



What a “Landscape of Consciousness” Means for Neurology and Neuroscience

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Abstract

Purpose of Review To gather (almost) all (reasonable) theories of phenomenal consciousness, describe them neutrally (largely in the words of their authors), and organize them in a comprehensive, cross-disciplinary taxonomy of categories—“Landscape of Consciousness.” Perhaps the process can encourage novel ways of thinking among medical (psychiatry/neurology) practitioners and neuroscientists.

Recent Findings Landscape organizes more than 350 explanations of phenomenal consciousness across physicalist and non-physicalist traditions. There are 10 primary categories: Materialism. Non-Reductive Physicalism. Quantum & Dimensions. Information. Panpsychisms. Monisms. Dualisms. Idealisms. Anomalous & Altered States. Challenge. Materialism, with the largest number of theories by far, has 12 subcategories: Philosophical. Eliminative/Illusionism. Neurobiological. Electromagnetic Field. Computational & Functionalism. Homeostatic & Affective. Embodied & Enactive. Relational. First-order. Higher-order. Language. Phylogenetic/Evolutionary. Representative theories are here summarized as (non-exhaustive) examples. The Landscape of Consciousness is a work-in-process—permanently.

Summary Two central theses: (i) understanding phenomenal consciousness at this point should not be restricted to selected ways of thinking or constrained by approved modes of knowing, but should rather seek expansive yet rational diversity, and (ii) issues of sentience, such as AI consciousness, virtual immortality, meaning/purpose, free will, life after death, etc., cannot be understood except in the light of particular theories of consciousness. Implications for psychiatry/neurology and neuroscience may be considered.

Keywords Consciousness · Theories of consciousness · Philosophy of mind · Identity theory · Materialism · Neurobiology

Introduction

Is understanding the fundamental ontology of consciousness, even if it were possible, relevant for clinical practitioners in neurology and psychiatry? Surely not, it would seem. What about for neuroscientists? Again, not much, other than for the very few who are specifically researching consciousness per se.

I don’t disagree with this obvious assessment—to a first approximation. However, digging deeper, I find nuance.

Even within a purely materialist/physicalist worldview, where mental states are entirely the product of physical states and consciousness is entirely the output of the brain without residue, there are literally dozens and dozens of theories, and they differ dramatically in terms of scale (orders of magnitude) and core mechanisms. For all kinds of disorders of consciousness—psychiatric disorders, clearly, but also neurological—the specific nature of consciousness could provide clues to more precise diagnoses and targeted treatments.

Landscape

It is no secret that I have been obsessed with the classic mind-body problem—how can physical states generate mental states—and with the diverse theories of consciousness that

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purport to solve it. In 2024, I published a comprehensive “landscape” of consciousness.

“Explanations of consciousness abound, and the radical diversity of theories is telling. Explanations, or theories, are said to work at astonishingly divergent orders of magnitude and putative realms of reality.”

That’s how I begin “A Landscape of Consciousness: Toward a Taxonomy of Explanations and Implications” (hereafter, “Landscape”), which covered approximately 225 theories of consciousness, organized into 10 categories [1]. The Landscape of theories ranges from the subatomic dance of quantum mechanics to the universal embrace of cosmic consciousness. Physicalist theories flow from quantum collapse, sub-neuronal organelles, neurons and synapses, neuronal nodes and local brain circuits, large-scale brain circuits, brain-wide electromagnetic fields, to embodied, enactive, and extended mind.

I describe each theory neutrally, using the words of its author or adherents, with minimal critique and only for clarification. I do not attempt to judge or rank theories.

Landscape is a classificatory project that gathers, collects, and organizes candidate explanations of consciousness from neuroscience, psychology, computer science, philosophy, physics, and religious/philosophical traditions. It aspires to surface assumptions, chart inter-theory relations, and enable “stress-tests” of consequences (e.g., AI consciousness, free will). The Landscape delivers no verdict about which theory is true. It is, instead, a platform for inquiry that keeps open the question, even the deepest question: Will physical facts suffice to explain the essence of consciousness, even in principle?

Landscape is the product of a lifetime. My PhD at UCLA’s Department of Anatomy and Brain Research Institute was in neurophysiology (thalamocortical evoked potentials). I created and host *Closer To Truth* (CTT), the long-running U.S. public television series and web resource on science and philosophy (cosmos, life, mind, meaning). One-third of CTT focuses on mind/brain/consciousness topics; I’ve discussed consciousness with more than 200 scientists and philosophers (*Closer To Truth* website, www.closertotruth.com, and *Closer To Truth* YouTube channel). (CTT is co-created, produced and directed by Peter Getzels.)

My stance must be humble: collect and categorize, not assess and adjudicate. Seek insights, not answers. Idealistically, I want to capture all the theories, at least all contemporary theories that are sufficiently distinct and have explanations that can surmount an arbitrary hurdle of rationality or conceivability.

My focus in Landscape is narrow and ontological: What spawns or births our inner subjectivity, our felt experience? The theories skew contemporary and scientific, yet I engage humanity’s wider wisdom

across times and cultures. But I am no “consciousness practitioner:” I don’t meditate; I’ve not taken psychedelics; I’ve had no mystical experience. (For these three omissions, I am criticized; I tell my critics I play intense table tennis; they say it doesn’t count.)

To organize theories of consciousness, there are superb surveys and typologies, scientific and philosophical. David Chalmers uses six classes to structure the metaphysics of consciousness [2]. In making a case for panpsychism, he assesses materialism, dualism, and monism as well as panpsychism [3]. Anil Seth and Tim Bayne summarize 22 neurobiological theories seeking to explain the physical basis of consciousness. They intensify the mystery by observing, “Notably, instead of ToCs [theories of consciousness] progressively being ‘ruled out’ as empirical data accumulates, they seem to be proliferating” [4]. This seems telling.

I am less restrictive. My quasi-“Overton Window” of consciousness [5]—the range of explanatory theories I feel comfortable presenting, if not propounding—may be wider than those of others, whether physicalists or nonphysicalists. One reason for my wider window is the unsolicited theories of consciousness that stream into *Closer To Truth*, some of which I find intriguing if not convincing.

After Landscape was published, a book seemed the next step. I’d scarcely sketched a proposal before realizing the futility: a volume stillborn, obsolete on its publication date. Far better: a dynamic website, adding and updating theories in real time, and authenticated by the theorists themselves—Landscape of Consciousness website [6] (See Box 1, “Landscape of Consciousness.”)

What is Consciousness?

Let’s take a step back. What is consciousness? There are many definitions, and this is part of the problem. So, to begin making sense of what consciousness is, we have to specify what we’re talking about. AI pioneer Marvin Minsky called consciousness “a suitcase term”, meaning that people toss in whatever they wish, so that it becomes turgid with related but confounding concepts like perception, attention, wakefulness, memory, emotion, and intelligence. I mean, none of these. By consciousness, I mean “phenomenal consciousness:” your what-it’s-like inner sense, your first-person private felt. It’s the sight of the setting sun, over a stilled ocean; the sound of Mahler’s Eighth Symphony, choral opening; the smell of fresh bread, right out of the oven. These interior experiences are called “qualia,” and they are the crux of the conundrum.

Philosopher Ned Block distinguishes phenomenal consciousness from “access consciousness” [7].

Box 1 Landscape of Consciousness

The Landscape of Consciousness charts more than 350 theories, accessible via five digital lenses [6]: Landscape Grid, <https://loc.closertotruth.com/consciousness-theories>; Landscape Categories, <https://loc.closertotruth.com/all-consciousness-categories-and-subcategories>; All Landscape Theories, <https://loc.closertotruth.com/all-consciousness-categories-subcategories-and-theories>; Landscape Map, <https://loc.closertotruth.com/map>; and Interactive Visualizations, <https://loc.closertotruth.com/interactive>, as well as Search and AI. Each lens refracts inter-theory relationships from different angles.

The diverse presentations are access-facilitators, pedagogical, and programmatic: The idea is to enable researchers to locate their own commitments, to observe neighbors and opponents, and perhaps to discover unexpected affinities or insights.

Because classification can bias evaluation, Landscape remains explicit about its unavoidable arbitrariness: selections are curated for some combination of originality, rationality, coherence, explanatory power, and intellectual interest, and value-judgment inclusions/exclusions and placements in categories must be made. Theory length or position in the Landscape should not be read as endorsement.

Collaborators: physicist/neuroscientist Àlex Gómez-Marín on vision, mapping, novel entries; digital strategist D. J. Smith on architecture; information designer Deniz Cem Öndüğü on visualizations; Sean Slocum and Sandra Derksen, editors. A note of appreciation to the anonymous reviewer for pointing out the paper/theory by Andrew Budson and colleagues, “Consciousness as a Memory System,” a summary of which is included. A more extensive presentation has also been added to the Landscape website. Indeed, one purpose of the Landscape website is to solicit, recognize, and explore new theories.

Finally, Landscape of Consciousness is a work-in-progress—permanently.

- Phenomenal consciousness: “Experience; the phenomenally conscious aspect of a state is what it is like to have it.”
- Access consciousness: “A representation is access-conscious if it is poised for use in reasoning and for direct rational control of action and speech.”

Two Foundational Theses

Landscape is driven by two theses:

1. Epistemic pluralism with rational guardrails. Understanding consciousness at this point should not be restricted to selected kinds of theories or constrained by approved modes of thought; wide, rationally disciplined diversity is the guiding principle.
2. Implication dependence. Deep questions about sentience, such as meaning and purpose, AI consciousness, virtual immortality, personal identity, free will, and even post-mortem survival, cannot be adequately addressed except in the light of particular theories of consciousness. Theories constrain consequences [8].

Identity Theory

A crucial insight is that any putatively complete explanation of consciousness must ultimately make an identity claim (explicitly or implicitly). If a theory asserts, for example, that global neuronal brain broadcasting is sufficient, then global broadcasting just *is* consciousness; remove it, and there is nothing it is like to be the organism. If electromagnetic fields generate consciousness, then these fields *are* consciousness in the same strong sense that Clark Kent is Superman [9].

Why insist on identity? Because it is the only way to explain consciousness truly. All other weaker relations (e.g., correlation, constitution without identity, causal dependence) leave qualia as unexplained danglers. A theory that aspires to finality must tell us what, in nature, the sentient feel *is* (or, in the case of eliminative/illusionism, explain why such a target is incoherent and how the appearance of feel is generated without remainder). Identity need not be simple (e.g., one-to-one mapping); it may be a structural identity at different levels of organization or a necessary formal property. But identity it must be.

For example, predictive processing offers a unifying story about brain function, but unless a specific predictive structure is claimed to be identical with experience, the theory remains a theory of perception/cognition rather than one of consciousness. The Landscape makes such identity commitments explicit.

In other words, I am not using Identity Theory to solve the mind-body problem. Others do, but I do not. I use Identity Theory to force theorists of all persuasions to confront the blunt reality of what they claim. The crux: Some immutable “consciousness identity” occurs in every sentient creature. Something just *is* consciousness.

Landscape Categories

The Landscape now groups more than 350 theories of consciousness into ten categories, the first eight ranging from physicalist to non-physicalist (Figure 1, Landscape Map, created by Àlex Gómez-Marín). Overlap is acknowledged, and border disputes are expected; classification is heuristic, not dogmatic.

Materialism

Consciousness is entirely physical, produced solely by physical processes in physical systems (e.g., biological brains), and thus all mental states can be explained wholly by physical states (e.g., neurobiological, electromagnetic, computational, homeostatic), which ultimately can be

A LANDSCAPE OF CONSCIOUSNESS

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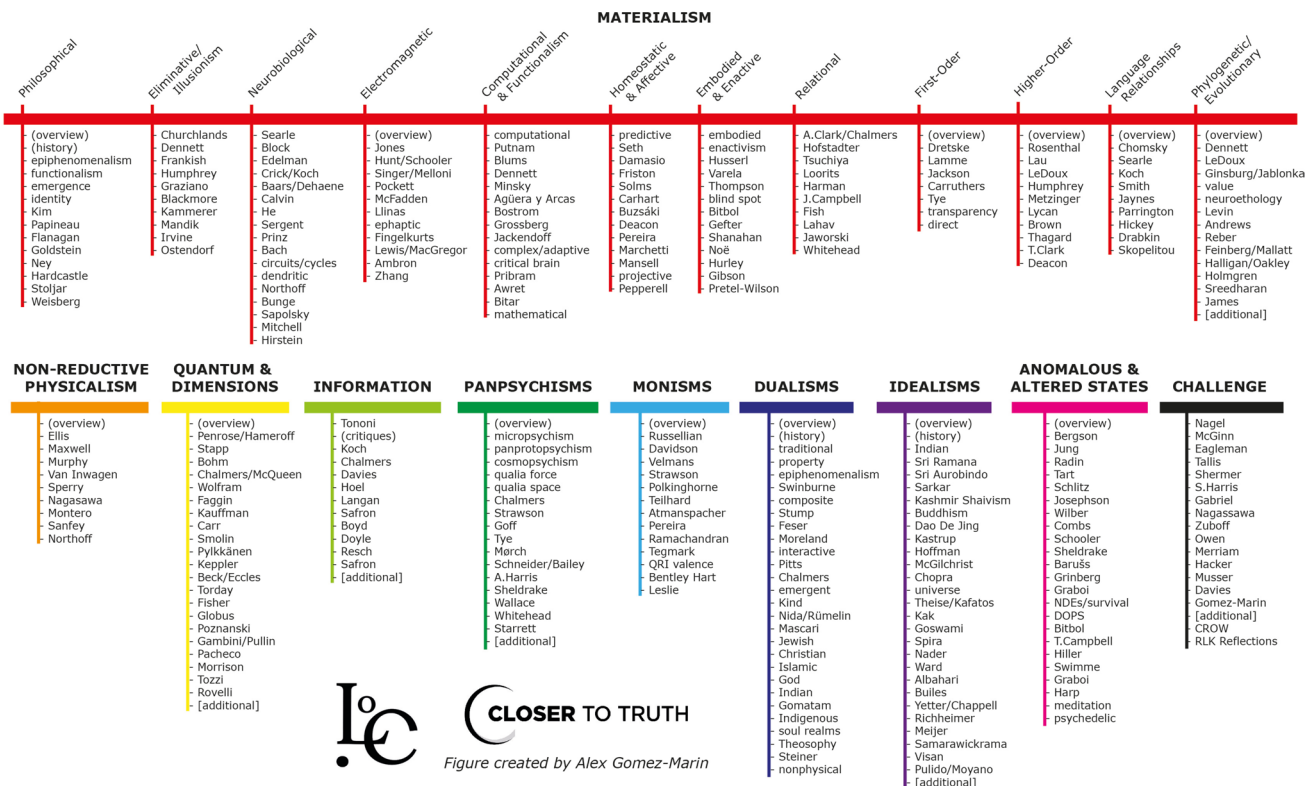


Fig. 1 This Landscape of Consciousness map, created by Alex Gómez-Marín, charts (almost) the entire Landscape, with all Consciousness's first-level categories (10), Materialism's second-level subcategories

reduced to fundamental fields and particles. There are no mental properties beyond the physical; qualia are nothing more than complex neural organization. Materialism has twelve subcategories to organize the large number of theories (see Fig. 1).

Non-Reductive Physicalism

Consciousness is entirely physical, solely the product of physical systems (e.g., biological brains), but mental states or properties resist complete reduction to physical states and cannot be entirely explained by physical laws or descriptions. Mental states or properties are irreducible in practice and perhaps in principle, while remaining physically realized. Higher-level properties have a kind of autonomy: top-down causation and strong emergence are key principles, but the metaphysics remains physicalist.

Quantum & Dimensional

Fundamental physics is constitutive of consciousness, with diverse mechanisms and locations: for example,

(12), and (almost) all specific theories (>300). Theories are abbreviated, generally with the theorist(s) name(s)

quantum state reduction (collapse of the wavefunction), coherent quantum dynamics in specific substrates (e.g., microtubules), and higher-dimensional geometry/topology. Quantum mechanics plays a necessary role in generating consciousness, beyond its widely accepted role in all physical entities. Such proposals aim to connect the indeterminacy, superposition, and entanglements of quantum theory with the unity and indeterminacy of phenomenal experience. Quantum theories vary widely in terms of locus of impact and whether quantum processes are merely enabling or identical to phenomenality. Quantum theories are motivated by the sense that classical neuroscience lacks the resources to explain phenomenality and unity.

Information

Information is taken as reality's basic currency, more fundamental than space-time or matter-energy, and consciousness is identified with, or realized by, specific informational facets—structured, integrated, or self-referential information and causal organizations (e.g., integrated information).

Advocates emphasize formal, substrate-neutral measures to connect phenomenology with structure. Thus, organization and causal structure, not substance, explain the qualia and unity of consciousness.

Panpsychisms

Consciousness (or proto-consciousness) is primitive, a non-reducible, ubiquitous feature of every part of physical reality, similar to the fields and particles of fundamental physics. Complex minds are composed of basic experiential constituents at this deepest level of reality. The challenge is the “combination problem:” how do myriad micro-experiences yield a unified macro-experience?

Monisms

Monisms treat reality as exactly one substance, kind, stuff, ground, or being that manifests both everything mental and everything physical. In neutral monism, neither “physical” nor “mental” is fundamental; both derive from a common base. Thus, mind and matter are two aspects or manifestations of a single underlying reality. Monism avoids the weak resources of materialism and the interaction problem of dualism by dissolving the unbridgeable split.

Dualisms

Classical substance dualism posits an immaterial mind (or “soul”) interacting with a material brain; reality is composed of two radically different kinds of existences—mental and physical. Dualism accounts for first-person data that materialism/physicalism struggles to match, but it must surmount two high hurdles: How could the nonphysical interact with the physical, and how to reconcile nonphysical interventions with conservation of physical laws (i.e., the closure of the physical)? Property dualism posits irreducible mental properties. Emergent dualism envisages “souls” generated by biological complexity under higher-order psychophysical laws.

Idealisms

Mind or consciousness is fundamental and universal, the ultimate reality; the physical world is derivative, an appearance or virtual construction in and of consciousness, or an outright illusion. Metaphysical elaborations vary on whether there is one universal mind, many minds, or both (as aspects). Analytic idealism treats reality as constituted by mental processes. Idealism originated in the Vedic scriptures of ancient India and evolved into a sophisticated

concept in Indian philosophy. Different schools vary in their understanding of how the world relates to the cosmic mind.

Anomalous & Altered-State Programs

This category contains not so much theories of consciousness themselves, but rather presents data, often controversial, that inform or reveal theories of consciousness: parapsychological research (psi), extrasensory perception (ESP), near-death experiences, out-of-body experiences, meditation, and psychedelic states. The argument is that physicalist accounts neglect relevant phenomenology and that this data may reveal constitutive features of consciousness, such as nonlocal mind–matter interactions. Standards of evidence and susceptibility to diverse errors are continuing points of contention: illusion, delusion, fraud, imperfect experimental design, unwitting experimenter bias, ex ante sample selection, ex post data selection, ex post reasoning, and/or plain-old wishful thinking. Advocates argue that the data are robust; only the mechanism is uncertain.

Challenge

Challenge theories contend that explaining consciousness may be beyond human cognitive capacity (mysterianism), or that our conceptual resources are misaligned and may require radical reconceptualization. Evolution felt no pressure to select for understanding consciousness.

Materialism’s 12 Subcategories and Example Theories

The following are twelve subcategories under Materialism, each with example theories (Fig. 1). (All theories can be found on the Landscape of Consciousness website, along with their references, 6.) These theories are representative, hardly complete; examples, hardly exhaustive.

Philosophical

Ways of approaching consciousness (e.g., epiphenomenalism, functionalism, emergence, identity theory, supervenience).

Epiphenomenalism

Conscious experiences are real but causally inert by-products of brain activity. Physical processes determine behavior, while phenomenality “rides along” without influencing the physical world (like foam on a wave).

Functionalism

What makes a state conscious is its functional/causal role and informational organization, not its material substrate. If the right architecture is present, consciousness happens in any medium (e.g., silicon), not only in carbon—this is called “multiple realizability.”

Emergence

Consciousness arises from complex physical organization. On weak emergence, it is in principle reducible (or explainable) in physical terms (i.e., chemistry, physics). On strong emergence, consciousness involves novel, irreducible properties, not deducible from biology, chemistry, and fundamental physics.

Mind-Brain Identity Theory

Each mental event just is a neural event—two descriptions of the same physical reality. Eliminate the neural state or condition, and there is nothing left to constitute the mental state or experience.

Supervenience

There can be no mental difference without some physical difference: fixing all physical facts fixes all mental facts. Supervenience expresses dependence/constraint and is compatible with both reductive and nonreductive theories.

Eliminativism/Illusionism

Eliminativism: mind is a myth; mental states do not exist. Illusionism: consciousness *seems* real but is a ruse, a brain trick. Phenomenal properties as commonly conceived do not exist, or are user-interface illusions created by cognitive systems.

Churchlands' Eliminative Materialism

Folk-psychology posits that beliefs, desires, and qualia, as ordinarily understood, are parts of pre-scientific thinking to be displaced by neuroscience. As neurocognitive theories advance, many common mental categories will be eliminated rather than reduced.

Dennett's Illusionism and Multiple Drafts

Consciousness is not a private, inner, single Cartesian theater, but a competition of parallel “drafts” in the brain that yields winning reportable contents. Consciousness is what

gets “fame in the brain.” The “hard problem” dissolves when neuroscience explains access, dispositions, and behavior—phenomenality is a user-illusion.

Frankish's Illusionism

Consciousness is not what it seems; qualia are illusions, not inner, non-physical realities. We systematically misrepresent experiences as having these nonphysical qualitative properties; in reality, there are only complex informational/functional states. Explaining consciousness means explaining why we believe in qualia, not positing qualia themselves.

Humphrey's Magical-Compelling User Illusion

Consciousness is an evolved illusion—an inner show that feels real but isn't what it seems. It is a vivid self-model that endows sensations with value and emotional force. Its “magical” feel is a feature of the brain's presentation layer, not evidence for nonphysical properties.

Graziano's Attention Schema Theory

Consciousness is the brain's internal model of its own attention processes, not a mysterious essence. Attributing awareness is part of this model, which the system uses to predict and control attention, yielding the intuition of a nonphysical perspective.

Neurobiological

Grounds consciousness in specific brain mechanisms—neuronal transmission, neural circuits, connectome pathways, neural correlates of consciousness.

Edelman's Neural Darwinism and Reentrant Neural Circuitry

Consciousness arises from evolutionarily selected neural circuits and their dynamic reentrant activity. The brain constantly selects and synchronizes neural groups through recursive signaling to integrate experience. Consciousness arises from dynamic, reentrant circuits that produce a unified scene.

Crick and Koch's Neural Correlates of Consciousness

Consciousness arises from specific patterns of brain activity that are necessary and sufficient for experience. Seek the minimal neural conditions jointly sufficient for specific conscious contents. Neurons fire, transmit chemicals, and form circuits that correlate with particular conscious states. (Even

with perfect correlations, it's not at all clear how physical brain activity produces mental subjective experience.)

Baars's and Dehaene's Global Workspace Theory

Consciousness arises when information is globally broadcast across the brain's processing systems. Specialized processors compete; the winners are globally broadcast to a workspace, enabling flexible reporting, reasoning, and control. Conscious access is thus a functional-computational property realized by large-scale cortical networks.

Consciousness as a Memory System

Consciousness evolved as part of the episodic memory system, likely to enable a flexible recombining of information, and it was subsequently co-opted to produce other functions, such as problem-solving, abstract thinking, and language. Hippocampal-based episodic circuits plus distributed cerebrocortical systems (visual, auditory, semantic, etc.) are the physical substrate of conscious contents.

Electromagnetic Field Theories

Consciousness is, or supervenes on, brain-wide EMFs generated by currents in the 3D neural web. Neurons matter because they shape the field patterns, but the fields per se are what realize phenomenal feel and unity.

Jones's Electromagnetic Fields

Mind as brain-generated electromagnetic fields, not just products of neuronal firings. Field dynamics are treated as the locus where distributed neural events become unified experience.

Hunt and Schooler's General Resonance Theory

Consciousness arises from resonance across scales—synchronized oscillations linking neural and possibly broader physical systems. Resonance provides the mechanism for integration and the graded richness of experience.

McFadden's Conscious Electromagnetic Information Theory

The brain's EM field carries integrated information that constitutes conscious experience. Neural spikes write to the field; causal efficacy runs via field-to-neuron feedback loops. In other words, conscious EM fields don't just mirror neural activity—they causally influence thoughts and actions.

Computational & Functionalism

Mind is computation performed by the brain. Functionalism posits that mental states are defined by their roles, not by their substrates. This stance motivates substrate-independent possibilities for artificial consciousness, which is why many AI adherents assume both concepts: computational functionalism.

Computational Theories

Families of accounts specifying particular computational architectures, seeking mechanistic links from algorithmic organization to phenomenology and first-person reporting.

Blums' Conscious Turing Machine

A formal architecture inspired by the Turing Machine in which a "conscious" controller coordinates modules via explicit global access. It offers precise roles for attention, working memory, and reportability in a mathematically specified system.

Agüera y Arcas's Computational Functionalism

Sufficiently rich machine learning systems could instantiate conscious processes by virtue of their functional organization. Biological implementation is not privileged if causal/representational roles are preserved.

Grossberg's Adaptive Resonance Theory

Top-down expectations and bottom-up signals interact via resonant dynamics that stabilize percepts and stimulate learning. Conscious contents correspond to resonant states that achieve global coherence.

Complex Adaptive Systems Models

Consciousness is a property of large, adaptive systems operating near criticality, and featuring self-organization and multi-scale feedback. Emergent order and robustness, not centralized control, explain integration and flexibility.

Critical Brain Hypothesis

The brain operates near a critical point between order and disorder, maximizing information processing and dynamic range. Criticality supports rapid integration and flexible switching associated with conscious states.

Homeostatic & Affective

Consciousness is brain regulation of internal bodily states (homeostasis) and affect (emotions); predictive, free-energy, and active inference theories align here.

Predictive Theories

Brains are prediction machines that minimize error or free energy by iteratively and continuously updating generative models. Conscious contents reflect high-level hypotheses that best explain sensory and interoceptive signals.

Seth's "Beast Machine" Theory

Consciousness arises from the brain's predictive guesses about sensory inputs—not from the inputs themselves—predictions that serve survival and regulation objectives. The brain constantly generates top-down "controlled hallucinations" to interpret ambiguous sensory signals.

Damasio's Homeostatic Feelings and Emergence of Consciousness

Consciousness arises from feelings that monitor and regulate the body's internal state. Interoceptive signals generate "homeostatic feelings" that inform the brain about bodily well-being, and thus frame a sense of self.

Friston's Free-Energy Principle and Active Inference

Consciousness is a process of reducing surprise and minimizing variational free energy by predicting and adapting to sensory inputs. The brain creates internal models that infer causes of sensations to reduce prediction errors. Conscious perception reflects inference over hidden causes; attention and iterative action optimize predictive precision and behavioral adjustment.

Solms's Affect as the Hidden Spring of Consciousness

Consciousness is fundamentally affective; it begins with feelings rooted in homeostasis. Affect and motivation originate in subcortical systems and constitute the core of conscious experience; cognition is secondary. Consciousness emerges when affective value guides inference and learning, emphasizing the integration of brainstem and cortical functions. The brainstem tracks bodily needs; affective states signal prediction errors in survival terms.

Carhart-Harris's Entropic Brain Hypothesis

Consciousness reflects the brain's entropy level: higher entropy means richer, looser experience; too high or too low means loss. Brain states vary along an entropy scale; psychedelics increase entropy and neural flexibility by disintegrating high-level priors, expanding the repertoire of brain states.

Embodied & Enactive

Brain–body–world coupling; cognition shaped by body and enacted via active world engagement; neurophenomenology as a conceptual methodology.

Embodied Cognition

Cognition is grounded in bodily form and action; sensorimotor capacities shape and (in part) constitute conscious experience. The body is not merely an input–output device, but rather an irreplaceable part of the cognitive mechanism. Without a body, human consciousness would be unrecognizable, if existing at all.

Enactivism

Mind is enacted in continuous organism–environment coupling; perception is external interactions rather than strictly inner model-building or representations alone. Consciousness is constituted by sensorimotor engagement with the world as well as by personal agency.

Varela's Neurophenomenology

Integrates disciplined first-person reports with neuroscience to link experience with mechanism. Mutual constraints between phenomenology and neuroscience aim to make consciousness a legitimate scientific field that takes holistic experience seriously.

Thompson's Mind in Life

Argues for deep connection and continuity between mind and life: basic sentience arises from self-organizing, autopoietic processes at the foundations of life. Embodiment and enaction ground consciousness beyond the brain (though still entirely physicalist/materialist).

Gefters's Enactive-QBist Engagement

Links enactive cognition with a QBist interpretation of quantum mechanics, where quantum theory enables agents

to make sense of their experiences, rather than a description of an objective, external reality: knowledge and world are co-constituted by agents' actions and updates. Consciousness is framed via participatory engagement rather than by passive representation.

Relational

Subject–object or organism–environment relations as constitutive of conscious content; active, transformative connections.

Clark and Chalmers's Extended Mind

Cognitive processes can extend beyond the brain into the environment when external resources are appropriately integrated (e.g., smartphones). Extended architectures may alter what counts as conscious access and control—ultimately, or even today.

Hofstadter's Strange Loops

Self and consciousness arise from self-referential, hierarchical loops that enable a system to represent itself. The 'I' is an emergent pattern in a tangled hierarchy rather than in a simple module.

First-Order

World-directed intentional states are sufficient in themselves. Consciousness can be directly brought about by external objects.

Lamme's Recurrent Processing Theory

Recurrent (feedback) processing within visual cortex is sufficient for phenomenal consciousness, independent of first-person reporting. Global broadcasting is not required for phenomenality, though it may enable access.

Transparency Theory

When we attend to experience, we “see through” it to the world; phenomenal qualities seem features of external objects, not internal states. Qualia are external properties represented internally.

Direct Perception Theory

We are directly aware of mind-independent objects and their properties, not inner sense-data. Phenomenal character,

qualia, is explained by the external objects and conditions perceived, not internal representations of it.

Higher-Order

Meta-representations about first-order states confer consciousness; perceptions become conscious by second-order thoughts about first-order sensations—a representation of a representation.

Rosenthal's Higher-Order Thought

Consciousness consists of an appropriate higher-order thought about a first-order mental state. Unconscious states become conscious when targeted by specific higher-order thoughts.

Lau's Perceptual Reality Monitoring Theory

Metacognitive “reality monitoring” distinguishes internal imagery from veridical perception, enabling conscious confidence and reporting. Perturbing prefrontal monitoring alters conscious judgments without altering first-order sensations.

Humphrey's Mental Representations and Brain Attractors

Self-related attractor states in the brain generate stable patterns that the system represents as subjective experience. Higher-order organization accounts for the compelling sense of “what-it's-like.”

Metzinger's No-Self Representational Theory of Subjectivity

The brain constructs a transparent self-model that is not recognized as a model, yielding the sense of being a self. Subjectivity is the content of this model; no substantial self exists beyond the representation.

Language Relationships

Language frames, shapes, and enriches conscious content, though basic sentience does not require it. Few theories center on language; most reject it.

Chomsky's Language and Consciousness

Human linguistic capacity reflects a special, biologically based faculty that enables unique forms of thought. Language expands conscious content even if core sentience is independent of syntax and semantics.

Searle's Language and Consciousness

Speech presupposes conscious intentionality; language expresses rather than constitutes consciousness. Nonetheless, language reshapes higher-order awareness via shared social practices.

Parrington's Language and Tool-Driven Consciousness

Tool use and language co-evolved, enabling abstract planning and reflective awareness. External symbol systems extend working memory and conscious control.

Phylogenetic/Evolutionary

Evolutionary trajectories make consciousness expected, not accidental. While evolution actualizes many theories, can evolution per se be a primary, almost standalone theory?

Dennett's Evolution of Minds

Mind and consciousness evolved incrementally via competence-without-comprehension processes. Features like first-person access and reporting derive from cultural and biological evolution, not sudden leaps or metaphysical demands.

LeDoux's Deep Roots of Consciousness

Survival circuits and defensive systems provide deep evolutionary roots for affect and awareness. Conscious feelings emerge when cortical systems conceptualize these ancient responses.

Ginsburg and Jablonka's Associative Learning During Evolution

Unlimited associative learning marks a key threshold for minimal consciousness. Criteria to detect this capacity appear across species and throughout evolutionary history.

Levin's Technological Approach to Mind Everywhere

Goal-directed behavior and problem-solving in diverse, "low-level" biological systems suggest the existence of widespread proto-cognition. Engineering interventions can probe and repurpose such capacities, blurring boundaries of mind.

Andrews's Consciousness Without Complex Brains

Some forms of consciousness may not require complex centralized nervous systems. Evidence from simple organisms motivates caution in setting anthropocentric thresholds.

Reber's Cellular Basis of Consciousness

Cellular-level processes instantiate primitive sentience. Complex minds scale from basic cellular awareness via evolutionary elaboration.

Feinberg and Mallatt's Ancient Origins of Consciousness

Primary consciousness emerged in early vertebrates with elaborated sensory–motor integration and evaluative systems. Potential neural markers (e.g., midbrain tectum) are minimal substrates.

As a PhD in neuroanatomy/neurophysiology, I have long appreciated the mainstream neuroscience position that "any theory of consciousness has to be brain-based." Indeed, virtually all of Landscape's more than 350 theories have the brain as *necessary* for consciousness, though somewhat less than half also have the brain as *sufficient* for consciousness. While almost half of all theories are physicalist/materialist, in which only the physical is real, a subset of these physical theories suggests that consciousness can exist in non-mammalian nervous systems (e.g., octopuses, arthropods). Some even suggest that consciousness is a product of life itself, even of primordial cells, and various theories propose mechanisms for how this might work. Frankly, after spending decades studying consciousness and after three years developing the Landscape of Consciousness (paper and website), I have become less dogmatic and more open-minded. Indeed, there are at least as many specific nonphysical theories as there are physicalist/materialist theories.

While I do try to discern the uniqueness and assess the usefulness of all theories, I do not probe their limitations, critique their flaws, or compare their efficacies. This would certainly be a worthy endeavor, but it goes far beyond the scope of this paper. Indeed, it goes far beyond the scope of my original Landscape of Consciousness review with its already 175,000 words [1], and even beyond the current scope of the Landscape of Consciousness website, which is almost twice as long [6]. As I envision it, an assessment, critique, and comparative analysis of theories could be a subsequent (and more controversial) step in a methodical, multi-year project. I may be making a virtue out of a necessity, but the very fact that I do not critique theories in this paper or in Landscape, but rather treat them all with an equal neutrality and (almost) equal respect, may offer a higher

level of confidence that these descriptions and presentations of each theory accurately represent the author(s)'s intent.

Implications and Applications

In my original Landscape paper and on the Landscape website, we explore the metaphysical implications of theories of consciousness. My primary thesis is that issues of sentence, such as AI consciousness, virtual immortality, meaning/purpose, free will, and life after death, cannot be understood except in the light of particular theories of consciousness. All these are explored in the Implications section of the Landscape of Consciousness website [8]. That's why I argue that understanding consciousness at this point should not be restricted to selected ways of thinking or constrained by approved modes of knowing, but should rather seek expansive yet rational diversity.

Regarding potential applications in the clinical practice of psychiatry or neurology, the simple awareness of the great variety of theories of consciousness, especially materialist theories, might stimulate novel ideas for diagnosis and fresh ways of thinking about treatment. This would be a more nuanced expansion of the practitioner's already comprehensive toolkit, rather than a magic bullet for revelatory diagnosis or breakthrough therapy.

Conclusions

The Landscape of Consciousness is a taxonomic instrument for viewing this vast field of burgeoning theories, where selection seems well out of reach and even convergence remains elusive. Moreover, theories are not always mutually exclusive; several could work together, and theories could be nested.

By organizing theories along a spectrum of metaphysical commitments and focusing on identity claims, scientific evidence, and philosophical analyses, Landscape may help clarify what counts as progress. It insists that theories either state what in nature *is* consciousness or explain, without residue, why such a "what-it's-like" experience arises. As neuroscience continues to advance and theories continue to proliferate, Landscape aims to be a living map continually revised by theorists, as informed by scientific data and guided by philosophical analysis—particularly regarding the implications or consequences of theories.

All the while, Landscape keeps that deepest question open: whether *any* wholly physical theory can give a complete account of subjective experience, even in principle. Holding that question open is not an abdication of science; it is a commitment to follow explanations wherever identity

can be made precise—and to assess, with methodological honesty, one's level of confidence that such an identity is veridical. In all cases, though, the divergent implications of diverse theories of consciousness should not be ignored.

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