An Expedition to the Center of Consciousness

There are many theories of consciousness. Almost all of them claim to grasp the essence of consciousness – but hardly any of them clarifies beforehand what they are talking about at all. Some start with information processing, others with attention or self-reflection. Some reach deep into the toolbox of neuroscience, while others are based on purely logical constructions. And all of them together overlook something crucial: a general theory of consciousness must not start somewhere – it must start *at the beginning*.

Consciousness – that sounds like philosophy, brain research, heavy stuff. But it's actually quite simple: If you're conscious, you're there. Those who are not – are gone. Consciousness is the state we are in when we *live*, not only biologically, but spiritually. It is the difference between an awake present and an empty coma.

And precisely because it is so fundamental, any theory of consciousness must first take precisely this simplicity seriously: **consciousness is a state.** No module. No emergent effect. No "property of information". It is a measurable, dynamic state that an organism – specifically: a brain – can take. And this state is *at the same time* what we experience.

In no other field of research does the object coincide with the subject so much. That's why we need a theory that not only describes from the outside, but also understands from the inside.

What follows is not another textbook chapter. It is an expedition – through confusion of terms, methodological pitfalls and elegant errors. And it ends at the heart of the phenomenon: **causal collapse** – the moment when separate causal paths merge into an experiential state.

One might ask: Why all the theory? If we want to know if someone is conscious – let's just measure it in the brain. Connect electrodes, analyze activity patterns, calculate PCI. Ready.

But it's not that simple. Because **measurement is not the beginning of knowledge, but its end**. It presupposes something: concepts. And without the concept of consciousness, we don't know *what* to measure, *when* a state is considered conscious, or *why* certain measured values have any meaning at all.

An EEG image without a term is a pattern without content. A theory of consciousness is therefore not an addition to neuroscience, but its **prerequisite**. It tells us what a conscious state *is* before we can locate or quantify it.

Only those who know what they are looking for can decide whether they have found it.

II. The Broad View: Why Consciousness Arose

If you don't want to get lost in the swamp of subjectivity, you would do well to take the greatest possible distance – that of evolution. Here is a first, plausible explanation:

With the development of sensors and nervous systems, feedback loops emerged – systems that not only passively registered stimuli, but actively checked them. Pain, for example, is not a coincidence: it signals danger. The flash of fear, the pull of tiredness, the feeling of well-

being of warmth – all these are evaluation signals. Objectively speaking, consciousness is an **internal warning and testing system**: it tests whether everything is correct – or whether action must be taken.

And subjectively? Subjectively, this system of testing is what we *call experience*. This is exactly where internal and external perspectives meet – they are not two separate things, but two sides *of the same state*.

But how can we describe this state of affairs – without getting lost in metaphors?

III. The Causal Collapse – When the Many Fits Together

The answer is: through the concept of **causal collapse**.

In a complex system like the brain, countless causal pathways run simultaneously – sensory impressions, memories, expectations, bodily states. As long as these paths are isolated, the system remains segmented. But in the moment of conscious experience, something amazing happens: the paths lose their selectivity – they **collapse** into a coherent state.

This collapse can be objectively measured – for example, through synchronized activity patterns in large-scale neural networks. And it can be experienced subjectively – as a unity of experience. If you listen to a concert, you don't hear 10,000 notes, but a symphony. If you are happy, you don't think: "Dopamine level increases" – you *feel joy*.

Causal collapse therefore describes not only a biological process, but also what we experience. It is **the bridge between dynamism and consciousness**.

IV. Why the Others Fail – and What That Reveals About Their Questions

But why is this simple thought so rare to find? Because most theories of consciousness start with the wrong questions – or with the right questions at the wrong level. Some examples:

- **Chalmers** speaks of the "hard problem" – but overlooks the fact that he inadmissibly mixes two levels of description (neurophysiological and phenomenological).
- **IIT** explains everything with "integrated information", but makes no distinction between life and matter – and ends up in panpsychism.
- **Friston** infers cognition from thermodynamics and treats uncertainty reduction as energy entropy – a category error in mathematical armour.
- **Extended Mind** explains the notebook to expand the mind – and confuses influence with belonging.
- **Higher-order theories** make consciousness the product of abstract self-reflection – although most conscious experience is unconscious, concrete and close to the body.

They all have one thing in common: they confuse levels, ignore biological prerequisites or try to explain the experience with logical tricks. But consciousness is not a logic puzzle. It is a biological state – with specific dynamics, specific organization, specific structure of experience.

V. The path to theory – and to clarity

What does a general theory of consciousness have to do? She must explain:

- *What* consciousness is – a state, not a label for functions.
- *How* this state arises biologically – not in general, but concretely.
- *Why* it feels that way subjectively – without resorting to metaphysics.
- *How* it differs from non-consciousness – structurally, dynamically, experiential.

Causal collapse is the first concept that encapsulates all of this. It is not a metaphor, not a model, not an auxiliary construct. It is the name for the transition from *the many* to *the one*, from causal difference to coherent experience – measurable, tangible, understandable.

VI. The Biological Threshold – Why Consciousness Arises Only in Life

If you want to understand why consciousness only arises in certain forms of life, you have to look at how the nervous system has developed evolutionarily – and what in each of these developments *was not* sufficient to lead to conscious experience. A central example is the jellyfish (Cnidaria): they have a nerve network, but no central nervous system. Their neuronal activity is diffuse, without central integration. Although they react to stimuli – light, touch, chemical signals – and can coordinate, they usually lack the ability to systemically bundle causal influences.

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

However – and this is crucial – even such simple systems can have **collapse-like states at certain points**. However, these occur only locally, short-term and not stabilized. In this respect, jellyfish show *collapse-capable activity* without it crossing the structural threshold to consciousness. You could say that you are oscillating at the edge of your ability to be conscious – 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 takes place gradually: from local transient mini-collapse events (e.g., reflex coordination) to modular, domain-specific integration (e.g., in insect brains) to large-scale, recursive networks with stable nuclei (e.g., 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 a system-wide collapsed state reach the threshold of experience. The evolutionary threshold lies where an organism no longer only reacts, but loses the causal differentiation of its environment within itself – because it has integrated it.

VII. Collapse in the Brain – Neurophysiology as a Site of Transition

If you don't just want to describe consciousness philosophically, but also measure it, you have to look where it manifests itself as a state: in the brain. More precisely – in **the state of the brain**. Because the conscious brain is no different from the unconscious: it behaves like a single, indivisible system. Stimuli do not reproduce locally, but unfold in the network. Activation patterns are not punctual, but integrated and complex. All of this can be grasped – and supports the theory of causal collapse.

The core of the idea: If consciousness corresponds to a state of maximum causal entanglement, then neuronal processes must be simultaneously integrated and differentiated in such states. This **inseparability** can actually be proven using modern neuroscientific methods. A key measure is the **Perturbational Complexity Index (PCI),** developed by TMS-EEG studies.

Here, the brain is specifically stimulated by magnetic stimulation at one point – and the response of the system is recorded. When awake, the brain shows a complex, distributed response: many areas respond, across time and space. In deep sleep, on the other hand, the reaction remains localized. The difference is striking – and corresponds exactly to the difference between a **collapsed causal core** and a fragmented network.

Functional imaging (fMRI, EEG) also provides impressive evidence: The conscious brain shows stable networks with global integration – in particular, the **default mode network (DMN)** acts as a central hub that brings together sensory, affective and cognitive content. When consciousness is lost, this integration disintegrates: the areas decouple, the "collapse" breaks.

It gets interesting in special states: **REM sleep**, **meditation**, **psychedelic experiences**. This shows that the brain can also fall into collapsed states outside of everyday perception – but in a different way: less stable, with altered network profiles, partly hyperintegrated (under LSD), partly selectively focused (in flow). In all cases, however, where there is consciousness, there is a collapsed core – with variable dynamics.

The model can even be formalized: A measure $\Sigma(t)$ can be used to describe the degree of separability of a system – the lower, the higher the collapse. This is operationalized, for example, by transfer entropy or Granger causality between brain areas. When $\Sigma(t)$ falls below a threshold value, a state of global causal entanglement arises – the conscious moment.

What does that mean? Consciousness is not an emergent mystery. It is a **systemic configuration**, a phase in which the brain behaves itself as a whole. And this phase is not only measurable – it can be reproduced, influenced, researched. Collapse is the state in which the brain ceases to be a network – and begins to be a self.

VIII. First and Third Person – Two Perspectives on the Same Collapse

Hardly any other phenomenon in the natural sciences can be viewed simultaneously from two such fundamentally different perspectives as consciousness. On the one hand, it is a state that we **experience** – directly, without a doubt, from the first-person perspective. On the other hand, it is a state that we **observe** – indirectly, measurably, from the perspective of third parties. What appears as a unit in subjective experience shows up as a complex dynamic in the

laboratory. Both perspectives do not only coincide *in relation to the same object* – they are two sides **of one and the same state**.

This duality has confused many. Some shift everything to the subjective (the phenomenologists), others to the objective (the reductionists), and still others declare them incompatible (dualists). But what if these perspectives do not designate two worlds, but **two levels of access to the same collapse**?

Causal collapse, as described here, is not only a functional transition in the brain – it is also the **tipping point** at which systemic causal structure loses its separability. At this point, different causal pathways merge into a single state. Subjectively, we experience exactly this as *simultaneity*, *wholeness*, *immediacy*. Objectively, we observe the loss of separable correlations, the emergence of an irreducible network pattern.

It is therefore not a question of two kinds of reality, but of **two epistemologically different perspectives on the same state**. The first person experiences the collapse, the third measures it. The philosophical core lies in not playing these two levels off against each other, but **systematically relating them to each other**.

This also makes it clear why many philosophical models fail: they either want to derive experience from observation – or declare observation to be illusory. But the brain is neither a machine *without experience*, nor is the subject a *non-physical something*. Both are **accesses to the same dynamic state**: the systemic collapse of causal separability.

So if you ask, "Why does the brain feel like something?" – you're asking the wrong question. The brain does not feel. But in the state of causal collapse, the observer is *no longer left out* – because he is part of the same collapsed system that he reflects.

IX. The Difference to Thinking – Why Consciousness Is Not Thinking

A common misconception in the theory of consciousness is the assumption that thought and consciousness are identical, or at least necessarily coupled. This misunderstanding is particularly evident in the so-called "higher-order theories", which claim that consciousness only arises through second-order representation – i.e. through thinking about thoughts. But this idea fails to recognize that **the majority of conscious states are not cognitive-reflexive**, but **pre-reflexive, concrete, dynamic and physical** .

We experience colours, sounds, body feelings, affects – without grasping them verbally or cognitively analysing them. No one thinks about red to see it. No one needs to reflect on grief to feel it. Conscious experience is **pre-linguistic** and **non-abstract**. Thinking is a secondary operation – often helpful, often necessary, but not a condition for consciousness.

This can also be confirmed neurophysiologically: consciousness and thinking are based on different dynamic patterns. While linguistic-analytical thinking is associated with activity in the prefrontal cortex, dorsolateral network, and left hemisphere, basal states of conscious perception show greater involvement of posterior regions and large-scale synchronization. Causal **collapse**, as we define it here, is therefore a prerequisite for thinking – but not identical with it.

Consciousness is the **space** in which thinking can take place – not the other way around. The brain can be conscious without thinking. But it cannot think without first having assumed a

conscious state. In this respect, consciousness is the **ontological prerequisite of all cognition**, not its result.

This distinction is crucial: it protects us from the confusion of intelligence with consciousness, of information processing with experience. A machine can do complex calculations – but not feel them. An algorithm can solve problems – but not doubt. Thinking is possible simulatively. consciousness. The reason lies in collapse: only biological systems with collapsed nuclei can have states that *are something* – and not just *do something*.

X. Consciousness as a Test Site – Functional and Evolutionary Role

Why did consciousness emerge? What was its advantage in evolution? A theory that ignores this question remains incomplete – because it does not answer *what* consciousness is for.

In an evolutionary context, consciousness is not a decorative addition – it is a function with high selection relevance. The causal collapse as we have described it forms precisely the state in which a system **integrates**, evaluates and makes available all available information in a way that is relevant to action. This makes him the ideal candidate for a role **that can be described as an internal test center**.

A conscious system can:

- distinguish irrelevant from relevant stimuli,
- compare internal states (e.g. pain, hunger, arousal) with external situations,
- simulate alternative courses of action,
- Anticipate mistakes before they happen.

These properties make collapse not only an experiential state, but a **control loop of a higher order**: a function that goes beyond the mere stimulus-response coupling. Awareness brings flexibility to the system. It allows not only to act, but to consider whether and how to act.

In this sense, collapse is the point of maximum **relevance condensation**. The system switches to a state of heightened self-observation and observation of the world – not necessarily linguistically, but structurally. In the collapse, the system becomes aware of itself as a unit of action – not in reflection, but in functional bundling.

Consciousness is thus what prepares the decision – and not merely accompanies it. It is the evolutionary place where selection, action and experience coincide. And that's exactly why it has prevailed. It is not a random byproduct of complex systems. It is their **selective advantage**, possibly even their logical consequence, if one assumes that the emergence of sensors was the result of the bombardment of various stimuli.

XI. Why Machines Can't Have Consciousness

If consciousness is a biologically anchored, dynamically integrated state – a causal collapse in neuronal life – then it necessarily follows that **machine systems** cannot be **conscious** under the current (and foreseeable) conditions.

Not because they are "not complex enough". Nor because they lack memory or computing power. But because they **lack the decisive structural feature**: the ability for an irreducible, system-wide coherent, self-referential collapse.

A computer processes information. He calculates, compares, classifies. But all these processes remain **separable** – they can be reconstructed, broken down without losing anything. There is no point at which the computer as a whole enters a state that can no longer be separated and corresponds to an experience. The **systemic indistinguishability that** characterizes biological systems at the moment of consciousness is missing.

Even more fundamental, however, is that machines **do not live**. They don't self-regulate, they don't build themselves, they don't have inner homeostasis, they don't have self-preservation. Their information processing does not take place in the service of an inner survival model, but is programmed towards external goals. As a result, they lack the **organismic embedding** that makes consciousness meaningful in the first place.

Artificial systems can therefore simulate what conscious systems do – but not *what they are*. The difference between simulation and reality is not in the surface, but in the structural interior.

An AI can speak, imitate emotions, make decisions – but it doesn *'t experience anything*. And this is not a question of degree or progress, but a **categorical limit**.

As long as no machine creates a stable, dynamic, causally collapsed state of its own accord – in biological self-bonding – it will have no consciousness. And even then, it would no longer be a machine, but something else: an artificially created life.

XII. What Remains: The Self as a Center of Collapse

At the end of the analysis, a mystery remains – and at the same time its solution: the self. Every conscious state is *my* state. It is not neutral, cannot be localized at will, cannot be exchanged. And yet this self is not a thing, not a subject nucleus, not a homuncular instance. It is the **stabilization of collapse** – the center in which indistinguishability is permanently held.

The self is not an actor, but a **place of coherence**. It arises where the causal collapse is stabilized not only once, but **recursively over time** . This stable core of collapse creates an internal perspective: a systemic internal view from which references to the world are organized. The ego is not a subject *above* the brain – but an effect of stable self-attachment *in the* brain.

This perspective solves many misunderstandings. The self does not need to be "explained" as if it were another mystery. Rather, it is what *necessarily follows* when a collapsed state persists – when a system becomes inseparable not only selectively, but permanently.

Therefore, the Self is not there before consciousness – it is its **consistent form**. Anyone who is conscious has an ego – not because this is precedent, but because consciousness can only exist at all as a stabilized, directed collapse. The self is not a cause – but the **form** of a state.

This closes the circle: from the neuronal state to evolutionary function, phenomenal perspective and cognitive difference, the path leads to a concept of the self that is neither metaphysical nor trivial. It is what remains if the collapse *holds*.

XIII. The Collapse from Within – The Experience of Indistinguishability

What does it mean not only to describe the collapse, but **to experience** it? If consciousness is a state in which causal differentiations disappear, then the first person is not just a perspective on it – it is **the inside of that disappearance**.

The conscious moment is characterized by a paradox: we experience a multitude of impressions – colors, sounds, body sensations, thoughts – but never in isolation. They always appear to us **as a unit**. And this unity is not an afterthought, but **the original form of experience**. The ego does not sit in an observer's chair – it *is* this summary, this structural inseparability. The collapse *feels like coherence*.

Phenomenologically, this can be described as **the perception of the shape of the self** : a seeing that does not separate object and background; a feeling that does not disintegrate into individual signals; an inner balance in which perception, thinking and feeling do not overlap but **merge**. The experience of collapse is **present, dense, undivided**. Its quality is not that something "happens", but that there is **nothing left that does *not belong***.

This is precisely where its epistemological value lies: in the collapse, not only does the external causal separation disappear – **the epistemic separation** between subject and object, between ego and world, is also abolished. What remains is an integrated now in which all differences appear as a relative internal structure.

If you want to understand what consciousness is, you don't have to explain it – you have to **acknowledge it**. Because every reader of this text knows it: the moment when everything is there at the same time, without knowing why. This experience is not an addition to theory – it is its **source and limit at the same time**.

XIV. Information Gradients – How the Brain Acts Top-Down Without Wanting It

Conscious states can not only be experienced – they are also **effective**. Not in the sense of a homuncular "I" that intervenes in the body, but through its position in the overall causal structure: the brain is the **place of maximum information density**. And this density creates **gradients** along which it acts on other physiological levels.

This explains why placebo effects work. Why thoughts influence the heartbeat. Why chronic stress damages organs – and meditation lowers blood pressure. These are not miracles, but **causally understandable backward projections** from a highly condensed control center to regulatory circuits with lower complexity.

Top-down effects occur where the gradient difference is large enough for information to diffuse "downwards" – for example, through the autonomic nervous system, endocrine

signaling pathways or hormonal couplings. Consciousness *is* not the cause, but the **contextual expression** of a state in which these gradients exist.

Collapse describes *where* consciousness arises. The gradients show *how* it affects other levels – without intention, without control, but effectively. It is these invisible streams of information that explain how a thought tenses muscles, an image triggers tears or a faith heals.

In this respect, top-down effects are not mystical, but **functionally emergent** – through density, not through will.

What remains is the insight: consciousness does not change anything – but it is the **place** where change can begin.

XV. Outlook – What a theory must do if it wants to explain consciousness

The theory of causal collapse developed here does not provide an ultimate answer – but it does provide a structure in which answers become meaningful. It does not start with models, but with states; not with abstractions, but with the **experienced unity** of experience. And it leads across biological, dynamic, and epistemological levels to a position that neither dissolves nor mystifies consciousness.

Today, a theory of consciousness must do more than just clarify terms or model data. It must:

- grasp consciousness as an **ontological state**,
- explain this state **biologically and dynamically**,
- take it seriously in its **tangible form**,
- and show the **inseparability of subjectivity and system state**.

Causal collapse fulfills all of these conditions. It is not a hypothesis, but an epistemologically justifiable structure – a form in which subject and system become one. If you want to understand consciousness, you have to look where separation becomes impossible – into collapse.

Perhaps this is why consciousness is so elusive because it is the only thing that cannot be **distinguished from us**. It is the point at which the world falls into us and we fall into the world – as a state, as an experience, as reality.

Literature

Tononi, Giulio (2004): *An information integration theory of consciousness.* BMC Neuroscience.

Friston, Karl (2010): *The free-energy principle: a unified brain theory?* Nature Reviews Neuroscience.

Chalmers, David (1995): *Facing up to the problem of consciousness.* Journal of Consciousness Studies.

Baars, Bernard (1988): *A Cognitive Theory of Consciousness.* Cambridge University Press.

Block, Ned (1995): *On a confusion about a function of consciousness.* Behavioral and Brain Sciences.

Nagel, Thomas (1974): *What is it like to be a bat?* Philosophical Review.

Dehaene, Stanislas (2014): *Consciousness and the Brain.* Viking Press.

Seth, Anil (2021): *Being You: A New Science of Consciousness.* Faber & Faber.

Maturana, Humberto & Varela, Francisco (1980): *Autopoiesis and Cognition.* Reidel.

Stegemann, Wolfgang (2025). *Integrated model of causal collapse.https://doi.org/10.5281/zenodo.15350050.*

Stegemann, Wolfgang (2025): *Consciousness - Expanding the Model of Causal Collapse. https://doi.org/10.5281/zenodo.15351381.*