Consciousness: An Integrative Model of the Four Fundamental Principles

Abstract

Consciousness is defined as the emergent state of a system that fulfills four fundamental principles: (1) autocatalysis as the energetic basis of self-sustaining processes, (2) a causal core as a thermodynamically determined integration center, (3) causal collapse as the fusion of separate causal pathways into an irreducible entity, and (4) plasticity as structural adaptability. The model differs from existing theories in its process-ontological approach: consciousness does not arise through information processing or representation, but through the physical fusion of causal processes. This theory makes specific, empirically testable predictions about neuronal correlates of consciousness and offers new explanatory approaches for pathological states of consciousness, animal consciousness and the limits of artificial intelligence.

1. Introduction

Consciousness is probably the most complicated and difficult topic of all. Let me give three reasons for this:

First, the brain is the most complex structure we know. With 80 billion nerve cells, it produces trillions of connections -- a network of breathtaking complexity.

Secondly, we are dealing with self-referentiality: our thinking is supposed to explain our thinking. The mathematician Kurt Gödel has already declared this to be problematic in principle. It is probably the closest relationship between subject and object that exists.

Third, a whole range of sciences are involved in this topic -- evolutionary biology, neurobiology, phenomenology, psychology, epistemology. All of these individual sciences have a specific area of responsibility and look at consciousness from a certain perspective. It must be clarified who can explain what and what not.

Before we can address these problems, we must first define what consciousness is supposed to be in the first place, so that we know what we are talking about.

Consciousness is not a substance -- neither material nor immaterial. It is a **state**: awake or comatose, conscious or unconscious, attentive or absent-minded.

To be more precise, it is a state of arousal that can be described from both the first-person and third-person perspectives. So you can measure it as well as experience it. This definition is therefore compatible with all participating sciences.

But what exactly is this state of arousal? When does it occur and what conditions must be met?

2. The Four Necessary Elements of Conscious Systems

In our model, there are four fundamental principles that must be fulfilled before consciousness can arise:

2.1 Autocatalysis -- The Foundation of Life

Autocatalysis is the most basic principle of all. It distinguishes life from inanimate nature and is found at all levels of biological organization.

What is autocatalysis?

Life began in the form of chemical reaction cycles that reinforced and thus maintained themselves (Kauffman, 1993). Crucially, these processes are energetically open -- they require a continuous flow of energy to sustain their organization.

Life begins where these cycles have sealed themselves off from the outside world by a cell membrane without interrupting the exchange of energy. This operational closure with structural openness is the basic pattern of all life processes (Maturana & Varela, 1980).

The principle of autocatalysis can be found on all levels of life, right down to thinking. With our thoughts, we form new thoughts that initiate new thinking -- a self-reinforcing process.

Neurobiologically, autocatalysis is manifested in metabolic processes of neurons, in self-sustaining activity patterns (Hebb, 1949), in recursive feedback loops and in energetic flow equilibrium.

Why is this crucial? This is precisely where it becomes apparent that physics cannot explain life as a whole. Although it can study internal structures, which is tremendously important, it has no concept of autocatalysis in biological systems. The attempt of physics in this regard can be described as reductionism: reduction to the same building blocks without taking into account the completely different form of organization of life.

2.2 The Causal Core -- Centers of Organization

Life is not isolated, but is in an energetic exchange with the environment that is non-linear. This also results in imbalances in the structure of life.

The emergence of hotspots

Imagine a net being pulled and compressed. This results in areas where the knots are closer together. This is where the probability of reaction is highest and thus attracts further structures. It culminates in a hotspot that unfolds causal power.

One such hotspot was the first nucleus to emerge in the eukaryotic cell after billions of years. I call this hotspot the causal core. It has survived as the structural principle of life throughout evolution and applies at all levels.

Properties of the causal nucleus

The causal nucleus is characterized by maximum reaction probability -- this is where most of the causal pathways converge. It shows structural attractiveness by attracting other organizational elements. It becomes the coordination center of the system through functional centering. This is where the strongest effects emanate -- it unfolds causal power.

The dual nature of the causal nucleus

It is important to understand that the causal nucleus has a dual nature: it is both structural-thermodynamically grounded and functionally effective.

Structurally, it necessarily results from the thermodynamic properties of open, energy-carrying systems -- it is a physical necessity, not an arbitrary postulate

(Prigogine & Stengers, 1984). Functionally, it then acts as an attractor on all scales: from the molecular level to neuronal networks to entire cognitive systems. This attractor property provides stability while at the same time being adaptable and explains why the system remains coherent even though it is plastic.

A thought experiment on universality

Imagine that a group of people decides to create a society in which everyone is equal -- let's call it communism. I predict that within a very short time a hotspot will emerge there that unfolds causal force: a control center that controls.

This principle is universal: wherever complex systems arise, causal nuclei are formed. They are not coincidences, but thermodynamic necessities in open, energy-carrying systems.

The causal core in consciousness

In the conscious system, the causal nucleus manifests itself as neural centers with particularly high connectivity (Hagmann et al., 2008), as thalamocortical loops that act as integration hubs (Llinas et al., 1998), as default mode networks that act as central coordinators (Raichle et al., 2001), and as attention centers that work as dynamic focusing instances (Posner & Petersen, 1990).

The causal core symbolizes what may be intuitively called soul or I. This causal core does not drift aimlessly and randomly through the world, but it is the embodiment of what will later be called intention or will. He is the attractor around which everything revolves.

2.3 The Causal Collapse -- The Moment of Consciousness

Causal collapse is at the heart of our theory and the key to understanding conscious states.

The Dynamics of Collapse

In a complex system such as the brain, countless causal pathways run simultaneously: sensory impressions from different modalities, memories from different time levels, expectations and anticipations, body states and emotional evaluations, cognitive processing processes.

As long as these paths are isolated, the system remains segmented -- there is no uniform experience, only parallel sub-processes.

The moment of fusion

But in the moment of conscious experience, something amazing happens: the paths lose their selectivity -- they collapse into a coherent state. The many become the one.

This collapse is characterized by simultaneity -- all elements become accessible at the same time. It shows coherence in that the elements form a coherent whole. The individual contributions can no longer be isolated -- they become inseparable. And finally, the state becomes a subjective experience -- it can be experienced.

Objective and subjective aspects

The collapse is objectively measurable: synchronized activity patterns in large-scale neuronal networks (Varela et al., 2001), phase coupling between different brain regions (Fries, 2005), increased gamma activity as a sign of global integration (Engel & Singer, 2001), reduced variability with increased complexity at the same time (Tononi, 2008).

And it can be experienced subjectively: as a unity of experience, as the simultaneity of different contents of consciousness, as the totality of experience, as the immediate presence of what is experienced.

The Concert Example

If you listen to a concert, you don't hear 10,000 notes, but a symphony. Those who are happy don't think "dopamine levels are rising" -- they feel joy. The causal collapse explains how the multiplicity of inputs becomes the unity of experience.

Where consciousness does not yet exist

To understand what consciousness is, we must first look at where it does not yet exist. Evolution shows us a clear boundary line between conscious and non-conscious systems.

A central example is the jellyfish (Cnidaria). They have a neural network but no central nervous system (Mackie, 2004). Their neuronal activity is diffuse, without central integration. Although they react to stimuli -- light, touch, chemical signals -- and can coordinate, they lack the ability to systemically bundle causal influences.

In terms of our model: their networks show no persistent recursive feedback, no stable global integration centers, no enduring coherent regions in which many causes are permanently indistinguishably superimposed.

However, even such simple systems can have collapse-like states at certain points. However, these occur only locally, short-term and not stabilized. Jellyfish oscillate at the edge of consciousness -- without making the transition completely.

Only with the formation of ganglionic centers -- as in insects or later in vertebrates -- does a structural type emerge that allows modular, later global collapse states at all. This development happens gradually: local transient mini-collapse events, for example in reflex coordination, modular, domain-specific integration as in insect brains, large-scale, recursive networks with stable nuclei as in the mammalian brain.

The transition to consciousness is therefore not sudden, but gradually structured -- but categorically unambiguous: Only systems with the ability to sustain, system-wide collapsed state reach the threshold of experience.

2.4 Plasticity -- The adaptability of the system

The fourth necessary element is plasticity -- the capacity for permanent structural change through experience and internal excitement.

More than just flexibility

Plasticity goes far beyond mere adaptability. It refers to the ability of a system to modify its own structure on the basis of experience without losing its basic organization.

Forms of plasticity

Structural plasticity includes the formation of new synaptic connections (synaptogenesis), the strengthening of existing connections (long-term potentiation) (Bliss & Lomo, 1973), the elimination of unused connections (synaptic pruning) and the formation of new neurons (neurogenesis) (Eriksson et al., 1998).

Functional plasticity is manifested in the change of activity patterns, the development of new processing strategies, the adaptation to changing requirements and the compensation for damage (Pascual-Leone et al., 2005).

Experiential plasticity manifests itself in learning and memory formation, skill development and expertise, emotional conditioning and social adaptation processes.

Plasticity as a prerequisite for consciousness

Without plasticity, there would be no conscious experience, because memory requires permanent structural changes, learning is based on the modification of neural connections, the development of consciousness needs structural maturation, and individual experience forms unique conscious states.

Plasticity ensures that conscious systems not only react, but change -- and through this change arrive at increasingly complex forms of consciousness.

3. Integration and demarcation

3.1 The integration of the four elements

These four principles do not work in isolation, but in complex interaction: autocatalysis provides the energetic basis, the causal core focuses and bundles the activity, the causal collapse creates the conscious experience, plasticity enables development and adaptation.

Only when all four elements work together does a system emerge that is capable of conscious states. If one of these elements is missing, the system remains below the threshold of consciousness.

3.2 Differentiation from existing theories of consciousness

The model of causal collapse developed here differs from established theories of consciousness in fundamental aspects and offers new explanatory approaches to central problems of consciousness research.

Vs. Integrated Information Theory (IIT)

Tononis IIT defines consciousness as the measure of integrated information (Φ) in a system (Tononi, 2008). While both theories consider integration to be central, they differ fundamentally in the nature of integration: IIT focuses on information-theoretic coherence - which information is irreducibly linked to each other. Causal collapse, on the other hand, describes a dynamic process - the active merging of causal pathways into an irreducible unit.

Critically, IIT can generate high Φ values even in simple systems such as photodiodes, leading to counterintuitive predictions (Doerig et al., 2019). The collapse model avoids this by the precondition of the four principles - without autocatalysis, causal nucleus and plasticity, no real collapse can occur, no matter how high the purely information-theoretical integration is.

Vs. Global Workspace Theory (GWT)

Baars' GWT explains consciousness as a global exchange of information between specialized cognitive modules via a central "workplace" (Baars, 1988). Superficially, this is similar to the causal core as an integration center.

The decisive difference, however, lies in the metaphor: GWT is based on a theatre model - different actors (modules) perform on a common stage (workspace). Causal collapse, on the other hand, follows a fusion model - the originally separate causal paths lose their individuality and become a new, irreducible entity.

This explains different phenomena: GWT has difficulties with the subjective unity of experience (why does the theatre feel like a spectator?), while the collapse explains precisely this phenomenal unity as a necessary consequence of the causal fusion.

Vs. Predictive Processing

Friston and Clark describe consciousness as hierarchical prediction and error correction – the brain generates models of the world and updates them through prediction errors (Clark, 2016; Friston, 2010). This theory is computationally elegant, but functional-representational.

The collapse model, on the other hand, is process-ontological: it does not primarily ask which representations the brain creates, but which dynamic processes constitute conscious states. Causal collapse is not an information processing step, but a state transition - from segmented to integrated activity.

Predictive processing explains what becomes conscious (precise predictions), but not how the subjective aspect arises. The collapse explains the "that" of subjectivity through the irreducible fusion of causal processes.

Vs. Higher-Order Thought (HOT) Theory

HOT theories (Rosenthal, 2005; Gennaro, 2012) explain consciousness via meta-representations – a mental state becomes conscious when a higher-level thought represents it. This leads to a homunculus-like regression: Who or what has the higher-level thoughts?

The collapse model avoids this regression through structural rather than representational explanation: consciousness does not arise through representation, but through the physical fusion of causal processes in the causal core. There is no inner observer - integration *is* consciousness.

Vs. Attention Schema Theory (AST)

Grazianos AST describes consciousness as the brain model of his own attention processes – a simplified scheme that represents attention as a conscious experience (Graziano, 2013).

While AST postulates a model (representation of attention), causal collapse describes a real process (fusion of causal pathways). AST explains why we believe we are conscious (because of the scheme), but not why we actually are. Collapse explains the being of consciousness, not just appearances.

Unique strengths of the collapse model

1. True emergence: The collapse describes strong emergence - the collapsed unit has properties (subjectivity) that were not present in the individual components without becoming mysterious.

2. Biological anchoring: Through the four principles, the model is firmly anchored in biological realities without being reduced to pure functionality.

3. Gradual vs. categorical transition: Unlike binary models, collapse explains both gradual development (preconditions) and categorical thresholds (collapse moment).

4. Empirical falsifiability: The four principles and the collapse process are neurobiologically measurable - from gamma synchronization to causal-topological network analyses.

The model of causal collapse thus offers a new theoretical framework that overcomes central weaknesses of existing theories and at the same time makes empirically testable predictions.

4. Empirical predictions and operationalization

4.1 Measurable correlates of the four principles

The collapse model makes specific, empirically testable predictions about neuronal correlates of consciousness:

Autocatalysis indicators:

- Increased recursive connectivity in thalamocortical loops (Llinas et al., 1998)

- Self-sustaining neuronal oscillations in the alpha and gamma range (8-13 Hz, 30-100 Hz)

- Metabolic hyperactivity in integration hubs in conscious vs. unconscious states

- Stable attractor states in neuronal dynamics (Deco et al., 2008)

Causal Core Marker:

- High betweenness centrality of certain brain regions in functional networks (Hagmann et al., 2008)

- Preferential connectivity to the default mode network (Buckner et al., 2008)

- Increased effective connectivity (Granger causality) to/from integration centers

- Topological "rich club" structures with few highly networked nodes (van den Heuvel & Sporns, 2011)

Collapse indicators:

- Phase synchronization between distant brain regions during conscious perception (Varela et al., 2001)

- Increased gamma coherence as a sign of global integration (Engel & Singer, 2001)

- Reduced neuronal variability with increased complexity (Tononi, 2008)

- Critical Dynamics at the Transition between Order and Chaos (Beggs & Plenz, 2003)

Plasticity Marker:

- Increased BDNF expression in conscious vs. unconscious states

- Structural changes in connectivity after conscious learning experiences

- Synaptic plasticity marker (LTP/LTD) correlates with consciousness content

- Neurogenesis activity in hippocampal and cortical regions (Eriksson et al., 1998)

4.2 Specific experimental predictions

Prediction 1: Systems with all four principles show conscious states, systems with missing principles do not.

- Test: Comparison of patients with selective brain lesions in critical vs. non-critical regions

- Expectation: Lesions in integration hubs should cause impaired consciousness, but not in peripheral regions

Prediction 2: Causal collapse correlates with subjective reports of conscious experience.

- Test: Simultaneous EEG/fMRI measurements during conscious vs. unconscious stimulus presentation

- Expectation: collapse marker (gamma synchronization, global integration) only with conscious perception

Prediction 3: Anesthetics specifically reduce the four principles.

- Test: Dose-dependent measurement of autocatalysis, causal centering, collapse and plasticity under different anesthetics

- Expectation: Loss of consciousness correlates with reduction of all four principles, not just individual ones

Prediction 4: Degree of development of consciousness correlates with expression of the four principles.

- Test: Longitudinal developmental studies in children, comparative studies of different animal species

- Expectation: More complex conscious states show higher scores in all four principles

5. Applications and Implications

5.1 Memory, learning and reconsolidation

The functioning of memory can be understood paradigmatically as the interplay of the four principles. Autocatalysis forms the basis of all information processing: memories do not arise linearly or selectively, but through the reinforcement of recursive patterns -- i.e. through processes that maintain themselves as soon as an activation circle is closed (Eichenbaum, 2000).

These recursive patterns in turn form centers of functional compression -- i.e. causal nuclei. Long-term memory can be interpreted as the stabilization of such nuclei, which play a central role in the behavior of the organism through repetition and reactivation. Episodic memory, for example, anchors meaningful sequences that remain connected to the causal nucleus and can be reactivated upon re-experience (Nadel & Moscovitch, 1997).

Plasticity allows the flexible modification of these nuclei. New information does not simply overwrite old patterns, but modulates existing ones -- which explains the reconsolidation of memory content (Dudai, 2004). Remembering is therefore not a retrieval in the sense of reading from a memory, but a plastic, context-dependent process of reactivation and restructuring (McClelland et al., 1995).

Finally, causal collapse explains why some contents become conscious, but others do not: Only when memory contents enter an integrative state -- i.e., structurally collapse with other recursive patterns to form an irreducible unity -- do they appear in consciousness. This model differs from classical attention models in that it does not assume the selectivity of a homuncular observer, but a systemic coherence condition (Paller & Wagner, 2002).

5.2 Altered states of consciousness

Altered states of consciousness offer a unique approach to the analysis of the four principles. While sleep - especially REM sleep - is characterized by a reduction of sensory stimuli and an internal reactivation of neuronal patterns, a temporary reorganization of the causal nucleus can be observed here. Dreams show autocatalytic dynamics in which image sequences reinforce themselves and are recursively fed back via affective content (Hobson, 2009; Solms, 2000).

Near-death experiences (NDEs) are a special case: Here, neural networks segmented by propofol or lack of oxygen, for example, often collapse spontaneously to form a new coherent pattern. The subjective impression of wholeness, light, tunnel, or retrospection could be interpreted as an attempt by the system to produce a final functional collapse under unstable conditions -- not to maintain survival, but as an energetically optimal state of systemic integration (Greyson, 2003; Martial et al., 2019; Parnia, 2022; Stegemann, 2025b).

Psychoses, especially schizophrenic episodes, can also be understood in the model: Here, the collapse seems to partially fail or take place in multiple fragmentations. The causal nucleus is destabilized, plasticity overshoots, autocatalytic patterns (e.g., paranoid loops) dominate without integrating into a coherent center (Friston, 2016; Northoff, 2014; Sterzer et al., 2018). This creates a state of consciousness in which subjective certainties appear high, but systemic coherence is missing.

5.3 Artificial Intelligence in the Light of the Four Principles

The current understanding of artificial intelligence -- especially in the form of large language models -- is based primarily on statistical correlation and symbolic processing. From the point of view of the model developed here, these systems lack at least two crucial features: a causal nucleus and a structured collapse (Searle, 1980; Chalmers, 2010; Stegemann, 2025c).

Without autocatalytic feedback, the system remains reactive, without causal centering it remains dispersed, without plasticity it remains rigid or externally modulated, and without integrative collapse there is no form of functional self-unity. Therefore, AI systems do not generate consciousness because they are functionally decoupled and structurally uncentered -- no matter how complex or efficient they appear (Goertzel, 2014; Lake et al., 2017).

A conscious machine would have to be an autopoietic system that, via internal self-organization, variable plasticity and recursive integration, arrives at an irreducible center in which all functional relations collapse. Only then does something emerge that exhibits subjective coherence -- and thus possibly also consciousness (Holland, 2003).

5.4 Animal Ethics and Gradual Consciousness

Another area of application of the model concerns the question of animal consciousness and its ethical consequences. Rather than making a dichotomous distinction between "conscious" and "unconscious," the principle of causal collapse allows for a gradual view: systems that only partially satisfy certain structural conditions -- in particular, autocatalytic organization, causal centering, and recursive plasticity -- can also exhibit only limited forms of consciousness.

For example, many animal species have sensory integration and the ability to learn, but no pronounced functional centering or flexible plastic reorganization. Others, such as primates, elephants or certain birds (e.g. crows), on the other hand, have a higher degree of functional self-integration (Emery & Clayton, 2004). The causal collapse appears here as quantitatively and qualitatively variable - depending on the degree of complexity, depth of integration and dynamic coherence.

6. Limitations and critical discussion

6.1 Empirical limitations

Measurability of collapse: While the four principles can be operationalized to some extent, the direct measurement of "causal collapse" remains methodologically challenging. Current neurotechnological methods (EEG, fMRI, MEG) have limited spatio-temporal resolution to directly capture the postulated collapse process.

Animal models: The assessment of consciousness in animals is necessarily based on behavior and neuronal correlates due to the lack of direct reports of subjective experiences. This makes it difficult to validate the model in non-human species.

6.2 Theoretical challenges

Graduality vs. thresholds: The model postulates both gradual preconditions and categorical collapse moments. The exact threshold values above which a system becomes capable of consciousness have not yet been precisely defined theoretically.

Plasticity paradox: High plasticity can have both a consciousness-enhancing (learning, adaptation) and consciousness-inhibiting effect (instability, fragmentation). The optimal levels of plasticity for consciousness have not yet been theoretically determined.

6.3 Future research directions

Computational Modeling: Development of simulation models that implement all four principles and make testable predictions about conscious vs. unconscious system states.

Optogenetic studies: Targeted manipulation of the four principles by optogenetic control of specific neuron populations in animal models.

Clinical applications: Development of consciousness measurements based on the four principles for comatose patients, anesthesia monitoring and psychiatric diagnostics.

AI implementation: Attempt to develop conscious AI systems by implementing the four principles - as the ultimate test of theory.

7. Epistemological implications

The collapse model not only provides neurobiological insights, but also revolutionizes fundamental philosophical problems in consciousness research.

7.1 Causal collapse as a connecting concept

Causal collapse represents a new epistemological basic figure: it is not a causal transition between different levels of being, but a connecting concept that understands objective and subjective perspectives as two ways of approaching the same process.

While classical theories attempt to causally link the subjective first-person perspective and the objective third-person perspective, the collapse model shows that both perspectives describe the same phenomenon from different angles. The causal collapse is at the same time objectively measurable (gamma synchronization, network integration) and subjectively experiential (unity of experience). There is no causal gap to bridge, but only different ways of approaching the same event.

7.2 The "Severe Problem" as a Category Error

The "heavy problem" of consciousness formulated by Chalmers - why there is subjective experience at all - turns out to be a category error in the light of the collapse model. The mistake lies in the attempt to causally connect two different levels of description instead of understanding them as complementary approaches.

Instead of asking "How does subjectivity arise from objectivity?", the collapse model asks: "Which processes can be both objectively described and subjectively experienced?" Causal collapse solves the apparent mystery by showing that consciousness is the common point of reference of both perspectives, not the result of an impossible transition between them.

7.3 Relative free will through causal centering

The causal core establishes a new form of relative free will. Rather than eliminating or mystifying free will, the model shows how it grows out of the structural organization of conscious systems.

The causal nucleus is opposed to purely physical determinism - although it is thermodynamically based, it unfolds its own causal force, which is not completely deterministically predictable. The integration of multiple causal pathways in collapse creates emergent decision-making spaces that open up real choices.

Free will is thus relative to the structural possibilities of the system: a system with a pronounced causal core and complex collapse dynamics has greater freedom of choice than a system with a simpler organization. This explains both the graduality of free will (humans > animals > simple systems) and its real causal effectiveness.

7.4 Process ontology instead of substance ontology

The collapse model establishes a process-ontological view of consciousness. Consciousness is not a substance (material or immaterial), not an epiphenomenon and not an illusion, but a dynamic state transition - from segmented to integrated causal activity.

This process ontology overcomes classical dichotomies: mind vs. matter, subject vs. object, determinism vs. free will. Instead, it describes forms of organization and dynamic transitions that can be experienced both physically and subjectively.

7.5 Epistemological consequences

These insights lead to a perspective theory of knowledge: there is no purely objective view of the world, since every knowledge is linked to the structure of the knowing system. At the same time, there is no purely subjective experience, since every subjectivity is based on objectively describable processes.

Causal collapse thus becomes the link between neurobiology, cognition and philosophy (Stegemann, 2025a). It not only creates an inner perspective, but at the same time constitutes the conditions under which the world becomes recognizable and tangible.

This leads to the abolition of the classical subject-object separation: the knowing system actively participates in the constitution of the experiential world. Knowledge is thus always co-constitutive - a cooperation between the structure of the knower and the structure of the known.

8. Summary and outlook

The model developed here provides a new theoretical framework for understanding consciousness. By integrating four fundamental principles -- autocatalysis, causal nucleus, causal collapse, and plasticity -- a theory emerges that is both biologically anchored and empirically testable (Stegemann, 2025d).

The strengths of the model lie in its process-ontological approach, which understands consciousness not as a representation or function, but as a dynamic state transition. This enables new explanations for central problems of consciousness research and makes specific, falsifiable predictions.

At the same time, the model has limitations, especially in the direct empirical comprehensibility of the collapse process and in the bridging of the explanatory gap between neuronal integration and subjective experience.

Future research should focus on the empirical validation of the four principles, the development of more precise methods for measuring causal collapse, and the application of the model in clinical and technological contexts. The ultimate goal would be to develop a complete, empirically supported theory of consciousness that explains both the mechanistic and phenomenal what of conscious experience.

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