemate between materialism (which removes the mental from investigation) and idealism (which holds the material world as a figment of the mind) (see Koch 2019, loc 4205ff.). For Koch, panpsychism is unitary in that there is only one substance – consciousness is a fundamental aspect of reality. The shortcoming of panpsychism is that it cannot explain how individual consciousness particles combine to form a consciousness whole. On the other hand, IIT is not based on the consciousness of single parts but postulates that certain complex systems are consciousness. This is the case with the human brain, as well as most other animal brains. The complex nature of animal nervous systems (in fact, all multicellular organisms) brings forth consciousness, and consciousness is not a feature of their separate components. He goes so far as to argue that any complex system has the basic attributes of consciousness: 'It is a property of complex entities and cannot be further reduced to the action of more elementary properties' (Koch 2014, p. 27).

Panpsychism also does not explain why a healthy brain is conscious and the same molecules reduced to goo in a blender are not conscious. Thus, Koch argues, consciousness is a feature of complex systems that are capable of a particular type of information integration. His affiliation with panpsychism is referred to as 'integrated panpsychism' (Koch 2014, p. 28). Any system that possesses some nonzero amount of integrated information experiences is conscious, while a heap of sand or galaxy of stars are not conscious. Thus, neither the cosmos nor the earth has consciousness (see Koch 2019, loc 4313), but the Internet as an information system could be conscious (Koch 2014, p. 29). Integrated Information Theory is a very complex model, but it is not about a complex phenomenon.

Concluding remarks

Together with the picture created by the conceptual and terminological discussions, the search for the NCC and the recognition of the hard problem of the brain both confirm that certain prior assumptions about consciousness constitute its fabric (see also the discussion in Owen & Guta 2019, pp. 11–12). The crisis in consciousness research is confirmed by these ontological theories of consciousness. There is no consensus on the explananda that need to be theorised. And despite repetitive warnings in this regard, there is a proliferation of ontological theories. Hutto, for example, argues that what is needed in consciousness research is a ‘fundamental rethinking of our basic assumptions about the nature of consciousness’ (Hutto 2011, p. 53). There are too few signs that this is taking place in mainstream neuroscience of consciousness. The impact of the mereological fallacy, together with the legacy of the binary theoretical framework, ensures that different concepts of consciousness, even different modes of consciousness, are conflated into each other.

Within this theoretical framework, a remarkable diversity of views on the fabric of consciousness can be found. While bound together in the rejection of Cartesian substance dualism, these theories all claim some form of monism. These monistic views in mainstream neuroscience of consciousness vary from theories of physicalism and idealism to dual-aspect monism. Despite strongly rejecting substance dualism and explicitly seeking to be monistic, these theories are, however, not non-dualistic. They consider sunsets as earth-turnings but continue to offer sun-movement explanations. This is the main difference with a neuro-ecological perspective on the fabric of consciousness: monistic theories in mainstream neuroscience of consciousness largely remain within the dualistic logic that characterise the binary theoretical legacy and fall short of being non-dualistic. But the proliferation of ontological theories in mainstream neuroscience of consciousness is not close to the many functional theories of consciousness generated under these theoretical conditions.

Chapter 10

The neuroscientific fabrication of *consciousness*: Functional and mechanistic theories of 'consciousness'

Introduction

When reading consciousness research, one would never suspect that the term 'theory of consciousness' in fact refers to at least three different kinds of theories. The previous chapter was about the ontological theories of consciousness. The *public face* of mainstream neuroscience of consciousness is not really the ontological theories but the many functional and what will be called the mechanistic theories of consciousness.

Functional theories emerge from the computational notion of consciousness and, roughly speaking, are concerned with the mental or cognitive functions of the brain. Two features characterise these theories. One is the proliferation of theories, and the second is that despite the variety, they are remarkably monolithic. In its short history of four to five decades, mainstream neuroscience of consciousness has generated more functional concepts and theories of 'consciousness' than all the other

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research traditions together. The objective here is not to provide a comprehensive overview of these theories but to illustrate how the scholarly fabrication of consciousness is subject to this theorising and what the consequences are of this proliferation of theories. Two specific consequences for consciousness research follow from this. One is the fabrication of consciousness that, in many instances, is not even recognised by insiders as really about consciousness, and the other is a proliferation of concepts of *consciousness* (that is, in addition to the existing list of consciousnesses or types, modes, kinds or forms of consciousness such as awareness, awakeness, creature consciousness, phenomenal consciousness, etc., that make up this research landscape).

Ironically, the proliferation of functional concepts and theories of *consciousness* are balanced by a remarkable singularity in that they are of the same kind – they display unidimensional features.

Functional theories of 'consciousness'

More than a decade ago, Seth (2007) already identified seventeen functional models (theories) or kinds of models of 'consciousness' in the neurosciences. Some of his categories themselves contain more than one theory of consciousness (see Seth 2007). Today, that number has risen to well over 40 theories and counting.[180] These are mostly functional theories of consciousness, explaining consciousness as the product of certain mental, experiential or computational functions or combinations of such functions.[181] Suffice it to say that each of these theories is based on and promotes a particular concept of 'consciousness'. Not only are there many different functional theories of consciousness but there are also different kinds of functional theories of 'consciousness'.[182] And in the end, they are all the same type, unidimensional.

180. For another list of physicalist functional theories of consciousness, see LeDoux (2019, p. 273).

181. The general thesis of functionalism is still widely accepted as 'the core philosophy of the field' [of cognitive science] (Boden 2011, p. 153). She explains it as follows: 'Functionalism analyses mental states as causal-computational functions: internal representations and information-processes, which interact with each other and mediate between input and output' (Boden 2011, p. 152).

182. Most theories of consciousness in the neurosciences are nowadays what are called neurocognitive hybrids – theories based on both cognitive and neuroscientific perspectives (see Baars & Gage 2010, pp. xiv, 29). Neuroscientific and neurocognitive are thus used interchangeably, while cognitive is used when the focus is clearly on the function and not the structure of the brain. In mainstream neuroscience of consciousness, these two starting points are converging to different degrees into concepts of consciousness that benefit from both sources in what are referred to as hybrid neurocognitive theories (see McGovern & Baars 2007, pp. 177–178). More than a decade ago, it was already necessary to refer to neuroscientific theories and research on consciousness as hybrid neurocognitive theories.

Neurocognitive scientists typically distinguish between first-order theories and Higher-Order Theories (HOTs) (see Brown, Lau & LeDoux 2019, p. 754). First-order theories focus on perceptual states or mere perceptual awareness, while HOTs are concerned with conscious experience. In the technical jargon, the first is about access consciousness and the latter is about phenomenal consciousness.[183] In recent years, another category of theories developed that will be referred to as *composites of unidimensional theories of 'consciousness'*.

In addition, it should be noted that functional theories of *consciousness* can be separated in terms of their underlying mechanism. These can, broadly speaking, be categorised along three lines: as theories of cognition, as experience (of cognition) or as theories about information and, in some instances, as a combination of any or all of these.

First-order theories

First-order theories of *consciousness* are based on sensory or local recurrence and global broadcasting theories and do not require any additional higher-order representations of such percepts or awareness. The most common and well-known first-order theory is the Global Workspace Theory (GWT), also referred to as Global Neuronal Workspace.

This theory was first proposed by the cognitive psychologist Bernard Baars, and variations are supported by Dehaene and others (see Dehaene & Naccache 2001). Baars seeks to account for the fact that most tasks we do are performed unconsciously. Therefore, he presents the idea of a blackboard or workspace where things are broadcasted to the whole brain to become conscious (see Baars 1988, p. 75ff.).[184]

Conscious cognition or awareness is the integrative function to make available to the whole brain the network activities that result from perception (see Baars 1988, 2005). The GWT is based on a particular concept of consciousness and operates in the space between conscious and unconscious cognitive processes. The difference between conscious

183. Block (2015, p. 165) points out: 'This issue – of whether cognitive access is part and parcel of consciousness – divides the field. Cognitive theories of consciousness say yes. Stanislas Dehaene et al., Jean-Pierre Changeux and their colleagues (2011) have advocated a "global neuronal workspace" theory of consciousness. According to that theory, neural coalitions in the sensory areas in the back of the head compete with one another, the winners triggering "ignition" of larger networks via long-range connections to frontal areas responsible for a variety of cognitive functions'.

184. Consciousness, for Baars (2012a, pp. 40–41), 'is those sensory, endogenous, and action-related brain events that we experience in a steady subjective flow during the waking state, and whose contents we can report with high accuracy'.

and unconscious cognition is the notion that only information that is in the global workspace becomes generally available for consciousness.

Consciousness in this theory is that which makes unconscious (or nonconscious) processes available to other cognitive functions (such as decision-making) (see Panagiotaropoulos, Wang & Dehaene 2020, p. 180). It departs from the observation that when you are conscious of something, many different parts of your brain have access to the information. Thus, consciousness is the globally available information from awareness or cognition, and this is a theory about access consciousness and not phenomenal consciousness (see Cleeremans et al. 2020, p. 113). Consciousness is present when there is global broadcasting of information (see Block 2015, pp. 165–166). In other words, the GWT is a computational theory of consciousness as conscious awareness (see Owen & Guta 2019, p. 10).[185] In this theory, an executive capability of computation replaces the intuitive 'I' or homunculus (little man) inside the head doing the observing (see Baars & Gage 2010, p. 293ff.).

As a functional theory about conscious awareness, it does not deal with phenomenal consciousness and therefore does not even recognise the HPC, which is about phenomenal consciousness (see Chalmers [1995] 2017a, p. 34).[186] This is a perfect example of a unidimensional theory of consciousness – consciousness is reduced to conscious awareness (see Bayne & Carter 2018, pp. 5–6) or to access consciousness (see Seth 2018, p. 3).

Higher-Order Theories or Higher-Order Representation Theories

Proponents of HOTs distance themselves not only from (unidimensional) cognitive theories of consciousness (such as the GWT),[187] which they consider

185. There is a close association and numerous commonalities between the GWT and Dennett's multiple drafts model of consciousness (see discussion in Schneider 2017).

186. This is evident from the way in which Baars (2012a, p. 42) dismisses the hard problem: 'Mental causation is only puzzling if we start from a strictly dualistic or mentalist perspective. That is, if we believe that subjective experience engages a one province of reality while classical physics describes another, we must explain how the two can interact. Causation becomes a problem. However, if subjective experience is only a particular perspective on reality, and that the two domains of subjectivity and inter-subjectivity do not contradict each other, the problem disappears'. This is also the reason why Dennett (see 2018) does not recognise the hard problem of consciousness.

187. Many discussions of the differences and similarities between the GWT and HOT exist (see e.g. Block 2015, p. 166f.; Brown, Lau & LeDoux 2019, p. 757f.). While the GWT is a theory about cognition, 'an alternative cognitive theory of consciousness David Rosenthal and Hakwan Lau (2011) hold emphasizes higher-order thought: a perception is conscious if it is accompanied by a thought about that perception' (Block 2015, p. 166).

as theories of cognition (not actually consciousness), but also display deep differences among each other. In short, HOT itself is not a single entity but 'comes in many varieties' (Brown et al. 2019, p. 755).[188] While new variants continue to emerge, HOTs are all based on what is known as the *transitivity principle* (see Rosenthal 2020, p. 2); that is, the notion that consciousness is a mental state that one is aware of (as opposed to mental states that are unconscious). Thus, consciousness has to do with higher-order thoughts or representations of basic first-order perceptions (or what is also known as access consciousness) (see Brown et al. 2019, p. 755; Greely 2020, pp. 30–32). In short, consciousness is conscious cognition or awareness.

Higher-Order Theory goes beyond sensory representation or the idea of consciousness as global broadcasting and sees consciousness as subjective experience; conscious experience entails some kind of inner awareness in that it invokes additional cognitive processes as crucial to consciousness. One of these processes is cognitive access, which is essential for phenomenal consciousness.[189] States that have subjective phenomenal qualities, such as perception, thoughts and emotions, are considered consciousness (see Brown et al. 2019, pp. 754–756).[190] There is not just a single understanding of what conscious access means.[191] Higher-Order Theories are representational theories that claim consciousness is a state of which the subject is aware (see Carruthers 2017, p. 289) and that (phenomenal) consciousness adds a subjective quality to perception: the perception of a red apple is complemented by an experience or thought about the red apple (see Carruthers 2000, p. 257f.).

188. Carruthers (2000, p. 258) suggest that these theories can even be separated into four general types.

189. As Carruthers (2000, pp. 256–257) points out, the explanation for phenomenal consciousness should be sought in the cognitive domain, in the domain of thoughts and representation.

190. Flohr (2006, pp. 12–13) explains: 'Higher-order representation theories of consciousness try to evade the sceptical arguments and attempt to integrate consciousness into a general computational representational theory of the mind. [...] The core hypothesis in these theories is that states of consciousness constitute a specific subset of representational states: higher-order, self-reflexive representations that represent the actual internal state of the representing system itself. A person will be conscious if he is not only in a certain internal state, but also thinks (or perceives) that he is in that state. Consciousness is equivalent to a reflexive knowledge of one's own internal state'.

191. An analysis by Block (Block 2015, p. 166) of the intricate relations between the GWT and different versions of HOT is expressed in the following remarks: 'According to the global neuronal workspace theory, consciousness just is global broadcasting. [...] This is a cognitive theory of consciousness because the global workspace governs cognitive processes such as categorization, memory, reasoning, decision, and control of action. An alternative cognitive theory of consciousness David Rosenthal and Hakwan Lau hold emphasizes higher-order thought: a perception is conscious if it is accompanied by a thought about that perception. [...] An opposed point of view, which Victor Lamme, Ilja Sligte, Annelinde Vandenbroucke, Semir Zeki, and I hold, is that activations in perceptual areas in the back of the head can be conscious without triggering global broadcasting. [...] Thus, Victor Lamme and I argue that contrary to the views of those who favor a cognitive theory of consciousness, the neural basis of consciousness does not include the neural basis of actual cognitive access'.

A feature of this type of theory is that they most often operate with at least two dimensions or components of consciousness. These theories are mostly motivated by an awareness that there is an experiential aspect to consciousness. This has been referred to in many ways: what it feels like, phenomenal consciousness and awareness of cognition, to mention only a few. Therefore, a feature of these theories is that they operate with at least two types of consciousness: access consciousness and phenomenal consciousness, or perception and reflective awareness of perception if the former concepts are not used.

An example of a HOT is the Recurrent Processing Theory (RPT). Consciousness, Lamme (2018, p. 2) says, is when we experience our brains detecting objects. In this view, consciousness or a conscious state is about what one is conscious of. Recurrent processing is the ‘key neural ingredient of consciousness. We could even define consciousness as recurrent processing’ (p. 2).

His explanation of how visual perception takes place includes the insights that when an (Lamme 2006):

> [/]mage hits the retina, it is processed through successive levels of visual cortex, by means of feed-forward connections. In about 100–150 ms the whole brain ‘knows’ about the new image before our eyes, and potential motor responses are prepared. (p. 499)

During this process, neurons select for things like motion, depth, colour or shape and the like. We are not aware of these processes; they are nonconscious but only come into consciousness after recurrent (or re-entrant or resonant) processing (see Lamme 2006, pp. 495, 497).

For him, consciousness is more than just experiencing the world. In his words (Lamme 2018):

> Does the real mystery of consciousness lie in the fact that we experience the world that surrounds us, or in the ability to reflect on it and cognitively manipulate what we perceive; is consciousness about seeing or about knowing what we see? (p. 1)

In this view, consciousness is the reflective experience of awareness and not only cognitive awareness as opposed to nonconscious awareness. As opposed to the GWT and HOT that treat consciousness as cognitive aspects (they are about access consciousness), this theory is an attempt to include phenomenal consciousness in the concept of consciousness.

In a similar argument, Ramachandran suggests the idea of a metarepresentation in the brain as a second-order or higher-order representation of sensorial representations. These metarepresentations, he notes, bear an uncanny resemblance to the homunculus that philosophers take so much delight in debunking.[192] Thus (Ramachandran 2004, p. 99): 'I suggest that the homunculus is simply either the metarepresentation itself, or another brain structure that emerged later in evolution for creating metarepresentations'.

Composites of unidimensional theories of *consciousness*

A third type of neurocognitive theory of consciousness can be called composites of unidimensional theories, that is, theories seeking to combine features of or whole theories into new configurations or a *standard model of consciousness*.

In a theory that seeks to integrate insights from the different theories, a group of Belgium scholars are proposing a novel theory, *Self-organising Metarepresentational Account* (SOMA). It differs from the others in at least three important respects. The first is that experiences occur in experiencers. Phenomenal experience, rather than being an epiphenomenon, is linked to agenthood: 'The very notion of conscious experience presupposes the existence of a subject it is the experience of' (Cleeremans et al. 2020, p. 115). With this, they have added what is elsewhere referred to as the self, which is essential if one were to talk about consciousness.

The second is that it sees consciousness not as an intrinsic property of neurons or their patterns of activation but as a learning process in the brain. Consciousness, in this view, depends on the learning process in the brain.[193]

The third is that this theory significantly narrows the gap between content and states of consciousness that characterise the other neurocognitive theories of consciousness (see Bayne & Carter 2018, p. 1).

A proliferation of unidimensional theories and concepts of *consciousness*

A critical analysis of the above picture reveals some important features and consequences for consciousness research and supports the notion of a crisis in consciousness research.

192. This is the same metaphor Crick and Koch (2003, p. 120) employ for their IIT.

193. 'The theory is based on three assumptions. The first is that information processing as carried out by neurons is intrinsically unconscious. The second is that information processing as carried out by the brain is graded and cascades in a continuous flow over the multiple levels of a heterarchy. The third assumption is that plasticity is mandatory: the brain learns all the time' (Cleeremans et al. 2020, pp. 115–116).

An unmistakable characteristic of the above theories is that they are, despite apparent variety, remarkably similar. They all belong to what have been called unidimensional theories of consciousness. That means they define and describe consciousness by means of single factors only instead of being multiplex theories of a complex composite phenomenon. This is aptly illustrated by the spark plug metaphor that Graziano (2020, p. 231) coined to describe his own theory. He claims that AST, his theory of consciousness (to be considered later), is 'something like the spark plug theory of how an engine works. It addresses an important component of the machine without dismissing the importance of the rest of [the] engine' (Graziano 2020, p. 231). With that, he aptly identifies the very nature not only of his theory but of most current functional theories of 'consciousness'. While it is an apt description, he apparently does not realise the amount of damage this metaphor brings to consciousness research. In as much as a spark plug theory is not a theory about an engine but of a spark plug, theories about *components* of consciousness are not theories about consciousness as such – that is, unless consciousness is, in a mereological fashion, reduced to one of its dimensions. Unidimensional theories of consciousness are not theories about consciousness but, at best, theories of components of consciousness or things being called 'consciousness' – in most instances, cognition.

Secondly, another feature is that these theories contribute to the proliferation of 'consciousness-is-just' definitions. It is (just) experience, subjective experience, subjective awareness, content of mind, perception, cognition, affect, awareness of cognition, attention, feeling, process of inference, sentience or information integration, to mention the most prominent ones.[194] Each of these and many more function in theories and definitions of consciousness as the descriptor of the fabric of 'consciousness'. It is common in these studies to find an opening statement to the effect of 'consciousness, as used here' followed by one of the many concepts of consciousness: awareness, experience, phenomenal consciousness, attention, affect and so on.

The list of the *consciousness-is-just* type of concepts in mainstream neuroscience of consciousness is long and growing and reflects the fabrication of consciousness by means of (mostly reductive) single features. As concepts of consciousness placed side-by-side, each treats consciousness as something different from the others and pretends to say

194. The extent of this can be illustrated by means of a random list of actual concepts or definitions of 'consciousness' as they appear in the neurosciences. 'Consciousness' is '[the] cognitive representational capacity' (Bering & Bjorklund 2007, p. 598), 'subjective awareness' (Collerton 2010, p. 180), 'recurrent processing' (Lamme 2006, p. 499), 'experience itself' (Velmans 2009, p. 291) and 'affect' (Solms 2021, p. 141). In a single article, another author uses three different definitions: 'consciousness' is 'everything you experience', 'conscious perception' and 'integrated information' (Koch 2018).

what the fabric of consciousness is. They clearly present *consciousness* as something different from all others. In short, they are unidimensional concepts and privilege single aspects or components of consciousness as if they were 'consciousness'.[195] This is the result of two theoretical moves that characterise the neuroscience of consciousness: reductionism and the flip side of the coin, the mereological fallacy.

The third feature emerging from this is the contribution of these theories to what I see as a crisis in consciousness research. There are several aspects to this. The first is that where unidimensional concepts and theories are employed, it is common practice to claim that it is easy to explain consciousness. A growing number of voices in these circles claim that consciousness is not that hard to explain.[196] Consciousness, in this view, is rather simple because it is reduced to a single feature.

The second aspect is that consciousness as a multiplex phenomenon[197] is reduced to a unidimensional one. Most of these theories switch between different concepts and definitions of consciousness as if the parts represent the whole. In other words, one sees the collaboration of the mereological fallacy and the transfer of features from one concept to another. Rose's (2012) evaluation of the neuroscience of consciousness captures most of these features:

> The truth is that in order to approach consciousness as a neuroscientist, one first has to strip the term of its richer meanings [...] consciousness is simply what happens when you are awake, the obverse of being asleep. Consciousness is a 'dimmer switch' (Susan Greenfield); it reduces to mere 'awareness'. As awareness is akin to perception and perception can be studied via the visual system, consciousness modelers like Francis Crick and Christof Koch are up and away. But the essential human meanings embedded in our being conscious have somehow been lost in this reduction. (p. 58)[198]

In a very real sense, these theories are not about the same sense of consciousness (see also Owen & Guta 2019, p. 13 for a discussion). The recent

195. Unidimensional and multidimensional express what Searle (2000, p. 563) means by a 'building block approach' and a 'unified field approach'.

196. For example, Hobson and Friston (Hobson & Friston 2014, p. 22) state: 'Consciousness is not a hard thing to understand, describe, or make hypotheses about – if one associates it with inference based on deeply structured hierarchical (probabilistic) beliefs about sensations'.

197. The multiplex nature, or what Bayne and Hohwy call the 'modal nature of consciousness', did not receive a great deal of attention in the neuroscience of consciousness (see Bayne & Hohwy 2016, p. 60).

198. Rose is not the only one to be concerned about the focus on perception when it should be on consciousness. Solms (2014, p. 173) also points out that the approach to consciousness taken by the mainstream of (cognitive) neuroscientists 'has been hampered by an excessive focus on exteroceptive, objectified forms of consciousness, especially visual consciousness'. It is, however, a question whether the same logic should simply be replaced by just another focus point, such as affect, or whether this calls for a different logic to consciousness research altogether.

evaluation of functional theories by Northoff and Lamme (2020) confirms this point:

> To more or lesser extent, one can say that roughly each of these theories claims to explain consciousness in a different way. Diversity is also manifest in the fact that different theories target distinct explananda on the side of consciousness … Since they focus on different aspects of consciousness as their explanandum, the different theories of consciousness may not necessarily be incompatible with each other. (p. 569)

Finally, these remarks illustrate yet another feature of the crisis in consciousness research. While being about different phenomena, consciousness research continues in a remarkably peaceful but nonconstructive manner. It is peaceful in the sense that theories are not necessarily seen as incompatible. These theories most certainly are not incompatible if they are about different phenomena. Therefore, it is not surprising that the 'current field of the neuroscience of consciousness' is referred to as a 'dazzling diversity' (Northoff & Lamme 2020, p. 568).[199] Functional theories of *consciousness* just are not about the same thing. The encouragement of mutual respect for other voices does not muster enough respect to activate critical engagement and discussion. The ethos of cultural relativism seems to paralyse the scholarly debate. The verdict of insiders on this issue is instructive (Odegaard, Knight & Lau 2017):

> Traditionally, much discussion on human consciousness takes the form of authoritative scholars advocating intriguing theories and ideas but placing relatively little emphasis on conflicting data. To make true progress as a rigorous scientific field, we need open and legitimate platforms, on which theoretical viewpoints are critically scrutinized and evaluated from multiple angles. (p. 9610)

The reality is that there is very little constructive discussion and dialogue about and between theories, because the most common strategy is simply to replace *other* theories with the 'correct one'. It is common to learn that a 'new' theory is based on the rejection of most other theories or that they are completely wrong. There seems to be a blind spot about the fact that most of these theories are not about the same phenomenon. What they share is that individual functions of consciousness are relegated to be 'consciousness'.

Another recurring feature above is the fact that particular theories are not even considered theories of consciousness within the field. Many so-called theories of consciousness do not pass the test to be about consciousness.

199. In addition, it should be kept in mind that these theories each identify distinct brain regions and neural structures that are responsible for *consciousness*. They also vary from specific brain areas to the whole brain and with no agreement on which specific areas of the cortex, prefrontal, posterior or primary sensory regions (see Northoff & Lamme 2020, p. 570 for a discussion).

Bayne and Carter (2018, p. 6) also suggest that unidimensional theories (such as the GWT and the IIT in their example) need to develop to account for the multiplex nature of consciousness (or to become viable theories of consciousness, as they say). However, they do not state explicitly enough that unidimensional theories are not actually theories of consciousness but theories about components of consciousness. There is a difference between unidimensional or spark plug theories of a complex composite phenomenon and multidimensional theories about a complex composite phenomenon. Unidimensional theories reduce a complex composite phenomenon to a unidimensional phenomenon. A spark plug theory does not become a theory of an engine by just adding more components to it – it remains a theory about a spark plug.

Even though some of these theories are highly complex in themselves (compare the IIT to be considered later), the concepts reduce consciousness to unidimensional entities. Despite the variety of concepts and theories, the neuroscience of consciousness treats consciousness as a (simple) unidimensional phenomenon, most often equated with a single mental or computational function. It is perfectly understandable but hardly sustainable that each researcher defines terms and concepts in a unique and idiosyncratic way. To decide who or what is conscious cannot completely depend on the concept of consciousness employed.

Summary remarks

Even though different functional theories of consciousness target distinct aspects of neural activity, they share a common feature. Most of them are based on a stimulus-related activity and are only concerned with the content of consciousness (see Northoff & Lamme 2020, p. 570). That means *consciousness* is identified in the response to a particular sensorial stimulus, mostly visual stimuli. As explained by Tononi and Koch, much of the contemporary work in the neuroscience of consciousness that aims at characterising the NCC 'has concentrated on changes in specific visual contents of consciousness (or awareness)' (Tononi & Koch 2008, p. 247). Suffice it to point out here that changes in the content of consciousness are not the same as generating consciousness. Someone placed in a brain scanner performing a specific task is already conscious.

The point is that there is a realisation that changes in the content of consciousness are not a way to explain what consciousness is or how it is generated. What consciousness is cannot be equated to changes in the content of consciousness (what most of the research is about). Therefore, the question remains: How is it generated? The nature of consciousness is also closely related to the question of how it is generated.

Mechanistic theories of consciousness

On how *consciousness* is generated by the brain, the most common response among neuroscientists, Kitchener and Hales (2022, p. 1) point out, 'it is probably fair to say, is to ignore it'. This is also evident from the various ontological theories discussed, which are vague but specific enough to be uncommitted to any specific mechanism (exemplified by the term *emerge*). Most scholars are satisfied with the idea that *consciousness* emerges from the brain.

A few theorists, however, seek to explain how the brain generates *consciousness*. As with the other type of theories, there is also a proliferation of mechanistic theories. As theories that seek to find a mechanism *in the brain* that causes *consciousness*, they are remarkably diverse. However, they are all neurocentric and share two other structural features. They operate with distinct concepts of *consciousness*, and they identify completely different features in or of the brain that do the generation.

As the objective is not to evaluate the actual theories, six will be mentioned to illustrate how mechanistic theories of *consciousness* also contribute to the crisis in consciousness research. They are not about the same phenomenon and are not competing theories in the true sense of the word but like ships passing in the night.

While a great deal is already known about the mechanisms of specific mental functions (such as colour vision or shapes or motion), the neural mechanisms underlying phenomenal consciousness are not known. Thus, given the neurocentric starting point, the answer to the question of how 'what it feels like' is generated in the brain remains unknown. Six prominent theories present themselves in contemporary studies.

The IIT is probably the best known. It claims to be a comprehensive theory of consciousness in that it provides an account of the fundamental nature of consciousness (its fabric), addresses (solves) the HPC, and accounts not only for the functional dimensions of consciousness but for phenomenal consciousness (the what-it-is-likeness of experience). It is a theory that 'tries to establish, at the fundamental level, what consciousness is, how it can be measured, and what requisites a physical system must have to satisfy in order to generate it' (Tononi & Laureys 2009, p. 402).[200]

200. Unlike theories that depart from the question of how the brain produces consciousness, this theory claims to depart from the essential phenomenal properties of consciousness. Indeed, it does not start from the hard problem of consciousness of how to distil consciousness out of matter but 'from consciousness itself' (Tononi & Koch 2015, p. 5). It is based on five essential phenomenological properties (called axioms) of experience and five corresponding postulates about consciousness that serve as basis. 'Axiom', as the term is used in IIT, comes from an approach in mathematics and logic (see Bayne 2018, p. 7).

The IIT originated as a solution to the problem caused by the loss of consciousness – the typical problem encountered with comatose and vegetative patients and with sleep (see Tononi 2005, pp. 109, 120) – and the issue of the presence of consciousness (e.g. in animals and computers). The theory claims that the level of consciousness of a physical system is related to its level of integration of information. In short, consciousness, according to this theory, depends on the level of integration of information, and a complex system performing information integration up to a certain level will be conscious (see Tononi 2005, p. 111; Lamme 2006, p. 499).[201]

While it claims to be about phenomenal consciousness (the 'content of consciousness'), the starting point of loss of consciousness is about creature consciousness (or what is referred to here as 'level of consciousness'). It is really about responsiveness, and as with other theories of consciousness in the neurosciences, these are easily conflated.[202]

Another theory explaining the mechanisms according to which *consciousness* is generated is linked to the widespread belief in mainstream neuroscience of consciousness that perception (and thus 'consciousness') is based on a representational and inference model of perception. According to this theory, perception is a process of inference that can mathematically be described by means of the free-energy principle and the Markov blanket, which are theoretical models explaining the dynamical processes in certain active systems that seek to maintain homeostasis (see Badcock, Friston & Ramstead 2019; Friston 2010). Recently, these theories were applied by Solms (2021, p. 151ff.) to his (spark plug) theory of consciousness as affect.[203]

The third is the *Electromagnetic Theory of Consciousness* (EM ToC), which maintains that *consciousness* is a specific feature of matter. To be

201. While the advocates of this theory admit after many years that it is doubtful whether the current axioms are 'truly valid, complete and independent' (Tononi & Koch 2015, p. 5), the verdict of a critical analysis is much less pleasing: 'It has proven very difficult to identify theses that could play the role that IIT requires of its axioms. Some theses that are advanced as axioms arguably qualify as self-evident truths about the essential features of consciousness, but they fail to provide substantive constraints on a theory of consciousness, whereas other theses might provide substantive constraints on a theory of consciousness but are not plausibly regarded as self-evident truths about the essential features of consciousness. In short, the axiomatic foundations of IIT are shaky' (Bayne 2018, pp. 6–7).

202. See, for example, the following evaluation: 'The data that we have reviewed also pose a challenge to the IIT of consciousness, an influential complexity-based theory of consciousness. Advocates of IIT are explicitly committed to the unidimensional view of conscious states, for they equate a creature's conscious state with its level of consciousness, and degrees of consciousness, according to IIT, are in turn understood in terms of the amount of integrated information (U) associated with the relevant system' (Bayne & Carter 2018, p. 6). Also: 'We perceive IIT as disembodied, abstract, and lacking the affective vital meaning of feelings, a cornerstone of all living consciousness' (Delafield-Butt & Trevarthen 2022, p. 21).

203. In a joint publication with Friston, Solms uses these theoretical insights to address the HPC (see Solms & Friston 2018). It should be noted that the argument presupposes a neurocentric basis for whatever is taken to be consciousness. And consciousness is taken to be 'feeling'.

precise, it is an electromagnetic feature of matter resulting from the basic nature of matter as an electromagnetic phenomenon.

In a recent study, two neurophysiologists propose that electromagnetism is likely the mechanism responsible for the generation of consciousness in the brain. The argument is based on the fundamental physics of electromagnetism (EM), which holds that our biosphere and everything in it is made of and effectively is entirely electromagnetism (electromagnetic fields) (see Kitchener & Hales 2022, p. 3). From the atomic level up, humans and the environment in which they live are nearly entirely EM field objects. From this point of view, a human being is EM fields from the atomic level up. This means *consciousness* is substrate-dependent and not something emerging from the brain.[204]

The *Temporospatial Theory of Consciousness* (TTC) is the fourth example and sets itself apart from most (functional) theories in two ways. The first is that it takes consciousness to be a multidimensional phenomenon. In addition to the transcendental dimensions of consciousness recognised by neurologists (state or level and content) that are associated with awakeness and awareness, respectively, this theory includes 'form' or 'structure' as yet another dimension of consciousness. This dimension is described as 'the spatial and temporal organization of the contents of consciousness' (Northoff 2013, p. 734). The spaciotemporal continuity organises, that is, 'puts together' in time and space the percepts of the brain.

The second feature is that consciousness is not located at a single location or generated at a specific point in the brain but is the product of an integrated, distributed and interdependent process. It takes seriously the fact that the visual response in a brain imaging machine is based on a brain that is already conscious. Thus, any conscious experience takes place in a particular context (as background) 'with the latter itself being conscious, preconscious and subliminally perceived' (Northoff & Zilio 2022, p. 5).

This is based not only on an enlarged concept of consciousness (multidimensional instead of a unidimensional notion of perception of awareness) but also on the distributed neural activities that make consciousness possible.[205] It is suggested that the data show that stimulus-related, prestimulus and resting-state activity take on different roles for consciousness (see Northoff & Lamme 2020, p. 581). For consciousness to

204. It could well be that the actual mechanism responsible for consciousness turns out to be EM (or a combination thereof and quantum mechanisms) on an atomic level. But that does not explain why a human brain is conscious but the atoms of a tree or rock are not.

205. In this theory, consciousness may be conceived of as 'a highly heterogenous multifaceted neuronal process with different levels or layers of neuronal activity nesting within each other' (Northoff & Lamme 2020, p. 579).

be present at all, not only a stimulus but the brain's spatial topography and temporal dynamic are already present.[206] The intrinsic activity of the brain and its spatiotemporal structure make consciousness possible in the first place. Without it, there would be no consciousness at all, and it is therefore referred to as the neural predisposition of consciousness (see Northoff 2013, pp. 734–735).

The fifth is the AST, which is an attempt to find a *standard* model of *consciousness*. It is based on the hypothesis that attention[207] is such a mechanism that takes information from sensory perception to the point where one can express it in language. In the description of *consciousness*, the two concepts, 'attention' and 'awareness' of things, are synonymous (see Graziano et al. 2020). Three features of this model need not be described in detail. Suffice it to say that it is based on them: one is the distinction between i-consciousness and m-consciousness[208]; the second is the association to illusionism; and the third is the realisation that AST is a spark plug model. I-consciousness is what we have in the brain, namely the real attention process of information-processing (see Graziano et al. 2020, pp. 156–157), while m-consciousness is what the brain makes us believe about (its own model of) i-consciousness (see Graziano 2020, pp. 228–230). M-consciousness is just a derivative from the real process in the brain – which means humans do not really have it. The what-it-feels-like is an illusion or just a computed property of the brain.[209]

In their own description, this is a spark plug model (Graziano 2020):

> I noted above that AST was something like the spark plug theory of how an engine works. It addresses an important component of the machine without dismissing the importance of the rest of [*the*] engine. AST says that consciousness depends on a particular piece, an attention schema, plugged into the larger system. That piece does not contain the contents of consciousness. The brain

206. This dimension of the brain is referred to a special mechanism, the temporospatial expansion, and is described by means of four features: globalisation, expansion, nestedness and alignment (see Northoff & Zilio 2022, pp. 5–9). Together, they make up a complex four-dimensional model that enables consciousness.

207. Graziano (2020, p. 227) uses the word 'attention', but as he states, attention and awareness (or subjective awareness) covary.

208. In this theory, i-consciousness (i for information is the real consciousness that exists within us) and m-consciousness (m stands for mysterious and refers to what we think, intuit is real or experience) are very similar to access consciousness and phenomenal consciousness (Graziano 2020, p. 229).

209. In this theory, m-consciousness is an illusion just like the colour, motion or spatial property of an object (see Graziano et al. 2020, pp. 169–170). Unlike i-consciousness, people do not really have m-consciousness but instead attribute it to themselves. Like all 'illusionist' views, this argument is also based on the assumption that for consciousness to be real, it must be a thing, some material entity. Things are only real if they exist as such or as entities. Humans only 'intuit, think and claim to have a subjective experience' (Graziano 2020, p. 232).

> must also construct models of color, pain, emotion, self, memory, response and many other items. (p. 231)

This example is fascinating because, in a very distinct way, it illustrates a great deal about the current state of neurocognitive theories of consciousness in general, as well as the level of (dis)agreement on very basic concepts.

Finally, quantum physics as an alternative to classical physics proposes a certain view of matter, and as such, human beings and the human brain arguably contain quantum processes. This is the basis to explain the mechanisms of the brain's generation of consciousness by means of quantum mathematics (see Edwards 2020).

The best-known representative of a quantum-level theory of consciousness is that of Hameroff (2014a, p. 126; see also Hameroff 2014b), who argues that 'consciousness derives from deeper-order, finer-scale quantum computations in microtubules inside brain neurons'. These theories of consciousness have nothing to do with describing the nature of matter as such but seek to explain how consciousness is generated in the brain by means of quantum-level processes (for a critical discussion of these, see Baars & Edelman 2012).

Each one of these theories is based on specific concepts and definitions of consciousness and claims to be able to explain phenomenological consciousness. More important to notice is that they not only theorise different phenomena as consciousness but end up with completely different phenomena being labelled as *consciousness*. They are all neurocentric, but in different ways. They only agree that consciousness is generated by processes in the brain but not about which *consciousness*.

■ Concluding remarks

The above theories of *consciousness* display an affinity for different kinds of things called *consciousness*. They all are spark-plug-type theories that vary from consciousness as cognition and attention to information and prediction. Many of them are not about consciousness as such but, at best, about dimensions of consciousness.

Functional and mechanistic theories of *consciousness* contribute to the ever-growing list of concepts and theories of *consciousness* that are not about the same phenomenon. This is, among others, the result of research that does not depart from the phenomenology of consciousness but arrives at claims about *consciousness* based on other considerations. Consciousness as a multidimensional phenomenon is presented as a unidimensional phenomenon that can be designated by a range of spark-plug-type concepts and theories. But it is also the impact of the binary theoretical framework that results in a proliferation of theories of *consciousness*. The mystery of consciousness itself has been turned into the mystery of *consciousness* in being an extensive program of solving the mind–body problem.

The cognitive revolution can be held responsible not only for the various cognitive definitions of consciousness but also for the more general feature that the conception of consciousness itself has been infected with the notion of cognition. In fact, the cognicentric conception of consciousness has become so much a part of the notion of consciousness that, in many instances, it is used completely unintentionally and uncritically.

The overall implication from these features is that mainstream neuroscience of consciousness does not represent *the* neuroscientific perspective on the brain and how it functions but only *a* perspective. There is neither a single nor a normative neuroscientific view on the brain and how it works – and being the dominant voice does not mean it is correct. On the contrary, as with the uncritical use of the concept 'consciousness', there are surprisingly many voices from within complaining about these features. Therefore, before Nobel accolades can be dished out, it is important to remember how the fabric(ation) of *consciousness* determines what *consciousness* is taken to be.

PART 3

The fabric(ation) of theories of nonlocal consciousness: *You are without your brain*

Consciousness is not generated by the brain and cannot be located anywhere (also not in the brain) as it is a nonlocal phenomenon. This, in a nutshell, is the viewpoint promoted by theories of nonlocal consciousness. However, the fabric(ation) of nonlocal consciousness is much more complicated than this. As a nonlocal entity, its fabric is variously conceptualised from an unknown and undiscovered nonmaterial element in nature to an entity that belongs to a new materialism, also referred to as an extended materialism. In both instances, compared to the reductive materialism of contemporary science, proponents suggest the discovery (or recovery) of the actual ontology of the cosmos – the material world – should be differently understood.

This loosely associated research tradition in consciousness research can be characterised by two shared features that place them in opposition to mainstream neuroscience of consciousness. One is a rejection of materialism (or its modern physicalist versions) and falls on the idealist side of the spectrum of ontological theories. Idealism and its related theories, such as dual-aspect monism and panpsychism, serve as a replacement for physicalism that reduces consciousness (reality) to materiality. The second feature is the rejection of the brain as the source of consciousness; it is not a brain phenomenon but either a fundamental feature of matter or a nonlocal entity.

To make sense of the different theories of nonlocal consciousness, a distinction between human and cosmic theories of nonlocal consciousness will be made. In some instances, they are clearly distinct, but the membrane between them is rather porous. Therefore, features of the one often seep into the other, as is the case with *the cosmic human* to be considered later. However, in some arguments, nonlocal consciousness as a feature of human beings is fundamentally different from nonlocal consciousness as a feature of matter.

Not all kinds of nonlocal consciousness are fabricated similarly, and there is no agreement on what its fabric is like. Theories of nonlocal consciousness will be presented here by means of two sets of studies. The first is studies that are based on nonordinary experiences and are concentrated in disciplines that deal with ASCs or nonordinary experiences, as these are referred to. These are mostly certain kinds of anthropological studies and studies associated with parapsychology. The second set of studies refers to those that mostly depart from developments in the philosophy of mind and locate consciousness research in a variety of versions on the idealism side of the materialism–idealism continuum.

The term *nonlocal consciousness* is different from *non-local consciousness*. The latter suggests it is distributed (as in systemic-biological processes), while the *nonlocal* is not saying that consciousness is a *non-local* process but that it is an entity-like phenomenon with an independent existence (it is nonlocal). Therefore, theories of nonlocal consciousness venture into the terrain of ontology and suggest different kinds of new-materialist and non-materialist theories of reality. The term *non-materialist* expresses notions of consciousness as entity-like but not of any known material kind. It finds its meaning in the acceptance of the standard scientific theories of matter and claims that there is 'matter' of a non-materialist kind to be recognised or discovered. *New materialism*, on the other hand, suggests that our whole view of matter needs to be altered (in fact, it is being replaced by a new materialism that incorporates consciousness as a 'component'). Both depart from the standard view with its mental–matter divide (the 'physical' is ontologically different from the 'mental'), which has no room for consciousness. Both instances of nonlocal consciousness point towards a yet unrecognised form of matter that needs to be acknowledged. In some instances, nonlocal consciousness is a nonmaterial entity (like the energy-like essence of substance dualism), and in others, it is suggested that this notion of consciousness points towards a new (expanded) concept of matter itself. In this view, matter itself is rather different from what materialists have made us believe.

Despite these differences and the strong rejection of the physicalism of mainstream neuroscience of consciousness, this research tradition is remarkably like mainstream neuroscience of consciousness. These theories consist of nested assumptions that emerge from the same side of the four fundamental fault lines, most notably consciousness as a nonbiological phenomenon, and they fall on the same side of the fundamental fault lines and are, in different ways, fully embedded in the binary theoretical framework. As an example of what a critical analysis reveals, a shared feature of these theories is that claims about consciousness do not actually derive from consciousness research as such and do not depend on actual investigations of consciousness itself. None of them are theories about consciousness as such but claim to present novel notions about consciousness based upon other considerations. These considerations vary from investigations into particular states of consciousness (such as near-death and OBEs) to solutions to the mind–body or the mind–matter problem (in a variety of disguises).

Because they set themselves up against neuroscientific theories of consciousness, this analysis will focus on the similarities and disagreements between them. While rejecting mainstream neuroscience of consciousness, theories of nonlocal consciousness are, in many respects, just the flip side of the same coin. It could be argued that the neuroscientific rejection of Cartesian dualism, and with it the denial of the different folk beliefs in a spirit-like essence, can be held responsible for a renewed emphasis on nonlocal consciousness as the essence of consciousness. A dismissal of the phenomenon to be explained should expectedly result in reactions to recover it. However, most of their shared features go back far beyond the emergence of the neuroscience of consciousness. Theories of nonlocal consciousness also share very specific features that include the following:

- Theories of nonlocal consciousness have clear historical connections to what has been described as monistic duality (the common-sense beliefs characterising the human condition) and to older dualistic theories that contain some kind of spirit-like essence as their central insight.
- Some of these theories are often linked to some kind of afterlife belief or survival hypothesis and are easily associated with religious traditions or the religious defence of traditional beliefs.

Unlike neuroscientific concepts of consciousness that all assume a close connection (if not identity) between the brain and consciousness, these theories see consciousness as a nonlocal entity that exists and can exist independently from a brain or a body. In fact, a shared feature of these theories is a recovery of the idealist notion of consciousness as fundamental. In different ways, consciousness is seen as a feature of the universe that has been overshadowed by materialism.

Theories of nonlocal consciousness stand alone on another fault line in seeing it as an entity or feature of the universe instead of as linked to the brain or body processes. Consciousness as a nonlocal entity cannot be reconciled with other naturalistic theories, be they ontological or process theories. ‘Consciousness’ in these theories is something completely different from both neurocentric and neuro-ecological theories of consciousness.

Chapter 11 will focus on the fabric(ation) of theories of human nonlocal consciousness in the context of nonordinary experiences. These experiences are not only wide-ranging but have posed a challenge for explanation since time immemorial. In some circles, they nowadays function to present alternative notions of consciousness. One phenomenon and area of research that bloomed since the 1970s is near-death experiences (NDEs). This has become a site for challenging mainstream consciousness research with very specific claims about consciousness as a nonlocal entity. Without realising it, these theories remain the flip side of the physicalism they so strongly reject.

In Chapter 12, a rather different set of theories of cosmic nonlocal consciousness is introduced. They are closely related to notions of panpsychism and dual-aspect monism, with the theory of the *cosmic human* as exemplary of this perspective. Panpsychism is a theoretical (philosophical, if you will) development in the philosophy of mind research and seeks to answer the classical mind–body problem. Related to and incorporating panpsychism, in some instances, is *dual-aspect monism*.

A critical analysis (a third-person perspective) of the nested theories and assumptions of nonlocal consciousness will be given in Chapter 13. Despite their strong objection to mainstream neuroscience of consciousness, most theories of nonlocal consciousness operate within the same theoretical framework as that which they object to. Most prominent is the binary theoretical framework with its mind–body problem as the central formulation of the problem of consciousness. It is not surprising that when departing from the dualistically prestructured problem, they also arrive at a dualistically formulated solution to consciousness.

Chapter 11

Nonordinary experiences and the fabric(ation) of human nonlocal consciousness

Introduction

Nonordinary experiences (NOEs) occupy a prominent place in the first set of theories of nonlocal consciousness, to be referred to as *theories of human nonlocal consciousness*.

Explaining human consciousness as a nonlocal phenomenon has a long history in human reflection. Garcia-Romeu and Tart remind us of a typical instance with a description of the Canadian physician Richard Maurice Bucke (2013), who, somewhere during the 19th century, had the following experience in England:

> It was in the early spring at the beginning of his thirty-sixth year. He and two friends had spent the evening reading Wordsworth, Shelley, Keats, Browning, and especially Whitman. They parted at midnight, and he had a long drive in a hansom (it was in an English city). His mind deeply under the influences of the ideas, images and emotions called up by the reading and talk of the evening, was calm and peaceful. He was in a state of quiet, almost passive enjoyment. All at once, without warning of any kind, he found himself wrapped around as it were by a flame colored cloud [...] Directly afterwards came upon him a sense of

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> exultation, of immense joyousness, accompanied or immediately followed by an intellectual illumination quite impossible to describe [...] Among other things he did not come to believe, he saw and knew that the Cosmos is not dead matter but a living Presence, that the soul of man is immortal, that the universe is so built and ordered that without any peradventure all things work together for the good of each and all, that the foundation principle of the world is what we call love and that the happiness of every one is in the long run absolutely certain. (p. 122)

This description of nonlocal consciousness contains two aspects that are typical: consciousness is a feature of the universe and human consciousness is a nonlocal entity (described with the term *cosmic consciousness*). Although they are often connected and in many instances go together, a broad distinction between notions of nonlocal human consciousness and nonlocal cosmic consciousness can be made. In some examples that will follow, only the one and not the other is implicated, while others claim that notions of nonlocal consciousness describe both human nature and what the world is made of.

The mentioned example confirms that the link between NOEs and theories of nonlocal consciousness is much older than any neuroscientific theory of consciousness. It should also be acknowledged that research on NOEs is not limited to a single discipline or type of experience. Unlike panpsychism, which is mainly restricted to neuroscientists and philosophers seeking to solve the mind–body problem, research on NOEs and consciousness covers several areas, such as shamanism and so-called NDEs, and includes specialists from a variety of disciplines, such as anthropologists, medical practitioners, philosophers and scholars of religion. Not many neuroscientists support this view, but there are a few exceptions. As an illustration of theories of nonlocal consciousness, the focus here will be on two areas only: altered or ASCs in cross-cultural research and NDEs.

Classical altered states of consciousness research and nonlocal consciousness

In anthropological and cross-cultural research, the study of NOEs ordinarily is conducted as ASC research and covers a broad range of experiences, including voices, visions, vivid dreams, ecstasy, OBEs, trance, sleep paralysis and extra-sensory perception (ESP), to mention only a few.[210] So-called

210. These experiences have been called many things, including extraordinary, exceptional, mystical, parapsychological, psi or hallucinatory experiences and are often also referred to as ASCs. Following the argument of Schmidt (2017, pp. 105–106), the term NOEs will be used as a synonym for ASCs to refer to the collection of experiences.

psi phenomena[211] play a central role in most of these studies, but the very phenomenon of *psi* is, as will become clear, variously understood. Theories based on NOEs are challenging mainstream neuroscientific concepts of consciousness, provide an alternative way of conceptualising consciousness and, in fact, primarily claim to alter our view of human beings. The central claim in all these theories is the idea of consciousness as an entity that can exist independently from a brain and body. These theories are characterised by a double dualism (body and soul, mind or consciousness, as well as body and world dualism), which is monistic duality (the folk version of dualisms) in overdrive.

From its inception, research on ASCs functioned as an apology for the notion of nonlocal consciousness. Unlike neuroscientific theories of consciousness, in which ASCs (in the sense of NOEs) are virtually absent from reflection about consciousness, in these theories they form the backbone and starting point of reflection about consciousness.

While there is a long tradition of studies on NOEs going back to the 19th century and anthropological studies about such experiences, some dedicated research traditions developed over the last few decades in anthropology that seek to explore the study of NOEs for the understanding of consciousness. Studies of NOEs in anthropology (as in other fields, such as psychology)[212] predate the neuroscience of consciousness by a few decades. It will be presented here in two phases: the classical ASCs since the 1960s and the more recent collection of approaches that will be referred to as the *first-person anthropology of experience*.

The classical definition of altered states of consciousness

There is disagreement on who coined the term ASC,[213] but it was popularised in the English language since the 1960s by the publications of Arnold Ludwig (1966), a psychiatrist; Charles Tart (1969), a (para) psychologist; and Stanley Krippner (1972), a cultural or parapsychologist,

211. The term *psi* is, broadly speaking, an umbrella term for two kinds of phenomena, namely ESP and psychokinesis. The first refers to things like telepathy, clairvoyance, precognition and remote viewing and the second to effects of mental actions on physical objects (see Cardeña 2018, p. 664; Williams 2021, p. 149).

212. Ideas of cosmic consciousness are, however, much older than any neuroscientific theory, as the term itself comes from the 19th century, where it was used by the Canadian psychiatrist Richard Burke (see May 1991, pp. 6–9). For a comprehensive overview of psychological research over the last century on what some call *cosmic consciousness*, see the collection of May (1991).

213. Farthing (1992, p. 205) claims that Tart coined the term ASC in its modern usage, while Kokoszka (2007, p. 5) attributes it to Ludwig (see also Facco, Agrillo & Greyson 2015, p. 85 in support of the latter view). Tart (2011, p. ix) himself refers to the fact that people consider him the 'father' of ASC research.

becoming what are known today as the 'classical definitions' of ASCs.[214] However, since the inception of the term in the 1960s and focused research on ASCs, there has been a strong tradition of promoting the notion of nonlocal consciousness that operates in the realm of alternate reality. As an example, Tart, one of the *founding fathers* of ASC research, argues that consciousness can be defined by studying ASCs and not the other way around. The logic is clear: exceptional experiences of sunsets, so to speak, can be used to explain what sunsets are; experiences of nonlocal consciousness can explain what consciousness is. This results in a notion of nonlocal consciousness that can operate in nonordinary realms of reality.

Tart wrote a great deal about consciousness as a systems phenomenon that is very insightful and valuable (see Garcia-Romeu & Tart 2013; Tart 1980, 2001, 2012). The implication of the systems view is that discrete states of consciousness are the product of complex system processes. However, at the same time, Tart seeks to explain that despite seeing consciousness as a systems phenomenon linked to the structures of the brain, he considers some ASCs not as limited to the brain but as some independent entity. This is based on a random conflation of consciousness and awareness and the (uncritical) reliance on first-person testimonies.

In his systems model, mind, consciousness and awareness are related but clearly distinct features and functions. He sees consciousness and awareness on a continuum where the first is the simple perception of a sound of, say, a bird, but consciousness is the complex of operations that recognises the sound as a bird call, which identifies the bird species and so forth (see Tart 2001, pp. 26–27). In line with his systems model, Tart (p. 27) also recognises that consciousness is a product of the brain: 'I believe that seeing consciousness as a function of the brain is sound'. At the same time, he also states that certain ASCs (telepathy, experiencing out-of-bodiness as the feeling that one's mind leaves one's body or a mystical union with aspects of the universe outside oneself) and, in particular, 'supernormal knowledge' (p. 27) that is directly given in altered states convince him that awareness is not only a function of the brain. At this point in the argument, he jumps between awareness and consciousness and claims that 'there is enough scientific evidence that *consciousness* is capable of temporarily existing in a way that seems independent of the physical body' (p. 29; [*author's added emphasis*]). Elsewhere, he states that OBEs and NDEs show that 'a mind or soul traveling [*sic*] outside the physical body, either in the physical world or some non-physical world' (2012, loc 3101) has been confirmed. Here the experience of a mind–body dualism serves to confirm

214. The initialism ASC will be used for both *altered* and *alternate state of consciousness* and ASCs for the plural for both phrases.

an ontological substance dualism.[215] His reliance on conventional folk dualism at this point also displays the reification view of consciousness as a spirit-like essence.[216]

Apparently, Tart does not see the contradiction in affirming both a systems view of consciousness and a dualist ontology; if consciousness is a system phenomenon, it cannot exist independently of that system unless it is seen as some unknown mysterious entity (and then it is no longer a system phenomenon but only interacts with another system). This argument not only postulates special ASCs but also supernormal entities or places encountered in such experiences.

The power of ASCs to inform his view on consciousness is based on three arguments. One is the great similarity across cultures and belief systems. For example, 'there's something "real" about the NDE rather than its being nothing but a hallucination' (Tart 2012, loc 3673). The second is the veridicality of experiences during out-of-bodiness.[217] The third is the strength of first-person accounts, which confirm the fabric of consciousness.[218] In the end, all these claims stand or fall based on the strength of veridical proof.

The reason for elaborating on his view is because the inception of ASC research set an example which has subsequently been repeated many times, especially in some branches of anthropological research.

The first-person anthropology of experience

Current suggestions of nonlocal consciousness in the anthropological study of ASCs come from a variety of subdisciplines that will be referred to

215. Tart (2012, loc 3101) provides his version of materialism, which he suggests is the opposite of dualism: 'The reality of these psi phenomena requires us to expand our world-view from a world that's only material to one that has mind as some kind of independent or semi-independent reality in itself, capable of sometimes doing things that transcends ordinary physical limits'.

216. Based on such NOEs, his (Tart 2012, loc 3585) version of dualism maintains: 'Putting this in more traditional spiritual terms, we may have a soul, a nonphysical center of identity and consciousness, and while it's normally completely occupied with the physical-reality simulation generated by our brain and senses, sometimes it may travel elsewhere'.

217. Tart discusses the well-known NDE account of Pam Reynolds as an instance of veridical perception. He concludes his discussion with the following words (Tart 2012, loc 3815): 'Essential science likes to collect a lot of evidence about something before getting too serious in theorizing about what might have happened. It would be wonderful if we had more cases like this [Pam Reynolds], but so far, we don't'.

218. Tart explicitly argues that OBEs and NDEs serve as 'evidence' for postmortem survival. He thinks peoples' claims are in fact evidence of what happened (Tart 2012, loc 3970): 'From the point of view of those of us who haven't had an OBE or NDE, of course, we can certainly accept as data that those experiencing these phenomena claim that they have direct knowledge of survival; it's their (from our perspective) belief, but we can rationally accept it only as evidence of varying quality, not final proof'.

as *first-person anthropology of experience*.[219] It is not a unified movement but refers to at least three dedicated subdisciplines in anthropology that focus on ASCs (or NOEs): transpersonal anthropology,[220] anthropology of consciousness[221] and, more recently, a movement referred to as paranthropology.[222] Because the boundaries between them are fluid, they study the same phenomena (often linked as psi, spirit or transpersonal[223] experiences or phenomena), and the same names appear in all three subdisciplines; the focus here will be on the shared assumptions.[224] And not surprisingly, Tart (and Krippner) play significant roles in these studies.

The presence of spirit entities

As first-person anthropological studies of ASCs seek to remain close to the experients' accounts, the term 'consciousness' is not widely used. Instead, terms such as 'spirit' or 'psi' are used to refer to spirit entities that can be linked to humans, animals or plants. Thus, although nonlocal consciousness is not a common term in anthropological studies, as a phenomenon, it is part of a pattern that is associated with experiences of spirit entities. The claim is that such entities exist and can operate independently from a material body.

As most people on the planet subscribe to some kind of monistic dualism – that is, the idea that humans consist of at least two entities – it is not surprising that anthropologists also routinely record data on ASCs and

219. I follow Turner (2002, p. 172) who uses the term 'first-person anthropology of experience' to refer to a wide spectrum of ASC research in anthropology.

220. Transpersonal anthropology emerged from transpersonal psychology as a recognised discipline in the mid-1970s and 'is simply the cross-cultural study of the psychological and sociocultural significance of transpersonal experiences' (Laughlin 2012, p. 24). It assumes that some ASC or transpersonal experience lies behind many of the (bizarre) reports in anthropological literature on alternate realities and entities. An important emphasis in transpersonal anthropology is that transpersonal experiences by researchers themselves offer an important methodological tool for understanding such experiences (see Laughlin 2012, p. 31; see also Lahood 2007).

221. One of the focus points of the anthropology of consciousness is on how various cultures – and the individuals within them – understand and relate to alternations in consciousness (see Krippner & Schroll 2014, p. 5).

222. The term 'paranthropology' is a shortened form of the more cumbersome 'parapsychological anthropology' and was first coined by the linguist Roger W Wescott (see Caswell, Hunter & Tessaro 2014, p. 469).

223. A case in point is Turner (2006, pp. 55–56 n 4), who mixes the functions and terminology of the different approaches: 'I take psi to mean not only telepathy and present-day psychic crafts, but the possibility of conveying energy to a person in healing and, generally, the gifts of a shaman, finding lost objects and people, changing the weather, speaking with the dead, and second sight'.

224. Grouping them together is confirmed by the fact that scholars such as Krippner, Scroll, Hunter and others are equally at home in either of the subdisciplines.

beliefs reported by informants and, in particular, claims about the activities of spirit entities.[225] There are, however, three particular areas or experiences where the activities of spirit entities are considered in the anthropology of experience studies. The first is the study of shamanism that contains references, on the one hand, to the travel of a spirit entity outside of the shaman's body and, on the other hand, to possession, visitation or assistance from spirit entities. The second is mediumistic studies, where the spirit entities of deceased persons are allegedly encountered. The third is a wide range of studies on the activities of spirit entities that either possess or visit human beings (thus, spirit possessions). Although it does not directly study NDEs, NDE research plays a significant role in most of these studies because it is invoked in support of claims of veridicality. In other words, few anthropologists study NDEs themselves, but the NDE literature is often employed in support of the notion of spirit entity activities or of the possibility of nonlocal consciousness.

The mentioned experiences give access to a variety of engagements with spirit entities that can allegedly invade a body, provide knowledge and information, travel independently from a body (or brain) and supply humans with precognition, visions and voices. Thus, the idea that a spirit (soul or consciousness) can exit a body and travel around is part of a collection of beliefs and experiences that support the notion of nonlocal consciousness. As the activities of spirits very often are those of a human being, it goes without saying that humans consist of two entities.

□ The foundation of first-person anthropology of experience studies

The default position in most anthropological research is cultural relativism, which takes it that local beliefs need to be understood in their own terms (see Hutton 2006, pp. 93–94). Thus, while the anthropological literature is filled with reports and accounts about ASCs, Hunter says, they are traditionally explained away by anthropologists or seen as irrational, illusions or merely primitive explanations (see Hunter 2015a, p. 5).[226] Unlike cultural relativism, which brackets ontological claims, first-person anthropological studies in actual fact are based on three sets of assumptions that form their foundation for making ontological claims: one is a departure

225. The term 'spirit entities' is used instead of 'invisible entities' because, for experients, they are not invisible. The term 'nonmaterial entities' is avoided because that invokes a particular theory of materiality and for many of these scholars, spirits contain a different kind of materiality.

226. Hunter (2015b, p. 80) calls this 'a form of ontological bracketing' in that the researcher takes no position on the ontology of experients' claims. Others even complain that in cultural relativism 'the ontological aspect is swept away' (Frecska, Hoppál & Luna 2016, p. 158), because not taking subjects seriously actually means dismissing their view.

from first-person accounts that are taken as literally true; the second is a claim about the (potential) ontological existence of spirit entities based on alleged veridical accounts; and the third is the notion of ectoplasm as a different modality of matter.

☐ *Spirit entities and experiences are literally true*

Anthropologists of experience are not all of the same mind on the ontological reality of spirit entities (see next section) but agree that experients (or subjects) should be taken seriously – and that means that what they claim is literally true. They share a set of nested assumptions clustered around first-person accounts and interpret systems of supernatural belief 'from the perspective of those who subscribe to them, that is, not as beliefs but as ontological realities' (Caswell et al. 2014, p. 471). In short, they suggest that the 'native interpretation is correct' (Hunter 2012, p. 98).

Taking the direct witness accounts (or, as anthropologists also refer to them, the natives' or informants' point of view) seriously is nothing new, but in first-person anthropological ASC research, it means taking experients' accounts as literally true.[227] As a source of evidence, the testimonies of experients, including the ethno-autobiographical evidence by anthropologists themselves, carry the implicit assumption that what is experienced constitutes reality. This means first-person anthropological studies depart from the direct witness or first-person accounts and seek to confirm or disconfirm their claims.

Hunter (2015b, p. 83), for example, quite correctly points out that the reason why ASC experients believe in spirits (and other entities and realms) is simply because they have experienced them. An epistemology that Schroll (2010, p. 5)[228] characterises as 'empathetic understanding' and Bowie (2010, p. 5) as 'cognitive empathetic engagement' serves as the rationale for taking what experients encounter as an indication of what exists. Some even make an ethical apology for such first-person perspectives (see Béguet 2020, p. 18).

These claims are based on two sets of data. One set is the numerous accounts of ASCs in anthropological literature. The other set of data is the growing body of publications of what can be called autoethnographic

227. 'Taking it literally' is expressed in many ways. Sometimes it is formulated positively as 'to test the paranormal claims of the locals' (Luke 2010, p. 257) and sometimes negatively as something like 'to demonstrate that the psi phenomena under investigation are genuine' (Luke 2010, p. 259). Krippner and Schroll express it with a stronger phrase as seeking 'ways of determining the veridicality of these [ASC] reports' (2014, p. 7; see also Béguet 2020, p. 24).

228. For an example of such a sympathetic understanding, see the study on Grindal (Hellweg, Englehardt & Miller 2015).

accounts – that is, anthropologists who themselves participate in the ASCs that they study.[229]

Spirit entities are ontologically real

It is not always easy to know precisely what is claimed to be real about spirit entities in first-person anthropological studies of experience. On the one hand, there are clear and explicit claims that spirit entities exist and have an ontological reality like other objects in the world. Paranthropology, Hunter says, is explicitly concerned with the ontology of the paranormal (see Hunter 2015a, p. 5);[230] paranthropology, in the words of Graham (2011, p. 21), orients itself on the phenomena themselves as possessing an 'independent existence'.

There is, however, no agreement on how to conceptualise that existence. While the dominant view is represented by paranthropology as ontologically real,[231] several other voices seek to defend the ontological reality of ASC entities in alternative ways.[232] A common strategy in many of these studies is an attack on cultural relativists and scientists who allegedly subscribe to

229. Taking informants seriously is explicitly illustrated by means of these autoethnographic testimonies (see Caswell et al. 2014, pp. 470–471). Hunter presents his own experience in spiritualist séances as evidence that spirits are more than socially real (see Hunter 2015b, pp. 77–78). Long lists of anthropologists, among them Edith Turner (1993; Turner 1994), who personally experienced ASC entities, is provided in support of the ontological reality of what is experienced (see Hunter 2011, p. 15, 2015a, p. 15; Schroll 2010, p. 20).

230. Hunter (2015a, p. 5) points out that the ontological problem 'is whether or not paranormal phenomena are in some sense "real," and whether paranormal experiences can be said to be "of something" with an existence independent of the human psyche' is perhaps the most prominent in first-person ASC research. For example, Hunter (2012, p. 99) concludes that when a shaman claims to visit the spirit world during trance, they do leave their body to converse with spiritual intelligences, and when an informant says they have seen a spirit, they really did see a spirit.

231. Various positions can be identified in these studies. So-called ontological pluralism stands in direct opposition to the traditional standpoint that the Western scientific worldview is the only real or correct view of reality. Its *possibilian approach* holds that 'all possible hypotheses are equal until sufficient evidence is available to either reject or accept one or more hypothesis' (Hunter 2012, p. 70). The direct witness perspective takes the content of experiences and states of consciousness literally and seriously in the sense that they present an independent ontological reality. A shaman's report that they often shapeshifted into an eagle and flew through the skies is taken as an experience (which it obviously is) but does not 'negate the possibility of it also being an event, but there is no way of providing enough evidence to decide the matter' (Krippner & Schroll 2014, p. 7).

232. This is clearly expressed by Pekala and Cardeña (2000, p. 73): 'It is necessary to determine whether the experience is likely to be materially real (partaking of physical, material reality), imaginally real (partaking of mental or emotional reality) or a combination of both (Grof's 1993 proposal of a psychoid realm)'. Voss (2011, p. 37), for example, rejects the implicit materialism in cultural relativism which marginalises the ontological claims in ASCs and seeks to find a way of 'redeeming the authenticity of visionary experience from both the scepticism of a literalist, physicalist mentality and the reductionism – or concretisation – of "new age" credulity'. The alternative reality produced by ASCs 'may appear to humans as having somehow "broken through" into sense-perceptible reality', but in fact 'they partake of a fundamentally different ontological reality and are therefore immune to the laws which govern our material world' (Voss 2011, p. 37).

the ‘empirical impossibility’ (Béguet 2020, p. 17) of spirit entities. While Hunter (2015a, p. 7) claims that these studies ‘ignore the direct experiences of informants’, he means to say that they do not take them as literally true. But as seen, he goes further by equating those experiences with ontological realities.[233]

Ectoplasm: A different modality of matter

In an autoethnographic study that plays a constitutive role in these circles, Turner (1993, p. 9) claims that during an Ihamba healing ceremony in a Zambian village, she saw with her own eyes ‘a large gray blob of something like plasma emerge from the sick woman’s back. Then I knew the Africans were right, there is spirit stuff, there is spirit affliction, it isn’t a matter of metaphor and symbol, or even psychology’. The term used for such spirit manifestations is ‘ectoplasmic forms’ – a term already coined in 1894 to describe the ‘materialization’ of anomalous limbs (Hunter 2012, pp. 95, 118).[234]

Concluding remarks on nonlocal spirit entities (consciousness)

The nested assumptions and theoretical framework underneath these views will be considered together with the rest of the views on nonlocal consciousness in a following chapter. But what is not explained about consciousness, what is absent from these claims about nonlocal consciousness (spirits), is as important as what is claimed. In all these studies, nonlocal consciousness (thus *consciousness*) is characterised by one feature and one feature only: it has an existence independent from a living body. And that claim does not depend on the study of nonlocal consciousness as such (an entity that can be found independently from a material living body) but from experiences attributed to such a body. This is an important point to keep in mind: the complete lack of research on nonlocal consciousness as such. Claims of nonlocal consciousness are the unintended consequence of a certain understanding of experiences.

233. The strongest claim for this position probably comes from Hufford (2010, p. 145), who, based on widespread belief and experiences of spiritual beings testified by direct witnesses who are not hallucinating, argues that they must be ‘perceptions of a spiritual reality that are somehow factual’. His argument suggests that because they are not hallucinations, they must be real, and given their cross-cultural similarities, they must be about actual perceptions (see also Hufford 1995, 2017).

234. The psychic explanation given for the alleged production or transportation of material objects is ‘that spirit energy can make changes in the vibration of matter so it can pass through other matter, and then re-solidify’ (Voss 2011, p. 42, n. 22).

Near-death experiences and the fabric(ation) of nonlocal consciousness

So-called NDEs[235] occupy a central role in current theories of nonlocal consciousness. In recent years, the supernatural branch of NDE research[236] has claimed that based on such experiences, consciousness is a nonlocal entity that can exist independently from a brain and body and can survive the death of a body. In fact, this *survivalist* trend in NDE research claims that this cluster of experiences is revolutionising science, alters our view of the world and changes the way we understand what being human is about.[237]

The summary of Van Lommel (2013) captures the notion of nonlocal consciousness as it appears in these circles of NDE research:

> One cannot avoid the conclusion that endless or nonlocal consciousness, with an apparently unaltered 'Self-identity', has always existed and will always exist independently from the body, because there is no beginning nor will there ever be an end to our consciousness. There is a kind of biological basis of our waking consciousness, because during life our physical body functions as an interface or place of resonance. But there is no biological basis of our whole, endless, or enhanced consciousness because it is rooted in a nonlocal space. Our nonlocal consciousness resides not in our brain and is not limited to our brain. So, our brain seems to have a facilitating and not a producing function to experience consciousness. (p. 39)

235. For several reasons, the term NDE is highly problematic. It emerged in the 1970s as a description for an age-old pattern or cluster of experiences that clearly is not limited to closeness to death. In fact, this cluster of experiences occurs more readily in circumstances that have nothing to do with death or danger (although it occurs also in such settings). Today, the term covers any configuration of at least a few out of a potential list of fifteen or sixteen features that include experiencing out-of-bodiness, travelling through a tunnel, seeing a bright light and having a life review (for an overview and analysis of the concept and NDE research, see Craffert 2019).

236. Near-death experience research is normally divided between 'supernatural' and naturalistic explanations (see Revonsuo 2010, p. 273).

237. This trend of NDE research claims that the reality of nonlocal consciousness impacts essential questions of our existence, the meaning of life and human destiny (see Engmann 2014, p. 7; French 2001, p. 2010). Life after death, an immortal soul and a heavenly realm are all implicated in nonlocal consciousness. But it also impacts medical science in general and neuroscience in particular. In the words of Van Lommel (2006, p. 148): 'The inevitable conclusion that consciousness can be experienced independently of brain function might well induce a huge change in the scientific paradigm in western medicine, and could have practical implications in actual medical and ethical problems such as the care for comatose or dying patients, euthanasia, abortion, and the removal of organs for transplantation from somebody in the dying process with a beating heart in a warm body but with a diagnosis of brain death. Such understanding also fundamentally changes one's opinion about death'. Furthermore, it is also suggested that NDEs call into question the 'common assumption in neuroscience [...] that consciousness is the product of brain processes or that the mind is merely the subjective concomitant of neurological events' (Greyson, Kelly & Kelly 2009, loc 2995; see also Holden 2009, loc 2668).

If it were the case that science could incontrovertibly show that consciousness is a nonlocal entity that exists and can exist independently from a human body and brain, it would undoubtedly alter our view of who and what we are as human beings. For that reason, it is important to ask what 'consciousness' is in these theories of nonlocal consciousness and how it is fabricated. A critical analysis of the overt claims and underlying assumptions of this view will be presented by means of three aspects: the fabric, the fabrication, and the brain models. The third, brain models, will only be considered in Chapter 13, however.

The fabrication of (nonlocal) consciousness

A critical analysis of the fabrication of consciousness in NDE research shows one overwhelming feature: it is not a study of consciousness and does not directly address any issue about consciousness as such. It is the study of one (altered) state of consciousness that is used to draw conclusions about what consciousness is. The importance of this remark will resurface several times. In addition, it is characterised by two dominant claims: that NDEs provide veridical evidence for nonlocal consciousness, and that consciousness can continue after physical death. A whole range of features and nested assumptions characterise the scholarly fabrication of this view on consciousness.

The scientific basis for this claim has two closely related sides. One has to do with the evidence and the other with the way in which the data are interpreted. In so far as these can be separated, they will be presented as the first two sets of assumptions and features: the evidence, followed by the scientific strategy. The third set will turn towards yet another dominant feature in this fabrication, namely the issue of survivalism.

In this presentation, it is important to keep in mind that there is also a difference between what insiders claim and what a third-person perspective, or a critical analysis, shows about these features. As with the other theories of consciousness, the aim is a critical evaluation and understanding of the *what* and *how* of the fabric(ation) of consciousness.

The first set of features relates to the data and evidence for nonlocal consciousness in NDE research. These claims stand on two legs. The first is the ubiquity of NDE reports, and the second is the claim that NDEs provide reliable veridical information and knowledge about consciousness.

The first line of argument in these studies is the ubiquity of NDE reports as evidence for what is reported. It is, for example, clearly explained by Long (2010, p. 48), who manages the largest database of NDEs available today: 'By studying thousands of accounts of NDErs [near-death experiencers], I found the evidence'.[238] The one pillar of this 'scientific' methodology is to gather as many 'reliable' accounts as possible, and the more reports that can be amassed, the stronger the case becomes for the reality of NDEs.[239] The very fact of multiple first-person accounts becomes the confirmation of what transpired instead of the data to be interpreted.[240]

The second line of argument is the oft-repeated claim of ample evidence of veridical perception during NDEs. Despite the strong arguments against the 'positivism' of conventional science, when it comes to proof for nonlocal consciousness, this tradition is equally positivistic.[241] Beauregard (2012, p. 162), for example, points out that unlike many of the features of NDEs that are subjective and cannot be corroborated, the OBEs that take place are quite important from a scientific point of view because they can be independently corroborated.[242] And the claim in these circles is clear and simple: 'numerous examples' of veridical out-of-body perceptions (Greyson 2000, p. 341) are available. In recent years, this claim has been elevated to the following: 'In a recent review of 93 corroborated reports of potentially verifiable out-of-body perceptions during an NDE, about 90% were found to be completely accurate' (Van Lommel 2011, pp. 22–23).

These same or very similar words are repeated numerous times in different studies. Not only do they all go back to the very same source, but they all misrepresent that source (for a description and analysis of the research, see Craffert 2015, pp. 10–12, 2016). The strongest aspect of this

238. Also, Hufford (2017, p. 4) claims that 'well-established empirical data shows that compellingly real perceptual spirit experiences are cross-culturally common among healthy and well-educated subjects'.

239. This strategy is also clear in the words of Van Lommel (2011, p. 25): 'More and more experiences are being reported by serious and reliable people who, to their own surprise and confusion, have experienced, independent of their physical body, an enhanced consciousness with a persistent experience of self'. The conviction of multiple testimonies of nonlocal consciousness supports the conclusion that consciousness can exist independently from the brain.

240. Whether ten or a thousand accounts of NDErs perceiving things during the experience does not matter if what they claim to have perceived cannot be verified and independently corroborated. In the words of Kastenbaum (1996, p. 260): 'Ten thousand reports are no better than ten reports if they are offered simply as further examples of the fact that some people believed they had died and come back to life'.

241. Near-death experiences provide evidence to *objective reality* and give insight about the material and transmaterial domains (see Holden 2009, loc 2624). For Beauregard (2011, p. 77) there is the material world which is known by the senses and then a 'transcendent level of reality' which he suggests can be experienced by means of ASCs but without a functioning brain. In his words (Beauregard 2011, p. 77): 'It would be possible for humans to experience a transcendent reality during an altered state of consciousness in which perception, cognition, identity, and emotion function independently from the brain'. In other words, ASCs are even possible without the active presence of a brain (it is not clear why this is not just ordinary perception for the nonlocal consciousness).

242. Also, Van Lommel (2013, p. 19) considers this 'the decisive evidence that conscious perception is possible outside the body' and Hufford (2017, p. 16) calls veridical NDEs the 'strongest evidence of their paranormal nature'.

line of argument is the pervasiveness of the scientific rhetoric claiming corroborated evidence and not the actual evidence in need of such a claim.

The second set of features has to do with its scientific strategy. On the one hand, there is a strong reaction to, if not rejection of, so-called scientism. This includes the legitimate objection that in its classical version, science operates with physical–mental dualism. This problem has been considered under the discussion of integrated realism. But it also includes the unwarranted claim that scientists and neurosciences do not take the evidence seriously.

As a scientific strategy, it is important to note that the research on NDEs and nonlocal consciousness does not study consciousness directly but merely focuses on the confirmation or disconfirmation of experients' claims.

On the one hand, it is such an important point that it needs critical reflection. Nothing in this research tradition is aimed at analysing or explaining (human) consciousness, but it is a site for making strong claims about the fabric of consciousness. The only feature of consciousness that is considered in this research is that it is allegedly a nonlocal entity that can survive after bodily death. One would think that researchers would be concerned by important issues such as what the nature of this nonlocal entity is in everyday life, how it is linked to the body, how its sensory faculties function to be able to perceive when detached from a body or how communication between the sensory apparatus of consciousness and that of the body takes place. In short, all of these and many more questions about the importance of such nonlocal entities (more than 8 billion on Earth today) should have received attention. Instead, the only concern of scholars in this tradition seems to be affirming that nonlocal consciousness can survive bodily death.

On the other hand, the research programme of this investigation is not consciousness as such, but its focus is the confirmation or disconfirmation of what experients claim. This is an important feature to grasp in the analysis of NDE research and nonlocal consciousness. It was already mentioned that the mere collection of reliable reports serves as one of the scientific pillars in this enterprise. Another pillar is the fact that the content of NDE reports is to be confirmed – as shown above. But there is yet another side to this in that the objection to mainstream neuroscience of consciousness is based on the implicit assumption that the ultimate scientific task of this research is the confirmation or disconfirmation of these reports. However (Craffert 2019):

> [/]t is not the content of experiences or the claims of experients but the experiences themselves that need to be scientifically investigated. The seriousness of a conviction is not a guarantee of the validity of a claim and the content of an experience does not necessarily represent a scientifically acceptable source of evidence. (p. 74)

Whether or not an NDE is evidence for the survival of consciousness is a matter for investigation and not evidence in itself (see Wilde & Murray 2012, p. 132). The experience of being out-of-the-body is different from the fact of being out – a steadfast conviction that an experience is real is not to say that what is experienced is real.

Regarding the third set of features, although NDE research is not, in the first instance, engaged in consciousness research, it uses NDEs as a springboard to state claims about consciousness. Thus, on the one hand, these theories about nonlocal consciousness are theories about specific NOEs, namely the so-called NDEs. That NDEs are reported as consciousness (soul or self) leaving the body is undisputed, but such reports are not (scientific) explanations for the experiences but the data to be explained. A (mistaken) theory about NDEs is not a theory about consciousness as such. This understanding highlights the crisis in consciousness research: theories about other phenomena are presented as theories of consciousness.

And, on the other hand, it is hard to avoid the conclusion that the apology for nonlocal consciousness in NDE research is little more than a scientific excuse for survivalism. One of the dominant, if not most prominent, claims in NDE research is that NDEs confirm 'life continues after bodily death' (Long 2010, p. 47; for similar claims, see also Beauregard 2012, p. 181; Greyson 2000, p. 338; Parnia 2013, p. 217; Van Lommel 2011, p. 27). Even if it is conceded that consciousness is an energy-like entity that can depart from a body during close-to-death incidents (such as during cardiac arrest, to which these studies refer), that does not mean it also exists forever. From its inception, this research tradition has displayed a tendency to promote an afterlife hypothesis (see the critical discussions by Irwin 2002; Lundahl 1981; Metzinger 2009, p. 94). The reality is that during an NDE, patients are not dead but alive, although in 'a state of severe dysfunction' (Engmann 2014, p. 62). Near-death is 'not a *return from death*' (Nelson 2014, p. 112). The experience of being separated from the body is not evidence for survivalism.

Once it is accepted that such evidence exists, that forms the basis of Beauregard's attack on sceptics or what he also refers to as physicalist science. Most scientists, he claims, reject the possibility of an afterlife because they 'refuse to accept the implications of the research on NDEs' (Beauregard 2012, p. 182),[243] and adding to that, he suggests that physicalist theories of the mind cannot explain how NDErs can have

243. Beauregard (2011, p. 76) refers to the Pam Reynolds case as 'anecdotal' – which it certainly is. In fact, despite all his attempts, it remains dubious evidence. But at the same time, he suggests that precisely this case provides evidence for the '"objective" ontological reality' of transcendent experiences (Beauregard 2011, p. 75).

veridical perceptions while there is no brain activity (see Trent-Von Haesler & Beauregard 2013, p. 200). On the first accusation, the plea is not guilty because scientists do not refuse to accept the evidence; rather, they do not see the evidence and do not accept that such evidence exists. Every aspect of that claim is disputed. On the second accusation, the plea is guilty because scientists do not even try to explain something for which there is no evidence. Physicalist neuroscience cannot explain how consciousness can exist or function without a functioning material brain because it is not a prevalent problem.[244] Based on this caricature of physicalist science,[245] Beauregard offers a curious dualist ontology. For him, 'mind and consciousness are not produced by the brain,' and consequently, 'mental functions and personality can survive physical death' (Beauregard 2012, p. 213). This is only a solution if one starts with a dualist mind–body problem and not when consciousness is seen as part of a functional complex.

The fabric of (nonlocal) consciousness

The fabric of consciousness in this view is steeped in the matter–mental dualism as well as a dualistic view of reality. This is evident when Beauregard (2012, pp. 181–182), for example, says that consciousness can exist independently from a body and brain and even suggests that after physical death, mind and consciousness may continue in a transcendental level of reality that is normally not accessible to our senses and awareness.

As none of these studies directly investigates nonlocal consciousness as such, very little is said about its ontology (fabric). It is, however, interesting to see what features are ascribed to it. Consciousness, as a nonlocal entity, duplicates all the perceptual and mental features that belong to human beings. It can process sensory input, see and hear; it has memory and even selective vision and inattentive blindness (e.g. see Nicholls 2016, p. 108; Van Lommel 2011, p. 23).

In a previous section, it was pointed out that this dualistic thinking of an abiotic brain results in a mysterious misconception of the body. Here, as

244. The claim of nonlocal consciousness independent from brain function is completely different from perhaps the central issue in consciousness research, namely how a material object (a brain) can produce consciousness.

245. For physicalists, there certainly is a correlation between neural processes and mental processes to the extent that without a material or neural basis, there can be no mental processes. But it is a caricature to add that physicalists 'believe that mental events are equivalent to brain processes' because 'they cannot explain how neural processes become mental events' (Beauregard 2011, p. 75). Obviously, correlation does not entail causation, but if there is no evidence of the one without the other, it is not necessary to know the process to claim the connection.

Goris points out, these descriptions create a serious paradox of the sensory activities of a disembodied soul. If nonlocal consciousness 'lacks sense organs and a brain that can process sensory input' (Goris 2014, p. 78), how can it see and hear? In a more laconic formulation, Cave (2013, p. 3) asks: 'if blind people have a soul that can see, why are they blind?'.

Concluding remarks

The first important point to make is that neither the anthropological study of ASCs nor the scientific study of NDEs is limited to these research traditions. Here, the focus is on the traditions that link ASCs and NDEs to nonlocal consciousness, but that is not inevitable. Many other studies of ASCs and NDEs do not come to these conclusions.

The second point is that as one of the quoted remarks by Beauregard above claims, these views on consciousness depend on accepting the implications of views on NDEs. A contested and arguably mistaken explanation of NDEs is used to claim what the nature of consciousness is – that is, without any direct investigation of consciousness as such.

A variety of NOEs, such as possession and OBEs, are widely regarded as supporting and confirming monistic duality. It is widely accepted that such experiences contribute to ordinary beliefs in monistic duality, and as Laughlin (2011) further points out:

> [*R*]eligions are commonly founded in *direct personal experience*, sometimes in the dream state, sometimes in other ASC-like visions, drug trips, fantasies or 'waking dreams,' and so forth. That is why the issue of animism will not go away. (p. 46)

It is not an exaggeration to say that NOEs are monistic dualism in overdrive. Experients often testify that for them, NOEs are more real than everyday experiences. It is unsurprising that they play a role in many folk traditions of dualism and, in the case of experients, occupy a special place in the conviction of the reality thereof. Monistic duality is a common feature of human experience, and therefore it is not surprising that some form of substance dualism has been the standard model in many traditional societies. Animism and its modern versions of panpsychism have been around for a long time.

Chapter 12

Idealism and the fabric(ation) of cosmic nonlocal consciousness: Dual-aspect monisms and panpsychisms

Introduction

The second set of nonlocal theories of consciousness emerges from the philosophy of mind and is closely associated with ontological theories of matter. These theories seek to answer the mind–body problem or, more appropriately, the mind–matter problem and produce cosmic theories of nonlocal consciousness.

The study of consciousness is deeply embedded in idealism and its family members. In fact, in human history, materialism, instead of idealism, animism or panpsychism, has been the minority voice.[246] Theories of

246. Materialism (physicalism) is indeed, as Kripal (2019, p. 117) indicates, the 'historical minority' compared to panpsychism and animism that are at the heart of nonlocal theories of consciousness.

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nonlocal consciousness are much older than the physicalist theories of mainstream neuroscience of consciousness, and they come from many different disciplinary fields. The idea of 'soulism' or 'everything has a soul' was described in 19th-century anthropology by the term 'animism' and recently taken up in philosophy of mind circles by means of the concept 'panpsychism'.

The 'consciousness' of panpsychism and dual-aspect monism is a nonlocal entity, either attached to matter or an extension of matter. It is important to note that 'consciousness' here is not, in the first instance, a description of human consciousness, but it is a term used to describe an alleged feature of nature (matter). It is only by extension that human 'matter' is conscious.

The two most prominent fabrications of cosmic nonlocal consciousness are panpsychisms and dual-aspect monisms – which are not easy to separate. Each will briefly be characterised before being illustrated by means of a specific instance, referred to as the *cosmic human*, which contains both and even links it to human nonlocal consciousness.

Solving the mind–body problem through panpsychism

Panpsychism emerged in the philosophy of mind as a revival of animism, a very old answer to the mind–body problem, which is, as indicated, an instance of the mental–physical binary. Without using the concept, the systems philosopher Ervin Laszlo (1999) gives a typical description of panpsychism:

> Subjectivity, however, which is not the same as reflexive consciousness, is just the faculty of having sensations, and I believe this is associated with every system that exists and evolves in nature. ... If you say your dog has subjectivity, then you must say that also the mouse has it, and so on down the line. The simplest living organism must be seen as having subjectivity, and if so, then why not also their components, the macromolecules, molecules, and atoms? The seeds of consciousness must be present in the universe – they must be everywhere. (pp. 144–145)

Panpsychism itself is made up of different versions that all seek to answer the mind–body problem.[247] In its simplest form, Strawson (2017, p. 374) says, panpsychism is the view that everything, the whole of concrete reality, is conscious. As in the description above, this only makes sense if consciousness as subjectivity is reduced to *sensations*. That all living

247. It is, however, also invoked in other theories that depart from the mind–body problem (see the earlier example of its use in the IIT as integrated panpsychism).

animals, a thermometer and even plants react to certain sensations such as heat and cold is undisputed. But that is to reduce human subjectivity (human consciousness) to just sensations – another perfect instance of the mereological fallacy and a unidimensional theory of consciousness.

As with all other viewpoints in consciousness research, there is not a single or monolithic version of panpsychism. Not only are there particular versions of it (such as *cosmopsychism*, *emergentist panpsychism* and *panprotopsychism* – see Goff 2017, pp. 113–118; Kripal 2019, pp. 115–132), but they disagree on the basic building blocks.[248] For some, panpsychism is close to, if not a version of, idealism (see Kastrup 2012), while others argue for a *physicalist panpsychism,* which is a materialist or physicalist theory (see Strawson 2017, p. 377). Irrespective of the differences between them, it is probably correct to say that panpsychism(s) is or are a monistic position in opposition to dualism (some versions reject either materialism or idealism or both) but not a middle ground between them. Therefore, in this sense, it is not related to materialism (for or against it) but is itself a new version of materialism, a 'new materialism' (Du Toit 2016, p. 1) or an *extended materialism*, as others say. Be that as it may, as with monisms in mainstream neuroscience of consciousness, panpsychism is indissolubly linked to the prestructured dualistic binary theoretical framework.

Among proponents of panpsychism, another fault line between process and entity ontologies exists. The most common conception is that consciousness is an entity, based on the long-standing notion of two entities in the world: material and spiritual. Not everybody sees it as a new-materialist ontology. Rockwell (see 2013), for example, offers an apology for panpsychism that goes back to the philosophy of Peirce and is based on an ontology that sees reality as a continued process instead of an aggregate of bits or entities (particles). This is a version of monism in which the basic stuff of biological and physical things is taken as process and not entities. In this view, consciousness is not a feature of things (physical or biological) but of complex systems and processes. In his words (Rockwell 2013):

> Large-brained organisms are conscious because of the patterns embodied in their nervous systems, etc., not because of any intrinsic properties magically lurking in the meat itself. It is contingently possible that animal protoplasm is the only physical substance capable of embodying these patterns. But there is no reason whatsoever to believe this is true, which is why both panpsychism and AI [*artificial intelligence*] are possibilities that deserve to be taken seriously. (p. 253)

Panpsychisms set themselves up as an alternative to what they see as reductive materialism or reductive physicalism by suggesting that the true nature of things contains consciousness. According to this view, genuine

248. It will become clear that panpsychism is also used rather loosely in some contexts, referring to general consciousness everywhere instead of in its technical senses as a feature of matter (e.g. see Lamme 2018, p. 6).

monists or naturalists should thus adopt panpsychism as an explanation for reality and consciousness. While adding a not-yet-discovered feature of matter, the underlying ontology of these positions remains conventional physics – it is against a picture of conventional matter that room is made for the mental (consciousness). A logical consequence of this view of consciousness is a form of idealism.[249]

In this overview, panpsychism can be seen as either an entity or fundamental aspect of nature or as the product of complex systems. In the latter instance, it is still connected to the materiality of the system and results from the system instead of being taken as a feature inherent in matter itself. Once it is established that consciousness is a feature of nature, then it is easy to interpret human experiences of a nonlocal or transpersonal nature as instances of consciousness that are immaterial – especially when departing from an idealist position. From such a perspective, it is logical to end up with a conclusion such as the following: 'physical death is not the end of consciousness, but its liberation' (Kastrup 2012, p. 10). In a world where consciousness is ubiquitous to matter, it is also not difficult to find connections to traditional religious ideas of omnipresent and cosmic deities and spirits (see Du Toit 2016, pp. 9–11).

■ Dual-aspect monism

Dual-aspect monism was introduced as a popular stance in mainstream neuroscience of consciousness – exemplified by the causal way in which Hobson, in a discussion with Friston, says: 'we are dual aspect monists, not Cartesian dualist' (Hobson & Friston 2014, p. 27). That is to say, the neurocentric version of 'consciousness' for them is not the 'soul' of substance (Cartesian) dualism but some*thing* else. As pointed out, in mainstream neuroscience of consciousness, it is an empty concept – it is a physicalist (materialist) theory sprinkled with idealism – without a clear description of the *thing*, the entity, of consciousness.

Like panpsychism, to which it is closely linked, dual-aspect monism is no modern theory but goes back in history to medieval times. The prototypical dual-aspect model, in which a unitary substance shows itself in two ways, Walach points out, is that of Spinoza, the 17th-century philosopher. There is not even a qualification of the two aspects and what they contain, and their relationship is never clarified (see Walach 2020, p. 8). Essentially, dual-aspect monism is not a theory about consciousness but about matter.

249. For many, there is no clear distinction between panpsychism and idealism (see Goff 2017, p. 107; Strawson 2017, p. 375).

As with all theories of consciousness, the very term 'dual-aspect monism' has more than one sponsor and meaning. Atmanspacher distinguishes between '"compositional" and "decompositional"' versions of the theory; compositional dual-aspect monism is panpsychism of a very special stripe (see Kripal 2019, pp. 118–119) and holds that whenever there is matter, there is also mentality.[250] This is based on the idea of *extended materialism*, also referred to as 'new materialism', where matter itself is reconceptualised with dual aspects.

Decompositional dual-aspect monism starts with the notion of *unus mundus* [one world] or cosmic unity and maintains reality is neither mental nor material but somehow both and neither. It is only in the sensory and cognitive process that humans experience a difference, and they appear separate. This version is also close to idealism but could most probably also be seen as a *new materialism* based on a combination of quantum physics and Jungian psychology (see Kripal 2017, loc 3895, 2019, pp. 120–121; Walach 2020, p. 8).[251]

That this view on consciousness is a derivative of a theory about nature (or matter) is confirmed by the very starting point of the discussion. Consciousness, in this view, 'is fundamental to the very nature of nature' and the '"inside" of matter is mind' (Kripal 2019, p. 200), Kripal (2019, p. 12) concludes.[252] In short, consciousness precedes matter and is not in any way the product of matter – 'matter is minded'.[253] And despite the theoretical claims about dual-aspect monism, it remains a replacement of materialism with idealism; mind (or consciousness) is fundamental. All of this is based on philosophical arguments that have nothing to do with the investigation of consciousness as such.

While this follows from the dualist thinking of the mind–body problem, it is also the result of the reification of consciousness. Consciousness as a thing is wedded to the false notion about human matter (because if matter is conscious, human [matter] must also be conscious). All of this, however, does not follow from an analysis of matter itself or from human beings or human consciousness.

250. This version of the theory is closely related to the naturalistic panpsychism of Strawson referred to earlier.

251. In an even stronger version of the dual-aspect monist model, referred to as a complementarist model, Walach (2020, p. 7) uses this *one world* notion to argue for mind and matter as 'coprimary'.

252. Kastrup (2012, p. 7) refers to it as an 'ontological primitive'.

253. A similar argument that postulates consciousness as a thing is offered by Walach (2020, p. 7): 'Matter alone, it seems, is not sufficient to account for the phenomena we experience, beginning with our consciousness and leading to, but probably not ending with, psychic phenomena. Thus, we would have to stipulate that consciousness is at least as primary as matter. Therefore, we call it coprimary'.

The *cosmic human*: Panpsychism(s), nonordinary experiences, and quantum physics

The porous boundary between human and cosmic versions of nonlocal consciousness almost inevitably results in arguments where features of the two are combined. In fact, this can be seen in the description at the beginning of this part in the account of Bucke, where an experience of the *cosmos* translates to an alternative view on both matter ('matter is not dead') and human beings ('soul of man is immortal').

Kripal's (2019, pp. 45, 198) solution to the mind–body problem, which he, together with mainstream neuroscience of consciousness, describes as the 'biggest question of all', is that of the *cosmic human*. This solution to the mind–body problem is fabricated out of components from three different domains: panpsychism(s), psi or NOEs, and quantum physics. Kripal is not alone in bringing together insights and claims from these three areas (see also Williams 2021). The very term *cosmic human* suggests such a combination of human and cosmic versions of nonlocal consciousness.

His version of the *cosmic human* will, however, serve as an illustration of how a smorgasbord of ideas on nonlocal consciousness is presented as the grounding of nonlocal consciousness. What is not apparent on the surface is that different concepts of consciousness and consequently of nonlocal consciousness present themselves on this platter. As in other kind of theories, different concepts are used as if they are the same. Also, none of these pillars provides any proof of nonlocal consciousness.

Panpsychisms, dual-aspect monisms and idealism

The first component of these theories is a combination of versions of panpsychism and dual-aspect monism. Kripal lists five monistic answers to the mind–body problem that all belong on the idealist side of the materialism–idealism continuum in different ways that present some version of matter as minded. It is not clear whether he favours any specific one; instead, the rhetoric is that together they establish a basis to claim cosmic nonlocal consciousness (see Kripal 2019, pp. 155–132, 200). The five vary from versions of panpsychism through dual-aspect monism[254] to outright idealism. The *quantum mind*[255] and *cosmopsychism* are the

254. Kripal's (2019, p. 120) version of dual-aspect monism is a special stripe of panpsychism and provides the explanation for our common-sense monistic dualism, because deep down, reality is one.

255. The notion of the *quantum mind* is based on the application of quantum concepts and theories such as complementarity, entanglement and non-Boolean logic to mental processes (see Atmanspacher 2017, p. 305ff).

other two versions of panpsychism he invokes that are informed by quantum physics and make up the rest of the list of five.

Based on the argument that quantum mechanics are part of all matter, there is no mind–matter problem because, in such a worldview, all matter contains quantum processes. In this view, mind and matter are the same thing, just known by humans in different ways. And if quantum wave functions can be conscious, as argued, then everything is conscious. In these naturalistic but not materialistic solutions, everything can be conscious, including the universe itself (see Kripal 2019, pp. 122–123).[256] Our own human experience of consciousness as such is thus grounded in a deeper fundamental aspect of our world itself (see Williams 2021, p. 152).[257]

These views are joined together more in their rejection of materialism than in offering a joint view (or even compatible views) on reality. This is evident in the following remarks (Kripal 2019):

> Mind does not emerge as a fragile temporary product of matter, but matter emerges as a fragile and temporary product of mind. This is why Kastrup is so critical of panpsychism. He sees it as not having broken with materialism, another form of reductionism or emergentism that cannot handle the fundamental nature of cosmic Mind. If panpsychism is a bottom-up view, Kastrup's idealism is a top-down. (p. 129)

A third-person critical analysis of these reveals yet another feature, namely that in being solutions to the mind–body problem, they all remain trapped in the binary theoretical framework. Like mainstream neuroscience of consciousness, the theory of the cosmic human and all its building blocks are steeped in a configuration of the binary theoretical framework. To begin with, the mystery of consciousness is a version of the mind–matter problem and how mind and matter interacts: 'Any theory of mind is also a theory of matter and the alleged mind–matter interface' (Kripal 2017, loc 3883).[258] Like panpsychism, on which it depends, dual-aspect monism also seeks to solve the mind–body problem but turns into a mind–matter problem. Thus, from the beginning, this is also a version of a dualistically prestructured problem that expresses the relationship between two entities, mind and matter. Thus formulated, the mystery can only be 'solved' in an equally dualistic manner.

256. Williams (2021, pp. 151–162) offers a similar position based on versions of dual-aspect monism and quantum theory.

257. Walach's (2020) model of consciousness as 'coprimary' with matter is a stronger version of dual-aspect monism and also combines panpsychism and quantum theory.

258. Mainstream neuroscience of consciousness is unsuccessful in solving the mind–body problem, and therefore alternative hypotheses are necessary (see also Kastrup 2012, p. 6; Walach 2013, pp. 74–79).

The claim that a theory of consciousness is also a theory of matter is neither factually true nor the result of scientific investigation (or reasoning) but its presumption. It is not true because neuro-ecological theories of consciousness are not theories about matter but about living organisms and do not express any view on the ontology of matter but on the product of system processes in living organisms. This claim is the product of the mind–body problem and not a feature of consciousness as such.

Flipped scientists

The second pillar or component of Kripal's *cosmic human* is first-person accounts of NOEs, which resulted in radical life changes or, in his words, a 'flip'. In addition to the thousands of such reports over the centuries (see Kripal 2019, p. 54f.),[259] there are nowadays similar reports by intellectuals, scientists, medical professionals and even Nobel laureates who have exchanged a materialist outlook on the world for one in which mind (or consciousness) is fundamental.[260] These accounts include instances of precognition, telepathy and childhood reincarnation. These people have 'flipped' from a materialist outlook on the world to one in which mind (or consciousness) is fundamental. That such reports are real, that the experiences result in life-changing transformations and that they serve for experients as evidence of the reality of what they experienced is really beyond doubt (see also Kripal 2019, p. 27). But none of these examples are any different from the everyday experiences of millions of people that lead to monistic dualism, discussed earlier. This justification is very much a replica of what has previously been presented on NOEs and NDEs – the latter a clear focus point in this argument. It is the typical multiple-experiences-of-sunsets argument.

While acknowledging the role of NOEs in the formation and maintenance of religious traditions, Kripal seeks to 'affirm the historical reality' (Kripal 2019, p. 30) of such experiences, because, irrespective of religion, they consistently appear around the world. Therefore, many of these accounts suggest that 'our world is populated with innumerable strange creatures, which are normally completely invisible to our perceptual systems' (Kripal 2019, p. 72). Matter is alive and conscious, and the world is not what materialists think it is. Together, these stories suggest that the materialist

259. Accounts of NOEs and the testimony that they result in radical human transformation have been collected since the 19th century (see May 1991).

260. Kripal's flipped scientists are just a subcategory of the larger body of psi experiences that proponents of nonlocal consciousness argue should be considered an important source of knowledge about the world (see also Williams 2013, 2021).

view of the world is mistaken and should be included as data for a new understanding of matter, he suggests.

A critical analysis of these arguments focuses on two aspects. One is the assumption of the veridicality of the perceptions (or experiences) of the flipped scientists. Unlike the argument on ordinary perception, that things are not always what they seem, for these 'perceptions' the suggestion is that things are in fact what they seem. They allegedly have an empirical basis in the claim of the veridicality of these perceptions during NOEs. As with the OBEs during NDEs, this argument depends on the veridicality of nonordinary perceptions. If these accounts have no truth value in the real world, why should they be taken as evidence for anything besides their reality as experiences? This aspect will be considered in detail within Chapter 13.

The second aspect is the assumption that the testimony of the NOEs of *flipped scientists* can in fact provide sufficient (empirical) proof of nonlocal consciousness. However, whether these testimonies could serve as evidence for the reality of nonlocal consciousness is based on several assumptions and arguments. A critical reading of some of the arguments and assumptions will be given here.

Firstly, that such extraordinary experience can result in life alterations is, as far as I can see, not disputed. Life transformations (or conversions, if you like) are widely reported to follow from NOEs (and from many other experiences, such as trauma). What is not widely accepted is that what is experienced is also real. There is a huge difference between the reality of an experience and the reality of what is experienced. That Eben Alexander experienced traveling on the wings of a large butterfly is different from him being transported by such a creature. What many scientists deny is the reality of such experiences. Therefore, it is not the case that 'the evidence' is bluntly taken off the table; certain data are not considered evidence in the first place.

Secondly, Kripal's implicit rhetoric is that the testimonies of scientists and learned people who had extraordinary experiences are in themselves evidence for the reality of what they experienced[261] and, consequently, an affirmation of not only the 'flip' but also the 'flipped view'. For example, their OBEs are taken as evidence for nonlocal consciousness (see e.g. Kripal 2019, p. 64ff.). The testimonies of these people are not more important than the thousands of similar reports that Kripal rightly refers to, for example, in the history of religious traditions. In fact, he suggests that the large number of historical reports about NOEs does provide insight into the nature of the world (see Kripal 2019, p. 156). But all of these are the

261. Alexander, for example, takes his experiences literally (see Kripal 2019, p. 149).

data to be interpreted and not the evidence to be confirmed. Thousands, even millions, of experiences of sunsets are no proof of the movement of the sun (despite the fact most people on the planet still experience beautiful sunsets every day – at least if they live in my neck of the woods). What is called for is an explanation of 'what has happened' and not 'did it happen?'

Thirdly, Kripal's gallery of flipped heroes is less impressive than what his rhetoric suggests. While he had a profound experience, one could hardly claim that Ayer 'flipped' to a different worldview. In his own words: 'My recent experiences [an NDE] have slightly weakened my conviction that my genuine death, which is due soon, will be the end of me, though I continue to hope that it will be. They have not weakened my conviction that there is no god' (Ayer 1988, p. 6). While admitting that Shermer did not flip, Kripal takes his experience as evidence that 'the world is not what we think it is' (Kripal 2019, p. 84). But that is a long way from affirming anything about consciousness – a view Shermer affirms (see Shermer 2015). It should be noted that many academics who defend nonlocal consciousness themselves experienced some form of NOE which *flipped* them (see Kripal 2019 for examples). Is there a link between the power of personal experiences and scientific theory? Is an NOE a precondition to defend a theory of human nonlocal consciousness?

Fourthly, there is another side to the testimonies of his flipped heroes, and that is the many aspects of detail in their accounts that are left aside. It serves Kripal's case to argue that Alexander and Ehrenreich's experiences reveal to them that 'the material world is fiercely alive' (Kripal 2019, p. 72). And there is no doubt that for experients, the content of their experiences is more real than the ordinary and in fact literally true (see Kripal 2019, p. 149). But why then take only some of the content as revealing of how the world and consciousness are? Are there in fact also large (invisible) butterflies in the universe on whose wings humans can fly? Claiming that the content of NOEs reveals the way the world is should certainly be even-handed and then include all the features thus experienced. Should not all the data be placed on the table?

Finally, Kripal also employs the shared notion of the binary theoretical framework on visual perception. He argues that the evidence from so-called NDE experiences of 'the impossible 360-degree vision', which can only be expected from someone placed in 'an extra space-time dimension' (Kripal 2019, pp. 55, 56), supports the notion of nonlocal consciousness. The implicit assumption is that normal seeing is like a camera lens; it only reflects what is right in front of it. Visual perception is taken as representation, but during NOEs, people see in extra-space dimensions. However, the reality of visual perception (as will be argued in Part 4 in more detail) is that it is not representation but responding to – seeing is *seeing as*. *Seeing as* always consists of 360 degrees but much more; it is seeing the house as my house, not in a one-dimensional representation of the side of the house one is looking at but also what is behind it, inside it; one sees it as home (not just a house) and even thinks about its bond. Compared to this, where seeing even contains X-ray vision, so to speak, of the invisible aspects of the house (as my house), this 360-degree vision is rather elementary and hardly evidence for nonlocal consciousness. Ordinary vision, seen as the response of an organism to the world, always already contains 360 degrees as well as X-ray vision and all the other features. This argument illustrates that consciousness is distributed rather than nonlocal, which means it is a process not just in the head or in the object but in their interaction.

A quantum world

The third pillar of Kripal's argument is an association between NOEs and quantum insights about the entanglement and nonlocality of matter. The term 'association' is important in this description because quantum insights do not refer to the quantum mechanistic theories discussed in Part 2. This is not an explanation of consciousness based on the mechanisms identified in quantum physics but belongs to a research tradition that claims the materialist view of the universe has been replaced by a quantum view. It states that particles that once interacted become entangled and afterwards correlate with one's internal states. This results in the notion of nonlocality, which contains that entangled particles form an invisible whole and cannot be treated as if they are separated (see Kripal 2019, pp. 99–100). Kripal follows the line of arguing of Wendt, who adapts these insights to human beings. This is used to solve the mind–matter problem in claiming that human beings are both classical objects and quantum in nature simultaneously. Thus, our bodies are classical objects but not our consciousness (see Kripal 2019, p. 122). In this interpretation and application of quantum physics to consciousness, it is claimed that 'subjectivity [consciousness] is a macroscopic quantum mechanical phenomenon' (Wendt in Kripal 2019, p. 125).[262]

As I am not qualified or competent to even engage the more technical studies that invoke quantum theory, only two remarks are to be made. The first is that there seems to be a link between the notion that consciousness is mysterious and that matter in a quantum perspective is mysterious, and therefore the one can serve to illuminate the other. This much is documented in the way in which quantum theorists initially struggled to explain matter in this non-Newtonian view (see Stenger 1992, p. 6).

262. Based on the acknowledgement that quantum properties pertain to quantum systems and are subject to certain environmental conditions, others take quantum physics merely as conceptual structures and do not seek to apply them to human consciousness (see Walach 2013, p. 78).

The second is that quantum theories seek to explain matter, but as the physicist Adam Frank (2017, p. 5) points out, ‘as yet there is no way to experimentally distinguish between these widely varying interpretations’ of quantum theories. And classifying consciousness as a material problem is tantamount to saying that it too ‘remains fundamentally unexplained’ (Frank 2017, p. 8).

Proof of nonlocal consciousness?

In the next chapters, the underlying assumptions of theories of nonlocal consciousness will be considered. Here, a first critical (third-person perspective) observation about the three pillars will suffice. None of the pillars provides an explanation of (nonlocal) consciousness or serves as proof thereof.

Both panpsychism and dual-aspect monism depart from the prestructured dualistic framework seeking to answer the mind–body problem (or its variations). They provide answers as to the relationship between two entities instead of explaining what is going on that humans experience two separate entities. Given the binary theoretical framework within which these solutions are offered, the nature of the other two pillars is equally significant.

Chapter 13

Nested assumptions and features of theories of nonlocal consciousness

Introduction

At the beginning of this part on theories of nonlocal consciousness, it was said that these theories share two features that keep them together: a rejection of the materialism and brain models of mainstream neuroscience of consciousness. But the picture is much more complicated than this. Despite strongly objecting to the materialism of mainstream neuroscience of consciousness, theories of nonlocal consciousness share a remarkable number of nested assumptions and features with mainstream neuroscience of consciousness. Theories of nonlocal consciousness are the flip side of mainstream neuroscience of consciousness in sharing the bulk of the nested assumptions.

They share a rejection of substance dualism, but more importantly, theories of nonlocal consciousness also share the binary theoretical framework and fall on the same side of the fundamental fault lines in consciousness research. Except for brain models and the fault line between brain-based and organism-based theories that is completely bypassed,

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these theories are not only in opposition to mainstream neuroscience of consciousness but are in many respects its flip side.

However, theories of nonlocal consciousness share in some other general features of consciousness research that are equally important to consider. The most important is the fact that they do not depart from an engagement with consciousness as such. Instead, these theories are informed by two separate and, in many respects, incompatible sources: these are ontological theories firstly about nature and secondly about NOEs. A second feature following on from this is that it contributes to the proliferation of concepts of consciousness and the usual suspects associated therewith, the reification of consciousness and the mereological fallacy. A third is that when everything is said and done, nonlocal theories of consciousness are also just unidimensional theories of the sun-movement type.

The features of nonlocal theories of consciousness within the constraints of the fault lines in consciousness research will be critically analysed by looking at three sets of features: the fabrication, the fabric and the brain models. As with mainstream neuroscience of consciousness, there is a mutual interaction between the fabrication and the fabric of consciousness in theories of nonlocal consciousness, and these will be kept apart in so far as it is possible.

The fabrication of nonlocal consciousness

The two most important building blocks of nonlocal theories of consciousness are ontological theories about matter (on the idealist side of the materialism–idealism continuum) and the reliance on first-person accounts of NOEs. Ironically, they represent different concepts of consciousness and, thus, incommensurable fabrics of consciousness. In different ways, all these theories share with mainstream neuroscience of consciousness the binary theoretical framework. Like mainstream neuroscience of consciousness, nonlocal theories of consciousness are firstly deeply embedded in the binary theoretical framework in general and secondly, more specifically, the mind–body problem – the *problem of consciousness* is the mind–body problem.

In some instances, it is the interplay between the two distinct bodies of data (as in the notion of the cosmic human) that are combined in claims about either human consciousness or consciousness writ large. Therefore, next to matter-based theories, notions of nonlocal consciousness also depend heavily on NOEs.

Matter-based theories of consciousness

Matter-based theories of consciousness (panpsychism, dual-aspect monism) are really theories about matter and not, in the first instance, about consciousness as such. This is nowhere better illustrated than in the following description of Kripal (2019):

> To simplify, then, we might say that dualism 'solves' the mind–matter problem by simply letting both be, whereas idealism and materialism 'solve' the problem by eliminating or demoting one of the two members of the binary and absorbing it, sometimes force-fitting it into the other. (pp. 113–114)

Like mainstream neuroscience of consciousness theories, matter-based theories of nonlocal consciousness emerge from and seek to address the mind–body problem. For example, panpsychism, as Goff (2020, p. 5) claims, is the 'best solution' to the mind–body problem.[263] The answer to the mind–body problem is, at the same time, the revolutionary solution to the fabric of consciousness.[264]

The mind–body problem as the mind–matter problem

Ideas of animism, panpsychism and dual-aspect monism predate materialism by centuries, and all are versions of idealism or close to it while sharing the binary theoretical framework. In mainstream neuroscience of consciousness, a spectrum of physicalist 'monisms', mostly disguised dualisms, falls primarily on the materialist side of the continuum, with some that flirt with idealism in the form of dual-aspect monism, and some even come close to panpsychism. However, in theories of nonlocal consciousness, reactions to substance dualism (and physicalism) fall squarely on the idealism side of the continuum and vary from panpsychism to dual-aspect monism and outright idealism. See again Figure 4.2.

These monistic alternatives to substance dualism and physicalist 'monisms' come in a variety of versions that all belong to the idealism side of the conventional continuum. They are, despite claims of monism, trapped in the binary theoretical framework that they share with physicalism and thus subject to the same dualist logic.

But the mind–body problem is here conceptualised as the *mind–matter problem*. A revolution is underway in the philosophy of mind, Goff (2019, p. 3) suggests, that basically claims 'consciousness is a fundamental and ubiquitous feature of the physical world'. Thus, the problem of consciousness is a problem about the nature of reality, its basic ontology, and not, in the first instance, the phenomenology of human consciousness. Panpsychism

263. It is also evident in his formulation of the *biggest question in science* that is steeped in the mind–body problem: 'Explaining how something as complex as consciousness can emerge from a grey, jelly-like lump of tissue in the head is arguably the greatest scientific challenge of our time' (Goff 2019, p. 1).

264. A case in point is the intricate argument of Strawson (2017, p. 386) that consciousness is experience and *exists* and therefore turns out, in his conclusion on the nature of reality, as a fundamental.

(2020, p. 5) represents 'a radical rethink of our picture of the universe', which indirectly impacts our notion of consciousness. With this remark, he confirms that panpsychism is firmly embedded in the binary theoretical framework. While also closely related to idealism, which maintains consciousness is fundamental to all that exists, panpsychism suggests an ontology in which particles and fields are forms of consciousness. In fact, it assumes material entities are conscious (see Goff 2017, p. 106); put differently, matter, up to its basic forms such as particles and electrons, has mentality or is conscious (see Goff 2017, p. 111, 2019, p. 3).

With this, these theories also fall on the nonbiological side of the biological–nonbiological fault line. It clearly is a nonbiological phenomenon, as consciousness is a feature of matter and not of bodies, or better, not of a biological process. Thus, on the 'things' side of the fault line between consciousness as process or as thing, consciousness in these theories is some*thing* that things (not only human brains or bodies) have. Therefore, these theories are not only the opposite side of materialism but also its flip side. Unlike in mainstream neuroscience of consciousness where the mind–body problem is reduced to the mind–brain problem, in these theories it is enhanced to a mind–matter problem. Consciousness is a feature of *matter* and consequently bypasses the fundamental fault line that separates brain from organismic theories. It is neither a product of a brain or body but belongs to the very structure of nature. Whereas consciousness is reduced in mainstream neuroscience of consciousness to one of its aspects (cognition or attention, etc.), here it is expanded into an aspect of the cosmos itself.

As the flip side of mainstream neuroscience of consciousness, these theories also see consciousness as an entity instead of a process, and as a feature of matter, it is almost by definition not treated as a biological phenomenon. Theories of nonlocal consciousness operate in the sphere of nonbiological entities that are fundamental to nature or the product of quantum physical processes. Because these theories do not investigate consciousness as such, they also display the typical unidimensional features. Nonlocal consciousness as an entity might be a complex entity, but it is never a unidimensional phenomenon.

Another feature is that nonlocal theories of consciousness are like neuroscientific theories of consciousness in that they do not directly confront the question as to what consciousness is but stand as answers to the mind–body problem and thus, indirectly, claim to explain what consciousness is.

☐ Challenges to a matter-based theory of consciousness

From a third-person perspective, three features pose a challenge to these theories.

The first is that consciousness in these theories is an energy-like essence in the extreme. It is an entity that exists in and without matter itself. The 'binding problem' of how the mental links with the material, which haunts substance dualism, is here reduced to the level of particles (see Thompson 2015, p. 104). How does this essence engage with matter?

The second is that the notion that all objects have mental capacities or functions is challenged in that they clearly do not (see Ganeri 2011, p. 686; Thompson 2015, p. 104). If consciousness is everywhere and in everything, where does one person's begin and the other's end and why are all objects not conscious? Panpsychism also does not explain why a healthy brain is conscious, but the same brain blended to goo, to use Koch's example, is not conscious (see Koch 2014).[265] The reason is, as Fuchs (2018, p. 72) points out, 'pure consciousness without a subjective body is a dualistic abstraction. Nowhere does this exist in experience'.

A third challenge is that there is a remarkable absence of research programmes on panpsychic or (nonlocal) consciousness, and it has nothing to say about how consciousness works; it has no theories about the way in which consciousness functions. Panpsychism is, as Tononi and Koch (2015, p. 11) say, 'mute when it comes to explaining the way any one conscious experience feels'. The reason is, Pigliucci suggests (cited in Berger & Gallagher 2020, p. 2), that panpsychism does not emerge from the empirical world but is a way to solve the mind–body problem by postulating that consciousness is just another (mental) property of the universe. It is just another way of getting around the mind–body problem by postulating the mental as a property of the universe and not just of humans. This, he says, is just a metaphysical construct, replacing one mystery with another.[266] The point is that if consciousness were a nonlocal entity, why repeatedly seek to affirm this point instead of designing a research programme investigating the features of consciousness as a nonlocal entity?

Nonordinary experiences as data for theories of nonlocal consciousness

Data about NOEs that suggest consciousness is a nonlocal entity come from many different sources, such as the many ASCs encountered in anthropological research, as well as experimental psi data. The case of flipped scientists refers

265. There are more reasons why panpsychism falls short of answering the question of what consciousness is. Frankish mentions that all evidence points towards the fact that consciousness is a highly localised phenomenon that is specific not only to brains but to particular states of brains (2016b) and, I would add, of bodies. A particular concern is the binding problem (see e.g. Koch 2019, loc 4236).

266. Solms remarks that this ontological claim is very similar to the idea of God (in Paulson 2021, p. 5). Koch's reaction on panpsychism (cited in Horgan 1994, p. 94): 'Why don't you just say that when you have a brain the Holy Ghost comes down and makes you conscious!'.

to spontaneous experiences that resemble psi research. The most powerful and common example in all of these, however, remains so-called veridical perceptions during NDEs. From the onset of ASC research to that of the flipped scientists, they feature prominently in support of the notion of nonlocal consciousness. Before analysing the value of NDEs in this regard, a few critical remarks must be made about these data sets in general.

☐ The nature of nonordinary experience data

The anthropology of consciousness studies, the research on NDEs and research on the flipped scientists invoke first-person experience data in support of theories of nonlocal consciousness. In short, reliance on NOEs to determine the fabric of consciousness is widespread in the above attempts. But these data[267] are not without problems.

One is that NOEs are themselves states of consciousness; there should be some caution in taking an instance of something to decide what that something is. Just as specific experiences of sunsets do not provide an explanation of what a sunset is, the problem with NOEs is similar. For example, the experience of being outside of one's body cannot directly be taken as evidence that consciousness is a nonlocal entity that can exit a body and exists independently from a material body. What is concluded cannot be assumed but must be argued (this is why veridical experiences of nonlocal consciousness are so central).

The second related aspect is that NOEs cannot (should not) be taken at face value. It is widely accepted in consciousness research that things are not always what they seem. But when it comes to NOEs, the assumption seems to be that a different set of rules apply in that things are what they seem.[268] The basic structure of research on these data is primarily whether

267. Psi data can broadly be separated into the experimental data on the two focus points of psi phenomena, namely extrasensory perception (ESP) and psychokinesis. The first refers to things like telepathy, clairvoyance and remote viewing and the second to effects of mental actions on physical objects (see Cardeña 2018, p. 664). The same phenomena are also experienced naturally, such as the instances of the 'flip' described in the section on the cosmic human. The latter (such as precognition) clearly overlaps with NOEs such as experienced remote viewing during out-of-body experiences (OBEs). This is not the place for an evaluation of each of these bodies of data.

268. While rejecting the view of science, they take the first-person testimonies at face value. Because evidence for the reality of experiences is conflated with evidence for the reality of what is experienced, it is not always easy to see what is being claimed by first-person perspective studies. Often there are vague remarks, such as that the so-called reductionist approaches (all those who do not accept the first-person perspective literally) also ignore the evidence of parapsychology for paranormal phenomena (see Hunter 2015a, p. 7). The very argument of criticising Western dualism is evidence of that very same dualism in affirming the reality of what is not material: 'But the jury of scientific inquiry as a whole is still deliberating the "thing-in-itself," and as a consequence continues to be restrained by the straitjacket of a dualistic paradigm that refuses to acknowledge the existence of psi/spirit' (Schroll 2010, p. 22).

they are either literally true or literally false (see Thompson 2015, p. 314). It is not apparent to proponents that it is a typical sun-movement type strategy of research. But it also reflects one of the components of the binary theoretical framework, namely that of perception as representation. While it is often accepted that ordinary perception might be mistaken (things are not what they seem), perception during NOEs is not only accurate but also privileged.

A third concern is that conscious matter is not part of experiential reality. Matter writ large is not experienced as conscious, and even if it were the case that everything is conscious, there is no experiential evidence that the cosmos is conscious. The same applies to the more specific understanding of nonlocal consciousness, namely, as a feature of human beings. Despite the fact of the overwhelming presence of monistic dualism as our most common experience of ourselves, there is no common experience of our nonlocal consciousness being separated from the body. Even though most people think of themselves as distinct from their bodies and talk of themselves in a dualistic way, humans have no common experience of being able to see and know what is going on next door or influence matter over a distance. If consciousness really were a nonlocal entity, the lack of evidence for the nonlocal activities of billions of such entities is remarkably noteworthy. If that were the case, consciousness research, if nothing else, should certainly focus on the reasons why so few instances of nonlocal consciousness activities exist.

From a critical analytical perspective, a fourth concern is about the quality of the data used in arguments of nonlocal consciousness. The tentative, if not ambiguous, nature of the research results of experimental studies is remarkable. After so many years of experimental research on psi phenomena, and given the argument of proponents of nonlocal consciousness that these features should belong to the experience of (nonlocal) consciousness every single day, why is the evidence so precarious?

On the one hand, proponents of psi data claim that meta-analyses of experimental research show that telepathy and ESP, like remote viewing and precognition, 'are factual and statistically robust phenomena' (Walach 2020, p. 6). On the other hand, these studies often use words like 'may suggest', 'positive results beyond what would be expected' or 'psi data do not "prove" but make them "plausible"' (e.g. see Cardeña 2018; Williams 2021). A related strategy is to admit that even though specific studies on psi do not necessarily prove the existence of a nonlocal entity, taken together, all the data might. Walach turns towards the 'fagot argument': in a fagot, each stick can be broken easily, but as a whole, one cannot break a fagot (see Walach 2020, p. 6). Surely, there are certain kinds of arguments where this cannot be true: if a single experience of a sunset cannot be evidence that the sun is moving then those of many people (scientists and intellectuals included) certainly also cannot be evidence.

The elephant in the room of experimental psi research is not that such data *might suggest* the reality of nonlocal consciousness as an entity, but that if the theory were correct, why no research about the fact that there is so little data about actual nonlocal consciousness? Blaming materialism for nonlocal consciousness being suppressed is not an answer because materialism is the minority view among the world's populations. The absence of research interests in the explanation of human life if consciousness were a nonlocal entity is remarkably ironic. If consciousness were a nonlocal entity, as claimed by these studies, why is it that most people on the planet (or should one say, most nonlocal consciousness entities on the planet) do not display the alleged features? In their criticism and rejection of the claims of psi research, Reber and Alcock suggest that maybe it is a search for the impossible (see Reber & Alcock 2020).[269] Is this search not the product of the misplaced assumptions that human perceptual experience represents reality and is seen as either literally true or false? There can be little doubt that this research is the product of the dualistic thinking of the binary theoretical framework. It seeks to find a way of explaining consciousness as an entity, a thing that interacts with the world of matter. In other words, it presupposes the mind–body dualism. For example, in discussing telepathy, Williams (2021, p. 165) remarks that 'our consciousness connects with an underlying and inherently nonlocal ground that is integral to our world'. None of this could be said or would even make sense if consciousness were seen as a process and not a thing. The very language presupposes the conclusion reached: consciousness an entity that interacts.

Finally, there is also a deep irony in the merging of arguments of NOEs with the ontological theories about nature. If matter is conscious and everything in the universe is conscious, so is human matter, the body. According to that definition of 'consciousness', it would be redundant to claim that specific states of consciousness prove what consciousness is. These remarks highlight the reason for the crisis in consciousness research, namely the fact that different concepts are at stake. Consciousness as a fundamental feature of nature is not the same (or even compatible) with consciousness as a visible new-material or invisible nonmaterial entity.

The mereological fallacy, the reduction of a whole to one of its parts, manifests in nonlocal theories of consciousness with different *consciousness is just* concepts. It is just sensations or just energy. Quantum phenomena most surely occur in all animals, plants and objects, but that is not a sufficient reason to think that quantum-level phenomena are responsible for meteorological conditions or conscious states (see Baars 2012b, p. 307; Baars & Edelman 2012, p. 288f.).

269. See also Acunzo (2013, p. 1) and colleagues: 'One of the most controversial hypotheses associated with anomalous experiences is the psi hypothesis, which states that anomalous experiences sometimes imply forms of interactions falling outside currently known biological and physical mechanisms'.

Veridical perception during so-called near-death experiences

The Achilles heel of experiential data is veridicality. Humans experience many things that they know to be unreal or not true.[270] But the central claim when NOEs are invoked in consciousness research is that such experiences provide access to reality. This is particularly the case with NDEs. A common claim is that perceptions from 'outside the body' prove to be accurate information or have been 'shown to be accurate' (e.g. see Cardeña 2017, pp. 189, 197). If this were the case, it would be foolish not to accept the evidence and agree that consciousness is in fact a nonlocal entity that can exist independently from a body. This is not the requirement from scientism but an acknowledgement by proponents themselves that such perceptions during OBEs that can be independently corroborated are of high scientific significance (see Beauregard 2012, p. 162; Kelly 2007, loc 1036); it could, as Van Lommel (2013, p. 19) says, be 'the decisive evidence' for nonlocal consciousness.[271] However, there is a problem not only with the evidence itself but also with the scientific rhetoric.

The seriousness of a conviction and the repeated statement thereof are not a guarantee of the validity of the claim. The claim that many corroborated cases of veridical perception from a position out of and above the body during NDEs is being repeated so many times that the claim, without any evidence, is presented as scientific fact (e.g. see Van Lommel 2011, p. 23, 2013, p. 20). All the studies go back to a single source that lists 107 cases of 'corroborated' perceptions, which vary 'from somewhat weak to extremely strong' (Holden 2009, loc 2774), and half of them were corroborated only by the experients. In contrast, the scientific rhetoric claims 'hundreds of published cases', and of the 107 cases, '91% were completely accurate' (Greyson, Holden & Van Lommel 2012, p. 445). The exponential growth in the claim of such evidence is not matched by the growth in actual scientific evidence for such claims.[272] What Badham (see 1997, p. 19) wished for more than two decades ago, only a single case of 'correct seeing', remains valid today. Evidence *beyond doubt* is not forthcoming for perception during NDEs. As Ring (cited in Holden 2009,

270. At issue is not whether NOEs are real for experients or whether they really happen. And as stated over and over, it is not a matter to confirm or disconfirm the actual claims of experients. At stake is how to account for them. Scientists, Nobel laureates included, are as likely as anyone else to take such experiences at face value as real and true.

271. Even if the veridicality of some experiences is accepted, physicalist explanations are not necessarily excluded (see Mitchell-Yellin & Fischer 2014).

272. Elsewhere, a list and its chronological progress from the one and only source in support of this claim have been given in detail (see Craffert 2015, pp. 10–14, 2016, pp. 259–262). Also, Fox points out that 'it remains to be established *beyond doubt* [emphasis mine] that during such an experience anything actually leaves the body' (Fox 2003, p. 340; see also Corazza 2008, p. 125).

loc 2970), a sympathetic supporter of this line of argument, remarks: 'But isn't it true that in all this time, there hasn't been a single case of a veridical perception reported by an NDEr [near-death experiencer] under controlled conditions? I mean, 30 years later, it's still a null case'.

Features of the fabric of consciousness

It is not easy to know what the fabric of nonlocal consciousness is in all the above proposals. Many descriptions have a spooky resemblance, and notions of consciousness as sensations or energy are innocent enough to be accepted. But they do not help much in understanding and explaining human conscious states. Much more difficult to comprehend are proposals about 'visible, new-material' entities that can invade or leave a body.

However, the overwhelming impression that a critical analysis of theories of nonlocal consciousness brings is the realisation that the word 'consciousness' has completely different meanings in the different bodies of data. The fundamental problem causing the crisis in consciousness research, using the word for different concepts, is prominently at work here. Of significance is that, like mainstream neuroscience of consciousness, theories of nonlocal consciousness treat consciousness as a thing instead of a process – a view that permeates consciousness research. Explained the other way around, if consciousness is a process and not a thing, most of the claims made about nonlocal consciousness cannot be true or do not even make sense. Therefore, the implicit theoretical assumption (because it is never overtly claimed) in the fabrication of nonlocal consciousness is that it is an entity of some sort. For some, it is a thing that can be 'seen' in addition to seeing someone's body, while others treat it as an energy-like essence that can exit a body and roam around. Yet others take it as a fundamental feature of nature that permeates all material things. In all instances, it is an entity of a sort. Implicitly, they share the same assumption that for consciousness, the self, the soul or nonlocal consciousness to be real, it must exist. The realism which underlies the dualism of these approaches is based on a reification view of consciousness and the self; if consciousness and the self were to exist, they would have to be independent entities or things (see Thompson 2015, p. 322).

Brain models in theories of nonlocal consciousness

Because nonlocal consciousness is not directly linked to brain processes, there is not much about the brain and brain models in this research tradition. And claims of nonlocal consciousness predominantly emerge from studies other than the neurosciences and contain very little about the brain and brain models. In fact, in matter-based theories of nonlocal consciousness, the brain should be as conscious (or not) as any other organ or material object – matter is conscious. While some of these studies contain valuable criticism of the neurocentrism and physicalism found in mainstream neuroscience of consciousness, a rejection of those views does not mean the flip side is correct.

In theories of nonlocal consciousness based on NOEs, two related metaphors explain the brain and consciousness relationship. One is referred to as the 'filter model', and the other is the 'radio receiver' model. According to the filter model, the brain does not create consciousness (mind) but merely selects based on time and place. The brain's task is to *filter out*, so to speak. As such, Kastrup (2012, p. 7) says, 'all subjective experiences exist *a priori*, irreducibly: the brain merely selects those that are useful for survival'. That is so because the brain is only the receiver and not the producer of consciousness. Just as a radio merely transmits what is broadcasted, the brain merely relays consciousness (see Van Lommel 2013, pp. 31, 39).

Both of these are mechanistic metaphors and assume that some physical entity is transmitted, and so consciousness is an entity. In the application of these metaphors, the brain apparently is a not-so-innocent bystander. The most astonishing claim about the brain is that it is the culprit in preventing us from perceiving transcendent reality, for Beauregard (2012, p. 208) claims that 'the brain usually acts as a filter that prevents the perception of what could be dubbed other realms of reality'. While nonlocal consciousness can be separated from the brain to perceive nonmaterial reality, it is the brain preventing it from doing this on a regular basis. Ironically, this is a reference to the brains of secular Westerners, because most people on the planet, as we have seen, are natural dualists. The brain 'blocks out, or veils, that larger cosmic background', Kripal (2019, p. 68) adds, but we are conscious despite our brains.

In this regard, Kripal introduces yet another line of argument that is not only factually suspect but can be turned around against him. He suggests that ordinary consciousness is not the place to search for an answer to the nature of consciousness, but precisely, its nonordinary or ASC experiences are. Here, he invokes what he calls 'the traumatic secret' (Kripal 2019, p. 37) and suggests that these NOEs that reveal the nature of matter and consciousness are generally only available in extreme, traumatic or dangerous situations (see Kripal 2019, pp. 38, 157). He finds a parallel between such experiences and what happens in science, where extreme technologies such as the Large Hadron Collider near Geneva are needed to see what matter is like. The implicit scientific rhetoric is that matter acts differently under extreme conditions, as in the Large Hadron Collider, which, in the case of the Higgs boson particle, shows that matter is not material at all. His other rhetorical example is that it takes heat to show that water consists of two gases.

Firstly, from his examples, it is not quite clear how trauma affects matter (or people) to give up its secrets. In the case of both water and the Large Hadron Collider, there is a material and systemic connection between the elements. In all the examples he lists of trauma, there is no link between the trauma and the claimed NOE. Mark Twain experienced a NOE while the 'trauma' was experienced by his brother several weeks later. The mother who saw her child on a railroad in a dream appears before the 'apparent' trauma to 'give up' anything (as it turned out, there was no real trauma with the girl either). An alternative reading of the evidence is that the child simply played out the suggestion planted in her brain the night before her trip when she overheard her parents arguing about her trip.

Secondly, be that as it may, it is important to note to what lengths sun-movement type arguments can go to explain the unexplainable. If consciousness is not a thing that is somehow related to a body, none of this makes much sense.

Concluding remarks

The many examples of the fabric(ation) of consciousness in these theories have added to the list of mainstream neuroscience of consciousness theories that all depart from the binary theoretical framework and, more specifically, the mind–body problem. A description of consciousness as (some)thing other than a body or a brain is producing an endless list of possibilities. It is virtually impossible to keep track of all of them today or decide which one is (more) correct. If consciousness is not a *thing* but a process, these theories are all like a dog chasing its own tail.

Within the confines of the binary theoretical framework and the position on the fault lines in consciousness research, it is noteworthy that theories of nonlocal consciousness contribute a considerable number of additional concepts of consciousness. Consciousness is seen as a visible material entity, an invisible new-material entity, an invisible energy force in nature or an invisible entity that most of the time resides in the human body. All of these are additional instances of consciousness as an entity, not a process, that is in an unexplained (unexplainable?) relationship with the material human body. Many of these are substance dualism (sun-movement type) explanations in overdrive. Put differently, all these conceptions of consciousness are produced within the parameters of the nested assumptions of a binary theoretical framework and display the features on one side of the fundamental fault lines in consciousness research. What if consciousness is something completely different to begin with? What if it is not a thing but a bio-neuro-ecological process?

PART 4

The neuro-ecological fabric(ation) of consciousness: consciousness as a brain–body–environment process

Becoming you as a bio-neuro-ecological process

In consciousness research, a *neuro-ecological revolution* is currently taking place. It offers an alternative neuroscientific theory of consciousness in that it rejects the basic assumptions of mainstream neuroscience of consciousness. And unlike theories of nonlocal consciousness, it does not reject the importance of the brain in consciousness research but seeks to provide an alternative naturalist explanation for consciousness.

It is called a revolution for two reasons. One is that it is introducing a completely different conceptualisation of consciousness from what has developed in the mainstream neuroscience of consciousness over the last few decades. It is reacting to mainstream neuroscience of consciousness, not only to the claims and results but especially to the nested assumptions that accompany it. Therefore, it does not just provide new answers to the same questions but to new and different questions. It does not share the mainstream formulation of the mystery of consciousness and does not partake in the two focus areas, the search for the NCC or the HPC. A neuro-ecological perspective is not bound to the binary theoretical framework in mainstream consciousness research but seeks to actively avoid and overcome it by means of a nonbinary theoretical framework.

The second reason is that a neuro-ecological perspective is producing not only a different notion of consciousness but a new philosophy of human beings and nature. Consciousness, as indicated, is the term that expresses the basic understanding of what it is to be human and, by extension, what the world is made of. In this view, consciousness is not a thing, an entity or an essence but a process – it is something living organisms do and not what they have. Thus, it is producing what will be referred to as the *neuro-ecological perspective* on *consciousness* and a *neuro-ecological concept* of consciousness, which at the same time provides a notion of what it is to be human.

The neuro-ecological revolution is based on two distinct historical developments, both of which are direct reactions to and corrections of the assumptions in mainstream neuroscience of consciousness, as well as idealist theories of nonlocal consciousness. The first development is reacting not only to the neurocentric but also to the corticocentric focus in mainstream neuroscience of consciousness, and it introduces a whole brain perspective that is grounded in the evolutionary development of organisms that display consciousness. In a pertinent way, it seeks to repeal the development of consciousness research that started with the cognitive revolution and found fulfilment in the consciousness revolution, but at the same time it acknowledges the importance of neuroscientific research in understanding consciousness and human nature.

The second development is the cultivation of an embodied perspective on consciousness. The fundamental insight of a neuro-ecological perspective is that *consciousness* is a condition of living organisms in their environment and not of the brain or parts of it only. Living organisms and neither just brains nor mere matter are conscious. It runs through the embodied turn in cognitive studies to an ecological view of the mental and consciousness in the neuro-ecological perspective.

Chapter 14 describes the antecedents and development of the neuro-ecological revolution in four different disciplinary areas. Divergent strands of research on the embodied and enacted framework come together in expanding the concept of consciousness beyond that of reductive single mental functions (such as cognition, attention or affect), while unidimensional models are replaced by multidimensional models and theories in what is seen as a multiplex phenomenon. Developments in four different transdisciplinary areas contribute to the perspective that sees consciousness as an embodied and enacted phenomenon that is not located somewhere in the brain or body but is distributed among the brain, body and environment.

Chapter 15 focuses on the fabrication of consciousness, based on nested assumptions from three sets of theories. One is the nonbinary theoretical framework that seeks to replace not only substance dualism but the dualistic thinking that characterises the other research trends. The second is a systems' view of reality that underlies this perspective, and the third is a set of brain models and theories that go beyond neurocentrism and localisationism that characterise mainstream neuroscience of consciousness.

Chapter 16 describes the fabric of consciousness as a multiplex phenomenon that is characterised by four features. Consciousness is a biological process and not a thing, and it is an organismic and not a material phenomenon. It is a distributed ecological phenomenon with a multiplex of dimensions.

Chapter 17 contains a brief introduction to the most significant dimensions of consciousness. These are described as the modes, domains, cycles, levels and states of givenness that make up consciousness as such as a bio-neuro-ecological phenomenon.

The neuro-ecological perspective is reacting to and seeking to rectify what is considered the misguided view of consciousness in mainstream as well as in nonlocal theories of consciousness: they are looking for consciousness *where* it is not and *what* it is not. *What* it is and *where* it is to be found are closely linked, but both these questions are intertwined with the reasons *why* the aforementioned theories are rejected. It is not the actual theories and their content but, first and foremost, the nested assumptions and theoretical frameworks of these theories that are found wanting.

Chapter 14

The neuro-ecological revolution in consciousness research

Introduction

A *neuro-ecological revolution*[273] is taking place in consciousness research. It is not a unified movement but consists of numerous tributaries that include diverse developments such as *neurophenomenology*, *embodied cognitive neuroscience* and the *biosemiotic theory of mind*. They share and contribute to the conceptualisation of *consciousness* from phenomenology, philosophical biology and embodied and enacted perspectives in several different disciplinary frameworks.

273. As far as I know, the term *neuro-ecological revolution* has not yet been used for this development in consciousness research. Nevertheless, it is not completely novel, and this claim is based on the work that many others have done (for detail see the following). Hutto (2017, p. 389), for example, refers to *enactment* as a *revolutionary shift* (a 'conceptual revolution') which promotes completely different understandings of cognition and consciousness as compared to classical cognitivism. Others, although not using the term 'revolution', clearly argue that a completely different view on cognitive processes is emerging (e.g. see Menary 2015, p. 2). Rose and Abi-Rached (2013, p. 233) think that we are *not* witnessing a wholesale revolution but nevertheless contribute to its progress in their criticism of mainstream neuroscience of consciousness.

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The development towards the neuro-ecological revolution has been taking place over the last three decades simultaneously in at least four different (inter)disciplinary fields of study. Together, they contribute to a view that all mental processes are integrated brain–body–environmental phenomena,[274] and all of them more or less are based on or influenced by the phenomenological insights of particularly Merleau-Ponty on perception. Four disciplinary contributors to the neuro-ecological perspective will here be introduced. They are: (1) the idea of a body-minded brain in neuroscientific studies, (2) mindedness in (neuro)biological studies, (3) the embodied and enacted turn in cognitive neuroscience and (4) the development of cultural neurophenomenology in anthropology. In various ways, they all conceptualise mental phenomena as features of organisms in an environment (and not brains only) and produce what will be referred to as the *neuro-ecological perspective* on *consciousness*. The notion of a *revolution* is based on both the concerns that mainstream neuroscience of consciousness is missing the target in consciousness research and very specific theoretical insights.

One development, which started as a reaction against cognitivism, emerged in neuroscientific studies and emphasises the holistic brain–body–environment view. While preserving the neurocentric position of the brain, they highlight the embodied nature of neural processes and thus account for the mental as bodily processes. A similar development in neurobiological sciences emphasise that mindedness is a feature of biological organisms. Enacted embodiment grew in the cognitive sciences out of a dissatisfaction with classical cognitivism and as a direct reaction to the neurocentrism and cognicentrism that characterise the cognitive sciences. Embodied and enacted cognitive neuroscience seeks to ground the mental in embodiment and resituates the role of the brain while emphasising that mental functions are both embodied and bodily.

In anthropology, a development known as cultural neurophenomenology developed from the other direction in seeking to acknowledge the role of neural structures and processes in universal cultural phenomena. While also taking enacted embodiment for granted, cultural neurophenomenology acknowledges the role of the genetic pregiven neural structures that are responsible for cultural universals – no aspect of culture, it claims, is not conditioned by the universal properties of human neurophysiology.

All four developments share a host of other theoretical insights and assumptions and seek to redescribe mental phenomena as multiplex brain–body–environmental processes. They fall on the same (the other) side of

274. There is, however, a long list of scholars from different fields who are seeking to find links between the formation of the abstract or conceptual with bodily experiences (see Throop & Laughlin 2002, p. 47).

the fault lines from mainstream neuroscience of consciousness. The real impact of those fault lines will only become completely visible once their counter sides are seen implemented. A neuro-ecological perspective indeed offers a radically different understanding of consciousness as such.

The body-minded brain or mindedness

One of the tributaries to the neuro-ecological revolution is the contribution from scholars who work on mindedness in the biological sciences. A search for the antecedents of *consciousness* in the evolutionary past of organisms that have incrementally developed behaviour, mind and self, Damasio argues, is responsible for a radical change in the way in which the history of conscious minds is told and *consciousness* is conceptualised. The neuro-ecological perspective searches for antecedents of self and consciousness 'in the evolutionary past [...] and is grounded on facts from evolutionary biology and neurobiology' (Damasio 2010, p. 15). In this perspective, the ground of consciousness is explored not in the cognitive or discursive aspects but in affective, precognitive features of human beings.

Few scholars have done more than Damasio to undermine the corticocentric view of neuroscience and to establish the basis of the neuro-ecological perspective. Without using the same terminologies as in this study, Damasio (1994, p. 127ff.) replaced corticocentric perspectives with a neurocentric perspective that includes emotions and feelings in the conceptualisation of cognition. One step was the development of a whole-brain view, as opposed to corticocentrism, and finds expression especially in affective neuroscience. He also promoted the notion of human beings as 'complex living organisms' (p. 86) that can only be understood as organisms with constant body–brain and body–environmental interactions – it is an oversimplification, he says, to even consider that the body and brain form an 'indissociable organism' (p. 88); in his words: 'If body and brain interact with each other intensely, the organism they form interacts with it surroundings no less so. Their relations are mediated by the organism's movement and its sensory devices' (p. 90). Again, without using the same terminologies, this is a proto-description of what others called an embodied and enacted view of human beings.

The above provides the foundation for what Damasio (1994, p. 232ff.) calls the 'body-minded brain' – the body is the ground for the brain. It is an organism that interacts with the environment, and this interaction is not a matter of just perceiving the environment but of interacting, where both entities act on one another. The mind (mental phenomena such as cognition and thinking) is not in the body or attached to it but is the product of an organism's action in the world. In his words (Damasio 1994):

> What I am suggesting is that the mind arises from activity in the neural circuits, to be sure, but many of those circuits were shaped in evolution by functional

> requisites of the organism, and that a normal mind will happen only if those circuits contain basic representations of the organism, and if they continue monitoring the states of the organism in action. (p. 226)

For Damasio (1994), the first task of the brain is not to think or perceive but to represent in the mind the own body with a view to survival. He argues this case on an evolutionary basis and suggests:

> [*R*]*epresenting the outside world in terms of the modifications it causes in the body proper*, that is, representing the environment by modifying the primordial representations of the body proper whenever an interaction between organism and environment takes place. (p. 230; [*emphasis in the original*])

The important insight of this perspective is that the organism's engagement with the world is always an in-tandem engagement of brain and body, mental on the one hand and somatosensory and somatomotor on the other hand. For him, mind is inconceivable without embodiment. Primordial bodily representations as well as the neural representation of the self are closely interconnected in what an organism experiences as *consciousness*.

Mindedness as a biological phenomenon

Within the biological sciences, there are also developments that emphasise embodiment as the basis of *consciousness* or, as they say, *mindedness*. In some circles in the biological sciences, this perspective also developed as a reaction to cognitivism. A feature of theories influenced by the cognitive perspective, Swan (2013, p. 4) points out, is the focus on the behaviour of cognitive systems (their function) and not their 'material instantiation'. Instead, cognition should be investigated within a whole organism, and the big question is why mindedness evolved.

Mind is not a thing but a placeholder for 'a host of abilities that we and some other animals are able to do with our brains and bodies' (Swan 2013, p. 5), and human mindedness is merely the culmination of animal mindedness and is a thoroughly biological phenomenon. Thus, mindedness, in this perspective, is a process instead of an object or thing and can be described as (Swan 2013):

> [*A*] biological phenomenon, thoroughly dependent upon a central nervous system in complex organisms such as humans and other primates, and a more diffuse kind of nervous system in less complex organisms. (p. 3)

Embodied theories of consciousness break with the practice of looking at computer and AI models of consciousness that are based on input–output information processing and in fact reject the input–output model. Instead, they take the mind (and consciousness) as 'an extremely complex biological phenomenon that enables sufficiently complex organisms to make meaning out of their worlds' (Swan & Goldberg 2010, p. 133).[275] Swan and Goldberg (2010) argue that:

> [*T*]here are three crucial components to the meaning-making process in organisms: (1) the environmental features that are salient to the organism for survival reasons; (2) the representations, within the organism's brain, of those select features of the environment; and (3) the action taken by the organism which results from this entire process. (p. 132)[276]

From this position, several significant implications follow for our understanding of consciousness. The relationship between mind and brain is not seen as causal but *isomorphic*: 'We don't say that plants *cause* photosynthesis or that digestive tracts *cause* digestion and neither, I argue, should we say that brains *cause* minds; rather, the "mind" can be thought of as the brain as experienced by the agent' (Swan 2013, p. 6, n. 3).[277] Swan's (2013) summary of what she calls a biosemiotic theory of mind captures the essence of what contributes to a neuro-ecological perspective:

> [*T*]hough it entails a thorough knowledge of the organismic brain, is distinct from neurophilosophy in that it (1) carves out a conceptual space for meaning understood in terms of beliefs, ideas, and other features of our 'mental life', (2) embraces the biological origins and evolutionary development of mindedness as the necessary grounding for understanding human mindedness as it is now, and (3) focuses not just on the brain but on the entire living organism in its environment. (p. 9)

275. Searle (1993, p. 310) says 'consciousness is a biological phenomenon' like other biological phenomena such as digestion and growth, part of the organism. The two crucial relationships between consciousness and the brain, then, can be summarised as follows: 'lower level neuronal processes in the brain cause consciousness and consciousness is simply a higher level feature of the system that is made up of lower level neuronal elements' (Searle 1993, p. 312). In a neuro-ecological perspective, it will be argued that he is correct in seeing it as a biological phenomenon but wrong in limiting it to the brain; consciousness is the product of living organisms, not brains, and it is the product of biological systems and not biological organs.

276. These problems hang together with other assumptions regarding the use of computing metaphors to understand consciousness (see Swan & Goldberg 2010, p. 132). See also Jasanoff (2018, p. 33ff.) on the role of computer metaphors.

277. Barbieri (2011) offers a similar explanation as Swan for how the mind emerges from the brain. Scientific models on this issue, he argues, can be divided into three major groups. Two of them depend on computer or information-processing metaphors. Computational theories use the metaphor of software as distinct from hardware; mental activity is produced by means of a sort of data processing: 'neuron firings and synaptic connections, are transformed into feelings by neural processes that are equivalent to computations' (Barbieri 2011, p. 382). Connectionist theories use the metaphor of a synaptic web, which emerges from computer-generated neural networks. Emergence theories in the organic model claim that higher-level brain properties emerge from lower-level neurological processes. The organic model of Barbieri (2011, p. 382) sees consciousness not as brain objects but brain artefacts; they are *manufactured artefacts* of neural components and neural codes.

As will become apparent below, this biosemiotic theory of mind also contributes three distinct theoretical insights to the neuro-ecological perspective. They are a relativising of the third-person perspective in favour of a phenomenological perspective, the emphasis on meaning-making as the central feature of living organisms and a rejection of the traditional mind–body dualism.

Embodied and enacted cognitive neurosciences

The third development contributing to the neuro-ecological revolution are the embodied and enacted theories as reactions against traditional cognitivism. Traditional cognitivism, as seen above, can adequately be presented by means of three features: it takes cognition, in the words of Gallagher (2017a, p. 1), as a 'fully in-the-head event'; it is based on a computational model of perception; and it is characterised as a representation of reality. Each one of these features is rejected and replaced in an embodied and enacted perspective. Their affiliation with the binary theoretical framework should be obvious – consequently, they are to be replaced by those from a nonbinary theoretical framework.

The 4E cognition turn

During the 1980s, an embodied reaction[278] emerged in the cognitive sciences that rejected cognitivism and was characterised by an extension of cognition from the brain to the body.[279] In the words of Menary (2010, p. 462): 'The once homogenous framework of cognitivism is being replaced by a multidimensional analysis of cognition as incorporating our brains, bodies and environments'. What is today widely known as 4E cognition[280] – cognition

278. While embodied ideas have antecedents already in the 1970s, many of those ideas remain neurocentric. Sperry, for example, advocated an embodied view of consciousness back then. However, he nevertheless remained neurocentric in his view of consciousness and the brain: 'Our new treatment of science of the contents of subjective experience, established by the 1970s cognitive revolution, has its basis in the idea that conscious mental states are emergent properties of brain processes' (Sperry 1995, p. 10).

279. As it is still developing and is taking place in the interdisciplinary space, it is not a unified area of research. The embodied turn in the cognitive sciences means a turning away from cognitivist as well as mentalist views to embodied views of cognition. It goes under different names, such as *grounded cognition* (Barsalou 2008), *embodied cognition* (Adams 2010; Clark 1999; Varga & Heck 2017) and *radical embodied cognitive science* (Kiverstein & Miller 2015). These views share a rejection of mentalism or cognitivism as well as a rethinking of cognitive science from its bottom up.

280. Taken together, the variety of approaches to cognition that are associated with the notion of embodiment are often referred to as the 4E or 4EA cognition: '"4Es" (embodied, embedded, enactive, extended cognition) – which has sometimes included more "Es" (ecological, empathic) and sometimes an A (4E&A, where A stands for affective)' (Gallagher 2017a, p. 28). Menary (2015, p. 2) offers a more comprehensive and evaluative overview of this landscape.

is embodied,[281] embedded,[282] extended and enacted (see Fuchs 2018, p. 108) – is united in one aspect only, namely a rejection of cognition as brain-based; the embodied turn in the study of cognition resulted in a variety of alternative theories of cognition.

As a family of embodied theories, they all understand cognition as rooted in 'engaged bodily lives' (Ward, Silverman & Villalobos 2017, p. 374) but disagree as to the role and weight given to embodiment or the body (see Gallagher 2017a, p. 26). Therefore, not all 4E theories reject representationalism equally strongly (see Froese & Fuchs 2012, p. 207; Hutto 2017). Also, Gallagher (2017a, pp. 26–47) shows that there is a spectrum of notions of embodiment which stretches from a weak notion of embodied roots of cognition and thinking (internalist) to enactivism as a philosophy about nature (externalist).[283] Weak notions of embodiment emphasise the role of the body or body representations in cognition.[284] In these versions of embodied cognition, the body is precluded from any significant contribution to cognition, as it still champions an internalist and representational role of conception and cognition. The classical computational model of cognition remains basically intact in most of these approaches (see also Froese & Fuchs 2012, pp. 207–210).

But most importantly, an enactivist view of embodied cognition does not just see an extension of cognition from the brain into the body and environment but rethinks how cognition takes place in the first instance (see Gallagher 2017a, p. 5).[285] They respectively represent internalist and externalist theories.

These remain theories of cognition and are not reflections on consciousness as such. A truly embodied theory of consciousness makes a clear distinction between cognition and consciousness. One such alternative

281. In the view that cognition is embodied, it is argued that cognition takes place not only in a central mental system but in the perceptual and motor systems as well (see Adams 2010, p. 619).

282. Embedded cognition 'is the thesis that our cognitive systems are located in and interact with the surrounding physical and social environment' (Menary 2015, p. 2).

283. The distinction between internalist and externalist clearly shows the difference between weak and strong versions of embodiment; 'internalist approaches focusing on B-formatted representations in the brain, and externalist theories that include the full body in its dynamical gestalt-like relations with its physical, social and cultural environments' (Gallagher 2017a, p. 44).

284. Weak notions of embodied cognition merely explain the 'embodied roots of abstract thought' (Gallagher 2017a, p. 31). These remain internalist views of cognition that ascribe a minimum role to the body.

285. An enactive approach which is based on several mutually supporting core concepts, such as autonomy, sense-making, emergence, embodiment and experience, sees cognition as grounded in the sense-making activity of autonomous agents (see Thompson & Stapleton 2009, p. 23).

is *cognitive neurophenomenology*.[286] The term *neurophenomenology* developed simultaneously from different disciplinary fields but with distinct features and directions regarding the *neuro* part of the concept.[287]

For Varela (1996, p. 330 n 1), the term 'neuro-phenomenology'[288] was a marriage between the emerging enacted cognitive neuroscience and human experience as understood in the phenomenological tradition. For him, the *neuro* refers to 'neuro-psycho-evolutionary' and the *phenomenology* was a recovery of the phenomenological philosophy of Merleau-Ponty.[289] The first aim of cognitive neurophenomenology was to bridge the gap between neurophysiological data and first-person accounts of experiences (see Gallagher et al. 2015, p. 297) while seeking a synthesis of how the brain works in a living organism.[290]

Enacted embodiment as a brain–body–environment self-organising system

Enacted embodiment grounds cognition (in fact, all mental processes) in the biodynamics of living systems and not just in the brain (see Ward et al. 2017, p. 369). Enactivist notions of cognition build on biological models that take it that perceptual and cognitive processes depend on and include bodily structures. An enactivist position goes further than acknowledging the role of bodily processes – 'enactivists claim that bodily processes shape and contribute to the constitution of consciousness and cognition in an irreducible and irreplaceable way' (Gallagher 2017a, p. 40). It also goes further than everyday cognition and includes social cognition (famously explained in traditional cognitivism by means of mirror neurons and theory of mind, which is based on the mental representation of the other in the brain of a cognisant) as a meeting of two organisms (see Froese & Fuchs 2012, p. 210). The basic assumption is that it is organisms and not brains that experience, and brains

286. While most studies simply talk about *neurophenomenology*, the label *cognitive neurophenomenology* is used to distinguish it from *cultural neurophenomenology*, which at the same time developed in anthropological studies.

287. In this presentation, the *cognitive* and the *cultural* neurophenomenology will be separated. In cognitive neurophenomenology, the *phenomenology* part is added to transform the *neuro*, and in cultural neurophenomenology, the *neuro* is added to account for cultural universals as brain products.

288. It is often claimed that Varela coined the term 'neurophenomenology' (e.g. see Revonsuo 2010, p. 192), but it was first proposed by the anthropologist Charles Laughlin (see Laughlin & Rock 2013, pp. 263–264 for a discussion and explanation).

289. The aim of the seminal book on enacted embodiment sees it as a modern continuation of the research programme founded by Merleau-Ponty and with Merleau-Ponty seeks to re-establish our bodies as both a physical and a lived structure (see Varela, Thompson & Rosch 1991, pp. xv–xvi).

290. In the words of Gallagher (2017a, p. 1): 'This view clearly poses a challenge to what has been the standard science of cognition, especially to cognitive neuroscience, and to any science that claims to provide full and exclusive explanations [of mind] in terms of one factor, e.g. neural processing'.

function only as embodied in a body of an organism and an organism that is embodied in its ecological and social environment (see Lutz & Thompson 2003, p. 34; Varela 2001, p. 319).[291] An enactivist position (Hutto 2017):

> [*P*]romotes a thoroughly biological vision of cognition grounded in a life-mind continuity thesis. It conceives of mind and cognition as emerging from the self-organizing, self-creating and self-preserving activities of a sub-set of living organisms that exhibit agency, understood in a particular way [..] [*and*] cognition is inescapably bound up with the world engaging, life-preserving activity of the sort in which agents, conceived of as complex assemblies of response systems, possess a certain kind of autonomy. (p. 378)

Cultural neurophenomenology: The neural basis of cultural universals

The fourth source for the neuro-ecological revolution is associated with cultural neurophenomenology, which is a development in anthropology and seeks to ground consciousness in the interaction between brain, culture and environment. It is to be located within a long tradition of anthropological thinking about consciousness (see Throop & Laughlin 2007 for a comprehensive overview of the anthropology of consciousness). Parallel to the appropriation by Varela of the phenomenological tradition of Merleau-Ponty in cognitive sciences, cultural neurophenomenology embraced it in a rather different configuration. Cultural neurophenomenology, or neuroanthropology, as it is also referred to, is distinguished from cognitive neurophenomenology after the term 'neurophenomenology'[292] was appropriated by Varela in the 1990s (see Laughlin & Rock 2013, p. 264).[293]

291. Thompson and Varela (2001, p. 424) propose that three kinds of 'cycles of operation' can be identified to describe the neural and organismic processes of embodiment: '(1) cycles of organismic regulation of the entire body; (2) cycles of sensorimotor coupling between organism and environment; (3) cycles of intersubjective interaction, involving the recognition of the intentional meaning of actions and linguistic communication (in humans)'.

292. The term *neurophenomenology* is sometimes loosely used to refer to studies that just take the first-person perspective seriously (e.g. see Facco, Agrillo & Greyson 2015, p. 87). This is also the case with Winkelman (2017, p. 2), who uses the term loosely when claiming that neurophenomenology 'is an approach to the understanding of the structure and content of phenomenal experience in terms of principles operating at the neurological level. [...] Or in other terms, the first-person perspectives of personal experience are explained by reference to some homologous causal features identified by third person perspectives on brain operation'. He does not realise that the neurophenomenological perspective is fundamentally an embodied perspective. For this reason, he regularly employs cognitive studies that are based on the classical cognitive understanding of mental phenomena in explaining altered states of consciousness (ASCs).

293. Lende and Downey propose a different origin for the concept *neuroanthropology*. In 2007, they started a weblog with the title *Neuroanthropology* and agreed on the name because of 'two graduate students in Australia, Juan Dominguez and Paul Mason' (Lende & Downey 2012, p. 4). In their view, the term had been floating around for a few decades, first used by Warren TenHouten in 1976 and later by Oliver Sacks in 1995. Mason claims that the term *neurophenomenology* also has other roots in different research traditions and credit it to the neurologist Oliver Sacks (see Mason 2007).

Cultural neurophenomenology contributes a range of concepts to the toolkit of a neuro-ecological perspective; these include neurognosis, cognised environment and extramental reality, as well as monophasic and polyphasic cultures.

Biogenetic structural theory,[294] as this development was initially called, was invented in anthropology during the 1970s by Charles Laughlin and colleagues to provide a neurobiological foundation for their anthropological theory. They recognised that the brain (or nervous system) is the organ of culture (see Laughlin 1989, p. 145, 1992, p. 17).[295] In the words of Laughlin (1992, p. 17): 'After all, every thought, every image, every feeling and action is demonstrably mediated by the nervous system'.[296] In this perspective, there is no mind–body dualism or mind–brain dualism as biogenetic structuralism specifically holds 'that "mind" and "brain" are two views of [the] same reality – mind is how brain experiences its own functioning, and brain provides the structure of mind' (Laughlin, McManus & d'Aquili 1990, p. 13).

In this view, the structures of consciousness are partially the result of genetically predisposed functions and structures of the nervous system and brain (see Throop & Laughlin 2002, p. 49). Therefore, universal patterns in culture are the result of the neurophysical organisation of human beings – the term they coined to describe this feature is *neurognosis*, which expresses the notion of *innate* knowledge of the world and the own body as a result of the internal neurobiological organisation of an organism.[297] It provides a correction to the idea that an organism's knowledge is dominated by immediate perception (see Laughlin 1996; Laughlin & Loubser 2010, p. 139).[298] One of the functions of the cerebral cortex of the human brain is to grow models of the world, or the lifeworld, which results in a 'brainworld'

294. It originated in the time of the domination of Lévi-Strauss's structuralism and was an attempt to place anthropological research on a biological footing. Laughlin (2011, p. 17) later preferred the term *neuroanthropology* to give expression to the insight that 'every aspect of culture, of symbolism, of social action, of interpretation and knowledge – are the processes, products and artifacts of brain states' (p. 28).

295. Anthropological theory, according to Laughlin (1996, p. 367), addresses adequately 'neither the issue of cultural universals nor the biological mechanisms that produce those universals'.

296. The importance of this is elsewhere expressed thus: 'our experience at any moment of consciousness is produced by our nervous system, with or without stimulation from events occurring in the external world' (Laughlin, McManus & d'Aquili 1990, p. 43).

297. A similar voice from an anthropologist explains this like this: 'Maurice Bloch writes that it "is not a matter of passing on 'bits of culture' as though they were a rugby ball being thrown from player to player" [..] Bloch is not suggesting that we are separated from the social and physical environment in which we exist; but rather, *how we know* and *what we can know* or *experience* of the world (including ourselves) is always and necessarily a product of our species-specific perceptual apparatuses, cognitive architecture, and biological constitution, which, together, give us life and enable us to survive' (Marchand 2010, p. S11).

298. This theory is strongly based on the developmental theories of Piaget and seeks to bring balance between the sources of genetic information and perceptual information, as well as the influence of remembered information on knowledge and consciousness (see Laughlin 1996, pp. 364–365).

(Laughlin 2019, p. 30) or what they call the 'cognized environment' (Laughlin 1996, p. 365). In the words of Laughlin (2019, p. 31): 'Our brain is already equipped with a library of nascent categories and images that lay the foundation for development of intuitive knowing patterns selectively abstracted from the sensorium'. Such knowledge of the world is inherent and pregiven to experience and cognition (see Laughlin 1992, p. 17; Throop & Laughlin 2002, p. 49). This is illustrated by many examples, one of which is the fact that primates tend to be neurognostically structured to experience fear of snakes (see Laughlin 1996, p. 368). A direct implication of this understanding of human beings is that there is a physiological foundation to all acts and states of consciousness (see Laughlin & Loubser 2010, p. 140).

The concept of neurognosis not only rejects the mind–body dualism but also returns the mind to the world of reality and physical causation (see Laughlin & Loubser 2010, p. 140). The structural properties and operations of the nervous system are directly involved in bringing forth the world of reality (it is not just a matter of computational representations in the brain). For this reason, humans live in a particular cognised world that is different from that of bees, butterflies or dogs.[299] Another significant concept is that of extramental reality.[300]

In the next chapter, it will become apparent that cultural neurophenomenology contributes to at least three central theoretical features: consciousness is a process and not a thing; it is a biological systems phenomenon; and it actively seeks to escape the traditional mind–body dualism. Taken together, these features contribute to the explanation and description of the 'multiplex nature' (Throop & Laughlin 2007, p. 660) of consciousness. Consciousness is a process made up of many different processes. This means that also the *dimensions* of consciousness are all elusive, fleeting processes instead of entities. And as a systems phenomenon, it is not an entity and not made up of entities. Therefore, consciousness is a meaning-making process. This is clear in the description of the relation between consciousness and experience (Laughlin 1992):

> Experience, as we have said, is constructed by the intentional dialogue between the prefrontal processes and the sensorial processes of the brain. The total field of this dialogue is consciousness and awareness of bits of experience is

299. The human neurognosis is rather different from that of any other creature. For example, humans do not have the neurobiological or cognitive apparatus to detect light on the ultraviolet range without the help of machines. Many insects can and therefore live in a different neurognostic world. Another example illustrating the role of neurognosis relates to human phobias of snakes and spiders (but not electrical wall sockets or motorbikes) that are very common, quick to learn but hard to get rid of (see Laughlin & Loubser 2010, pp. 140–141).

300. In the explanation of Laughlin: 'We argue that extramental reality is not necessarily an absolutely mind-independent "material" or "stuff" forever beyond our experience. Instead, our knowledge of reality is importantly based upon the interpenetration of percept and object' (Laughlin & Throop 2003, p. 11).

> a principle [*sic*] component of this field. Because the definitive characteristic of awareness is re-collection, re-membering, or recognition of patterns in experience, awareness tacitly presumes the role played by knowledge in the construction of experience. (p. 19)

Pulling the strings together

There are clear overlaps in the theoretical assumptions and conceptualisation of *consciousness* in the four developments that contribute to the neuro-ecological perspective. Insights and arguments in neurobiological, neurophenomenological and cultural neurophenomenological research point towards a radical reconceptualisation of 'consciousness' from that in mainstream neuroscience of consciousness. In this perspective, *consciousness* is a feature of certain living organisms and not of brains only and certainly not of matter either.

Taken together, the discussed developments constitute the neuro-ecological revolution in consciousness research. This perspective contains very specific features on the fabric of consciousness. The most important insight is that consciousness is a feature of living beings. A working description of the kind of thing that consciousness is that follows from this is: *consciousness is a multiplex, distributed bio-neuro-ecological process*. With these four words, a whole range of alternatives to mainstream neuroscience of consciousness is invoked, embedded in a family of nested assumptions. These will be the topic of the following chapter. The detail will become apparent in the rest of the discussion.

Chapter 15

The fabrication of consciousness from a neuro-ecological perspective

Introduction

Dualistic thinking and logic permeate consciousness research. Therefore, it is hardly possible to overemphasise the necessity of dealing with it. The mind–body problem and its neurocentric version of the mind–brain problem (the HPC) are dualistically prestructured, and dualism is found underneath the first-person and third-person perspectives that characterise most of neuroscience of consciousness. While Cartesian substance dualism is nowadays rejected in most of consciousness research, modern versions thereof (like brain–body dualism) continue to determine it. The traditional cognitivist view on perception (and thus of consciousness) is based on a body–world (or self–object) dualism. A neuro-ecological perspective rejects and replaces all of these. The 'problem of consciousness', in the words of one of the proponents of a neuro-ecological perspective, is 'that of understanding our nature as beings who think, who feel, and for whom

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a world shows up' (Noë 2009, p. 25).[301] The real HPC is therefore not how a material brain experiences consciousness but why humans experience the world and ourselves as distinct entities from our bodies; how do we account for the fact that in real life, we are natural-born dualists who take our first-person experiences at face value as a true representation of how things are?

A neuro-ecological perspective does not depart from the dualistically prestructured HPC that characterises mainstream modes of consciousness research. But it goes further in actively seeking to avoid dualism and embrace monism. Like most neuroscientists, a neuro-ecological perspective not only rejects substance dualism, but it goes further in rejecting all the dualism(s) as well as the dualistic thinking and logic that permeate consciousness research. The confession of monism is not necessarily to move beyond dualism; it emerges out of a dedicated theoretical programme that seeks to account for the complexities of consciousness as well as the shortcomings of dualism.

Consciousness, or the conscious condition (to further avoid the notion of an entity), is a concrete phenomenon, not of physical matter but of living systems; the conscious condition can, following Holvenstot (see 2010, p. 203), be described as the world-modelling function of all biological systems. Thus, the fabric of consciousness in a neuro-ecological perspective as a multiplex, distributed biological and ecological process will be presented in the next chapter by means of two sets of essential features: consciousness is firstly a *biological systems process* and secondly a *multiplex distributed ecological phenomenon* (not localised either in the brain or the body and not just a brain or organismic phenomenon), and as a multiplex phenomenon, it cannot be reduced to any of its constituting parts.

As in all other perspectives, the fabric(ation) of consciousness is an integration of nested philosophical and ontological considerations. The neuro-ecological *fabric(ation)* of consciousness is based on a family of three sets of nested assumptions that fall on the other side of the fault lines associated with mainstream neuroscience of consciousness. The first set is a nonbinary theoretical framework which consists of three parts. The second is based on the logic of systems thinking, and the third set of assumptions relates to brain models and how the brain functions in producing mental phenomena. The relational metaphors of 'nested' and 'family' are excessive to emphasise that it is as a coherent framework that these features work together in creating consciousness. Individual

301. From the very beginning of the neuro-ecological revolution, it was clearly conceptualised as an alternative to mainstream neuroscience of consciousness: 'instead of finding extra ingredients to account for how consciousness emerges from matter and brain, my proposal reframes the question to that of finding meaningful bridges between two irreducible phenomenal domains' (Varela 1996, p. 340).

components might be shared by some thinkers without taking the package wholesale.[302]

The nonbinary theoretical framework of a neuro-ecological perspective

Given the dominant (if not hostile) environment of the binary theoretical framework in consciousness research, what a nonbinary theoretical framework rejects is as important as what it endorses. In other words, it is important to realise that it does not provide alternative answers to existing questions but poses the questions differently; it does not seek to solve the hard problem of the brain in a new way but conceptualises the mystery of consciousness differently.[303] Thus, although the fabric of consciousness will only be considered in the next chapter, it is presupposed in the discussion of the fabrication here.

To invoke the sun-movement metaphor once again. The neuro-ecological perspective does not provide yet another sun-moving type of explanation and does not deny the experience of sunsets; it replaces the mind–matter and monist–dualist maps with a nonbinary theoretical framework, and it does not deny the human condition of monistic duality but offers a different explanation for it by taking the experienced phenomenon seriously but without adopting its explanation, terminology and logic. An integrated body–mind complex works across the common-sense monistic dualism of the human condition but without rejecting or avoiding it (see Samuel 2010, p. 37). The features of our common experience of monistic duality are not a 'naïve' explanation but the ordinary experiential features of human organisms.

In the binary theoretical framework, the mental–physical and monism–dualism maps are underscored by metaphysical realism that takes the material world of our senses as the yardstick against which the mental (non-physical) emerges. Metaphysical realism is a sophisticated version of the 'naïve' realism of the human condition, which it rejects. The nonbinary

302. A random example as illustration is Solms, who quite correctly rejects the traditional view of 'physical' without also questioning the implication thereof for the notion of 'mental'. He (Solms 2014, p. 178, fn. d) explains: 'Ironically, naïve materialism turns out to be a kind of crypto-idealism in which the mental nature of conscious perception is overlooked, and the qualities of matter-as-it-looks are conflated with those of reality itself'.

303. In the words of Gallagher (2017b, pp. 713–714): 'In contrast to naturalistic approaches to consciousness which investigate how consciousness is grounded in physical states, classic phenomenological approaches of the sort explicated by Husserl take consciousness itself to be the necessary (a priori or transcendental) ground that enables us to conceive of physical states in the first place. [...] Phenomenologists thus begin by pushing aside precisely the kinds of questions that naturalistic approaches are most interested in; for example, about how the brain causally relates to consciousness'.

theoretical framework of the neuro-ecological perspective is the theoretical answer to all of these. The adoption of *naturalistic monism*, *integrated realism* and the *world-modelling functions of the meaning-making response of living organisms* are the three features of an alternative theoretical framework for conceptualising consciousness. Together, they produce a relational ontology based on a relational epistemology which is different from all objective ontologies based on subject–object epistemologies.

Naturalistic monism

Naturalistic monism is not an alternative version of monism (in opposition to some kind of dualism) but is a reconceptualisation of the conscious condition in terms of a monism that is grounded in a different set of features. To clearly appreciate that description, it should be seen against a rejection of the monist–dualist options and their underlying mental–physical divide.

In a very perceptive study, Holvenstot shows that what he calls the matter–spirit dualism (which is a variation of the mind–matter or mental–physical dualisms) is the major stumbling block to progress in consciousness research (see 2010). It is the logic and substance underneath the mind–body problem and its consequent monist–dualist solutions. This dualism has a double bind on consciousness research. On the one hand, it limits solutions to outdated physical and binary metaphors and, on the other hand, neglects to conceptualise consciousness by means of its own unique intrinsic properties as its *own kind of thing*.

This argument will be presented in two parts. In the first part, a case against the failed binary maps of mind–matter and monism–dualism will be presented. In the second part, a suggestion of a reconceptualisation of consciousness in the framework of naturalistic monism will be given.

The matter–spirit, monist–dualist stumbling block in consciousness research

As seen in the previous section, the mind–body problem and its dualistic solutions that permeate consciousness research are based on the physical–mental divide. This conceptual map is the basis of the formulation of the mind–body problem and its monist–dualist solutions. This matter–spirit explanatory spectrum is exceptionally well defended by the terms of its own internal logic, but it is based on outdated ideas about the world and is itself a ‘folk’ version of reality.

According to this logic, reality can only be described by material metaphors that reaffirm the solidity, immutability, dependability, impermeability, permanence and measurability of stuff. What cannot be measured is relegated to the spiritual–mental (Holvenstot 2010):

> When we describe the world as purely physical we need mysterious transcendental, spirit-stuff/mind-stuff concepts in counterpoint to handle all the unmeasurable, non-physical phenomena that a materialistic description leaves out (like knowledge and meaning, group-think and social forces, empathy and emotional bonds, inner voice and intuition, ethical choices and value judgments, aesthetic experiences, love, freewill, creativity and play, etc). We need intentionally vague spiritual concepts to sanctify features of our experience that are otherwise invalidated for failing to manifest as physical and calculable. Our unspoken rule of thumb is if we can't measure it, spiritual concepts will cover for it. (p. 196)

But for the last hundred years, this understanding of matter has been undermined. Astronomy reveals that most of the universe is unmeasurable dark matter; looking at matter through electron microscopy shows it is mostly open space; and quantum physics reveals that taking measures impacts what is measured. We have known for a century that matter is empty of content, is spinning energy caught in a pattern, flouting causal properties, yet when we refer to 'reality' 'we revert to outdated material metaphors that reaffirm the solidity, immutability, dependability, impermeability, permanence and most sacredly, the measurability of stuff' (Holvenstot 2010, pp. 194–195).

Thus, the measurements of the materialist perspective are subjective and not universal descriptions because they depend on the scale and type of measurement. Measurability, Holvenstot (2010, p. 195) says, 'may not be the standard by which we can know most things'. The mind–body problem and its traditional solutions fall in the explanatory gap left by the matter–spirit explanatory spectrum: 'Experiential properties elude a meaningful reduction to material components and spirit concepts do not adequately cover for this clearly essential but non-physical aspect of reality' (Holvenstot 2010, p. 196). Its rejection is based not only on a reformulation of matter or what 'physical' means but also on a rejection of the binary matter–spirit (or physical–mental). In other words, it also reconceptualises the 'mental'. After all, what on earth is the non-physical–*mental* if our picture of the physical is a distorted one?

Therefore, an alternative conceptual framework removes consciousness from this one and acknowledges that it 'does not require a physical grounding or a spiritual excuse. As countless others have said, "it's its own kind of thing"' (Holvenstot 2010, p. 197).[304] Instead of the *mental*, which

304. Arguments to the same effect are advanced by others. The assumption driving the hard problem of consciousness, Swan shows, is that human beings are physical things, and given that physical things do not experience anything, neither should we. The mind–body problem as typically formulated generates the irresolvable dilemma of how something nonbodily and internal can be in contact with something bodily and external. This is poor reasoning and misrepresenting physicalism, she argues (Swan 2013, p. 6). The very definition of the problem, Fuchs (2018, p. 210) shows, 'however, already excludes an entire class of animate, bodily and inter-bodily phenomena'. Physicalism requires only that the mind and consciousness be explained in physical terms and not that they are emerging properties of the brain (see Manzotti & Moderato 2010, p. 4).

exists by virtue of being in opposition to the physical, it has become necessary to refer to the 'conscious condition' as the unique kind of thing that consciousness is as a biological process.

Biological aspect duality

The basic issue in consciousness research is the same for everyone, namely, how an immaterial mind is related to a material body and brain. While the history of consciousness research equals the history of the dualistic mind–body problem, the neuro-ecological perspective attempts to replace that with a different formulation of the 'problem' of consciousness. This fault line in consciousness research separates the field into incompatible research traditions. One of the most significant features of the neuro-ecological perspective is that it does not seek to solve the mind–body problem that characterises consciousness research but to dissolve the problem and replace it with a monist formulation.

Overcoming dualism was previously described by means of 'dual-aspect monism' (in mainstream neuroscience of consciousness) and 'dual aspect monism' (in new-materialist and non-materialist theories of consciousness). To avoid those two concepts, Fuchs proposes the term *aspect duality* or *biological aspect duality*. It is not only an alternative for substance dualism but also the persistent dualisms that characterise these dual-aspect monisms. And the most obvious way of doing that is by means of the living organism. It is the living being as a body-as-subject and body-as-object unity that overcomes the mind–body dualism and functions as the site where experience (consciousness) is seen as a form of living (see Fuchs 2018, p. 69ff.). Biological aspect duality, or what is also referred to as '"aspect duality" of the living organism or person' (Fuchs 2018, p. 80), formulates the 'problem' of consciousness as the dual aspects of a living being instead of a dichotomy of two entities (mind and body). Psychological and physiological processes have the living creature as their carrier, Fuchs (2018, p. 137) argues. The basis of this argument is a notion of (Fuchs 2018):

> [*H*]uman beings as unified living organisms, and yet at the same time under a dual aspect both as a subjective and physical body (*Körper*). […] A person is a lived body (*Leib*) inasmuch as his or her subjective states, experiences, and actions are bound to the medium of the body. […] Hence, the lived body is never only subject and never only object, it rather is a 'subject–object' (Husserl 1952, 195) or it is both *Leib* and *Körper*. (pp. 73, 74)

Fuchs illustrates the subjective as well as the intersubjective experience of the lived body with the example of a patient with a painful foot. His example is based on the above distinction between the subjective lived body [German: *Leib*] and the organic body [German: *Körper*]. If the pain was only in the patient's head, the doctor could ignore the reference to the foot and examine the brain. But it is the coextension of the lived body to the organic body that allows the patient to point towards the body part with the pain, and just where the patient points to as the locus of the pain, the doctor finds the cause: 'Both see the same foot which subjectively hurts and is objectively injured' (Fuchs 2018, p. 13). Conscious experience takes place in the interactions with the environment and not in the brain. An embodied explanation for the pain is as follows (Fuchs 2018):

> The pain-in-the-foot is thus neither in the physical space of the foot, nor is it in the physical space of the brain, for pains are, after all, neither anatomical things such as sinews, bones, or neurons, nor are they physiological processes such as charge-transfers at neuronal cell membranes. Where is the pain then? It is in the 'foot as a part of the living body', for this unified living body also produces – not least by means of the brain – a spatially extended body subjectivity. (p. 17)

This grounding of consciousness in the lived body also underlies the notion of perception and the implications for a nondualist version of perception in the neuro-ecological perspective that will be discussed below under brain models and the organismic modes of consciousness. In this framework, the mind–body problem is recanted as a 'body–body problem', namely the body-as-subject and the body-as-object, where the living body is the foundation and medium for the enactment of life (see Fuchs 2018, p. 210).

Integrated realism: The *second-person perspective*

The second pillar of a nonbinary theoretical framework is what Laughlin and Throop call an *integrated* or *natural realism*. This exposition will depart from their explanation but be supplemented by related insights from elsewhere in the neuro-ecological perspective. It is called *natural* because it represents a pattern that they identify among human beings in general, and it is *integrated* because it is a realism based on the interaction of several elements, not least the realisation of a gap between reality and experience. Integrated realism steers free from naïve realism and metaphysical realism and from the realism of a pregiven outer world or the idealism of a pregiven inner world. Instead, it is based more on the interaction between the outer world (the extramental reality)[305] and experience.

As already illustrated, things are not always what they seem. The world-of-experience is different from the world-as-it-is. Sunsets are earth-turnings. But we also know that humans register sound waves between 20 Hz and 20,000 Hz while dogs live in an auditory reality consisting of

305. Extramental reality refers to the way the world is apart from our knowing about it (see Laughlin & Throop 2009, p. 131).

sound frequencies of 45,000 Hz or more. In many respects, our sensory apparatus allows only limited access to the world-as-it-is. Thus, integrated realism accepts that the world is in a way that is apart from our knowing about it but that we know it not just as it is but how we are. Thus, it means that the world we experience is different in certain ways from the real world and that our sensorial picture of the world is limited by the capacity of our senses (see Laughlin & Throop 2009, p. 131). It stands opposed to several other *realisms* such as metaphysical realism, which maintains that there is a physical world that exists independently from our observations and can be described by physical means and where the 'mental' functions as the shadow side of what is non-physical. Thus, classical science is based on the belief that there exists a real external world whose properties are definite and independent of the observer who perceives them (see Hawking & Mlodinow 2010, p. 43).

Instead of choosing between extramental reality and the way in which it is experienced by a (human) organism, natural or integrated realism focuses more on the interaction between them. Laughlin and Throop mention five structures associated with these components that impact the interaction.

Firstly, there is the totality of the sensory and cognitive-perceptual structures of the nervous system that allow interaction with the world. The term *neurognosis* was coined to describe the fact that, like all other species, humans are 'wired' to know the real world around us (see Laughlin & Throop 2009, pp. 143–144). Our brains developed in the first instance not to think about the world but to survive in the world.

Secondly, in the interaction with extramental reality, the neurognostic structures engage with certain qualities of the world that are described with the terms *obduracy* and *affordancy*. The first refers to that which is possible for an organism in this world; humans cannot pass through walls without an opening. The second is that extramental reality offers organisms certain qualities to react to.

Thirdly, there is a feed-forward expectation and a truing of interaction between an organism and the world. Each subsequent interaction with reality, Laughlin and Troop (2009, p. 146) point out, 'operates to test our expectations and to true them relative to feedback from the world'. Elsewhere, this is treated in the cognitive neurosciences as predictive coding. Our nervous systems were designed (evolutionary speaking) to know the world and to obtain truthful models of it in our everyday interaction with it.

Fourthly, a structural feature of the interaction with the world is the realisation that many causal forces are hidden from experience: 'Indeed, we know the world as much for what we cannot sense as what we do sense' (Laughlin & Throop 2009, p. 146). Most causal forces are invisible to us.

Finally, we know the world through the intuition of intersubjectivity. We are born into a world of intersubjectivity and learn a great deal about it not through our own experience but from the intersubjective connection (see Laughlin & Throop 2009, pp. 146–147).

The second-person perspective is the expression in a neuro-ecological theory of consciousness as the way in which a human organism interacts with the world and does not represent a different view on the subject–object dilemma – it seeks to overcome that dilemma. Its monist formulation of perception as the engagement of an organism with the environment is based on a rejection of two features of the dualist position: naïve realism and the separation of subject and object.

In terms of the common distinction between the first-person and third-person perspectives that characterise dualistic thinking, this results in what is called a second-person perspective. Science represents the third-person perspective, while 'naïve realism' is an instance of the first-person perspective. Consciousness, as already indicated, has a first-person ontology that can, like all physical phenomena, be presented by means of a third-person perspective.

First-person and third-person perspectives are trapped in a mental–physical dualism. Also, this distinction often mistakes first-person experiences as 'primitive theories' or the product of primitive science, while they are just the result of (primitive) forms of responses to the world. They are the way in which the world is experienced and not explanations of such experiences (see Hutto 2006, p. 76).

Unlike the so-called first-person phenomenology that seeks to represent and defend the first-person experiences as real and ontological, the objective of a neurophenomenological approach is to present lived experiences in all their detail (see Gallagher 2017b) or, in the words of Desjarlais and Throop (2011, p. 88), to show 'what it means to be human, to have a body, to suffer and to heal, and to live among others'. Thus, it deals with the personal, private and unique content and experiences of consciousness.

The importance of an acknowledgement of the limits of first-person experiences and third-person explanations can be illustrated with the *second-person perspective*.[306] A second-person perspective is neither the complimentary position that accommodates both first-person and third-person perspectives nor an in-between position because it rejects the tacit

306. As an anthropologist, Laughlin (2012, p. 31) suggests a *perspectivist view* because he doubts whether any correct description of reality by 'either natives or anthropologists' is possible. Therefore, 'to cleave to the native explanation of the experience or the Western positivist account is equally wrongheaded' (Laughlin 2011, pp. 387–388).

dualism that enables the identification of the distinction between first-person and third-person perspectives. We must recast our understanding of consciousness by recognising that we can only begin to approach it from within an interpretative, intersubjective framework. We must begin by seeing it in 'second personal' terms' (Hutto 2006, p. 86). As explained by Fuchs (2009):

> What is lost in the principal divide is the human *person* which essentially means a *living being*, an *embodied subject*. The person is neither pure subjectivity experienced from within, nor a complex physiological system observed from without: it is a living being interacting with others within the *second person or the 'you'-perspective*. (p. 222)

Two more implications follow from this line of thinking.

Firstly, this impacts the very language we use to explain experiences. The experience of oneself as an entity separated from the body is in mainstream neuroscience of consciousness most often referred to as *naïve dualism* (e.g. see Metzinger 2005), while others call it 'a simplified, cartoon version of the social world in which agents – whether others or oneself – possess an invisible, energy-like or plasma-like mental essence' (Graziano et al. 2020, p. 157). Instead of the terms *naïve dualism* and *naïve realism*, Fuchs suggests that we refer to common-sense duality (monistic duality) as 'a *realism rooted in the shared life world*' (Fuchs 2018, p. 170).[307] On this view, the human condition of monistic duality is not a cartoon version but the very real experiential version of human shared subjectivities. The real challenge is not just to reject common-sense realism as naïve but to give an explanation of why that is the way in which humans experience the world.

The second is that the scientific enterprise in general and neuroscience specifically are specialised versions of this realism rooted in shared practices.

Physicalism, with its metaphysical realism which sees consciousness as a non-natural, nonmaterial property of the material world, is incoherent insofar as it overlooks its own dependence on the intersubjectively constituted lifeworld (see Fuchs 2018, p. 62). This has been exposed in many ways, one of which is what is called *model-dependent realism*.[308]

Model-dependent realism is a reaction against the common scientific wisdom that laws of nature 'are the mathematical reflection of an external

307. Merleau-Ponty (1968, p. 36; see also Laughlin 2019, p. 32) refers to this belief that the world really is the way our perceptual experiences portray it as 'perceptual faith'.

308. *Model-dependent realism* is the idea that 'a physical theory or world picture is a model (generally of a mathematical nature) and a set of rules that connect the elements of the model to observations' (Hawking & Mlodinow 2010, p. 42).

reality that exits independent of the observer who sees it' (Hawking & Mlodinow 2010, p. 34). All models and theories of the world depend on our cognitive faculties and the limits placed on them by the technologies used to explore and present it in affecting our senses (see also Jylkkä & Railo 2019, p. 4). What is argued for science also applies to model-making in everyday life (Hawking & Mlodinow 2010):

> We make models in science, but we also make them in everyday life. Model-dependent realism applies not only to scientific models but also to the conscious and subconscious mental models we all create in order to interpret and understand the everyday world. There is no way to remove the observer – us – from our perception of the world, which is created through our sensory processing and through the way we think and reason. Our perception – and hence the observations upon which our theories are based – is not direct, but is shaped by the kind of lens, the interpretive structure of our human brains. (p. 46)

Based on these assumptions, Fuchs points out that the perspective of the participant, that is, the 'we' perspective of the first-person plural, is the primary and permanent basis for the scientific observational or third-person perspective. Thus, even the neurosciences are 'primarily a highly specialized form of common practice arising from the lifeworld' (Fuchs 2018, p. 63).

World-modelling: Experiencing, responding, sense-making

The third set of theoretical features has to do with the world-modelling activities of living organisms. World-modelling as a description of consciousness stands in contrast to the reduction of consciousness to cognition with its typical features of computation and representation. Representation is based on the notion of the pregiven world, and naïve realism takes that world as real while idealism allocates reality to a pregiven inner world.

World-modelling can be described by means of three nested concepts: experiencing, responding and sense-making. These concepts not only redefine cognition and perception as dimensions of consciousness but include experiencing and sense-making as additional functions of world-modelling.

Embodied and enacted approaches argue precisely for the fact that material things, by virtue of their bodiliness and functions as systems (living organisms), can indeed *experience*.[309] In a neuro-ecological perspective,

309. Neurobiological perspectives explain subjectivity or the first-person perspective away instead of accounting for it. The misguided association with eliminative materialism, which seeks to eliminate folk psychological categories and thus the first-person perspective, 'does not account for meaning or the self or subjective phenomenal experience' (Swan 2013, p. 8). The biosemiotic theory seeks to ground meaning in biology.

neither perception and cognition nor consciousness are the product of the representation of the world in the brain but of the response of an organism in its interaction with it. The intuitive idea (monistic duality) that there is an external reality which is only given through the representations in our minds is challenged by the idea of embodied and enactive cognition. Embodiment is not something external or additional to perception but rather constitutive to it; reality is not something predetermined and external but continuously brought forth by a living organism (see Fuchs 2018, pp. 8–9). This is seen in the closely related notions of *responding* and *sense-making.* Enacted embodiment not only rejects the computational and representational model of cognition but replaces it with a model of cognition (and consciousness) as a brain–body–environment systems process. Samuel's (2010, p. 40) suggestion of the concept *body–mind complex* as an alternative to mind–body dualisms can be extended to the *body–mind–environment complex*.

The enactive programme originated by calling (Varela, Thompson & Rosch 1991):

> [/]nto question the assumption prevalent throughout cognitive science that cognition consists of the representation of a world that is independent of our perceptual and cognitive capacities by a cognitive system that exists independent of the world. (p. xx)[310]

Cognition is not a computational and representational process taking place inside the skull but refers to processes that take place in a body that is engaged in the environment. Perception takes place not to 'know' objects but to move.[311] Between the regulation of the own body and the intersubjective interaction with the environment, Thompson and Varela claim, there is the sensorimotor coupling: 'What the organism senses is a function of how it moves, and how it moves is a function of what it senses' (Thompson & Varela 2001, p. 424).[312] Thus, enactivism emphasises emergent

310. Varela et al. (1991, p. 86) explain this in the following way: 'Cognitivist architectures had moved too far from biological inspirations; one does not wish to reduce the cognitive to the biological, but the most ordinary tasks are done faster when performed even by tiny insects than is possible when they are attempted with a computational strategy of the type proposed in the cognitivist orthodoxy'.

311. In this perspective, perception, in the words of Gallagher (2017a, p. 20), rather is 'the result of narrow inferential or simulative processes, involves complex, dynamical processes at a subpersonal, sensory–motor level (in the elementary timescale) – but these processes are part of an enactive, dynamical engagement or response of the whole organism (in the integrative and narrative timescales), living in and materially engaging with structured environments'.

312. This view on how being conscious functions is expressed by Thompson (2015, p. 15) in the following way: 'In order to describe how consciousness functions to reveal and apprehend phenomena, I'll distinguish among three aspects – awareness, the contents of awareness (what we're aware of from moment to moment), and ways of experiencing certain contents of awareness as being or belonging to the self (our sense of self or "I–Me–Mine")'.

cognitive structures 'that self-organise as a result of interactions between organism and environment' (Ward, Silverman & Villalobos 2017, p. 368). Response involves more than representation or recognition of objects, because there are always ulterior motives as the organism desires food, rest, sex, aesthetic enjoyment or understanding and the like; the eye 'is never innocent', Gallagher says (2017a, p. 116).

Objects are not seen by the visual extraction of features but rather by the visual guidance of action (see Varela et al. 1991, p. 175). Thus, instead of internalist language of representation and inference, an enacted approach rather favours terms like 'adjustment', 'attunement' and 'affordance' (Gallagher 2017a, p. 21) in a holistic system of brain–body–environment. Mental activities, in this view, therefore, refer to 'dynamic patterns of environmental interactions' (Ward et al. 2017, p. 372). For an enactivist approach, what goes on inside the head never, as such, counts as a cognitive process because it is only a participant in the process that exists as a relation between the system and its environment.[313] The mental is also not a nonmaterial feature of the brain but a process. This view on perception and cognition is the basis for rejecting most of the assumptions of mainstream neuroscience of consciousness.[314] Indeed, things are not always what they seem.

Perception of vision, which is often seen as the illusion of the brain created based on light waves, is an extension of the bodily basis of experiencing the world because perceptual capacities developed in the process of interaction with the world. As Fuchs (2018, p. 11) explains: 'Perceiving has always meant taking part in the world, touching it, and being touched by it. It is based on embodied practice'. Therefore, his description of an enacted view on perception and cognition clearly captures this view (Fuchs 2018):

> According to the enactive approach, living beings generally do not passively receive information from their environment which they then translate into internal representations. Rather they constitute or *enact* their world through a process of *sense-making*. [...] In addition, through their social interactions and implicit relation to others, human beings are able to transcend their primary perspective and gain access to a shared, objective reality. (p. 26)

313. Cognition, and therefore consciousness, 'is not an event happening inside the system; it is the relational process of sense-making that takes place between the system and its environment' (Thompson & Stapleton 2009, p. 26). The radical enactivist position, as promoted by Hutto (2017, p. 379), sees cognition as a 'thoroughly relational, interactive, dynamically engaged, world-relating activity' that does not depend on the manipulation or engagement with any kind of informational or representational content.

314. As seen, different versions of neuroconstructivism characterise mainstream neuroscience of consciousness. The underlying assumption of neuroconstructivism 'is that there is an external reality which is only given to us through representations in our mind. This fundamental assumption of an inner mind being separated from external reality is challenged by the current concepts of embodied and enactive cognition' (Fuchs 2018, p. 9).

Perception in an embodied view is not limited to the representation in the brain of a picture or sensory stimulus from outside but consists of the embodied engagement with the world. We perceive things and people. It is not only a picture of a house that is represented, but 'we co-perceive its materiality, its solidity, as well as its "affordances" or possibilities for action, which would be available to our reaching, grasping, handling' (Fuchs 2018, p. 20). Perception of a house is not merely a vision of a picture of the house; perception 'means an action-directed openness to the world, not a photograph' (Fuchs 2018, p. 21).

The implication of this position for the view on human perception of colour drills home the point. We do not perceive light waves, but it is the interaction of such waves and a perceiving organism that are required for colour to be perceived in the world (Fuchs 2018):

> Color is neither an objective characteristic of the material world ('naïve realism'), nor is it a mere product of an inner world (neuroconstructivism). Colors and other sensory qualities are rather the expression of a complementarity of living beings and their environment. (p. 25)[315]

This example was already well explained in the seminal work on enactivism (Varela et al. 1991):

> We have seen that colors are not 'out there' independent of our perceptual and cognitive capacities. We have also seen that colors are not 'in here' independent of our surrounding biological and cultural world. Contrary to the objectivist view, color categories are experiential; contrary to the subjectivist view, color categories belong to our shared biological and cultural world. Thus color as a study case enables us to appreciate the obvious point that· chicken and egg, world and perceiver, specify each other. (p. 172)

Starting over in this way, we will not talk about qualia, the phenomenal qualities such as the redness of red or the taste of chocolate, but of 'our seeing something red' (Hutto 2006, p. 86) or tasting chocolate. It is important to note that this conceptualisation of cognition and perception is not the opposite of an internalist representationalist view (it is not merely an externalist version) as it does not share the internal–external dualism; both are relational processes of sense-making that take place between the system and its environment (see Thompson & Stapleton 2009, p. 26). *Responding* is, unlike *representation*, not just a mental or cognitive process but an embodied one in which neuronal and hormonal reflexes, so to speak, combine within the body–mind–environment complex.

In summary, in mainstream neuroscience of consciousness, perception starts with objects that are represented by means of the neural organs – in

315. See Varela and colleagues for a discussion of colour vision from a neuro-ecological perspective (Varela et al. 1991, pp. 158–167).

an ecological perspective, 'perception does not begin, but, rather ends in objects' (Throop & Laughlin 2007, p. 659). Consciousness is the process of making sense of the world, the self and the body by means of the body–mind-world complex instead of representing each of these in the theatre of the mind.

Strong emergence and a systems view of reality

Earlier, a distinction was made between weak and strong emergence. Weak emergence could be seen as epistemological: given our knowledge of the domain from which they arise, weakly emergent phenomena are merely unexpected features. Weak emergentism is advocated by several philosophers and neuroscientists in mainstream neuroscience of consciousness. Consciousness somehow emerges from brain processes, and it is based on the reification view of consciousness. Consciousness is a thing subject to the mechanistic billiard ball causation view.

A neuro-ecological perspective embraces a strong emergent view. Phenomena are not just unexpected but can be seen as ontological in emerging from the brain–body–environment *system*. They cannot (not even in principle), Fuchs argues, 'be deduced from the domain from which they arise' (Fuchs 2018, p. 220). In an embodied and enactive view of the organism under the double aspect of subject-and-object-body, a strong emergence of consciousness results from the totality of the system and not its parts. This view of strong emergence is directly related to a systems view of reality and science. With this, the third pillar of the nonbinary theoretical framework, the reification of consciousness, is replaced with a systems view of consciousness.

The key shift here is from *things* to *systems*; a systems view results in a systems ontology.[316] Murphy and Brown (2007, p. 9) develop a notion of physicalism from the philosophy of biology – in particular from the recognition 'that the natural world needs to be understood as forming a *hierarchy of levels of complexity*'. One of the insights of systems thinking that significantly impacts the current topic has to do with the shift in ontological emphasis that comes with systems thinking. It implies that one must give up on the traditional Western philosophical bias 'in favor of things, with their intrinsic properties, for an appreciation of processes and relations [...] the basic ontological categories for systems theory are agents

316. In a systems ontology, the universe is not made up of objects but systems, and the components of systems are not atoms but structures defined in their relations to one another (see Murphy & Brown 2007, p. 77).

and actions' (Murphy 2011, p. 9).[317] From a systems perspective, a mammal is not regarded as composed of carbon, hydrogen, calcium and the like but 'is composed of a circulatory system, a reproductive system and so forth' (Murphy 2011, p. 10). In this view, the body–brain complex is not seen as inert matter because it views matter, at least the complex systems, as 'inherently active' (Murphy & Brown 2007, p. 95). Consciousness is a process, a dynamical system that pertains to the brain in a body that is in interaction with the world, physically and socially.

Another insight is that a different view on causation from the Newtonian one is at work here. The linear top-down causation in mechanistic systems[318] is replaced in complex dynamic systems with the idea of 'self-cause' where parts interact to produce novel, emergent wholes (see Juarrero 2000, p. 33). Instead of an *either-or* between top-down and bottom-up causality, this is described as 'circular causality'.[319] In such a dynamic system, new modes of being emerge with new modes of causality. Such complex adaptive systems produce properties and organisms that display features that go beyond those of their parts. This is the reason why one state of consciousness can vary from another by virtue of not only sensory and affective content but also the complexity of processes mediating them (see Laughlin 2017, p. 47).

A third insight is that a systems perspective reveals that the world is full of systems that maintain stable patterns despite constant change in the matter of which they are composed. For example, the human organism is a relatively stable structure even though the matter of which the body is composed (the cells) is almost entirely replaced after seven years (see Murphy & Brown 2007, p. 71).

Finally, it is the concept of *autopoiesis* that expresses the feature of living organisms as processes and not things, as becoming instead of being.

317. Explained by Jeeves and Brown (2009, p. 112): 'Fortunately, we don't have to become Cartesians all over again. There are, in fact, reasons to believe that systems, even though made up of elements obeying the laws of physics, can embody forms of causation that transcend the determinism of these atomic and chemical laws'.

318. Top-up causation, which is the idea that human behaviour can be reduced to nothing more than lower-level laws and processes, was transferred from a mechanistic view in physics to biology (see Jeeves & Brown 2009, p. 111ff.).

319. Fuchs (2021, p. 131) explains circular causality of living systems in the following way: 'The organism structures its components and integrates them into superordinate functions (top down or downward causality); at the same time, the components themselves act together in such a way that the overarching processes emerge (bottom-up or upward causality)'. Such an interaction of parts and whole in a living system results in new emerging features and not new natural forces that contradict the laws of nature. He illustrates it with the example of iron: 'Iron embedded in hemoglobin is able to reversibly bind oxygen from the air we breathe, i.e. to release it again at a suitable point in the organism – while inorganic iron irreversibly rusts'.

Autopoiesis refers to the process whereby living organisms continually produce themselves and distinguishes the most elementary organism from the most sophisticated machine (see Rose 2012, p. 60; Stewart 2019, p. 2). A cell, Thompson (2015) explains, is a biochemical self-production system that is self-organising and self-perpetuating, whereas a virus is also a living organism but is a bounded entity with a protein coat that is not internally generated but only outside it in a host cell. Thus, a virus has no metabolism and is not an autopoietic system (Thompson 2015, p. 326). It is, however, not just the autopoietic process that is responsible for consciousness but coupled with the agency of organisms in interaction with the world (see Hutto 2017, p. 378). It is within the organic system of self-organisation that the emerging property of consciousness appears and the 'self' as an organismic system can be recognised (see Fuchs 2018, pp. 84–85). Circular causality explains these processes.

It is in contrast with the views in neurobiological theories that the monistic view of the embodied neuroscience perspective becomes visible. It implicitly assumes that if consciousness were to exist, it must be a thing. This is what the reification of consciousness looks like in theory: within the framework of an implicit dualism, it is correct to say that consciousness does not show. However, within an embodied theory, consciousness is the word used to denote properties which do *show* by means of the living person (see Fuchs 2018, p. 291). Thus, consciousness results not from things but from processes.

Taken together, the reformulation of the mind–body problem and the systems view of consciousness are not a rejection of a naturalistic explanation of consciousness but represent an alternative physicalist one. As explained by Fuchs (2018):

> For although integral acts of a living organism cannot be decomposed into separate 'physical' (*physikalische*) particles, they are nevertheless 'physical' (*physische*), bodily processes (both in the sense of body-as-subject and body-as-object) – and certainly in all these acts a more or less pronounced change occurs to the configuration of the body's physiological conditions. (p. 211)

Brain models and how the brain works: An alternative neuroscientific theory

In the neuroscience of consciousness, there is not just a single theory and model about the brain and how it works. In the first part of the book, five fault lines on brain models and how the brain works were identified. To recap, see Table 15.1.

A neuro-ecological perspective shares the first fault line with mainstream neuroscience of consciousness: no brain, no consciousness.

TABLE 15.1: Fault lines in brain models.

Brain-dependent	Brain-independent
Neurocentric	Non-neurocentric: Embodied and enacted or nonlocal
Localisationism: Cortex–brain stem–other	Holism: Brain in body
Reflexological: Input–output	Self-regulating: Intrinsically
Representation	Response

Source: Author's own work.

Neuro-ecological theories do not reject the idea that the brain is essential for consciousness but re-evaluate its role in the emergence of consciousness. This is the result of the systems ontology as well as insights about the brain itself. This is clearly expressed, for example, by Gallagher (2017a; see also Gallagher 2017a, p. 163):

> To be clear, enactivists don't deny the importance of the brain, but they understand the brain to be an integrated part of a larger dynamical system that includes body and (physical, social, and cultural) environments. The explanatory unit of cognition (perception, action, etc.) is not just the brain, or even two (or more) brains in the case of social cognition, but dynamic relations between organism and environment, or between two or more organisms, which include brains, but also include their own structural features that enable specific perception–action loops, which in turn effect statistical regularities that shape the structure and function of the nervous system. (p. 11)

Elsewhere, he suggests that in contrast to the computational or representational orthodoxy of mainstream neuroscience of consciousness, the embodied and enacted approach not only adds extra-neural externalities and interaction to the explanatory mix but also redefines the role of the brain (Gallagher 2013, p. 422).[320]

Of the remaining four fault lines, one has already been considered: a neuro-ecological perspective sees the brain as responding instead of representing. This is also clearly summarised by Gallagher (2017a). The brain, in its interwoven relationship to the body and environment (Gallagher 2017a):

> [*R*]*esponds* to the world rather than *represents* it [...] Specifically, it responds not by representing, but through a dynamical participation in a large range of messy adjustments and readjustments that involve internal homeostasis, external appropriation and accommodation, and larger sets of normative practices, all of which have their own structural features that enable specific perception–action loops, that in turn shape the structure and functioning of the nervous system. The enactivists suggest that not just the brain, not just the body with its different systems, not just the physical and social environment – but all of these together play important roles in cognition. (p. 47)

320. He argues that '[m]aybe one day we will look back on the computer as the most convenient and common form of misunderstanding the brain in modern history' (Gallagher 2012, loc 4033). Also: 'Since enactivist accounts reject standard computational and representationalist explanations they need to provide a different understanding of how the brain works' (Gallagher 2017a, p. 15).

In contrast to mainstream neuroscience of consciousness that is characterised by neurocentrism, localisationism and an input–output process, a neuro-ecological perspective falls on the opposite side of each of these fault lines. Nested assumptions make up each of the categories.

Beyond neurocentrism: Resituating the brain

A neuro-ecological perspective first and foremost rejects the neurocentrism of mainstream neuroscience of consciousness and replaces it with embodied and enacted views. As an alternative neuroscientific theory of consciousness, a neuro-ecological perspective rejects the reduction of consciousness to the brain or parts of it and replaces it with a view of a complex process in which the complete brain is resituated within the organism (see Fuchs 2018, p. 110). Instead of the separation of an abiotic brain from the body, this perspective is based on the co-evolution of brain and body and maintains the brain functions the way it does because it is dynamically coupled to the body and environment; the brain is an integral part of the body (see Saniotis & Henneberg 2011, pp. 186–187).[321]

This coupling of brain–body–environment, Gallagher (2017a, p. 114) points out, 'is structured by the physical aspects of neuronal processes, bodily movements, affects, anatomy and function, and environmental regularities'. Thus, mental events are seen as processes, the product of a system and ecologically distributed between the body, brain and environment. It should be noted that what is argued here is different from merely claiming that the brain is a complex system. The brain is a complex organ in the complex biological system that produces conscious experiences.

Two implications of significance follow from this. One is a repositioning of the brain itself. The brain is not the generator of consciousness but only an organ or, as Fuchs says, 'an organ of a living being in its environment' (Fuchs 2018, p. 67); it is an 'organ of mediation and resonance, not the creator of our world' (Fuchs 2018, p. 290).[322]

The second implication is the emphatic denial *you are not your brain*; instead, *you have a brain*. In contrast to the claim that you are your brain,

321. Fuchs (2018, p. 61) explains this in the following way: 'Over the course of evolution, the brain has developed as an organ whose complexity enabled the emergence of feeling, emotion, thought, and volition, and which became the crucial (though not sufficient) basis of integrative conscious experience'.

322. Many similar metaphors are used to explain this role of the brain. Elsewhere, Fuchs (2018, p. xvii) says that the brain or a central nervous system (and not only the brain), which is seen as the organ of translation, can be described as 'an organ of interrelations'. In a similar argument, Glannon (2011, p. 12) suggests that the brain be conceived as 'an organ that mediates interaction between the organism, or human subject, and the environment'.

from a neuro-ecological perspective, it is the case that human persons have brains, but they are not brains (see Fuchs 2018, p. 279; Noë 2009, pp. 23–26). This is a rejection of the mereological fallacy that reduces personhood to brainhood and effectively replaces neurocentrism with an embodied and enacted view. A neuro-ecological perspective not only resituates the brain itself in terms of its place (privilege) in a larger system, but it replaces the features linked to the brain–body and body–world dualisms.

Beyond localisationism: Holism and large-scale connectivity

While many neuroscientists accept the idea of brain holism, they often remain trapped in localisationism. A neuro-ecological perspective not only endorses the idea of brain holism but extends it to rethink even the way in which it functions internally. Several nested insights and assumptions are involved here.

Conscious perception is generated by means of a complex process that involves many different brain areas (see Greenfield 2002, p. 91).[323] On the one hand, there are identifiable brain locations (functional areas) that are associated with functions (such as visual perception, language production in Broca's area [left frontal lobe] and language comprehension in Wernicke's area [left temporal lobe]). This part of neuroscientific research gives rise to the search for the NCC. On the other hand, it is well-known today that most functions of the brain are distributed through numerous systems and networks, giving rise to the so-called 'binding problem', which seeks to understand how aspects of cognitive processing that are distributed between various neuronal assemblies are synchronised and assembled to produce smooth cognitive and neural perceptions (see Greenfield & Collins 2005, pp. 14–15).[324]

323. It is well known that sensory perception (for example, visual perception) does not take place in a single brain area but in up to 30 areas simultaneously, and there is 'no single area where it all comes together' (Crick & Koch 2003, p. 123). For example, what Collerton and colleagues say about complex integrative models for understanding hallucination is true more so with regard to states of consciousness (altered states of consciousness [ASCs] included) in general: 'Recognition that the brain as a whole, and the visual system as one aspect of it, is a complex dynamic system, together with the hypothesis that visual hallucinations reflect the end result of dynamic compensation of impairments, puts a high emphasis on understanding and modelling complex dynamic systems in order to give a better insight into the phenomenology of visual hallucinations' (Collerton et al. 2016, p. 214).

324. In the explanation of Price (2018, p. 38): 'The bottom line is that we do not know how cognitive functions are implemented in the brain. We can only speculate and approximate on what the underlying computations are and how they are instantiated'.

Because a neuro-ecological perspective locates consciousness not primarily in the brain, it does not search for the NCC. Therefore, a neuro-ecological perspective does not participate in the endless debates about which brain areas are primarily responsible for consciousness.[325] Also, it rejects the traditional tripartite (triune) model of the brain (see Parvizi 2009).

The tripartite brain model of older and newer parts that is fundamental to many claims about localisationism is rejected in this perspective and resituating localisation within interconnectedness of brain processes (Fuchs 2018, p. 45). The traditional view which emerged from the 19th century as consisting of old and new parts and the classical division of labour between them, emotion in the reptilian brain and higher cognitive processes in the cortex, dubbed 'corticocentric myopia', is being replaced by a view of reciprocal interconnections where cognitive and emotional processes are strongly interdependent (see Kiverstein & Miller 2015, pp. 3–4). Without denying that certain brain regions perform specific tasks, they present a picture of brain operation that sees the different regions being interconnected via functional networks.

In contrast to the notion of localisation in neurocentric theories, embodied theories operate with a range of models[326] and emphasise 'large-scale patterns of connectivity' (Kiverstein & Miller 2015, p. 2) in the whole brain.[327] One model of how the brain functions is called the model of brain-objects.[328] It started from research showing that the stimulation of a single whisker of a cat activates neurons across a whole field of somatosensory neurons. Thus, neither a linear pathway nor single neurons are activated, but it causes a storm of electrical impulses in the brain to enhance survival by means of discriminations of the features of the environment. Here is a summary of this model (Swan & Goldberg 2010):

> [*T*]he line we are drawing – one we believe begins to demystify how meaning emerges in the organism – is a direct one from the environment, through the organism, and back out into the environment in the form of meaningful action taken by the organism. (p. 141)

325. This is clearly expressed by the neuroscientist Damasio (2010, p. 25): 'No single mechanism explains consciousness in the brain, no single device, no single region, or feature, or trick, any more than a symphony can be played by one musician or even a few'.

326. These models that emphasise holism, include notions such as a *brainweb* (Fuchs 2018, p. 46; Thompson 2015, loc 1879) and connectomics (see Lake 2017, p. 118).

327. Some neurocentric neuroscientists also emphasise the idea of connectivity of brain processes. Most states of consciousness consist of several cognitive and mental functions and suggest the involvement of large-scale distributed interconnected cortical areas (see Hirsch 2005, p. 38).

328. This model is similar to the neuronal group selection model of Edelman: 'Neuronal groups, or brain-objects, formed by significant features of the animal's environment lead to behaviors that are adaptive for the organism' (Swan & Goldberg 2010, p. 144).

Beyond an input–output view: A self-regulating brain

A neuro-ecological perspective also replaces the input–output model of the brain with a model of the brain as self-regulating (see Thompson & Varela 2001, p. 418).[329] This fault line was described as the difference between the brain as primarily reflexive, driven by the momentary demands of the environment or as mainly intrinsic, involving the acquisition and maintenance of information for interpreting, responding to and even predicting environmental demands. Insights from several angles support this view.

From neuroimaging studies, two important insights became available about the way in which the brain works. One is that during passive moments when there is no external stimulation or active interaction, the brain moves towards what became known as the default network; that is, a consistent network of brain regions is active during passive tasks. The network includes regions across the posterior midline, medial prefrontal cortex, inferior parietal lobule, lateral temporal cortex and specific subdivisions of the dorsolateral prefrontal cortex (see Buckner 2012, p. 1139). A related but distinct phenomenon is what is referred to as resting-state or intrinsic connectivity networks: that is the fact that certain brain regions are always connected at a low-frequency activity (Buckner 2012):

> However, the phenomenon of intrinsic functional coupling is likely distinct from the observation that the default network increases activity at rest. […] Intrinsic connectivity networks are typically identified from the correlated activity patterns observed at rest. However, the intrinsic activity fluctuations that give rise to 'resting-state' networks are not specific to rest states nor to any particular brain system. (p. 1141)[330]

On another level, a distinction between processes within being conscious should also be emphasised. Based on the identification of two networks, an intrinsic connectivity network, which shows that certain brain regions are always connected at a low-frequency activity, irrespective of brain activity, and the default network, which becomes active during passive tasks, Buckner suggests that cognition displays certain features distinct from typical perception. While the latter is mostly external (sensory-driven), cognition and conceptual tasks that are internal could activate the

329. In this view, the brain is made up of passive reflex circuits, while the alternative model sees the brain as active and self-regulating its own activation.

330. 'A significant fraction of the energy consumed by the brain (quite possibly the majority) has been shown to be a result of functionally significant spontaneous neuronal activity' (Boly et al. 2008, p. 2). These authors continue to show that immaterial of fluctuations in the contents of consciousness, the brain is constantly processing information and fluctuations in brain activity is a continued process.

default network. A feature of this process is that humans organise information which could not be organised during stimulus presentation, solve problems that require computation over long periods of time, and create effective plans governing behaviour in the future (see Buckner 2012, p. 1140). It was only when it became apparent that 'the distributed regions across the default network were functionally coupled' (Buckner 2012, p. 1141) that it was realised that the default network is a 'functionally coupled brain system' (Buckner 2012, p. 1141). This implies that the default mode network is an inherent property of how the brain functions. Furthermore, it became linked to three specific cognitive functions: remembering, imagining the future and thinking about another person's perspective, or 'episodic memory, prospection (thinking about the future), and theory-of-mind' (Buckner 2012, p. 1143). It turns out to be a central aspect of many cognitive tasks. It is described as 'spontaneous and intrinsic neural processes' (Buckner 2012, p. 1142) that are active when perceptual tasks (external sensing) are terminated.

From neuroimaging and brain lesions, it is also known that certain brain areas and structures are responsible for particular functions. But two additional perspectives simultaneously have to be kept in mind. One is known as 'pluripotency' and the other as 'degeneracy'. The first shows that the same anatomical regions and structures of the brain are involved in many different functional activities. For example, Broca's area, which is traditionally associated with language production, is also involved in language processing, movement preparation, imitation and imagery tasks. The second, degeneracy, shows that different neural structures can perform one and the same function (see Kiverstein & Miller 2015, p. 5). Therefore, 'the brain does not depend on continuous input from the external world to generate perceptions' (Llinás 2001, p. 7). In terms of the way in which perception takes place, a neuro-ecological perspective emphasises the brain's responding to the outside world and the notion of sense-making.

These fault lines are finally illustrated with the distinction between views that the brain is 'hard-wired' in terms of neural development (most often ascribed to the level of subcortical structures) or a view of development as totally plastic (linked to the cortex). Laughlin points out that neither view is accurate because the brain develops structure under the simultaneous influence of genetic information and environmental press (see Laughlin 1996, p. 368). It is the importance of the plasticity of the brain that supports the neuro-ecological perspective.

Neuroplasticity, the constant modification of neural structures by means of experiences, perceptions and interactions with the world, is an indication that the brain does not function like the hardware of a computer that is guided by software; in the case of the brain, structure and function cannot be distinguished (see Fuchs 2018, p. 139). Neuroplasticity is exemplified by the extended period of postnatal neuroplasticity that allows and requires environmental input for normal development (see Wexler 2006, p. 16).

Summary and concluding remarks

Different theories of what consciousness is are embedded in nested assumptions about reality, what human beings are like and how brains function – such assumptions are both presupposed and promoted by certain theories. Consciousness as a feature of living organisms and not the brain (or the cortex) also only results from a wide range of theoretical insights and assumptions – most of them diametrically opposed to those that govern cognicentric and neurocentric views of consciousness.

With the above, a completely different theoretical landscape, which includes a rejection of the reduction of consciousness to cognition and the absence of the self, is envisaged. An embodied approach to consciousness does not merely add affect to cognition but completely reconceptualises consciousness and with it also cognition. A whole range of theoretical assumptions results in a new framework for studying consciousness. Brain processes are involved in consciousness, but the consciousness they 'cause' is not some extra substance or entity but just a different-level feature of the whole system.

Suffice it to say that a neuro-ecological perspective represents not only a completely different understanding of 'consciousness' from mainstream neuroscience of consciousness but also does not just give alternative answers to the questions posed; it rejects the very basis on which those questions are posed.

A neuro-ecological perspective of consciousness not only rejects but moves beyond the central research questions occupying mainstream neuroscience of consciousness research. To be sure, they do not offer alternative answers to those questions but do not recognise them as proper research questions in the search for a neuroscientific theory of consciousness.

Chapter 16

The fabric of consciousness: A multiplex distributed biological and ecological process

Introduction

The promise of a neuro-ecological perspective is that consciousness is something different from the notions in both mainstream neuroscience of consciousness and nonlocal theories of consciousness. This 'thing' has a different fabric, and this perspective also claims a rethinking of reality. The different visions on consciousness result in different views on the kind of creatures we think we are.

Based on the assumptions discussed above, the kind of thing consciousness is taken to be in a neuro-ecological perspective can be presented by means of four essential and interrelated features. Consciousness is:

- a process and not a thing
- a biological process (something that organisms do)
- a distributed ecological phenomenon
- a multiplex phenomenon.

Together, they build a different anthropology.

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Consciousness, a process and not a thing

The first set of features is particularly significant as a major characteristic of mainstream neuroscience of consciousness as well as nonlocal theories of consciousness is the reification of consciousness; in those views, consciousness is some kind of thing, either linked to the brain or a feature of matter. A neuro-ecological perspective rejects the reification of consciousness and thus does not see consciousness as an entity or a thing but a process and adopts a systems view of reality.[331]

Consciousness is not a thing but also not something like digestion that happens inside us (see Noë 2009, p. 202). Thus, central to a neuro-ecological perspective is the notion of 'process', which applies to mind, self and consciousness; they are processes and not things.[332] The notion of process contains two specific features. Firstly, it is based on life and not on matter. If we are to properly understand consciousness, Feinberg and Mallatt (2018, loc 314) argue, we need to recognise that 'the unique features of consciousness are in fact fully grounded in the unique features of life' and recognise it 'as a living process'. In the explanation of Noë (2009, p. 13), the phenomenon of consciousness, like that of life itself, 'is a world-involving dynamic process'.

Secondly, as a phenomenon of living organisms and not brains only, consciousness is not something a body or organism has but what it does. In the words of Noë (2009):

> It would be astonishing to be told that we've been thinking about consciousness the wrong way – as something that happens in us, like digestion – when we should be thinking about it as something we do, as a kind of living activity. (p. 23)

In this view, consciousness is neither a thing nor a way of thinking but a way of being (see Damasio 1994, pp. 224–225) or a way of living (see Vidal & Ortega 2012, p. 360). Coupled with the replacement of representation with a meaning-making response, consciousness is 'not an object in the world – on the contrary, it is the presence of the world for a subject' (Fuchs 2018, p. 32).[333] Ontologically, the fabric of consciousness is turned around, as what Hutto (2006, p. 76) says about experience is just as true for

331. In the explanation of Laughlin (1992, p. 18): 'It is important to realize that consciousness is not a "thing" that can be located within the brain. Brain does not contain consciousness. There is no "ghost in the machine," a little homonculus sitting in an easy chair somewhere in the brain that is passively watching a sensorial movie'.

332. In the words of Damasio (2010, p. 165): 'Wakefulness and mind are not all-or-none "things." Self, of course is not a thing; it is a dynamic process, held at some fairly stable levels during most of our waking hours. [...] Wakefulness and mind, as conceived here, are processes too, never rigid things'.

333. In the words of Thompson (2015, p. 15): 'Consciousness is that which makes something manifest and apprehends it in some way'.

consciousness: 'experiences are not objects, they are not experienced, but are the way in which *we experience things*'; consciousness is the way in which human organisms engage with the world,[334] first and foremost by means of their own selves and bodies.

Closely connected to the idea of process is the notion of consciousness as a continuum. In fact, this notion appears in many places in the description of consciousness. For one, as far as it goes, it is not an on-or-off phenomenon (see Damasio 2010, p. 159; Greenfield 2002, p. 92). Secondly, it is apparent that being conscious is not an all-or-nothing affair, a phenomenon that either does or does not exist.[335] These features stand opposed to any version based on the reification of consciousness.

To summarise this part in the words of Gallagher (2017a):

> Brain, body, and environment are said to be dynamically coupled in a way that forms a system, and the coupling is not equivalent to identity of material parts; rather it involves physical relational processes. (p. 8)

Or in the explanation of Kriel (2002), consciousness is not a thing but the emerging property or properties of complex living systems:

> So again (ad nauseam), mind is not something added to flesh, something dependent on flesh as a separate entity. It is a new manner of existence of flesh. So, in a sense I agree with the eliminative materialists – there is no such thing as consciousness. *But there **are** conscious animals*. [...] Flesh became mind. Flesh exists as conscious flesh. Consciousness, whether animal or human, is embodied consciousness, and the body, whether animal or human, is a conscious body, an ensouled body. (pp. 167, 168; [*emphasis in the original*])

It has previously been described by the term *autopoiesis*, which is a biological process.

■ *Consciousness* is a biological process

A neuro-ecological perspective falls on the biological side of the fault line between biological and nonbiological explanations. Mainstream neuroscience of consciousness, in this view, mistakenly assumes that consciousness emerges from physical properties, while it is more appropriately seen as part and parcel of dynamical living systems (see Holvenstot 2011, p. 244). Consciousness is not a feature of material objects

334. In the words of Fuchs (2018, p. 78): 'all *experience (Erleben)* is a form of *living (Leben)*'. Conscious experience or consciousness emerges or arises, Fuchs (2018, p. 135) explains, in the overarching system of an organism in an environment based on the interaction of various components.

335. This is clearly illustrated with the levels of anaesthesia, as well as the way in which certain diseases, such as Alzheimer's disease, gradually dissolve consciousness (see Damasio 2010, pp. 225–226, 229–233).

but of living organisms[336] and, as such, is the product of evolutionary development. As Searle (2000, p. 567) argues, we know enough about how the world works 'to know that consciousness is a biological phenomenon'.

Unlike most theories of consciousness that do not depart from consciousness as such, this perspective departs from what we know about consciousness in real life, namely that humans are indeed the only things we know for sure to be conscious.[337] Consciousness is, first and foremost, a feature of human beings and, by extension, living organisms. It is strongly linked to life because we know it is a characteristic that evolved in living (human) animal bodies (see Feinberg & Mallatt 2018, loc 223).

A neuro-ecological perspective departs from evolutionary and biological insights into consciousness – the precondition is a concept of the life of the organism as a functional whole (see Fuchs 2018, pp. 18, 45). In fact, Fuchs argues that in evolutionary terms, consciousness from the very beginning was embodied and extended as the integral of a living organism engaging the world (see 2018, p. 14; see also Watt 2005).[338] Earlier, this was described as the world-modelling process, whereby organisms in meaning-making responses engage the world, which increases in complexity as the complexity of form and functions of the organisms increases (see Holvenstot 2010, p. 204). This perspective shares with panpsychism the idea that consciousness is fundamental, but it is not fundamental to matter but to 'all biological processes' (Holvenstot 2010, p. 199).

Feinberg and Mallatt offer an extensive explanation of the multileveled basis of consciousness in certain animal bodies. There are, firstly, some general biological features of life required for consciousness. These include some basic features of cellular life. Secondly, consciousness depends on specific neuronal reflexes of particular kinds of brains, shared by some animals.[339] Thirdly, there are specific neurobiological features of animals who display primary or core consciousness (see 2018, loc 1269–1594). Thus, consciousness as a biological phenomenon or an evolved feature of

336. Not all scholars who see consciousness as a process also see it as the product of biological systems. For example, for Revonsuo consciousness is a biological phenomenon that literally resides in the brain (see Vidal & Ortega 2012, p. 349 for details).

337. Formulated in a typical neurocentric way, others admit that the human brain 'is the only physical system that undoubtedly possesses [consciousness]' (Dehaene, Lau & Kouider 2017, p. 486).

338. This position is also defended by Glannon: 'Consciousness is not strictly a brain phenomenon but an organism phenomenon, and the physical substrate of consciousness includes features of the organism that are not limited to the brain' (Glannon 2011, p. 15).

339. *Consciousness* is, however, not limited to brained organisms, but brains provide advantageous abilities (see Holvenstot 2010, p. 199).

biological organisms requires 'not only a certain structure, but certain materials' (Pigliucci in Berger & Gallagher 2020, p. 4).

Consciousness is present when patterns of neuronal activity within the body, patterns of hormonal secretion and distribution within the body, patterns of muscle relaxation and tension, patterns of sensory awareness (or the lack of it) and so forth work together (see Samuel 2010, p. 39). The endocrine, immune and nervous systems, furthermore, create links and mutual interactions between the brain and body at biochemical levels (see Thompson & Varela 2001, p. 424). The biological models show that bodily processes, such as hormonal changes – changes in body chemistry – as well as visceral and musculoskeletal processes, 'can bias perception, memory, attention, and decision-making' (Gallagher 2017a, p. 38). These also include the well-known insights that bodily systems experiencing fatigue or hunger and low glucose levels directly impact the perceptual and cognitive functions. These insights undermine the classic computational model of cognition as illustrated with the brain in a vat mental experiment – a brain that is fundamentally influenced by the body and its processes cannot be the same as a brain in a vat. Accordingly, to this view, the body influences cognition in terms of sensorimotor contingencies, affective factors and intersubjective processes (see Gallagher 2017a, p. 42). Fuchs (2018, p. 14) suggests that in evolutionary terms, meaning-making was originally a function of the whole body where, at its surfaces, which border on the environment, the organism is irritable, sensitive and responsive. In other words, embodiment as it relates to cognition and consciousness is not just about anatomical structure, sensorimotor contingencies and action capabilities, but it involves a complex ensemble of factors that govern them. In this view, consciousness is not added to a body (something you 'have') but is a feature of certain living organisms.

A neuro-ecological perspective takes consciousness as an organismic phenomenon. In the summary of Thompson and Varela (2001):

> [*W*]e conjecture that consciousness depends crucially on the manner in which brain dynamics are embedded in the somatic and environmental context of the animal's life, and therefore that there may be no such thing as a minimal internal neural correlate whose intrinsic properties are sufficient to produce conscious experience. (p. 425)

■ *Consciousness* is a distributed ecological phenomenon

A neuro-ecological perspective does not shift consciousness from 'in the head' to 'in the body' but to the embodiment of an organism within the world. Thus, in addition to the features of life and the neurobiological features of the neural system, consciousness in a neuro-ecological perspective is also seen as a distributed biological process that emerges from the interaction between brains, bodies and the environment. It is neither just a feature of matter nor a fundamental element of the universe; it is non-local without being nonlocal consciousness.[340]

The emphasis shifts from the brain to the body, and like all other mental processes, it is seen as a distributed phenomenon of the whole organism and not just the brain (see Lutz & Thompson 2003, p. 34). In a neuro-ecological perspective, consciousness is seen to emerge neither from the brain nor from the body only but from the bodily engagement in the world. The locus of consciousness, Noë (2009, p. 13) says, 'is the dynamic life of the whole, environmentally plugged-in person or animal'. Therefore, even modes of 'thinking' are not pure brain processes but are to be seen as the result of many such bodily processes. And these patterns are relational; they are instantiated in individuals as a result of their connectedness in groups and the world. In short, consciousness, as Fuchs (2018, p. 45) says, is a feature of 'human beings, that is, of organisms, not of brains'.[341] Thus, the brain–body duality is suspended and resolved into what is described as the living organism that is situated in the world. This embodied organism is the foundation of the two interconnected features of consciousness, namely self and subjectivity.[342]

This is amply illustrated with the notion of the *microbiome*, which refers to the trillions of microorganisms that live on and in the human body. It shows that neither the brain nor the body are systems enclosed by the boundary of the skin. Secondly, research shows that mental functions are affected by these tiny organisms (see Glattfelder 2019, pp. 416–418; Gravitz 2012; Rose 2013, p. 19).

Consciousness a multiplex phenomenon

As previously stated, neurology traditionally makes a distinction between the level or state (awake, asleep, etc.) and the content (awareness) of consciousness (see Tononi & Koch 2008, p. 242). Northoff (2013, p. 727)

340. If I understand him correctly, when Holvenstot (2010, p. 214) describes the conscious condition as 'non-physical and nonlocal' he means not-material but a systems phenomenon and distributed, because these are features of a biological system.

341. Mind itself, Fuchs (2009, p. 221) explains, is not merely a cognitive or neurocentric reality but in 'an extended or ecological view of the mind [...] the mind is not in the brain; it is not located in any one place at all but is rather distributed among the brain, the body and the environment'. Kirmayer and Gold (2012, p. 57) make the same point with the analogy of legs; one needs legs to walk, but it is not the legs that walk; one needs a brain to think but it is the I, not the brain, that thinks.

342. An even more radical theory of consciousness than the embodied and enacted theories is Manzotti's (2019, p. 3) proposal of what he calls the 'Spread Mind Theory' of consciousness (or mind): one's experience of an object is the object one experiences. Such a hypothesis is the core of the Spread Mind Theory. See also Malafouris (2013) on the material engagement theory that is based on the inseparability of thought, action and material things in cognition and consciousness.

refers to this as the bidimensional view of consciousness but suggests a tridimensional model. To be sure, Northoff argues for a tridimensional view in that the *form* or *structure* of consciousness is added to *level* and *content*. And his form or structure includes only one component, what he refers to as the temporospatial feature of the brain. However, none of these bi- or tri- descriptions are adequate to describe the multiplex nature of consciousness as a neurobiological phenomenon.

In agreement with those models, a neuro-ecological perspective accepts that consciousness is componential.[343] Unlike the limited categories in these models or the unidimensional explanations in neurocentric theories that conflate consciousness with single mental features (such as affect or cognition) or functions (such as computation of information), consciousness in a neuro-ecological perspective is a multidimensional phenomenon in more than one respect. The term *multiplex phenomenon* will be used for its numerous components and elements. As a multiplex phenomenon, it is multileveled, multidimensional and multifaceted.

Multiplex is more than an acknowledgement that consciousness has a modal structure.[344] The multiplex nature is given not only by the previous three features (process, biological and distributed) but also by the features that characterise the fabric of consciousness; it is closely linked to its ecology and is characterised by five dimensions of givenness: modes, domains, cycles, phases and states. Although these are all closely interlinked, as a way of coping with the multiplexity, they will be discussed separately.

The ecology of consciousness, which is constituted as a nested hierarchy, is characterised by several dimensions that display a certain scope and modes. It also manifests in three specific domains (the self, the body and the environment) and manifest in fixed cycles (wakefulness and sleep cycles) and as *states of consciousness*, which refers to identifiable episodes or phases in the stream of everyday consciousness. These states can occur in any one cycle or between cycles of consciousness and can impact any or all of the three domains of consciousness. States of consciousness can be classified on a spectrum from ordinary to nonordinary episodes.

Thus, consciousness is an extremely complex multidimensional phenomenon, and although experienced as a unity, it is also a disunity – that is, it is made up of a temporal hierarchy of elements. One state of

343. As Laughlin (2017, p. 32) pointed out many years ago: 'Although moment-by-moment experience presents as a dynamic and holistic field of sensory stimuli and knowledge, consciousness is actually componential'.

344. Even in mainstream neuroscience of consciousness, it is often acknowledged that consciousness 'is a multifaceted and complex phenomenon, encompassing functions such as language, attention and control. Its most enigmatic aspect, however, is that of conscious experience' (Lamme 2006, p. 494).

consciousness can differ radically from another not only because of sensory and affective content but also as a result of the complexity of the neurophysiological processes mediating information processing (see Laughlin 2017, p. 47). And there is no simple way of relating the parts to the whole. In the description by Laughlin (2011), it is:

> [*A*]n ongoing meta-movie, states of consciousness are scenes or individual films tailing one another in that movie. [...] There is no real 'me' *in* the theater, because I *am* the theater, the projector, the screen, the movie, even the popcorn. And the movie runs on and on, ranging in content from fantasies and dreamscapes to documentaries about the world outside the theater, and the self within the theatre. (p. 21)

A new philosophy of human beings and nature

Enacted embodiment partakes in a rejection of the theoretical assumptions on both consciousness and the scientific enterprise that characterise mainstream neurocentric neuroscience of consciousness. In this view, nature cannot be understood apart from the finite cognitive capacities and action affordances that humans must investigate. As Gallagher (2017a, p. 130) indicates, an enactivist philosophy of nature 'supports a kind of holism in which a plurality of factors is understood to contribute to the full conception of mind'. This kind of holism is much more complicated and difficult to operationalise than any unidimensional theory.[345]

Thus, enacted embodiment is not just a theory about cognition (and consciousness) but encompasses a philosophy of life and reality.[346] It changes the way in which we talk not only about consciousness but also about human engagement with reality. An embodied and enacted theory is first and foremost an alternative to the Cartesian legacy of the subject–object dualism, but it is also claiming that its view on consciousness redescribes our view on nature. Thus, it engenders a different view of human beings and of what is taken as reality. The effect is that most of the current discourses on consciousness do not make sense within such a framework. In Gallagher's (2017a) explanation:

> [*E*]nactivism involves not only a rethinking of the nature of mind and brain, but also a rethinking of the concept of nature itself. [...] Rethinking nature, as well

345. In Gallagher's (2017a, p. 21) explanation: 'Enactivists, by focusing on not just the brain, not just the environment, not just behavior, but on the rich dynamics of brain–body–environment, offer a holistic conception of cognition. To put it succinctly, however, it is difficult to operationalize holism'.

346. In Gallagher's (2017a, p. 23) words: 'That enactivism is a philosophy of nature can be seen in the fact that from the very start enactivism involved not only a rethinking of the nature of mind and brain, but also a rethinking of the concept of nature itself'. See also Hutto (2017, p. 377) who calls it a 'distinctive philosophical framework'.

> as the nature of cognition, perception, and action, in terms of a continuity and integration of dynamical self-organizing adaptive systems where the distinction between physical and mental is deconstructed, where nature is not conceived purely in terms of objectivity, devoid of subjectivity, may further motivate a rethinking of science. (p. 126)

Or, in Holvenstot's (2010), words:

> A definition of consciousness is the key component of an urgent and necessary cultural transformation. [...] Defining consciousness as a world-modeling condition in nature would redefine reality in a way that emphasizes our interconnectivity and interdependence; and would validate the synergistic, flexible, and meaning-laden aspects of existence that fall to the wayside in a reductive-material-mechanical paradigm. (p. 207)

Concluding remarks

Consciousness is not the nonmaterial thing that emerges once the 'physical' has been identified or that is somehow generated out of the material (or the brain) but is a concrete multiplex distributed ecological process. It is not localised, either in the brain or the body; it is not just a brain or organismic phenomenon, and it is not a unidimensional phenomenon either. As a multiplex phenomenon, it cannot be reduced to any of its constituting parts (the mereological fallacy). Instead, consciousness is a complex bio-neuro-cultural process that is rooted in life and not a brain only. In fact, consciousness is seen as a product of a brain, body and environment together and cannot be located anywhere in any one of these.

The two central problems with the cognicentric and neurocentric theories of consciousness are the reduction, if not simplification, of an extremely complex biological phenomenon to single features. Cognition or awareness are patently part of consciousness but do not encapsulate it. The fabric of consciousness as a multiplex phenomenon cannot be described by means of single words or categories. It is anything but simple and easy to define; consciousness, in this view, is a very complex phenomenon. The *fabric* of consciousness is related to its fabrication in scholarly circles but also its foundation in living organisms.

The complex picture of the ecology of consciousness that follows from this will next be described by means of two sets of a nested hierarchy of features.

Chapter 17

The ecology of consciousness: Modes, domains, cycles, levels and states of givenness

Introduction

Consciousness is a multiplex phenomenon that emerges from the process between brain, body and the environment. The fabrication of consciousness in a neuro-ecological perspective is much more closely connected to the very fabric of consciousness as such. It departs from an investigation of consciousness as it manifests in the one organism we know to be conscious: humans. At the same time, the fabric is closely intertwined with its fabrication as a process – the result of the relationships between living organisms and their physical environment.

As it is not only seen as something in the head but distributed among a brain, body and environment, the ecology of consciousness can be described as a nested hierarchy of various dimensions.[347] In everyday

347. To avoid the notion of elements or components of an entity, the term *dimensions* is used to describe and illustrate some of its multiplex features.

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consciousness, these dimensions are seamlessly intertwined and integrated but will, for analytical purposes, be separated into the modes, domains, cycles, levels and states of givenness.

The modes of givenness of consciousness

There is widespread agreement among neuroscientists of consciousness that consciousness has a dual structure of primary and secondary consciousness.[348] However, within the systemic-biological gaze of a neuro-ecological perspective, the structure of consciousness is much more complex than that.[349] To begin with, *self* and *subjectivity* are dimensions without which a neuro-ecological perspective cannot operate.

Furthermore, Damasio (2010, p. 168) suggests that consciousness has a scope and thus distinguishes two modes, 'core' and 'extended' or 'autobiographical' consciousness. He further maintains that the brain, first and foremost, constructs consciousness by generating a self-process within an awake mind.[350] This self is built in three stages: there is a *protoself*; next is the *core self*; and, finally, there is the *autobiographical self* (Damasio 2010, pp. 22–23, 180–181). The first two overlap with core consciousness and the latter with autobiographical consciousness (the details of the self-process will be considered later under the domains of consciousness).

For Damasio, core consciousness revolves around the core self and is about personhood but not identity. Core consciousness does not require language (it is precognitive)[351] because it consists of what he calls primordial feelings – the first images that the brain generates (see Damasio 2010, pp. 22, 172).[352] This core consciousness does not depend on objects or events external to the brain but consists of primordial feelings of merely being alive (see Damasio 2010, p. 322 n 17). Body movement is the essence of this primitive,

348. In mainstream neuroscience of consciousness, many distinguish between 'primary' and 'higher' modes of consciousness (see also the discussion in Feinberg & Mallatt 2018, loc 265).

349. In contrast to the cognicentric and neurocentric theories of consciousness presented in previous chapters, and what Blum calls the neo-Kantian tradition, there is the radical empiricism represented by William James and more recently in the embodied neuroscience of consciousness that endorses 'a broader and more inclusive understanding of consciousness wherein affective, nondiscursive elements – such as emotions, sensations, and felt qualities – are basic elements of experience, and cannot be reduced to conceptual or linguistic forms' (Blum 2014, p. 151).

350. The terms 'primary' and 'secondary' consciousness, as used in mainstream neuroscience of consciousness, will be avoided as they are embedded in a representationalist and neurocentric framework.

351. Damasio's core self corresponds with what others call the phenomenological notion of *prereflective self-awareness* (see Fuchs 2018, p. 114).

352. This distinction in consciousness has the practical advantage of admitting that many other animal species probably also display core consciousness (see Damasio 2010, p. 171).

brainstem-mediated consciousness.[353] Autobiographical consciousness is about both personhood and identity and contains one's life of the lived past as well as the anticipated future (see Damasio 2010, pp. 168–169).

Neuro-ecological theorists do not necessarily agree on the nomenclature but on the nature as a nested hierarchy of different modes based on the biological system. Zahavi (2014, p. 12) suggests that consciousness presents in two 'different modes of givenness' that he calls a prereflective and a reflective mode of consciousness; he argues that the first 'has priority since it can prevail independently of the latter, whereas reflective self-consciousness always presupposes prereflective self-consciousness'.[354] Fuchs (2018, pp. vi, 117), on the other hand, refers to 'basal consciousness', which he says emerges from deep inside the organism as 'a primary bodily-affective self-feeling as the core of all conscious processes' (p. 33), which then direct themselves to 'higher levels of consciousness' (p. 114). They agree on the hierarchy of the modes of givenness without using the same terms.[355] Basal consciousness is prereflective and not a product of the cortex but originates from the regulatory processes between the brain stem and the body of the organism, and its embodied subjectivity is foundational to consciousness.

Based on this groundwork, I therefore suggest that the emerging picture in the neuro-ecological perspective is that of a tripartite 'nested hierarchy' (to use another of Fuchs's labels; 2018, p. 117) of three modes of givenness. In the embodied and enacted processes of the human organism, each mode of givenness is made up of several interlinked bodily processes.

Subjectivity: The feeling of being alive

Protoconsciousness arises from the activation of brain stem structures that regulate the inner state of the organism. In this perspective, certain homeostatic regulatory processes between the body and areas in the brain stem are constitutive of consciousness. Damasio (1994, p. 150) describes it as the 'feeling of life itself, the sense of being' which is at the basis of consciousness.

353. This is evident, Delafield-Butt and Trevarthen (2022, p. 21) argue, 'in the intentional movements of the human foetus from the second trimester onwards, an active and sensible agency that shapes experience in the development of a human consciousness'.

354. Given this dual structure of consciousness, one can, as Panksepp (2007, p. 102) says, experience the body and world without necessarily understanding what one is experiencing. See also Block (2015, p. 170) on nonconceptual perception, which is iconic and not conceptual.

355. Feinberg and Mallatt (2018, loc 272–392) distinguish between primary sensory consciousness (which includes three overlapping domains, the exteroceptive, interoceptive and the affective) and more evolved 'higher' forms of consciousness such as self-awareness or thinking about one's thoughts.

The three sources that contribute to the insights on this prereflective, core or basal consciousness are the already-mentioned reaction against neurocentrism, referred to as *affective consciousness*; the second is *interoceptive consciousness*, and the third is proprioception.

The insight that affective consciousness brings is that innate affective feelings that arise from subcortical brain regions precede cortical brain activities and are foundational to consciousness. A neuro-ecological perspective does not view cognition and emotion as separate systems but treats them as thoroughly integrated at biological, psychological and phenomenological levels (see Thompson & Stapleton 2009, p. 26).

Interoceptive consciousness refers to the sensations from within the body (see Feinberg & Mallatt 2018, loc 406). The feeling one will experience with any state of pleasure, anguish or fear will contain signals of changes in the 'endocrine, cardiac, circulatory, respiratory, intestinal, epidermic, muscular' systems (see Damasio 2010, p. 99). Or to describe it by means of the organs involved, inner-body sensations come from the viscera: the gut, heart and lungs (see Feinberg & Mallatt 2018, loc 477). Interoception also includes some global kinds of inner sensations such as hunger, thirst and fatigue. Proprioception senses inner-body structures and feelings and has to do with body movement (see Feinberg & Mallatt 2018, loc 508). The proprioceptive system is a highly complex system that keeps the brain informed about the position in space, relationships to one another, and various 'parts' of the body (see Kriel 2002, p. 171 n 8). Any state of the body–mind–environment complex has unique ways of experiencing the sense of self, and ways of walking and of holding the body and of being an organism (see Samuel 2010, p. 41).

The range of nondiscursive or prereflective elements that may arise in experience includes a wide variety (see Damasio 1994, p. 127ff., 2010, p. 108ff. for a discussion). The following are implicated. The content of consciousness (the 'aware of') is rich in texture, and besides the information from the five senses (seeing, hearing, smelling, tasting and touching), it includes emotions[356] (fear, rage, joy), physical sensations (nausea, disgust), felt qualities (a crowded room that feels 'cold' or hostile) and intuitions (vague presentiments, a sense of foreboding, etc.). Experience itself is complex and multifaceted, as at least the following distinctions can be noted to the idea of *what it feels like*: perceptual experiences,[357]

356. In an embodied view, even concepts, such as emotions, are complex concepts referring to systems made up from a range of elements and systems. In such a pattern theory of emotion can be included bodily changes as a result of autonomic nervous system reactions, bodily changes in preparation for action, overt expressions and bodily postures, phenomenal feelings and cognitive reactions such as shifts in attitude or changes in perception (see Gallagher 2013, p. 2).

357. This includes all the experiences that sensual perceptions bring about, such as smelling a lemon, tasting chocolate or seeing a colour.

bodily sensations,[358] felt reactions[359] and felt moods[360] (see Blum 2014, p. 155; Tye 2017, p. 17; Zeman 2002, pp. 17–18 for detail).

Feelings, Damasio says, are just as conscious as perceptual images; they are first and foremost about the body in that they allow us to mind the visceral and musculoskeletal state of the body (see Damasio 1994, p. 159). Therefore, in Fuchs's (2018) description:

> The peripheral and autonomic nervous system, the senses, the skin, the muscles, the heart, the viscera – all these are carriers of subjectivity too. We belong to the world, with skin and hair – we are bodily, living, and thus more 'organic' beings than neuroscientific cerebrocentrism would have us believe. (p. 19)

Affective consciousness of external objects

The feeling of being alive constitutes the backdrop to every conscious state (Fuchs 2018, p. 112). These experiences (feelings) remain objectless but change as soon as these body–brain stem interactions are further processed in the interaction with other brain regions, especially the cortex. The role of the cortex is to establish intentional direction to the basic affective consciousness in the interaction with objects and the world.

One of the functions is that in the interaction with objects, the basic feelings and emotions are directed at them, and they receive affective significance or what Solms refers to as 'I feel like this *about that*' (Solms 2013, p. 7) as the basis of affective consciousness. Core consciousness and the core self emerge from these processes, and the relations of consciousness to objects are mediated by specific functions such as attention, perception and movement (see Fuchs 2018, p. 115; Solms 2021, p. 143). The *what-it-is-likeness* is rather a 'what-is-it-like-*for-me*-ness' (Zahavi 2014, p. 19).

Not surprisingly, many more dimensions play a role in the consciousness of objects. Hobson (2007, p. 436; see also Pereira et al. 2010, p. 215) lists the following ten components or capacities[361] that, in his view, make up

358. These refer to pain, tickles, tingles, itches, aches, hunger, thirst, fatigue, feeling hot or cold, and those present during orgasm or extreme bodily activities.

359. Felt reactions of passion or emotion contain such experiences as feeling anger, lust, love, grief, jealousy, and fear.

360. This refers to feelings of happiness, depression, boredom, tension, and the like.

361. In some Buddhist scriptures consciousness is said to comprise some 89 distinct elements, such as feeling, perception, will and concentration of which seven are discrete elements present in all versions of consciousness (see Hume 2007, p. 11).

consciousness: attention, perception, memory, orientation, thought, narrative, emotion, instinct, intention and volition.[362]

Reflexive and intersubjective consciousness

Consciousness emerges from the engagement of the human organism with the world. In this view, consciousness is neither in the brain nor in the body but is *embodied*; conscious acts are 'particular, integral activities of a living, self-sustaining, sensory-receptive, and mobile organism' (Fuchs 2018, p. 69). Life and the lived body are the grounding source of human conscious activities. This grounding of life Fuchs explains by means of the two components, subjectivity (self) and bodily movement. In his words: 'Therefore, the primary dimension of consciousness is the reciprocal, homeostatic, sensorimotor, and active–receptive relationship of the living organism and the environment' (Fuchs 2018, p. 69).

Therefore, consciousness is inextricably linked to culture. The relationship between consciousness and culture is two-directional and extremely complex. On the one hand, the reach of culture and consciousness is inherently limited by the pregiven structure of the human brain and consequently by human cognition and perception.

Damasio (2010, p. 29), for example, maintains that cultures 'arise and evolve from collective efforts of human brains, over many generations'. But he also realises that culture and environment turn back onto and influence self-consciousness:

> [*D*]istinct levels of processing – mind, conscious mind, and conscious mind capable of producing culture – emerged in sequence. [...] The ongoing digital revolution, the globalization of cultural formation, and the coming of the age of empathy are pressures likely to lead to structural modifications of mind and self, by which I mean modifications of the very brain processes that shape the mind and self. (p. 182)

Unlike the computer metaphor of the brain that is a one-way affair, the role of culture on the brain is a two-way affair where beliefs and practices are not only subject to brain functioning but also impact brain processes and structures. This is famously illustrated not only with the case of London taxi

362. Others have added many more dimensions, such as body perception, perception of colour, self-control, imagery and fantasy sense of personal identity, higher-order thought, etcetera (see Farthing 1992, p. 208; Metzinger 2009, p. 18). In fact, Tart identifies eleven, what he calls, subsystems that make up consciousness. In addition to some of the above he adds interoception as the subsystem controlling what goes on inside the body, the sense of identity, space-time sense and motor output (see Tart 1980, pp. 258–260). These lists do not necessarily acknowledge the same scope and modes as in a neuro-ecological perspective.

drivers[363] but also the fact that reading Braille, playing a string instrument or living in a particular type of urban environment can reorganise cortical maps and conceptual schemas in a significant way (e.g. see Slingerland 2008, p. 210). Culture impacts states of consciousness in many ways.

The three domains of consciousness

James (see [1891] 1952, p. 188) reminds us of the old joke that the human person is composed of three parts: soul, body and clothes. However, the neuro-ecological view of consciousness is based on a *homo triplex* view: self, body and environment. In contemporary consciousness research that is focused on awareness or cognition, it is common practice to identify the following three domains of consciousness: 'our environment, our bodies, and ourselves' (see Hobson 2001, p. 6, 2017, p. 101; Merker 2007, p. 73; Nelson 2011, loc 559). Within the binary theoretical framework, these three often appear in the discussed dualities: mind–brain and subject–world.[364] However, in the nonbinary theoretical framework of the neuro-ecological perspective, they are dynamically coupled in such a way that they form a system, and the coupling is not equal to the constituting parts but involves physical, relational processes (see Gallagher 2017a, p. 8). The three domains of consciousness will thus briefly be presented in their systems' coupling.

The interactive coupling of the domains of consciousness

Even though embodiment links self, body and world in their interactive coupling, a distinction can be made between consciousness of the world, which is primarily external to the organism, and consciousness of the self and the body, which are primarily internal. While *body* and *self* are both 'objects' in the world, they are at the same time also the subject of conscious experience. And they are 'objects' in different ways: the body is a material object, while the self is a relational object created by means of the systems' dynamics – both are 'objects' nonetheless. Put differently, while the body is

363. It was found that the hippocampi in London taxi drivers, who rely on a memorised map of the whole city which they must navigate without a map, were enlarged compared to people of a similar age. The longer they had been plying their trade, the more marked this structural difference was. As a result of what they were doing, their brains had physically changed. Also, an experiment with human subjects who were asked to practise five-finger piano exercises shows that enhancement occurred in areas of the brain, and remarkably, a comparable change in brain territory was observed when people were not practising the piano but were *imagining* they were practising (see Greenfield 2001, pp. 612–613).

364. In previous chapters, it was shown that in unidimensional theories of consciousness, or what Ray (2013, p. 317) calls 'a cognitive monoculture', consciousness is conflated with cognition, and two of the most important elements missing from such theories are an acknowledgement of the affective part of consciousness as well as the *self* and the body.

(among other things) a 'thing' in the world, self is not a 'thing' but no less real. These are some of the complex features that present themselves about the domains of consciousness.

The self, the body and the world are all three parts of the object of consciousness, but the body and the self are themselves part of the subject of consciousness. Thus, the experience of the self and the own body in a dualistic sense, as well as the cognitive expression of such dualisms, is perfectly natural because the conscious self that experiences first and foremost experiences itself.

Again, at the risk of overcomplicating the picture, a distinction between, on the one hand, body and self and, on the other hand, the world will be used. The reason for this is that being conscious of the world depends largely on the body's engagement with it and on sensory perception, while being conscious of the self and body depends primarily on bodily internal processes – although aspects of the self and body rely on the body's social engagement. The point is that prior to any external connections, there is a body and a self that is made internally while being conscious of the world that depends on that body and self.

Enough has been said about the difference between the notions of representation and response by means of sense-making of the world. Therefore, the focus here will be on the self and the body as domains of consciousness. As already argued, consciousness is not a virtual product of the brain but coextensive with the body – the human person is *living* while subjectivity and the self are unconditionally *embodied* (see Fuchs 2018, p. 288). Here, not only the recovery of the self as a central aspect of consciousness but an exposition of the self as embodied and the embodiment of the self, as well as the body-as-subject and the body-as-object, will be discussed.

The self embodied and the embodiment of the self

Consciousness, in one of Damasio's (2010, p. 8) descriptions, arises 'when a self process is added onto a basic mind process'. He adds (Damasio's 2000):[365]

> [*S*]olving the problem of consciousness consists of discovering the biological underpinnings not just of the mental patterns of an object but also of the

365. Later, Damasio (2010, p. 22) says: 'Conscious minds begin when self comes to mind, when brain adds a self-process to the mind mix, modestly at first but quite robustly later'. Or, as he says, consciousness is 'the phenomenal ability that consists of having a mind equipped with an owner' (p. 3), namely self. Being conscious refers to those experiences in a subject or self that include pain, pleasure, memory, imagination, emotion, will, desire and the like. He further argues that 'if the self process were to collapse and disappear completely, the mind would lose its orientation' (p. 170).

> mental patterns that convey the sense of a self in the act of knowing, *such that an owner-based unified perspective can be created regarding events occurring within the organism and in its surroundings*. (p. 112; [*emphasis in original*])

Unlike cognitive and neuroscientific theories of consciousness that largely ignore the notion of the self, self is central to an embodied neuroscience view of consciousness. Three features of the self will be used to describe it.

Self is a process

In an embodied view, self is fundamental to consciousness and shares its basic structure in that it is a process and not a thing (see Gallagher 2020, p. 2; and see Hutto & Ilundáin-Agurruza 2020, p. 509). It does not exist in isolation but emerges as part of the three domains and cannot be conceptualised separately from them.

Self, Damasio (1994, p. 227) says, is *not* a little person, the infamous homunculus, inside your brain contemplating what is going on but 'a repeatedly reconstructed biological state'. In explaining his definition of consciousness as a mind process infused with a self-process, he adds (Damasio 2010):

> I would say that if one is awake and there are contents in one's mind, consciousness is the result of adding a self function to mind that orients the mental contents to one's needs and thus produces subjectivity. The self function is not some know-all homunculus but rather an emergence, within the virtual screening process we call mind, of yet another virtual element: an imaged *protagonist* of our mental events. (p. 166)

In addition to the images that flow through the mind in being awake and aware, Damasio (2018, p. 142) maintains that there is an added perspective: ours. We are the subjects of our mental experiences and recognise the same for other people. Thus, the term human consciousness is used for such a distinct mental state: mine.

Self is multileveled: Protoself, core self and autobiographical self

Within a multidimensional framework, many aspects of the self can be identified. For the purpose here, it is sufficient to distinguish, with Damasio (2010, pp. 22–23), three kinds of self: 'The self is built in distinct steps grounded on a *protoself*. [...] Next is the *core self*. [...] Finally, there is the *autobiographical self*'. The protoself emerges from the part of the brain that stands for the organism and consists of a gathering of images that describe relatively stable aspects of the body.[366] But the protoself[367] is not only about the body because it is built on the body and becomes the pivot around which the conscious organism turns, Damasio (2010, pp. 21, 180) explains.

The core self[368] results from a relationship between the protoself and any part of the brain that interacts with objects (see Damasio 2010, pp. 180–181).[369] These dimensions of the self emerge from the processes mentioned in a previous chapter that are responsible for embodiment. The first task of the brain is organismic regulation; that is, the integrity of the organism depends on the regulatory cycles that 'link neural processes to basic homeodynamic processes of the internal organs and viscera' (Thompson & Varela 2001, p. 424).[370] These are referred to as the affective dimensions of organismic regulation and refer to the feeling of being alive, which is the backdrop of all conscious states. The protoself and core self are based on basic organismic functions such as distinguishing between itself and what is not itself, as well as basic affective aspects (see Gallagher 2013, pp. 3–4).[371] This core self is active in any act of engagement with the world where the what-is-it-like-*for-me*-ness comes into play and results in what Zahavi (2014, p. 18) calls the 'experiential self' that is active in all streams of consciousness.

The protoself contains the images of the organism itself, which are produced by chemistry[372] and viscera (see Damasio 2018, p. 146). That is, mapping

366. The protoself is explained as '*an integrated collection of separate neural patterns that map, moment by moment, the most stable aspects of the organism's physical structure*. [...] The contributors to the protoself include *master interoceptive maps, master organism maps*, and *maps of the externally directed sensory portals*' (Damasio 2010, p. 190; [*emphasis in original*]).

367. Fuchs talks about 'a basic bodily self' (Fuchs 2018, p. 90) and explains: 'primary consciousness is not a product of the neocortex, but ultimately originates from the vital regulatory processes taking place between brainstem and organism, in other words, that it emerges as an embodied subjectivity from the very beginning. The self is not a result of cognitive sophistication or reflection; rather, it arises with the affective and motivational instincts that serve the organism's vital needs' (Fuchs 2018, p. 113).

368. See also Fuchs (2018, p. 115) on core self while Gallagher (2020, p. 2) talks about 'pre-reflective self-awareness'.

369. Merker (1997, p. 3) also argues that the subject finding itself in the presence of objects is what constitutes consciousness.

370. As with all neural processes, these are distributed among numerous brain regions (see Thompson & Varela 2001, p. 424).

371. It is a basic aspect of all kinds of animals to distinguish the self from what is not the self (see Gallagher 2013, p. 2). Fuchs (2018, p. 89) argues that the self versus nonself is given with the way in which the organism is involved in the world: 'Through semipermeable boundaries, metabolism, sensing, and movement, living beings actively produce and preserve an inner/outer or self/non-self distinction'. Self, body and environment are intricately connected here.

372. The balance between serotonin-2 and serotonin-7 is essential for the notion of a sense of self. When serotonin-7 is strongly activated without the control of serotonin-2, it is likely to result in the loss of a sense of self (Ray 2013, p. 309).

and managing its own organs, as well as the special devices of perception placed at special sites of that body, the body's spying outposts – the smell and taste mucosae, the tactile elements of the skin, the ears, the eyes (see Damasio 2010, p. 91), including the maps of the organ's physical structure and the organism's place in the world (proprioceptive elements) as well as master interoceptive maps of the body.

All of this gives rise to the autobiographical self, which contains a record of its lived experiences and anticipated futures. Autobiographical selves, Damasio (2010, p. 210) says, 'are autobiographies made conscious'.

Self as multidimensional phenomenon: A distributed network of neural and bodily processes

Self is an integral part of conscious life and is therefore linked to many different mental functions, such as emotions,[373] memory and mind[374] itself, to mention only some.

The biological state of a self occurs when numerous brain and body-proper systems work well.[375] Each human organism has one self, except when things go wrong and the body–mind–environment complex creates more than one or the self disappears (as in some forms of anosognosia and certain types of seizure)[376] (see Damasio 1994, p. 227). An essential part of being self or consciousness is the notion of a continuity of the self over time and space.

And as shown in the discussion of monistic duality, human beings tend to experience themselves in a dualistic sense as both bodily and mental beings; the stereotypical sense of self (at least in Western traditions) is that of a sense of the experiencing subject and a sense of the self as an

373. Slaby (2014, p. 34) argues that emotions are among the fundamental 'sources of the self'. Take a person's emotionality away, he says, 'and there's nothing left that deserves to be called "self" – no valuing, no motivation, no agency, just a colorless plain condition'.

374. The mind of a person, De Munck (2000, p. 2) says, 'does not exist outside a self – this includes a body and a psyche. Culture, self, and meaning are inextricably linked: they are different facets, different faces, of what it is to be human'.

375. As Damasio (1994, p. 227) explains: 'For the biological state of self to occur, numerous brain systems must be in full swing, as must numerous body-proper systems. If you were to cut *all* the nerves that bring brain signals to the body proper, your body state would change radically, and so consequently would your mind. Were you to cut *only* the signals from the body proper to the brain, your mind would change too. Even partial blocking of brain–body traffic, as happens in patients with spinal cord injury, causes changes in mind state'.

376. Ewing (1990, p. 251) explains this: 'in all cultures people can be observed to project multiple, inconsistent self-representations that are context-dependent and may shift rapidly. At any particular moment a person usually experiences his or her articulated self as a symbolic, timeless whole, but this self may quickly be displaced by another, quite different "self," which is based on a different definition of the situation'.

embodied entity. Instead of either some substance dualism or explaining it away as an illusion,[377] a neuro-ecological perspective seeks to find ways of expressing this complex relational reality. Rather than a body–mind dualism, solutions take both self and the body as complex dualities: Laughlin (2013, pp. 100–101) suggests 'self-as-being and self-as-psyche' to address this aspect of the self, while Thompson (2015, p. 133) talks about self-as-object and self-as-subject. Similar dimensions are suggested to account for 'body'.

Finally, autobiographical self has to do with 'your own perspective on the world' (Carruthers 2019, p. 22) and concerns the cognitive-discursive aspects of self. The reality is that a great deal of research on the self is searching for it in the computational approach and the cortical information processing (see Asma & Greif 2012). Self is treated as either a self-reflected or a constructed reality. Laughlin (2013) points out that although anthropology has no paradigmatic school of thought about the self, it contains a host of information about how non-Western peoples experience, conceptualise and talk about the self. But perhaps (Laughlin 2013):

> [*A*]s many as 95% or more of uses of the term in the anthropological literature are concerned with the psychological dimensions of personhood, identity, role, status, and so on, rather than the greater existential sense of 'being-in-the-world'. (p. 102)[378]

The failure to acknowledge the embodied dimensions of the self results in its reification as reflexive, rhetorical process, as a discursive thing (see Seligman 2010, pp. 298, 299).

The implication of this discursive emphasis is best seen in the many selves that are available. The concept of *self* is like the concept of consciousness, highly contentious and fraught with diverse meanings. This is captured in the remarks by Ross (2003):

> The self in popular discourse is so polymorphous that no tidy definition can wrap it up. We have a personal self, a rational self, a conscious self, a biological self, a genetic self, an immunological self, and now a neurological self. Are they all identical? That seems impossible. Each of the selves is defined in a different realm of discourse, and the discourses do not admit straightforward translation from one to another. (p. 83)

377. The argument that self, like consciousness, is an illusion is equally based on the rejection of substance dualism, together with the tacit assumption that if the self were to exist, it must be an ontologically independent entity, and because it is not, there is no self (see Gallagher 2020; Zahavi 2014, p. 3 for a discussion of this view).

378. The principal interest of the anthropology of the self 'is in understanding how the developing individual constructs his or her identity within the context of physical and social environment' (Laughlin 2013, pp. 101–102). In other words, anthropologists are mainly concerned with the ethnopsychologies of the self (local theories of the self).

This list can easily be extended. While the terminology suggests that all of the above actually are 'aspects of the self', this formulation is problematic in that it suggests there is 'the self' of which they can be aspects (see Gallagher 2013, p. 1). Instead, a 'pattern theory of self' maintains that 'selves operate as complex systems that emerge from dynamic interactions of constituent aspects' (Gallagher 2013, p. 3). Subsystems and aspects contributing to particular selves include embodied, experiential, affective, intersubjective, psychological, cognitive, narrative, extended and situated aspects. In a neuro-ecological perspective, self is a distributed system of neural networks (see Laughlin 2013, p. 107).

Body-as-subject and body-as-object

From a neuro-ecological perspective, the environment exists or comes into being first and foremost by virtue of a bodily involvement with it. Our experience of being-in-the-world is primarily embodied, which means that the body is the site of interface with the physical, social and cultural worlds and that our experience *in* and *of* the world is first and foremost *by* and *in* the body (see Thompson, Ritenbaugh & Nichter 2009, p. 129). And consciousness always contains an object of which it is conscious; the body is an unavoidable condition of subjective experience, as subjective experience is always filtered through the body's 'state of being-in-the-world' (Spickard 2011, p. 335).[379] In this sense, the body is the foundation of the conscious mind (see Damasio 2010, p. 20). But the body is both mechanism and one of the objects of consciousness, because self and body presuppose one another. *Self* is the term nowadays used for a person's essential being which distinguishes them from others and the environment and contains a 'sense of self', which consists of a feeling of inhabiting one's own body as well as owning one's body and body parts.

The interactive coupling of self and body results in various configurations. Self as embodied (embodied self) is different from the body as mine (embodiment). The sense of being an embodied self is the experience of the body as what I am. The body can also be experienced as a thing that belongs to me, the body as mine (see Carruthers 2019, p. 24). Damasio (2010) explains this in his terminology as:

> [*T*]he brain's protoself structures are not merely *about* the body. They are literally and inextricably *attached* to the body [...] the body is best conceived as the rock on which the protoself is built, while the protoself is the pivot around which the conscious mind turns. (p. 21)

Within a neuro-ecological perspective, this is often expressed as the coextension of lived body and physical body, the 'lived body–living body

379. In the words of Fuchs (2018, p. vi): 'the primary locus of self-awareness is the body itself'.

problem' (Fuchs 2018, p. 84), which refers to the experiential and physical structures, respectively (see Varela, Thompson & Rosch 1991, p. xv). The body is experienced as an object (body-as-object – my body, my hands, etc.) and as subject (body-as-subject), which is the structure through which the world is experienced. The body-as-subject is transparent (Thompson & Stapleton 2009):

> [*I*]n the sense that one looks through it to the world. At this level, prereflective bodily experience is precisely the experience of the world as given through the 'transparent body'. (p. 29)

Thus, being conscious of the body is different from consciousness as embodied.

The lived body is where protoconsciousness takes shape, such as the affective aspects of embodiment, bodily states like hunger, fatigue and pain and also the sensorimotor body schema and body image which is created in the brain (see Gallagher 2017a, p. 151; Glannon 2011, p. 15). The processes of managing and mapping the body in the brain constitute the foundation of the self-consciousness process. The same patterns and processes that are responsible for consciousness, as such, play a role in being conscious of the own body. These are diffuse and multifaceted processes and include the autonomic nervous system with sensors that (Damasio 2010):

> [*L*]ink neural processes to basic homeodynamic processes of the internal organs and viscera, emotional states which reflect the links between the autonomic nervous system and the limbic system via the hypothalamus, brain-stem nuclei that regulate homeostasis are interconnected with nuclei that regulate sleep, wakefulness, and arousal. (p. 106)

In addition to regulating the own body, embodiment is also responsible for a feeling of inhabiting one's own body and owning one's body parts. Dysfunction of these processes results in all sorts of problems.[380]

The theory of the neuromatrix describes 'a genetically built-in matrix of neurons for the whole body [that] produces characteristic nerve-impulse patterns for the body and the myriad somatosensory qualities we feel'

380. A mismatch between the body image in the brain and the physical body results in a disturbed self-consciousness. Or the self can be deranged when patients cannot identify family members (Ramachandran 2011, p. 5442). Part of being a self is to have a body and an identity and relate them to others. Thus, the self is produced not by a single entity but by 'a push and pull of multiple forces which are largely unconscious' (Ramachandran 2011, p. 5236). Some well-known syndromes illustrate this feature of the organism. An example is apotemnophilia, where someone is convinced an arm (more often than not, the left arm) does not belong and needs to be amputated. Similarly, with damage to the right parietal lobe, patients experience paralysis on the left side, and some of them deny the paralysis or deny ownership of the paralysed left arm (called somatoparaphrenia). The explanation is that there is a mismatch between the body image in the brain and the physical body.

(Melzack 1999, p. S123). This theory was developed to account for pain and the phantom limb experience and suggests that there is an existing map or matrix of the own body imprinted on the brain. The experience of still having a limb which has been amputated supports this theory (see Fuchs 2018, p. 16).

Many pathological conditions show how the brain continuously builds and maintains a picture of the matrix of the own body which is constantly updated in autobiographical consciousness. A condition known as anosognosia occurs when a patient fails to integrate information regarding the paralysis of an arm into their life history. The patient will, despite all evidence to the contrary, keep on denying the paralysis as a result of damage to the right cerebral hemisphere (see Damasio 2010, p. 239).

Environment as subject and as object

Consciousness as a process of self, body and environment interaction also invokes the environment in a dual sense. There is the environment as extramental reality, which constitutes much of the content of consciousness, but the environment is also present in the process of consciousness as actor or agent.

The integrated realism of the nonbinary theoretical framework takes it that extramental reality exists independently from human organisms[381] and that we interact with a reality in which we have sensory apparatus to engage only partially. In a very definite sense, human perception of things is framed by the capacity of our exteroceptive sensory apparatus. Put differently, the world is pregiven, and humans' cognition is based on pregiven structures and functions. For example, humans have limited access to the electromagnetic spectrum. On the one hand, we do not see the world as it is but how we are,[382] and we do not see what is out there but what is preselected by the senses. If we were bats or dogs, we would

381. In the explanation of Laughlin and Throop (2003, p. 10): 'Extramental reality can be thought to consist of information that is "denied" us either because of limitations inherent in the structure of our sense organs and nervous system, or because of limitations set by the state of our current techniques/technologies'.

382. The implication of this is clear: 'the observer is *never, under any circumstances perceiving the noumenon, or the object "out there," but is always operating under the cognized object constituted within the sensorium of the observer*' (Laughlin, McManus & d'Aquili 1990, p. 337; [*emphasis in original*]). Or in the words of Winkelman and Baker (2010, p. 34): 'We do not experience the world the way that it really is, but the way that our mental hardware filters and structures the world and the way that our cultural software categorizes and evaluates the results'.

experience a completely different reality.[383] All that we call reality, Lilly (1977, p. 171) points out, 'is merely the point of view of our place in time'.[384]

On the other hand, the fact that the world is often different from what we hope or expect shows that humans do not make up reality.[385] In fact, it must be acknowledged that sensorial perception is the most reliable and culturally trusted method of obtaining knowledge about the world. What is true for other animals is also the case with humans: 'any successful animal is successful precisely because its senses have managed to put it in pretty good touch with the world' (Slingerland 2008, p. 224). The senses are surveillance devices between the organism and the world, and without reliable information, the organism cannot survive. Veridical perception[386] is thus seen as an exceptionally dynamic process which balances multiple influences and is not to be equated with any form of direct perception.[387]

The environment is also an agent in the interaction of self and body. This can be illustrated with three examples, two of which have already been discussed. One is brain plasticity (see also Doidge 2007), and the other is the microbiome. The realisation that as embodied beings we are intimately connected in an ecosystem and that the boundaries of us and not-us are extremely porous highlights the fact that how and what we think and feel (being conscious) are the result of the ecology.

The third is the role of chemical substances on states of consciousness. It is no secret that neurons function differently under different chemical conditions,

383. There is a sense in which the sensory apparatus thus preselects which aspects of reality are displayed. But as Solms illustrates with the reality of lightning, even this does not mean that the reality of things equals our consciousness of objects. When you observe lightning, you visually see a flash of light but aurally you hear a clap. In *reality*, lightning is neither of these perceptual objects, but as he says, it is 'a geo-electrical process that manifests differently in different sense modalities' (Solms 2014, p. 174).

384. While the sensory systems are used to gain knowledge about the world, there is not a direct link back from the perception to the sources in the real world – as is well known, for example, from the blind spot with vision (see Rees 2015, pp. 47–49). The visual system perceptually fills in the information that the blind spot misses.

385. Reality is 'a relational domain created by that being's agency and coupling with the environment' (Fuchs 2018, p. 89).

386. Veridical visual perception of objects is one mode of visual experience next to several with the boundaries between them indistinct, each merging into the other. The other visual experiences include misperceptions, illusions, dreams, simple hallucinations, voluntary images and complex hallucinations on the other extreme from veridical visual perceptions. With these examples of visual experiences that all employ the same neural structures and processes, it is already suggested that veridical perception of objects exists next to imaginary and hallucinatory experiences which can all claim to be real. In fact, the relationship between objects and subjective experiences in all instances is rather loose (see Collerton et al. 2016, pp. 196, 225).

387. What is 'seen' as out there in the visual environment Collerton et al. (2016, p. 205) say, 'is a good enough, probabilistic, internal model of that world – sparse and functional, resilient, and iterative, predictive, dynamic, and able to maintain stability and coherence but also allow rapid change'.

and different patterns of consciousness emerge with exposure to such substances. This suggests that the evolutionary development of ASCs is part of the way in which the brain functions (see Saniotis & Henneberg 2011, pp. 188–189). And for humans as a species, throughout history, intoxication has functioned as a basic drive; next to the basic drives of hunger, thirst and sex, Siegel (2005, loc 369) calls intoxication 'the fourth drive'.

Cycles of being conscious: Awake, asleep, dreaming

The daily experience of being conscious is characterised by the givenness of a repeated switch between being awake and being asleep. But the sleep–waking cycle actually contains three cycles of baseline consciousness: wakefulness, REM and NREM sleep (see Baars & Gage 2010, pp. 279–281; Hobson 2007, p. 347f.).[388] And each of these 'is extremely complex, and is comprised of numerous physiologic variables', but the properties of each phase 'usually cycle in a predictable and uniform manner, resulting in the behavioral appearance of a single prevailing state' (Mahowald & Schenck 2001, p. 269).[389] At the risk of overcomplicating the picture, a distinction between the waking and sleep cycle will be used, and only when necessary will the distinction between REM and NREM sleep be used.[390]

Although he uses the term 'states', Kokoszka shows that these 'unaltered' or 'main everyday' cycles of baseline consciousness are based on the circadian and ultradian[391] rhythms or cycles that humans experience every day.[392] Sleep is categorised in terms of identifiable REM and NREM

388. Hobson talks about modes of consciousness and the bimodal feature of consciousness (see Hobson & Voss 2010; see also Baars & Edelman 2012, p. 290).

389. Each cycle of consciousness is characterised by physiological markers in that distinct brain waves identify each (see Koch 2019, loc 1398).

390. Sleep is not a passive state but a specific brain state (see Koch 2019, loc 1616).

391. Circadian rhythms are periods between 20 and 28 hours, and the sleep–waking cycle falls into this category. It is based on an endogenous biological clock that, based on neurochemical processes, is responsible for the different 'states' or 'modes' of waking and sleep cycles. Ultradian cycles are between a few milliseconds up to 20 hours, and the REM and NREM sleep rhythms, lasting approximately 90 minutes, fall into this category (see Kokoszka 2007, p. 5).

392. It should be noted that Kokoszka identifies four such *modes* of consciousness, namely waking, REM sleep, NREM sleep and what is called a 'differentiated waking state of consciousness' (Kokoszka 2007, pp. 100–101 and see Kokoszka & Wallace 2011, p. 9). His differentiated waking state of consciousness is based on the notion that just as in sleep cycles, there is what is called a 'basic rest-activity cycle' of approximately 90-minute intervals during the wakeful phase of every day (see Kokoszka 2007, p. 92ff.). Whether or not this is just another attempt to find a label for some specific meditative and relaxed conditions, it could be that certain alterations of consciousness while awake (such as daydreaming) do follow from biological rhythms. Later it will be suggested that these can also be considered alterations to normal waking consciousness instead of being assigned to a fourth main everyday state of consciousness.

sleep patterns. Furthermore, sleep is a process consisting of several stages that are characterised by varying brain activity as measured by brain wavelengths (see Hobson 2017, pp. 438–439; Thompson 2015, loc 2707–2733). It is clear that changes between waking and sleep cycles are determined by rhythmical changes in body functioning or the biological rhythm of the basic rest–activity cycle (BRAC) (see Kokoszka 2007, p. 91).

Wakefulness is not an all-or-none thing (see Damasio 2010, pp. 165–166). For example, there is an optimal range of exteroceptive stimulation necessary to maintain normal waking consciousness (see Kjellgren, Lyden & Norlander 2008; Ludwig 1966, p. 225). Being conscious can easily be eliminated, modified, disrupted or even generated by means of various induction methods, chemical substances or adjustments to any number of the multileveled dimensions.

With sleep onset, awareness of the world is lost, but internally, generated images in the form of dreams continue to occupy consciousness. Two qualifications will later be added: none of these cycles are static and each one is subject to cultural variability. Thus, the very structure of being conscious displays not only diversity but disruption and alteration on a regular basis. Sleep is characterised by the deactivation of specific subsystems of the brain, particularly sensorimotor functions (see Hobson 2007, pp. 438–439).[393] In REM sleep, which is the most extensively studied sleep phase, many neurophysiological functions are active as if awake, while other systems are deactivated (see Mahowald & Schenck 2001, p. 271).

Because (REM and NREM) sleep is based on an alteration of processes during waking consciousness, a distinction will be made within the baseline cycles of consciousness between the default mode and alterations. Sleep can be seen as the first basic alteration on a daily basis of the default baseline mode of consciousness. Based on one of the biological features of consciousness, namely the cyclical variation within every normal 24-hour day in which waking consciousness is replaced by sleep consciousness, wakefulness will be taken as the basis for the default baseline mode of consciousness. As sleep cycles of consciousness result from alterations of waking consciousness, the latter will be taken as the default baseline mode of consciousness, while sleep can be seen as a first level of alteration.

As will be seen below, alteration of consciousness can take place in any or all of these cycles of consciousness. Thus, while ASCs are seen as

393. For example, Loubser (2010, p. 188) points out that as ‘we are experiencing altered states the motor-action portions of our brains are still connected to our visual systems, while their usual input to our muscles is inhibited; in the absence of a real ground level during trance state, feelings of weightlessness, for instance, can lead to experiences of flying or even being transformed into a bird’.

alterations of baseline consciousness, it follows that they are not limited to the waking state but appear in all (three) cycles of consciousness. It is, in fact, the case that many ASCs are related to the sleep cycle of consciousness or emerge in the transitions between awake and sleep cycles or between the states of sleep consciousness itself. As will be seen below, similar ASCs in the sense of identifiable clusters or patterns (e.g. out-of-body experiences [OBEs]) can appear in either the waking or sleep cycles. Thus, identifiable alterations of consciousness – ASCs – are deviations from baseline cycles of consciousness, either while being awake or asleep.

These biologically based cycles of consciousness will be used as the first level of distinction for the way in which the human organism processes information. Each ordinary or baseline mode of consciousness is characterised by certain stabilising factors that ensure everyday experiences of consciousness. In other words, even before talking about alterations, it is important to realise that each ordinary mode of consciousness is the product of a whole range of processes and systems that ensure waking, sleep and REM sleep cycles persist. Put differently, each baseline mode of consciousness is a deeply neurobiologically based experience.

Levels of consciousness: Impairment and loss of consciousness

In addition to the givenness of the cycles of consciousness, two closely related features of its givenness, the levels and states, will be considered. The boundary between *level* and *state* is porous because a change in level results in a change in state; the loss and impairment of consciousness often impact ordinary consciousness in everyday life and result in alternative states. The *level* of consciousness gives expression to the givenness of the alteration of consciousness as a common potential of human experience, and *state* refers to the experience of the flow and continuity of consciousness on a moment-to-moment basis. The latter can be disrupted and result in completely different states.

In consciousness research in general, there is, as indicated earlier, no agreement on terminology about *types*, *kinds*, *states* or *forms* of consciousness, and many even fall back onto consciousnesses as the reduction of dimensions to consciousness as a whole. But there is also a certain givenness that all in consciousness research must account for. The distinction between consciousness as awareness, awakeness and experience is one such givenness. Another is the distinction between the level and the content of consciousness, which in the words of Stoerig (2007, p. 707) refers to the distinction between whether an organism is in a conscious *state* or whether it refers to a trait. To systematise these variables, Bayne and Carter (2018, pp. 1–2) talk about global states of consciousness that contain both the content that can enter consciousness and the way in which that content can be used by the organism. Typical global states are alert wakefulness, REM sleep, comatose conditions, the vegetative state and the minimally conscious state.[394] *Local states of consciousness* is the term used for individuated dimensions in terms of their content or phenomenal character (see Bayne et al. 2016, p. 406). What is missing from all these categories is a consistent link to the embodied nature of consciousness.

The alteration of consciousness as a common potential of human experience is another givenness. Impairment or loss of consciousness is a neurobiological phenomenon and speaks to its level.

The impairment of consciousness is not easily definable.[395] Given the classical separation between awareness and awakeness, impairment can manifest in different configurations of these two.[396] The question about consciousness as awakeness features mostly in clinical settings, where it entails two issues: how to determine awakeness and where the line is between awake and aware on the one hand and unconscious on the other. In other words, where does consciousness end with conditions such as coma and other pathological conditions such as locked-in syndrome and the vegetative state? Thus, consciousness serves to describe the opposite of being either *unconscious*, such as someone in a stupor or coma (see Barušs 1992, p. 29), or *not conscious*, as just being unaware of things.

While humans are normally good judges of whether someone is awake, the boundaries become blurred in certain conditions, such as the loss of consciousness or what are known as the 'disorders of consciousness'.[397]

394. In clinical literature, these global states are often referred to as 'levels of consciousness' and most often refer to disorders of consciousness (see Bayne, Hohwy & Owen 2016, p. 405).

395. In the explanation of Flohr (2006, p. 16): 'Loss of consciousness can have many different causes, for example anaesthesia, brainstem lesions and sleep, the various causes of unconsciousness primarily interfering with different brain functions. Unconsciousness does not always consist of a general suppression of the entire activity of the central nervous system. Depending on the actual cause(s), many functions, such as protective reflexes and various cognitive processes, can remain intact. This approach is in accordance with the present theory stating that consciousness depends on a specific subset of brain processes'.

396. 'In clinical practice, consciousness is often pragmatically described as a product of two properties: wakefulness and awareness. Wakefulness refers to the state of vigilance, whether the subject is awake or can be aroused to a state of apparent alertness. Awareness describes the phenomenal perception of self or surroundings, in other words, the content of the conscious state' (Stender, Laureys & Gosseries 2017, p. 662; for a more complex picture of the various potential relationships between awareness and awakeness, see Boly et al. 2013, pp. 2–4).

397. The classic disorders of consciousness are brain death, coma and the vegetative state, but impairment of consciousness also includes other conditions such as the minimally conscious state, sleep and the locked-in syndrome that only appears as a loss of consciousness (see Blumenfeld 2009; Owen 2013, p. 113 for a discussion).

In clinical settings, the distinction between awake and aware is more complex than in colloquial speech. In our everyday speech and experience, awakeness and awareness are interlinked, interdependent and easily identifiable. However, in clinical settings, they often become independent (see Stender et al. 2017, p. 662). There are conditions in which an organism can be either awake and aware or awake and not aware or aware and not awake.[398] Clinical tests for the presence of consciousness when awake but not responsive in some respects occur with specific conditions in which the identification of someone being conscious remains challenging. For clinical neurologists, consciousness as awakeness has coma as its opposite (see Nelson 2011, loc 559).[399]

Drug-induced impairment of consciousness is probably the most common in altering the level of consciousness. In general anaesthesia, the complex relations between awareness and awakeness, and situations where only one of them is affected, come to the fore (e.g. see Gawryluk et al. 2010; Owen 2013; Stender et al. 2017; Stoerig 2007 for detail). The level of consciousness may fluctuate between complete or partial impairment of either awareness or awakeness. One can be aware without being awake and awake without being aware. Giacino (2005, p. 382) points out that traditionally, the transition between conscious and unconscious was seen as a linear function. That is also reflected in the common-sense notion of loss of consciousness as slipping between two states of consciousness. A more complex version of this model suggests that there can be fluctuation between the two in a zigzag movement between conscious and unconscious. However, a modular model holds that specific cognitive modules or subsystems can become underactive or disconnected from others. In the latter model, 'full' consciousness is conceived as the full activation and integration with all other modules and subsystems. Impairment can be induced in many other ways.[400]

398. It is possible to be awake but unaware (as in a coma) or aware but not awake, as in dreaming or sleepwalking (see Solms 2014, pp. 175–176; Stender et al. 2017, p. 662).

399. In clinical settings, the test for consciousness as awakeness is often performed from two perspectives. From an observer's perspective, a patient is conscious when they (1) are awake; (2) display background emotions; (3) exhibit attention; and (4) show evidence of purposeful behaviour. From the patient's perspective, Damasio & Meyer (2009, p. 3) argue, consciousness emerges 'when the brain generates (a) neural patterns about objects in sensorimotor terms; (b) neural patterns about the changes those objects cause in the internal state of the organism; and (c) a second-order account that interrelates (a) and (b)'. Patients who fail this test are considered unconscious (and normally also are not awake).

400. Also, the electrical stimulation of brain shows that consciousness disappears when certain brain areas are stimulated (Koubeissi et al. 2014). Also, in an embodied perspective suffering can threaten the coherence of self through effects on both its cognitive-discursive and bodily elements (see Seligman 2010, p. 298).

States (phases) and alternate states of consciousness

One of the properties of consciousness is that our conscious experience is unified.[401] Consciousness can thus be described as a 'stream' which flows from moment to moment – as is confirmed by the moment-to-moment alteration of the content of consciousness in everyday waking life.[402] Consciousness configures in identifiable patterns.

States of consciousness are not linear, unidirectional processes that always start from a fixed point to emanate at an exit position. In other words, consciousness does not always start at sensations that develop from sensorial perception to cognition and end up in executive decision-making or actions. Three features can be used to describe these patterns.

The first is that both the induction and disruption of normal everyday consciousness depend on a host of inputs. As Damasio (2010, pp. 165–166) explains in a neurocentric way: 'Being awake, having a mind, and having a self are different brain processes, concocted by the operation of different brain components'. Any state of consciousness consists of the activation or deactivation of particular neurophysiological and cognitive systems and mechanisms, and an ASC involves a changed pattern, which means that some, not necessarily all (and in different ASCs, different combinations), of these components are altered (see Farthing 1992, p. 208).

States of the body–mind–environment complex refer to the processes whereby the moving body is continuously being reconfigured in relation to environmental sensory stimuli. Thus, it refers to the continuing reconfiguration of the body's perceptual awareness of its environment and the body's reconfiguration of awareness in relation to itself (see Porath 2008, p. 661 n 2).[403] This takes place in a moment-to-moment process but also over time and space. Momentarily, it depends on engagement with the environment and very much depends on perception but also processes that one is not necessarily aware of.

401. As a process, consciousness can be a confused mess, but it can act as a unifier of thoughts, feelings, and emotions (see Tague 2021, p. 4).

402. Although the term ASC has been used often above, in a neuro-ecological perspective it is first and foremost as *state of consciousness*. In other words, a state of the body–mind–environment complex like any everyday state of consciousness. For example, Seligman uses the term 'integrated consciousness' and sees ASCs as the 'suspension of integrated consciousness' (Seligman 2005, p. 92).

403. The complex relations between the dimensions of consciousness are explained by Damasio (1994, p. 238) in the following way: 'You cannot have a self without wakefulness, arousal, and the formation of images, but technically you can be awake and aroused and have images formed in sectors of your brain and mind, while having a compromised self. In extreme cases, the pathological alteration of wakefulness and arousal causes stupor, vegetative state, and coma, conditions in which the self vanishes entirely'.

A second feature is the online and offline, the internal or external generation of consciousness.[404] This can be generated regarding any of the domains.[405] Being conscious, or any state of consciousness, can be fed by many different inputs. They can come from the outer senses (the five senses, plus others like heat and vibration), the inner senses (imagery, imagined scenarios, feelings), as well as from ideas (tradition, verbalised ideas) (see Ray 2013, p. 307). Also, phantasy[406] can originate spontaneously but can also be induced by means of psychoactive substances (see Horváth, Szummer & Szabo 2018, p. 124). Imagination and memory are central parts of consciousness and can mimic veridical consciousness. An important feature of the brain is offline action emulation (Jeeves & Brown 2009, p. 43; see also Bayne et al. 2016, p. 408).

A third feature is that the disruption of consciousness can be of either a single or a composite domain or cycle of consciousness. That means, for example, that alterations of the self can take place while awake or asleep, and it can occur to only the self (or the body) or to more than one domain. Alteration of a single domain or multiple domains can thus occur in any of the baseline cycles. As all these categories occur on continuums rather than as fixed points, the actual alterations are often instances of belonging somewhere in a continuum.

Given the complex structure of baseline states of consciousness, it is not surprising that nonordinary ASCs display an equal and even more complex character. Whereas baseline cycles of consciousness are the result of equilibrium and integration of processes in the organism in its normal engagement in the world, nonordinary states of consciousness result from the interruption, impairment or suspension of integrated consciousness by means of any one of the cycles, domains or structure of consciousness. Put differently, while integrated consciousness is the default way in which the organism functions, the alteration of consciousness can take place in any one of, or in any combination of, the cycles, domains or structures of consciousness. Thus, alterations can be linked to any one of the dimensions making up consciousness.

404. The idea of internal process was already introduced in the turning upside down of cognition from a bottom-up to a top-down process. In that view the interoceptive processes are more important than exteroceptive input in conscious perception. In fact, various neurocognitive models seek to give expression to the fact that 'the way in which we perceive the world is strongly determined by our prior expectations and beliefs' (Van Elk & Aleman 2017, p. 361). They are mutually interacting stages in the information processing mechanisms: 'external information is always processed internally, but at the same time, exteroception is fundamentally modulated by internal processes, such as attention, memory, and emotion' (Móró 2017, p. 35).

405. For example, the own body can be presented in an online representation as it currently is or, in contrast, an offline representation that is about the body as it is in general (see Carruthers 2019, p. 51).

406. Visionary phantasy 'is not only an extreme, exotic form of consciousness but a latent cognitive capacity that is actuated under certain conditions' (Horváth, Szummer & Szabo 2018, p. 128).

Any state of the body–mind complex is not a way of thinking, and it is not something you have; it is a way of being; consciousness is the mode of existence of certain complex living organisms.

Concluding remarks

It is apparent from this discussion that the time has come to diversify and complexify the study of consciousness and the discourses on being conscious. Avoiding the definitional and conceptual problems with consciousness research that everybody agrees upon does not lie in finding a single or monolithic definition or concept but in acknowledging the complexity and refining the discourse to account for the fact that it is a complex cultural concept and refers to complex neurocultural phenomena.

Each of the variables making up these dynamic, system-based phenomena should be seen to exist on a continuum. There are no hard-and-fast divisions between them, and often, it is difficult to even separate the instances. The transition from one state to another is often subtle and the processes and mechanisms multiple and variable. Thus, the term *states of consciousness* refers to the patterned ways in which conscious experiences manifest within cycles – some are the default baseline states and others alternate, and the alterations can be either ordinary or nonordinary.

PART 5

The fabric(ation) of consciousness and being human

It is easy to agree with the three things that are widely accepted in consciousness research: the significance of consciousness; that it is one of the most important unresolved mysteries, if not the most important unresolved mystery, of the 21st century; and that there is as yet no agreement on what that mystery is. Consciousness impacts the most elementary aspects of our humanity. Thus, solving the mystery of consciousness is to address the deepest questions and issues as to what it is to be human. For that reason, consciousness research is or should be at the heart of the study of humanity and human beings. But there is no agreement on what that mystery is, what consciousness is, where to find it or how to study it.

It is not widely acknowledged that, in different research traditions, the term is used for different phenomena and that, consequently, there actually is a crisis in consciousness research.

In ASCs, and for that matter in any state of consciousness, the ‘C’ is currently filled in by any number of spark plug concepts. However, the crisis is much deeper than that, because it concerns the very ontology of consciousness. Not only its scholarly fabric(ation) but its very fabric as a phenomenon in the world is at stake.

Chapter 18

Consciousness research and the kind of creatures we are as human beings

Introduction

Northoff and Lamme (2020, p. 577) remind us that '50 years ago, consciousness was basically not present in neuroscience as it was conceived a subject of philosophy (rather than science). 30 years ago, consciousness started to enter neuroscience'. Today, consciousness research is dominated by mainstream neuroscience of consciousness, and it has become *the* most prominent voice in expressing how we see ourselves as human beings. Consciousness research has become, so to speak, neuro-research, and there are good reasons to believe that it will continue to be influenced by it. Consequently, neuroscientific research is also claiming to illuminate for us what our nature is as conscious beings. For example, Swaab (2014, p. 3) says that the insight of neuroscientific research is greatly responsible for illuminating to us 'why we are as we are'. Understanding how the brain works contributes immensely to knowing *why we are as we are* and consequently *what we are*. The title of his book *We Are Our Brains* suggests that it answers not only the 'why' but also the 'what' of our essential being.

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However, a critical analysis of current consciousness research from a third-person perspective suggests a less optimistic future to illuminate human nature because it is not about consciousness as such. The two central claims of this study, as expressed in the title, are that consciousness research is in a crisis and that a neuro-ecological perspective is its best solution. The suggestion is that mainstream neuroscience of consciousness is part of the problem and not the solution to solve the mystery of consciousness and to explain what it is to be human. The reduction of personhood and the self to brainhood is hardly a step forward from dualistic soul-speak. This is the picture emerging from the critical analysis of mainstream neuroscience of consciousness. Before reflecting on the evolution of the crisis, a summary of the critical evaluation will tie the different strings together.

The current state of consciousness research

Consciousness research does not have a monolithic subject matter. It is characterised by distinct and incommensurable research traditions that fabricate completely different concepts and ontological realities. These research traditions are made up of nested theoretical and ontological assumptions that fabricate not only incommensurable theories of consciousness but distinct phenomena that are called 'consciousness'. Therefore, the crisis in consciousness research is exemplified not only by the fact that different theories and concepts of consciousness within and between the different research traditions have different explananda as their subject matter but also by the fact that they are about distinct phenomena.

Schematically, the broader landscape of the fabrication of consciousness can be presented in Figure 18.1.

Consciousness research

↙ ↘

Mainstream neuroscience of consciousness ↔ **Nonlocal theories of consciousness**

↓

Neuro-ecological theories of consciousness

Even though they are much older, nonlocal theories of consciousness are, with two or three exceptions, the flip side of mainstream neuroscience of consciousness in sharing most of the fundamental theoretical assumptions with the research tradition it rejects. A neuro-ecological perspective stands opposed to both of these not only in offering different theories and concepts of consciousness but also by being based on a completely different set of nested theoretical assumptions.

FIGURE 18.1: Schematic presentation of the broader landscape of the fabrication of consciousness.
Source: Author's own work.

Even though mainstream neuroscience of consciousness is dominating the landscape of consciousness research, it is not the only occupant and not necessarily about consciousness as such. Each one of these traditions is the result of historical, disciplinary and theoretical developments. These research traditions bring forth completely different notions on the fabric of consciousness. The three slogans, *you are your brain*, *you are without your brain* and *becoming you*, represent three very different concepts of the fabric of consciousness and thus visions of being human.

The details of this landscape, as summarised in Table 18.1, show that what is called consciousness research is not a unified domain but represents distinct ontological entities. The fabric(ation) of consciousness is not about different theories regarding the same phenomenon but about different phenomena altogether.

The different research traditions not only represent different theories about the fabric of consciousness, but they fabricate different phenomena that are labelled 'consciousness'. There is a fault line between, on the one hand, mainstream neuroscience of consciousness and nonlocal theories of consciousness and, on the other hand, neuro-ecological theories. The first two are flip sides of one another, except for three aspects: the role of the brain; the third-person and first-person perspectives, respectively; and most notably, the different between a brain-bound and a nonlocal entity. While they undoubtedly present completely different notions of 'consciousness', they are remarkably similar in many other respects. Theories of nonlocal consciousness are the flip side of what they object to and reject in mainstream neuroscience of consciousness.

The three most important shared features are the fact that both treat consciousness as a unidimensional phenomenon; both treat consciousness as a nonbiological phenomenon; and both depart from the mind–body problem and its related binary theoretical framework. The reduction of consciousness in spark plug theories to cognition, attention, perceptual awareness and the like in mainstream neuroscience of consciousness is matched in nonlocal theories of consciousness with the notion of 'consciousness' as a unidimensional nonlocal entity. The major concern in many studies on nonlocal consciousness is with survivalism instead of the possibility that consciousness is a multiplex systems phenomenon. The binary theoretical framework remarkably produces notions of 'consciousness' as an entity that emerge from the brain, or as an epiphenomenon of the brain, or as an element of nature. More specifically, in seeking to address the mind–body problem (respectively, as a mind–brain problem or a mind–matter problem), both these traditions remain trapped in the prestructured formulated problem and therefore fabricate similar notions of consciousness. While rejecting substance dualism and claiming to be monists, both these

TABLE 18.1: A detailed landscape of the theories of consciousness.

Domain	Mainstream neuroscience of consciousness	Nonlocal theories of consciousness	Neuro-ecological theories of consciousness
Perspective	*Neurocentric*: *You are your brain*	*Nonlocal entity:* *You are without your brain*	*Distributed non-local process: Becoming you*
Fabric	Reification: Entity/process in neurons	Reification: Entity	Neuro-bio-ecological process
	Nonbiological	Nonbiological	Biological
	Feature of the brain	Feature of matter	Feature of organisms
	Entity/(process)	New-material and nonmaterial entity	Distributed body–mind–environment process
	Unidimensional	Unidimensional	Multiplex
	Cognition/attention/perceptual awareness/inference/etc. (Subjectivity and self are absent.)	Nonlocal entity/element (Subjectivity and self are absent.)	Subjectivity, affective consciousness, reflexive and intersubjective consciousness, self
	Monism as disguised dualism: Materialism	Monism as disguised dualism: Idealism	Naturalistic monism
	Reject substance dualism: Physicalism, idealism, dual-aspect monism	Reject substance dualism: Panpsychism, dual-aspect monism	Reject dualistic thinking/naturalistic monism
	Monistic duality is naïve dualism	Monistic duality in overdrive	Monistic duality is common-sense dualism
Fabrication	Third-person perspective	First-person perspective	Second-person perspective
	Mind–body problem → mind–brain problem	Mind–body problem → mind–matter problem	Beyond mind–body problem
	Mystery of consciousness: Dualistic prestructured	Mystery of consciousness: Dualistic prestructured	Mystery of consciousness: How an organism is conscious
	Binary theoretical framework:	Binary theoretical framework:	Nonbinary theoretical framework:
	• Dualistically prestructured	• Dualistically prestructured	• Naturalistic monism
	• Metaphysical realism	• Metaphysical realism	• Integrated realism
	• Representation	• Representation	• Responding
	Newtonian physics: Physical and mental elements	Newtonian physics: Physical and mental elements	Systems ontology: Naturalistic monism
	Hard problem of consciousness; hard problem of the brain	Hard problem: Binding problem of mental and physical	Rejects mind–body problem; mindedness feature of organisms
	Computation, electromagnetism, inference, etc.	New-material or nonmaterial element of the world	Biological systems phenomenon
Brain models and theories	Generator	Radio receiver	Translator
	Brain-dependent: Neurocentric	Brain-independent	Brain–body–environment-dependent; non-neurocentric
	Neural correlates of consciousness	Nonlocal consciousness	Distributed: Non-local consciousness
	Localisationism: Cortex, brain stem, other	Brain-independent	Holism: Brain–mind in body
	Reflexological: Input–output		Self-regulating: Intrinsically

Source: Author's own work.

traditions operate within dualistic thinking. Therefore, the many different ontological theories (physicalism, weak emergentism, epiphenomenalism, panpsychism, dual-aspect monism) all result from the space between dualism and monism and are not really monistic – they remain dualisms in disguise.

The reason is because the mind–body problem, in all its versions, remains trapped in a binary theoretical framework. Besides the residue of representing the world (the body–world dualism), they share a physical–mental dualism (or body–spirit dualism). Mental things are not physical. This results in the variety of strategies to harmonise the two entities, which include hard-core physicalism and illusionism, dual-aspect monism and panpsychism. Both the monist and dualist solutions to the dualistically prestructured problem remain trapped in the same logic.

A neuro-ecological perspective stands on the opposite side of these two traditions on all the identified fault lines. Consciousness is a multiplex phenomenon that is a distributed biological process that emerges from the interaction between brains, bodies and the environment. Its only affinity to theories of nonlocal consciousness is the fact that it conceives consciousness as a non-local process that is distributed (it is not a *nonlocal* entity). With mainstream neuroscience of consciousness, this perspective shares the importance of the brain in processes of consciousness but in a distinct way. In fact, the suggestion of this study is that a neuro-ecological perspective represents a revolution in the neuroscience of consciousness in that it seeks to overcome and avoid the shortcomings of mainstream neuroscience of consciousness. This critical analysis of consciousness research affirms just that.

The adjusted assumptions of a neuro-ecological perspective are presented as the three features of the nonbinary theoretical framework: *naturalistic monism*, *integrated realism* and the *world-modelling functions of the meaning-making response of living organisms*. Things are not always what they seem, and therefore the common-sense dualism of the human condition (monistic duality) is described as biological duality or the coexistence of the lived body and living body. Consciousness is grounded in the living person and is not a thing. The notion of integrated realism replaces metaphysical realism, as well as the rejection of monistic duality as merely naïve, with the idea of the second-person perspective. Extramental reality that exists independently from observation is known through the engagement of the human body (person). Like the model-dependent realism that brings to the fore those features that our perceptual apparatus allows, integrated realism is the product of five sensory and cognitive-perceptual structures that allow the human organism to engage with or respond to the world.

In addition to the nonbinary theoretical framework, a neuro-ecological perspective also seeks to avoid the two main fallacies in consciousness research: the reification of consciousness and the mereological fallacy. Consciousness is a process and not a thing, and the logic of a systems reality is needed to overcome the implicit assumptions about consciousness as an entity in the world. Instead of reducing consciousness to some of its elements, a neuro-ecological perspective seeks to acknowledge its complexity, its multidimensional fabric. Therefore, unidimensional models are replaced by multidimensional descriptions.

Consciousness research for decades, if not centuries, has been a struggle to solve the mind–body problem. The consciousness revolution in the neurosciences was a discovery of conscious awareness as a topic of research within that framework. The *consciousness revolution in the neurosciences* is a misnomer because it is not the discovery of a topic but an adjustment of perspective that will bring about a revolution in the study of consciousness. And the neurosciences, as the study of the brain (central nervous system), have a huge role to play in a reconceptualised neuro-ecological study of consciousness.

The second claim is that a neuro-ecological perspective currently offers the best alternative way of examining, understanding and explaining consciousness as a body–mind–environment complex. This perspective brings together the insights of the neurosciences and the phenomenology of human experience of consciousness to describe and solve the mystery of consciousness.

The crisis in consciousness research is directly related to what have been identified as the two major stumbling blocks in consciousness research: the mind–body problem, which manifests as the binary theoretical framework, and the reification fallacy. The reification of consciousness to its *thingness* is directly related to the nested assumptions of the binary theoretical framework. While mainstream neuroscience and nonlocal theories of consciousness represent completely distinct ontological entities, they are remarkably similar in many other respects. They illustrate that from a shared theoretical framework, completely different phenomena can be identified as 'consciousness'. The neuro-ecological perspective suggests neither theories of different dimensions nor about different material but theories about processes and not things. Progress in consciousness research will not follow from the proliferation of more of the same kind of theories but from a critical engagement with the nested assumptions that constitute its fabric(ation).

■ The evolution of the crisis in consciousness research

When introducing the title of the book, it was indicated that the *crisis in consciousness research* is about the fact that the term has different meanings, and theories and concepts of consciousness are about distinct phenomena. There is widespread agreement about the conceptual crisis; the term is ill-defined and very different concepts are treated as the same. On a surface level, there certainly is a problem in a domain of research when thousands of publications with the same term are published that refer to different concepts. This could be the product of the cultural relativist view that pervades current consciousness research with the attitude of *live and let live*. If the term 'consciousness' is used, it is assumed to be about the same phenomenon, *consciousness*. But the real crisis is not just conceptual, definitional and ontological but the absence of an awareness of these problems. The *crisis in consciousness research* is exemplified by the fact there is not even an agreement on what the crisis is. This will be explained in two steps.

Firstly, there seems to be widespread dissatisfaction in the neuroscience of consciousness and an acknowledgement of a problem (if not a crisis). In his recent analysis of theories in (mainstream) neuroscience of consciousness, Lamme (2018, p. 9), for example, says that they are at a stalemate because they are about different explananda. In yet another study with Northoff (2020, p. 569), he finds a 'dazzling diversity' in the neuroscientific theories they investigate; different theories 'target distinct explananda', but 'the different theories of consciousness may not necessarily be incompatible with each other'. Instead, they see a 'convergence between the different theories of consciousness towards a more interdependent, integrated, and distributed neural basis of consciousness' (p. 577).

These spark plug theories are not in competition because they address different dimensions of consciousness, and therefore, a convergence of unidimensional theories located in the cortex is surely possible. But do they illuminate consciousness?

Despite claims of a convergence, voices from inside mainstream neuroscience of consciousness reject the corticocentrism and mental reductionism of these theories. Panksepp, for example, states that mainstream corticocentric cognitive neuroscience of consciousness is 'plainly wrong' (Panksepp & Biven 2012, p. 484). In a recent publication, Solms (2021) suggests that the:

> [*S*]olution proposed in this [*his*] book is a radical departure from conventional approaches. Since the cerebral cortex is the seat of intelligence, almost everybody thinks that it is also the seat of consciousness. I disagree; consciousness is far more primitive than that. It arises from a part of the brain that humans share with fishes. (p. 4)[407]

407. That too many different dimensions of consciousness (different things) are treated as theories of consciousness simply because the term 'consciousness' is used is well known (e.g. see Boly et al. 2013, p. 10f.; Hohwy & Seth 2020, p. 9ff.; Klein, Hohwy & Bayne 2020).

If they are correct, many mainstream neuroscientific theories of *consciousness* are not really about consciousness. They are the result of the mereological fallacy of conflating consciousness with one of its dimensions or the exchange of concepts as if consciousness as experience and consciousness as cognition are the same thing. But the crisis runs much deeper than this.

The solution to turn towards affective consciousness lower in the brain is also not only trapped in the legacy of the binary theoretical framework but a replacement of one spark plug theory with another.[408] Different explananda in these debates are about different dimensions of consciousness within the binary theoretical framework and its nested assumptions that are taken as consciousness as such. Therefore, Damasio (2018, p. 237; see also Damasio 1994, pp. 158–159), a forerunner of a neuro-ecological perspective, labels mainstream neuroscience of consciousness 'wrong on all accounts'. From a neuro-ecological perspective, it is *wrong* for the main reason that it is not really about consciousness.

Consciousness cannot be an entity generated by the brain, a special feature of matter or a biological process all at once. Consequently, theories about matter, processes of biological organisms and mechanisms in the brain or dimensions of consciousness cannot be about the same explananda. The fabric(ation) of consciousness is deeply embedded in very diverse configurations of nested theoretical and ontological assumptions. Calling dimensions of consciousness 'consciousness' does not make it consciousness as such. Spark plug theorists accuse piston theorists (and vice versa) of not producing theories about engines. But no spark plug kind of theory is a theory about an engine.

Thus, the second step is to acknowledge that the real crisis in consciousness research is not a disagreement about which spark plug theory is correct but the lack of insight into the way in which scholarly fabrications produce notions and theories of consciousness that are completely subject to the nested theoretical assumptions and without engagement with consciousness itself. The fabric of consciousness is fabricated in scholarly constructs without concern for consciousness as such.

For mainstream neuroscience of consciousness to become a scientific study of consciousness as a multiplex phenomenon, it should adjust its most

408. Solms prioritises feelings over cognition and identifies structures in the midbrain as the seat of consciousness. Consciousness is about 'lived experience'. However, it merely supplements conscious awareness with affective awareness and does not yet describe the processes of a conscious organism. It is noteworthy that the third pillar of his theory, by means of which consciousness is pictured as an 'engineerable' entity, is a theory about *cognition* and not consciousness (see Solms 2021, pp. 4, 134–138, 151ff.). His 'theory of consciousness' that he seeks to implement in a model of artificial consciousness is basically a theory of affect.

basic methodological assumptions about consciousness research. As Zeman (2008, p. 313) remarks at the end of an overview of neuroscientific theories of consciousness, the 'appropriate antidote is not to produce yet another theory of the origins of consciousness – but to adjust our assumptions'. The issue is not which spark plug theory is the best or correct (not wrong on 'all accounts') but the very nature of these kind of theories. Theorists are looking in the wrong place, as Bartra (2014, p. 4) points out about neurobiologists: they have been looking for consciousness in the functional structures of the brain when it might be found elsewhere. And this 'elsewhere' is, in fact, not only in different brain structures but in different theoretical locations altogether. And consciousness is not only to be found elsewhere, but it also seems to be something else from the mereological fabrications. And the something else is not just another kind of *thing* but the discovery that consciousness is a process. Solving the mystery of consciousness will not come from more experimental work or brain imaging (as important as these may be), but as Thompson (2014, p. 10) says, 'we need conceptual work, theoretical work. We may need to radically change how we think about things'. He uses the analogy of a cathedral to explain the multidimensional nature of the phenomenology of consciousness. Thinking that consciousness is in the head is (Thompson 2014):

> [*L*]ike saying a cathedral is in the stones. You need stones, of course, and you need them to be connected in the right way. But what makes something a cathedral is also iconography, tradition, and its being a place of worship. In other words, the larger context in which the structure is embedded helps constitute it as a cathedral. In an analogous way, consciousness isn't in the neurons or their connections. Here the larger context that constitutes consciousness – in the sense of sentience, or felt awareness – is biological: consciousness is a life-regulation process of the whole body in which the brain is embedded. In the case of human consciousness, the context is also psychological and social. (p. 9)

It is not only that there is a disagreement on what the crisis is but that in a great deal of consciousness research there is not even an awareness of the crisis. The main challenge in current consciousness research is not to solve the mystery of consciousness but to register the crisis. The crisis is not just in the different research traditions but in the way in which they are fabricated. It goes much deeper than conceptual disagreements or theoretical deadlocks but is about the fact that consciousness research is about very different phenomena being called consciousness.

The crisis in consciousness research can be summarised by means of two simple sentences: a great deal of consciousness research is not about consciousness as such, and the crisis is not only because of the proliferation of concepts and theories of consciousness but the absence of a critical reflection about this situation. The remark by Crick that it is not necessary to define consciousness is haunting consciousness research in the lack of a critical debate about the fabric(ation) of consciousness – the fabric is completely dependent on scholarly fabrication and has very little to do with its natural fabric. Calling something 'consciousness' does not mean it is about consciousness as such.

Consciousness as a body–mind–environment givenness

Consciousness research has always been concerned with the very essence of what it is to be human. That is, with the question of 'what we are as human beings'. Thus, regarding ASCs, defining the 'C' in ASC is clarifying what it is to be human; solving the mystery of consciousness is illuminating what kind of creatures we are as human beings. A neuro-ecological perspective brings the insights of neuroscientific research and the phenomenology of consciousness together in fabricating consciousness as a multiplex process, as a body–mind–environment complex. It is a neuro-bio-ecological systems phenomenon. Thompson illustrates this conception of consciousness with another analogy. Saying that it is just in the brain is like saying that flight is inside the wings of a bird. Just as flight does not exist if there is only a wing, without the rest of the bird, and without an atmosphere to support the process, and without the precise mode of organism–environment coupling to make it possible, so consciousness does not exist if there is just a brain without bodily and environmental factors (Thompson 2014, p. 4).

What it is to be human largely depends on how we understand consciousness. The human condition is a body–mind–environment givenness that need not be explained in the terms in which it is experienced. It is a givenness (a fabric) as well as subject to our fabrications. The study of consciousness is not about a specific object in the world but about the human condition. There is a sense in which it is true for all consciousness research in that it does not depart from a study of consciousness as such but from certain dimensions of consciousness. The oft-repeated suggestion of abandoning the term 'consciousness' because of the 'crisis' has yielded no positive results. Instead, we have seen a proliferation of theories and concepts. An alternative to abandoning the term is to complexify the study of consciousness. That implies an acknowledgement of its multiplex nature and methodological steps to weed out the conceptual reductionism.

Consciousness is not a thing, but as a process, it is no less real. It is a givenness of certain biological organisms within their environment. Like sunsets, it always had a material basis, but the explanation need not be in terms of the material experience. The challenge of consciousness research is to explain and unravel the complexity of living organisms that testify about what it feels like to experience, live and be a self. And the experience of a self entity need not be the basis of our explanations.

Consciousness research is important because consciousness is fundamental to our visions about what kind of creatures we are as human beings. And one can even agree that indirectly (for some more directly) it shines light on our understanding of what the world is made of. Sorting out whether we are our brains, are without our brains or only exist as a process in a body–mind–environment complex is a fundamental challenge to all concerned with the scientific understanding of our world.

Concluding remarks

From the rhetoric of the so-called consciousness revolution in the neurosciences to the numerical dominance of the neurosciences in consciousness research over the last few decades, it is not unreasonable to accept that this is the heart of current consciousness research. Likewise, theories of nonlocal consciousness suggest that mainstream neuroscience of consciousness is fundamentally flawed and suggest that we are on the brink of a revolution in our understanding not only of consciousness but of the world altogether. I have called the neuro-ecological perspective a revolution in the neuroscience of consciousness. All three cannot be true at the same time.

From a neuro-ecological perspective, there is a great deal of merit in Rose's (2012, p. 58f.) argument that the essential human meanings embedded in our being conscious have somehow been lost in the neuroscientific reductionism of consciousness to cognition. The same is true of its flip side, the nonlocal theories of consciousness. This constitutes a crisis that needs to be overcome.

The crisis in consciousness research is not a result of the variety of theories of consciousness and the proliferation of theories of different phenomena being called consciousness but the lack of critical reflection about the fabric(ation) of consciousness. The general academic atmosphere of cultural relativism results in an acceptance and toleration of every theory and concept of consciousness as if they are all about the same phenomenon. The resulting confusion and false agreements, as if progress is being made with consciousness research, is hampering any such progress. And the proliferation of theories and concepts of consciousness in mainstream neuroscience of consciousness is hampering the quest to search for a unifying understanding of consciousness.

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Index

‘What is consciousness?’ is widely regarded as the ultimate scientific question of the 21st century. Within this book’s pages, readers embark on an exploration concerning the very nature of what it is to be human: what humans are made of and what kind of creatures we are. For many, it also includes the question of what the world is made of. The mystery of consciousness is about the very fabric of the universe. What we take to be human has far-reaching implications for us and is fundamental not only to our understanding and explanation of religion, ethics, medicine and other cultural practices but also to how we live and order our societies, how we treat other animals and how we think about life. However, there is no agreement on precisely what consciousness is, where to find it, or how to study it.

This work presents two revolutionary concepts that redefine the landscape of consciousness research. Firstly, it boldly declares the state of diversity within consciousness studies as a crisis. Secondly, it proposes an innovative neuro-ecological perspective, offering a fresh alternative to problematic traditions centred on the crisis’s core.

The conceptual analysis of consciousness research is based on the author’s reading of numerous sources and is built on the research results available to scholarship. The book engages with voices from a tapestry of scholarly disciplines on consciousness, including neuroscience of consciousness, philosophy of mind, neuropsychology and neuro-anthropology. It represents a transdisciplinary analysis that participates in all these scholarly discourses and contributes to the interdisciplinary creation of knowledge about consciousness. As a beacon of insight at the forefront of consciousness research, *The fabric(ation) of consciousness* offers invaluable perspectives for scholars in the field.

Both the breadth of the topic of this book and the depth of its analysis are extraordinary. The copious references in the footnotes alone display Craffert’s mastery of sprawling research. The book’s identification and intricate analysis of a crisis in consciousness studies makes it a legacy work for researchers in the field. Craffert surveys the crowded and confusing landscape of consciousness studies, organises its subdisciplines into clusters, shows how they relate to one another, describes their diverse methodologies, and – this is very important – dissects their assumptions.

This book is well-structured, and the writing is admirably clear. The masterful preface invites readers to take the plunge, and the subsequent introduction clearly and elegantly lays out the book’s outline and the rationale for each section.

Judging from the book’s content, its audience will be the rapidly expanding ranks of scholars involved in brain science, consciousness research, mind–body problems and the philosophy of mind. In addition, the book will appeal to scholars curious about consciousness studies but who may not be deeply immersed in the field.

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