

Section 4. Major Current Theories of Consciousness

Before CUWF presents its own interpretation of consciousness, it is necessary to place the discussion within the landscape of major current theories. Consciousness has been approached from neuroscience, cognitive science, philosophy of mind, information theory, systems theory, and embodied cognition. Each approach captures an important aspect of the problem, yet none has fully dissolved the difficulty introduced in Section 3: how physical and biological organization becomes subjective experience, selfhood, and observer-level awareness.

The purpose of this section is not to give a complete history of consciousness studies. It is also not to dismiss existing theories. Rather, the aim is to identify what each major approach contributes, what explanatory strengths it has, and what remains incomplete from the perspective of CUWF. This prepares the reader to understand why CUWF requires a different framing: consciousness as recursive living wave-geometry built upon, and co-developing within, BMIR closure.

The theories reviewed here are not mutually exclusive in every respect. Some address neural correlation, some address cognitive access, some address information integration, some address prediction and regulation, and some address embodiment. CUWF will later treat many of these insights as partial views of a larger structure. However, CUWF differs by insisting that consciousness must be interpreted through two inseparable dimensions: a living self-maintaining substrate, and the dynamical mechanism by which that substrate becomes self-modeling, self-referential, and experiential.

4.1 Physicalism and Neural Correlates of Consciousness

Physicalist approaches begin from the assumption that consciousness is grounded in physical processes. In neuroscience, this often takes the form of searching for neural correlates of consciousness: brain states, circuits, patterns, or dynamics that reliably accompany conscious

experience. For example, conscious perception may be studied through cortical activation, oscillatory synchronization, thalamocortical interaction, attention-related networks, or large-scale brain integration.

The strength of this approach is that it is empirically grounded. It keeps consciousness connected to the body and brain. It allows researchers to compare waking states, sleep, anesthesia, coma, minimally conscious states, perception, attention, report, and behavior. It also avoids placing consciousness outside nature as a separate substance that cannot be studied.

However, neural correlation is not yet full explanation. If a certain brain pattern correlates with pain, the correlation does not by itself explain why pain feels painful. If a region becomes active during conscious thought, the activation does not by itself explain why the thought appears as 'I am thinking.' The gap between neural description and subjective appearance remains. This is the same difficulty introduced earlier as the hard problem.

From the CUWF perspective, physicalism is necessary but insufficient. Consciousness must be physically grounded, but it cannot be reduced to a list of local neural activations. The question is not only which neural processes correlate with experience, but how biological wave dynamics become integrated into a living self-domain in which experience appears from within. CUWF therefore accepts the importance of neural correlates, while seeking a deeper account of how those correlates become self-referential experiential geometry.

4.2 Global Workspace Theory

Global Workspace Theory proposes that consciousness arises when information becomes globally available to many specialized systems. In this view, the brain contains many distributed processes operating in parallel. Some information remains local and unconscious. Other information becomes conscious when it is selected, amplified, and broadcast across a global workspace so that it can guide report, attention, memory, decision-making, and action.

The strength of Global Workspace Theory is that it explains access consciousness well. It helps clarify why conscious information is reportable, flexible, and available for many cognitive functions. It also explains why attention and working memory are closely related to consciousness. A content becomes

conscious when it becomes available to the whole system rather than remaining trapped in a specialized local process.

However, global availability does not fully explain subjective feeling. A piece of information may be broadcast across a system, but why should broadcasting produce experience rather than only functional access? Why does globally available pain become felt pain? Why does globally available color become seen color? Why does information access become selfhood? Global Workspace Theory provides a powerful model of cognitive access, but the deeper questions of qualia, self-meaning, and self-world experience remain open.

CUWF can absorb part of the insight of Global Workspace Theory. Consciousness likely requires integration across distributed processes. However, CUWF argues that global broadcasting is not enough unless the broadcast information is integrated into a living self-model within a BMIR-based domain. In CUWF terms, information does not become conscious merely by becoming globally available; it becomes conscious when it is rendered as meaningful within a recursive self-world geometry.

4.3 Integrated Information Theory

Integrated Information Theory approaches consciousness through the idea of integrated information. It attempts to identify consciousness with a system's intrinsic causal organization: the degree to which the system is both differentiated and integrated as one irreducible whole. In this view, consciousness is not merely information processing, but integrated information that exists for the system itself.

The strength of IIT is that it tries to provide a formal criterion. It does not only ask whether a system behaves intelligently or reports experience. It asks what kind of causal structure a system must possess in order to have experience. This ambition makes IIT one of the most mathematically explicit and philosophically bold theories of consciousness.

However, IIT is also highly debated. Its mathematical measures are difficult to apply to real biological systems. Its implications may extend consciousness or proto-consciousness widely across physical systems, which creates controversy. It also does not necessarily place biological life, embodiment,

metabolic flow, and living self-maintenance at the center of consciousness. From the CUWF perspective, integrated information may describe one important condition, but integration alone may not be sufficient unless it occurs within a living or life-equivalent self-maintaining domain.

CUWF shares with IIT the intuition that consciousness requires integration and cannot be reduced to isolated components. However, CUWF differs by placing integration inside living Entropic Geometry. The central unit is not information alone, but a living self-domain in which boundary, flow, memory, feedback, self-modeling, and experience are recursively coupled.

4.4 Predictive Processing and the Free Energy Framework

Predictive processing and the Free Energy Framework describe the brain as a prediction-generating system. Instead of passively receiving the world, the brain continuously predicts sensory input and updates its internal model by minimizing prediction error or free energy. Perception, action, learning, and bodily regulation can then be interpreted as parts of one predictive control process.

The strength of this approach is that it connects perception, action, attention, and body regulation. It explains why perception is not a direct copy of the world but an active construction. It also fits well with the idea that the organism must regulate itself in relation to its environment. The body is not a passive container for the brain; bodily signals, action, and environmental feedback all participate in the predictive loop.

However, prediction error minimization does not automatically explain subjective feeling. A system may predict and correct input without necessarily feeling pain, fear, beauty, or selfhood. The theory explains how an organism may model the causes of its sensations, but the question remains: when does prediction become experience? When does a body-state prediction become 'I feel afraid' or 'I am in pain'?

CUWF is close to predictive and free-energy approaches in recognizing that perception and action are active, embodied, and regulatory. However, CUWF reframes prediction within a living wave-geometric domain. Prediction becomes conscious only when it is integrated into the self-OS of a living closure

and rendered as self-world meaning. CUWF therefore treats prediction as important, but not sufficient by itself.

4.5 Higher-Order Thought Theory

Higher-Order Thought Theory proposes that a mental state becomes conscious when it is represented by another, higher-order mental state. A first-order state may occur unconsciously. It becomes conscious when the system has a higher-order representation that it is in that state. In simple terms, a perception becomes conscious when the system can in some way represent itself as perceiving.

The strength of this theory is that it approaches self-reference directly. It recognizes that consciousness involves more than first-order processing. There is a difference between a state occurring in the system and the system being aware of being in that state. This is especially relevant for reflective awareness, introspection, and self-conscious thought.

The limitation is that higher-order theories risk a homunculus problem if they are not formulated carefully. If a mental state becomes conscious because another state observes it, one may ask what observes the higher-order state. If another observer is required, the theory may generate an infinite regress. The theory must therefore explain how higher-order representation becomes conscious without adding a hidden inner subject.

CUWF accepts the importance of self-reference, but it does not treat consciousness as a simple relation between first-order and higher-order thoughts. Instead, CUWF interprets consciousness as recursive stabilization of a self-model within a living domain. The self-model is not watched by an inner observer. The recursive operation of the self-model is what constitutes the observer-function.

4.6 Embodied and Enactive Cognition

Embodied and enactive approaches argue that cognition and consciousness cannot be understood by studying the brain alone. Mind is not sealed inside the skull. It is enacted through the living body's

active relation with the environment. Perception, action, movement, bodily regulation, and world engagement are all part of cognition.

The strength of this approach is that it is close to the direction CUWF requires. It rejects the idea of consciousness as disembodied computation. It recognizes that the body is not merely an input device for the brain. The living organism as a whole participates in experience. A conscious being perceives the world through posture, movement, affect, bodily need, memory, and action possibility.

However, embodied and enactive cognition may still lack a sufficiently formal physical substrate for explaining how embodied activity becomes subjective experience. It can describe the body-world relation richly, but may not fully specify the wave-geometric structure or dynamical mechanism through which living embodiment becomes self-modeling consciousness.

CUWF strongly agrees with the embodied direction. Consciousness must be grounded in a living body-domain. However, CUWF adds that the body-world relation must be interpreted through Entropic Geometry, BMIR closure, recursive resonance-stabilization, self-OS formation, and conscious-domain rendering. In this way, CUWF attempts to provide a physical-ontological substrate for the embodied insight.

4.7 Panpsychism and Dualism

Panpsychism and dualism represent two different attempts to address the difficulty of consciousness. Panpsychism proposes, in broad terms, that consciousness or proto-consciousness may be a fundamental feature of matter or reality. Dualism proposes that mind and body are distinct in some deeper ontological sense, often treating consciousness as something not reducible to physical matter.

The strength of these views is that they take consciousness seriously. They do not simply dismiss subjective experience as an illusion or reduce it to behavior. They recognize that first-person experience is difficult to explain using ordinary physical description alone.

However, both views create problems from the CUWF perspective. If consciousness is placed everywhere in matter, it becomes difficult to explain why some systems display rich subjective domains

while others do not. If consciousness is separated from the body as a second substance, it becomes difficult to explain how consciousness interacts with biological life and physical processes. Both approaches risk losing the layered developmental structure that connects matter, life, self-modeling, and experience.

CUWF therefore rejects both body-soul dualism and flat panpsychism. Consciousness is not a separate non-physical substance added to the body. Nor is every piece of matter conscious merely by existing. Consciousness is instead a higher-order self-referential regime of living Entropic Geometry. It arises when wave-patterns are organized within a self-maintaining BMIR closure and recursively projected through a self-model as a domain of experience.

4.8 Why CUWF Requires a Different Framing

The theories reviewed above each capture important parts of the consciousness problem. Physicalism and neural correlates keep consciousness grounded in the body and brain. Global Workspace Theory explains access, attention, and report. Integrated Information Theory emphasizes intrinsic integration. Predictive processing explains perception and action as model-based regulation. Higher-Order Thought Theory highlights self-reference. Embodied and enactive cognition place mind within body-world interaction. Panpsychism and dualism remind us that subjective experience cannot be ignored. However, from the CUWF perspective, none of these approaches alone is sufficient. A full theory must explain not only brain activity, information access, integration, prediction, self-reference, or embodiment. It must explain how these processes become one living self-domain in which feeling, thought, memory, body, action, and world are rendered as experience.

CUWF therefore requires a different framing. Consciousness is not treated as computation alone, information alone, neural activation alone, or a separate mental substance. It is interpreted as recursive living wave-geometry built upon, and co-developing within, BMIR closure.

This framing has several distinctive features. First, it requires a living or life-equivalent substrate. Second, it treats consciousness as a self-referential regime of living Entropic Geometry. Third, it

interprets feeling and thought as experiential wave-modes, not as non-physical additions. Fourth, it treats the self as a dynamically stabilized self-model or self-OS. Fifth, it treats the observer not as a hidden inner entity, but as the recursive stabilization of a self-world model within a conscious domain.

In this sense, CUWF does not simply replace existing theories. It reorganizes their strongest insights within a different ontological frame. Neural activity, global broadcasting, integration, prediction, higher-order representation, and embodiment may all be important, but under CUWF they must be interpreted inside one living wave-geometric architecture.

The guiding statement of this section is therefore: Consciousness is not merely neural activity, information access, prediction, or representation. It is recursive living wave-geometry: a self-referential regime of Entropic Geometry built upon BMIR closure and rendered through a conscious self-domain.

Summary Table: Current Theories and CUWF Position

Theory / Approach	Main contribution	Remaining limitation from CUWF perspective
Physicalism / Neural Correlates	Grounds consciousness in brain and body activity.	Correlation does not fully explain subjective experience.
Global Workspace Theory	Explains access, attention, report, and global availability.	Global broadcasting does not by itself explain feeling, selfhood, or qualia.
Integrated Information Theory	Offers a formal criterion based on integrated intrinsic causal structure.	May not sufficiently require living embodiment or BMIR self-maintenance.
Predictive Processing / Free Energy	Explains perception, action, and body regulation through prediction and error minimization.	Prediction alone does not explain when self-specific experience appears.

Higher-Order Thought Theory	Highlights self-reference and higher-order representation.	Can risk homunculus or regress unless recursive stabilization is explained.
Embodied / Enactive Cognition	Places mind in living body-world interaction.	May lack a formal wave-geometric substrate.
Panpsychism / Dualism	Takes subjective experience seriously.	Risks either overextending consciousness to matter or separating mind from body.
CUWF framing	Interprets consciousness as recursive living wave-geometry built upon BMIR closure.	Requires further formal development and future measurable signatures.