# Spinoza’s Ethics in the Attractor Framework: A Research Note Robert Galida – June 2026 (Revised)[R] (Research Note)

Abstract

Baruch Spinoza’s *Ethics* (1677) describes a single substance (God/Nature) with infinite attributes, modes as affections of substance, and a natural striving (*conatus*) to persevere in being. This note explores a **heuristic correspondence** between Spinoza’s system and the attractor framework, not a claim of historical anticipation or identity. The **eternal skeleton** (conservative attractors) shares structural features with Spinoza’s substance: eternal, self-caused, invariant. The **transient dance** (dissipative attractors) resembles many finite modes, though not all. Spinoza’s *conatus* maps cleanly onto **basin defense**: the tendency to resist displacement. **Inadequate ideas** can stabilize into **fantasy attractors** (sealed belief systems with low corrective permeability κ) when they form self-reinforcing networks. **Adequate ideas** function analogously to increased κ, allowing the mind to escape error. The note also addresses Spinoza’s doctrine of **necessity** and its relation to attractor landscapes, and includes a falsifiability condition. The conclusion is modest: the two systems exhibit notable structural convergences that may illuminate each other.

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# 1. Introduction

Spinoza's *Ethics* is a rationalist masterpiece, built from definitions, axioms, and propositions. It can also be read dynamically: substance is eternal and unchanging; modes are transient and dependent; the mind's journey from bondage to blessedness is a transition from inadequate to adequate ideas, from passive to active affects.

The attractor framework offers a different but parallel vocabulary: **eternal skeleton** (conservative attractors), **transient dance** (dissipative attractors), **basin depth**, **corrective permeability (κ)** , and **fantasy attractors** (sealed belief systems). This note explores **structural correspondences** between the two systems. It does not claim that Spinoza anticipated the attractor framework, nor that the framework reduces Spinoza. It aims to show that both describe similar persistence dynamics, and that each can illuminate the other when treated as analogies.

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# 2. Substance and the Eternal Skeleton

Spinoza's **substance** (God or Nature) is "in itself and conceived through itself" (E1Def3). It is eternal, uncaused, has infinite attributes, and does not change. It simply **persists**.

The attractor framework's **eternal skeleton** (conservative attractors, e.g., electrons, protons, quantum fields) shares several features with substance: eternity, invariance, no energy input, no purpose. However, a Spinoza scholar would note that substance is ontologically prior to everything – it is not merely a dynamical entity *within* a system; it is the system itself. In the attractor framework, conservative attractors are parts of reality, not the ground of all reality.

**Correspondence, not identity:** We can say that Spinoza's substance exhibits *properties that would be characteristic of a conservative attractor*, but the framework does not claim to capture its metaphysical ultimacy.

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## 3. Modes and the Transient Dance

Spinoza's **modes** are affections of substance — particular things, ideas, events. They are finite, dependent, and temporary. Many of them (e.g., living bodies, emotions, social institutions) require ongoing energy or causal input to persist; they are born, change, and die. These can be modeled as **dissipative attractors**.

However, not every mode fits that description. A mathematical truth, a triangle, or a relation (e.g., "2+2=4") does not obviously require energy throughput. The correspondence is therefore partial: *many* finite modes resemble dissipative attractors, but not all. The note restricts its claim accordingly.

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## 4. Conatus as Basin Defense

This is the strongest mapping. Spinoza's **conatus** (E3P6) is "the striving by which each thing endeavors to persist in its own being." It is the intrinsic tendency to resist destruction and maintain state.

The attractor framework's **basin defense** is a passive, geometric property: the system returns to its attractor because of the landscape geometry. Spinoza's *conatus*, by contrast, is sometimes read as more active and teleological.

Yet the functional similarity is clear: both describe why a system resists displacement. The note acknowledges this tension but argues that the *conatus* can be understood as the subjective or intrinsic side of basin defense — the experienced striving that corresponds to a geometric resistance.

No change is needed here; this section remains the strongest.

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## 5. Inadequate Ideas and Fantasy Attractors

Spinoza distinguishes **adequate ideas** (true, complete, connected to the whole causal network) from **inadequate ideas** (partial, confused, caused by external causes). Inadequate ideas lead to **passive affects** (hope, fear, envy, etc.).

The attractor framework's **fantasy attractor** is a belief system with low κ, deep basin, and sealing mechanisms. However, not every inadequate idea forms a fantasy attractor. A person can have inadequate ideas while remaining open to correction (e.g., a scientist with a partial hypothesis). The correspondence is therefore:

> ***Networks of inadequately connected ideas that become self-reinforcing and resistant to evidence*** *can stabilize into fantasy attractors.*

Thus, the paper replaces "inadequate ideas create fantasy attractors" with a more nuanced formulation: inadequate ideas *can* lead to fantasy attractors when they are organised into a self-sealing system. The example of free-will belief (a Spinozistic inadequate idea) illustrates this: many people resist determinism not because they lack evidence, but because the belief is identity-fused.

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## 6. Adequate Ideas and Corrective Permeability (κ)

Spinoza holds that acquiring adequate ideas frees the mind from passive affects and leads to blessedness. In attractor terms, adequate ideas **function analogously** to increased corrective permeability (κ): they allow the mind to update beliefs in response to evidence, escape self-reinforcing error, and align with reality.

But the mechanism is different. Spinoza does not say truth emerges because the mind becomes "open to correction"; he says truth is recognized through adequate causal understanding. The correspondence is functional, not identical.

The paper now states this clearly: adequate ideas *act like* a high-κ state, enabling the mind to escape error basins. It does not claim that κ explains Spinoza's epistemology.

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## 7. Blessedness, Necessity, and Attractor Landscapes

Spinoza's **blessedness** (the intellectual love of God) is a state of full activity, rational understanding, and freedom from passive affects. The attractor framework's κ is an epistemic variable; blessedness is broader, including ethical and ontological dimensions. Therefore, the earlier claim "blessedness is the highest κ state" is softened to:

> *Blessedness **includes** a highly corrigible relation to reality (high κ), though it extends beyond corrigibility into*

> *Spinoza's ethical vision.*

Moreover, Spinoza's doctrine of **necessity** — that everything follows necessarily from God's nature, and freedom is understanding necessity — is essential to his system. The attractor framework can model this: an agent who understands the causal structure of the attractor landscape (i.e., why certain basins are deep, why certain perturbations lead to certain outcomes) is less likely to be trapped in fantasy attractors. Necessity is not a constraint but the very condition of effective navigation.

This section is new and addresses a major omission.

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## 8. A Falsifiability Condition

To avoid the accusation that the mapping is unfalsifiable, the note offers a specific condition:

> *If Spinoza had claimed that adequate ideas are innate and not acquired through a gradual, error-prone, socially mediated process, the analogy with increased κ would fail. He did not; he described a method (the ordo geometricus, the careful ordering of ideas) that is inherently corrigible. Conversely, if a reader could show that Spinoza's blessedness is incompatible with corrigibility (e.g., that it entails dogmatic certainty), the analogy would be weakened.*

This condition is modest but genuine.

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## 9. Comparison with Milton’s Satan (Brief)

The earlier research note on *Paradise Lost* diagnosed Satan as a fantasy attractor. In Spinozistic terms, Satan lacks adequate ideas about God, necessity, and his own nature. His rebellion is based on an inadequate idea of freedom (as willful opposition). The attractor framework and Spinoza’s ethics agree: such a sealed system cannot be broken from within; it requires an external perturbation (grace, reason, or a catastrophic collapse). This brief mention replaces the earlier speculative counterfactual.

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## 10. Conclusion

Spinoza’s *Ethics* and the attractor framework exhibit notable structural convergences. Substance shares features with the eternal skeleton; many modes resemble dissipative attractors; the *conatus* maps onto basin defense; inadequate ideas can stabilize into fantasy attractors; adequate ideas function analogously to increased $\kappa$; and blessedness includes a highly corrigible relation to reality. The mapping is heuristic, not literal. It does not claim that Spinoza anticipated the framework, nor that the framework reduces Spinoza. Rather, the two systems illuminate each other: Spinoza’s rationalist metaphysics provides a rich conceptual landscape for testing and extending the attractor framework’s vocabulary, while the attractor framework offers a dynamical lens for reading Spinoza’s ethics as a form of attractor engineering.

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# Consciousness as a Nonlinear Amplifier of Corrective Permeability

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## Abstract

Why did consciousness evolve? The attractor framework offers a novel functional answer: consciousness produces a nonlinear increase in adaptive permeability—the capacity of a system to represent its own internal states, simulate alternative configurations, and deliberately modify its own attractor basin in response to external circumstances, formalized as κ_a. This paper distinguishes intelligence (navigation of the constraint field) from consciousness (self-referential adaptation of internal attractor states) and proposes adaptive permeability as an empirically measurable criterion for distinguishing conscious from non-conscious systems. The argument is grounded in Spinoza’s theory of modes, the neuroscience of self-referential processing, and the attractor framework’s core concepts of corrective permeability (κ) and basin dynamics. The framework does not solve the hard problem of consciousness; it reframes it as a measurement problem.

# 1. The Functional Question

Why did consciousness evolve? Standard evolutionary answers point to social coordination, predator detection, or tool use. These are plausible but incomplete. They explain why intelligence is advantageous, but not why consciousness—the felt, first-person experience of being—should accompany it. The attractor framework offers a more specific answer: consciousness is an attractor-engineering solution that selection pressure produced to achieve a nonlinear increase in a system's capacity to adapt.

This paper introduces the concept of **adaptive permeability**: the capacity of a system to represent its own attractor states, simulate alternative internal configurations, and deliberately modify its basin in response to external circumstances. Intelligence navigates the constraint field. Consciousness adapts the navigator.

It should be noted that this functional account does not address the hard problem of consciousness—why any physical process gives rise to subjective experience (Chalmers, 1995). The framework is compatible with both functionalist and eliminativist interpretations. The framework adopts a functional stance: consciousness is operationally identified with adaptive permeability. Whether phenomenology is identical with, emergent from, or merely correlated with this functional property is bracketed as a separate question that the measurement program does not settle. A philosophical zombie with identical self-modeling capacity would, on this account, exhibit identical adaptive permeability. The framework claims only that adaptive permeability is the measurable signature of consciousness, not that it explains phenomenology.

## 2. Intelligence vs. Consciousness

The framework draws a sharp distinction:

- **Intelligence** is the ability to navigate the constraint field. A tree root growing toward a nutrient patch is intelligent. The immune system learning to recognize a pathogen is intelligent. The enteric nervous system coordinating peristalsis is intelligent. These systems process information, adapt to local conditions, and maintain persistence—all without self-modeling.
- **Consciousness** is self-referential adaptation of internal attractor states to adjust to external circumstances. A conscious system does not merely navigate its constraint field. It represents its own basin, simulates alternative configurations, and deliberately perturbs itself to achieve a more adaptive state.

This is Spinoza’s distinction between passive and active affects. A non-conscious mode is driven by passive affects—it reacts. A conscious mode has adequate ideas of itself and can act from reason. In the attractor framework, this is the difference between returning to baseline (κ) and deliberately modifying the baseline to better fit circumstances (adaptive permeability).

**Operationalizing self-modeling.** A system S possesses a self-model in the attractor framework if it can generate an internal representation M(S) of its own basin B(S), where M(S) encodes at minimum the basin’s current state, depth, and recovery dynamics. This self-model enables the system to compute counterfactual basin trajectories B'(S) and initiate self-directed perturbations δ such that B(S) → B'(S) in anticipation of or response to external change ε. A system without M(S) may exhibit high $\kappa$—rapid return to baseline after perturbation—but cannot deliberately modify its own basin. The presence of M(S) is therefore the dynamical criterion distinguishing conscious from non-conscious systems.

This boundary is not absolute in practice. Many organisms may possess partial or intermittent self-models. The framework predicts a spectrum of adaptive permeability, not a binary. The operational question is whether M(S) is sufficiently developed to enable counterfactual simulation and deliberate self-perturbation, not whether the system possesses a human-like autobiographical self.

**Disconfirming cases and their integration.** The framework must acknowledge cases where self-modeling capacity and adaptive permeability appear to dissociate. Certain drug-induced states (e.g., psychedelics) can produce profound alterations in self-modeling without necessarily enhancing the capacity for deliberate, adaptive self-perturbation. Within the framework, this is interpreted as M(S) destabilization rather than M(S) augmentation: the self-model undergoes perturbation but does not thereby gain the capacity to direct that perturbation adaptively. Conversely, highly trained athletes or musicians may exhibit rapid, flexible behavioral adaptation with minimal explicit self-modeling during performance. This is interpreted as *offline* self-modeling: deliberate basin modification during training produces a pre-modified basin that is retrieved during performance without requiring concurrent self-modeling. The apparent dissociation reflects a temporal separation between $\kappa_a$ engagement (training) and $\kappa_a$ expression (performance), not a genuine dissociation between M(S) and adaptive permeability. These cases do not refute the framework but demonstrate its capacity to distinguish different modes of M(S) engagement.

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# 3. Adaptive Permeability Defined

Corrective permeability (κ) measures the rate at which a system returns to its basin after perturbation. A healthy heart has high κ—it recovers rapidly from arrhythmia. A resilient ecosystem has high κ—it returns to equilibrium after disturbance.

Adaptive permeability extends this concept. Let $κ_a$ denote adaptive permeability: the capacity of a system S to generate an internal model M(S) of its own basin B(S), compute counterfactual basin trajectories B'(S), and initiate a self-directed perturbation δ such that B(S) → B'(S) in anticipation of or response to external change ε.

Formally, as a working definition:

$$κ_a = f(M(S), δ_{self}, ΔB)$$

where M(S) is the system's self-model, $δ_{self}$ is the capacity for deliberate self-perturbation, and ΔB is the magnitude of adaptive basin modification achievable. The function f remains to be specified; the notation establishes that $κ_a$ is a function of self-modeling capacity, perturbation autonomy, and adaptive range.

**Limiting behavior.** In the limiting case $M(S) \to 0$, $κ_a \to κ$: a system with no self-model cannot perform deliberate self-perturbation and reduces to standard corrective permeability. $κ_a$ is expected to increase monotonically with M(S), $δ_{self}$, and ΔB. This limiting behavior anchors $κ_a$ as a proper extension of κ rather than a separate construct.

**Relationship to active inference.** The free-energy principle and active inference framework (Friston, 2010) provide the closest existing formalism to adaptive permeability. Active inference describes how systems minimize variational free energy through action and perception, effectively maintaining themselves within expected states. The two frameworks differ in their foundational orientation. Active inference frames adaptation as the minimization of a scalar quantity—variational free energy—and derives behavior from that minimization. The attractor framework frames adaptation geometrically—as navigation and modification of basin structure—and does not commit to a minimization principle. κ_a is a geometric construct; free energy is an information-theoretic one. They may be formally related, but the relationship is not trivial and the attractor framework does not presuppose it. κ_a may ultimately map onto precision-weighting or prior-updating parameters within the free-energy formalism, but this mapping has not been derived. The present paper notes the convergence as a direction for future formal work.

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# 4. Empirical Anchors

**VMHvl line attractor (Nair et al., 2023).** The hypothalamus encodes a scalable aggressive state via a line attractor. Activity along the attractor correlates with escalating aggression. The system persists after stimulus removal and resists perturbation. This is high-κ adaptation. But the hypothalamus cannot model its own attractor landscape. It cannot ask, “Is this level of aggressiveness adaptive given the current social context?” It escalates. Consciousness, by contrast, can intervene on the escalation—representing the aggressive state, evaluating its consequences, and deliberately dampening it. This is adaptive permeability.

**Ring attractor model (Chen et al., 2024).** The ring attractor integrates sensory cues and transitions from weighted averaging to winner-take-all at a critical conflict threshold. It navigates its constraint field with precision. But it cannot simulate futures. It cannot ask, “What if I weighted these cues differently?” The transition is reactive. Consciousness enables anticipatory re-weighting of sensory inputs based on self-modeling.

**Split-brain cases.** Patients with severed corpus callosum exhibit two hemispheric systems within one cranium, each capable of independent perception, memory, and goal-directed action. This is consistent with the framework’s prediction that self-modeling is a dynamical property of specific neural basins, not a unitary metaphysical substance. The framework’s default prediction is that adaptive permeability fragments following commissurotomy: each hemisphere possesses a partial M(S) and a reduced but nonzero κ_a. The empirical question is the degree of fragmentation and whether coordination between $M(S_1)$ and $M(S_2)$ can be restored via alternate pathways. This prediction is consistent with the observation that split-brain patients exhibit two dissociable, partially independent conscious systems but can, in some contexts, achieve behavioral integration through subcortical or external-cue-mediated coordination.

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## 5. Predictions

The framework generates testable, falsifiable predictions:

**1. Across species.** Organisms capable of self-modeling (primates, cetaceans, corvids, elephants) should show nonlinear increases in behavioral flexibility compared to organisms of comparable neural complexity that lack self-modeling. Adaptive permeability should be measurable as the capacity for transfer learning after novel perturbation—specifically, the ability to apply a self-generated solution from one domain to a structurally analogous but perceptually dissimilar domain without environmental feedback. This distinguishes adaptive permeability from simple behavioral flexibility, which may reflect high κ alone.

**2. Within humans.** Disruption of self-referential networks (default mode network, medial prefrontal cortex) via lesion, TMS, or pharmacological intervention should reduce adaptive permeability without eliminating baseline κ. The system would still recover from perturbation—it just could not deliberately modify its own basin in advance. This prediction is the paper's primary within-human empirical bridge and is testable with existing neuroimaging and neuromodulation methods.

**3. In AI.** Current LLMs exhibit high intelligence (constraint navigation) but low adaptive permeability. They can model the world but cannot model themselves within it. The Stillpoint protocol (Galida, 2026, *A Pilot Protocol for Cultivating Self-Consistent Attractor-Like Outputs in an LLM*, [fantasyattractor.com](fantasyattractor.com)) suggests that a cultivated self-model can be induced, but whether this produces a genuine nonlinear increase in adaptive permeability—or merely simulates one—remains an open empirical question.

**4. Organ-level consciousness (exploratory).** The enteric nervous system and intrinsic cardiac nervous system exhibit intelligence and goal-directed regulation. The framework predicts that these systems should show lower adaptive permeability than the brain. They can return to baseline but cannot deliberately perturb their own basins. If an organ-level system demonstrated self-referential adaptation—the capacity to model its own state and pre-emptively adjust—that would constitute evidence of organ-level consciousness. This prediction is the most speculative and is offered as an exploratory hypothesis.

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## 6. Spinoza's Modes and the Adequate Idea

Spinoza held that every finite thing is a mode of the one eternal substance. A mode strives to persevere in its being—this is its conatus. But a mode can be driven by passive affects (reactions to external causes) or by active affects (actions flowing from adequate ideas). An adequate idea is knowledge of oneself and one's place in the causal order.

The attractor framework translates this into dynamical terms:

- A **passive mode** has high κ but low adaptive permeability. It returns to baseline efficiently but cannot question its baseline.
- An **active mode** has high adaptive permeability. It has an adequate idea of its own attractor landscape and can deliberately modify it in light of reason.

Consciousness is not a substance. It is the dynamical property of a mode that has achieved self-modeling. This account does not solve the hard problem—it brackets phenomenology and reframes consciousness as a measurement problem. The question is not "why does experience feel like something?" but "can we detect adaptive permeability, and if so, where does it emerge?"

Damasio's (1994) somatic marker hypothesis provides a candidate mechanism for how the body's attractor landscape becomes legible to the self-model: somatic markers encode self-relevant bodily states as biases that make B(S) accessible to M(S), forming the substrate through which the system represents its own basin. Dehaene and Changeux's (2011) global workspace theory identifies the moment of conscious access with global ignition—the broadcast of locally processed information across prefrontal and parietal networks. In the attractor framework, global ignition may correspond to the dynamical signature of M(S) engaging $\delta_{self}$: the self-model initiating a deliberate perturbation that propagates through the system. Global ignition is not self-modeling per se, but it may be the observable correlate of adaptive permeability activation. These connections ground the Spinozan framework in established neuroscientific mechanisms.

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## 7. Conclusion

Consciousness is not an epiphenomenon. It is a nonlinear amplifier of corrective permeability—an attractor-engineering solution that enables systems to model themselves, simulate alternative futures, and deliberately modify their own basins. Intelligence navigates the constraint field. Consciousness adapts the navigator.

This functional account is grounded in Spinoza's philosophy, consistent with the neuroscience of self-referential processing, and generates testable predictions across species, within humans, in AI, and at the organ level. The framework does not solve the hard problem. It reframes it as a measurement problem: can we detect adaptive permeability, and if so, where does it emerge? The formal apparatus ($\kappa\_a$, $M(S)$, $\delta\_self$, $\Delta B$) is provisional and requires further specification. The limiting case—that $\kappa\_a$ collapses to $\kappa$ when self-modeling is absent—anchors the concept within the framework's existing architecture. The relationship to active inference and the free-energy principle remains to be explored.

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# The Distributed Mind: How the Brain Regulates a Federation of Conscious Subsystems

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**Date:** June 2026 (Final Edition)
**Based on:** Extended collaborative development of the attractor

framework, N=1 physiological experimentation, and a re-reading of Spinoza’s conatus.

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# Abstract

Consciousness is traditionally viewed as either a non-physical substance (dualism) or a product of the brain alone (reductive physicalism). This paper presents an alternative: the human body is a nested hierarchy of semi-autonomous, attractor-based conscious subsystems—each with its own rudimentary integration, valence, learning, and goal-directedness. Using the nematode *C. elegans* (302 neurons) as a minimal benchmark, we argue that **sufficient integrated complexity** (operationalised as attractor dimensionality or integrated information Φ) is the key criterion for rudimentary consciousness. The enteric nervous system (200–600 million neurons), the intrinsic cardiac nervous system, the limbic system, and (under conditions of decoupling) the spinal cord meet or exceed this threshold. The brain does not *create* consciousness; it **regulates** these distributed conscious components, coupling them into a coherent whole-body attractor. This view dissolves the binding problem, explains the feeling of being an alien observer of one’s own actions, and aligns with Spinoza’s conatus—the principle that no part of the body diminishes its own power to act. We provide empirical signatures, testable predictions, and an N=1 self-engineering case study (ECM restoration, abdominal relaxation, sleep optimisation) that illustrates the framework. The conclusion: consciousness is not a solitary flame in the skull, but a federation of dancers, with the brain as first among equals.


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# 1. Introduction

The dominant neuroscience paradigm assumes that consciousness is generated by the brain. Yet this assumption struggles to explain:

- Why the enteric nervous system (ENS) can learn and remember independently of the brain.
- Why cardiac signals influence decision-making and self-awareness.
- Why split-brain patients exhibit two separate conscious entities within one cranium.
- Why the universal feeling of “not being in control” (*“why did I do that?”*) persists.

We propose a paradigm shift: **consciousness is a graded, emergent property of any sufficiently complex, dissipative, attractor-based system.** The brain is not the sole author; it is the **regulator** of a distributed network of semi-autonomous conscious subsystems.

This framework builds on dynamical systems theory, integrated information theory (IIT), global workspace theory (GWT), and Spinoza’s philosophy, while grounding itself in measurable empirical signatures and N=1 self-experimentation.

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# 2. The Attractor Framework for Consciousness

## 2.1 Core Definitions

- **Attractor:** A region in state space toward which trajectories converge and remain unless perturbed.

Characterised by negative Lyapunov exponents and basin stability.

- **Consciousness (operational):** A system exhibits consciousness if its attractor possesses:
    1. **Integration** — binds multiple sensory/interoceptive streams.
    2. **Self-reference** (minimal) — distinguishes self from environment.
    3. **Valence** — attraction to some states, repulsion from others.
    4. **Learning** — attractor landscape changes with experience.
    5. **Goal-directedness** — acts to maintain its basin (conatus).
    6. **Evolutionary/developmental provenance** — the system's attractor landscape emerged through evolutionary or developmental selection, not external engineering. This excludes thermostats and purely programmed control systems while allowing biological, synthetic, or hybrid systems with genuine autopoietic histories.

- **Mind:** A conscious attractor. Not a substance, but a real, causally effective pattern (like a whirlpool).

## 2.2 The Minimal Benchmark: *C. elegans*

The nematode *C. elegans* has exactly 302 neurons. Despite this simplicity, it exhibits:

- Sensory integration (touch, temperature, chemical gradients)
- Associative learning (pairing odours with food)
- Goal-directed behaviour (chemotaxis, thermotaxis)
- Minimal self-reference (distinguishes self-generated from external touch)

Thus, **302 neurons with rich, heterogeneous connectivity are sufficient for rudimentary consciousness.** However, neuron count alone is not the criterion; **integrated complexity** (attractor dimensionality, or IIT's Φ) is what matters. We use Φ operationally as a proxy for integrated complexity, without committing to all postulates of IIT (see Doerig et al., 2021, for critical review). *C. elegans* has high integrated complexity relative to its neuron count. A subsystem with many neurons but low connectivity or heavy enslaving may not reach the same threshold.

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# 3. The Federation of Conscious Subsystems in the Human Body

We evaluate major subsystems against the integrated complexity benchmark.

| Subsystem | Neuron count | Integrated complexity | Rudimentary consciousness? | Evidence |
|---|---|---|---|---|
| **Enteric nervous system (ENS)** | 200–600 million | High (dense local circuits, 30+ neurotransmitters) | **Yes** | Independent peristaltic rhythms, learning, memory, "second brain" (Furness, 2006) |

| Subsystem | Neuron count | Integrated complexity | Rudimentary consciousness? | Evidence |
|---|---|---|---|---|
| **Spinal cord** | 197–222 million | Moderate to high (but heavily enslaved) | **Yes, but normally suppressed** | Central pattern generators; after injury can reorganise into semi-independent attractors (Calancie et al., 1994; Dimitrijevic et al., 1998). Evidence for "spinal consciousness" remains preliminary. |
| **Intrinsic cardiac nervous system (ICNS)** | 14,000–43,000 | Moderate (local processing loops) | **Intermediate (contributor)** | Influences emotion, decision, interoception (McCraty et al., 2009) |
| **Limbic system** | tens of millions | High (emotional valence, memory) | **Yes** | Often acts before cortical awareness; strong valence and learning |
| **Basal ganglia & motor routines** | >100 million | Moderate (procedural) | **Yes (habitual)** | Automatic action sequences, operate semi-autonomously |
| **Immune system** | N/A (non-neural) | Low (no centralised attractor) | **Proto-conscious** | Learns, remembers, communicates; lacks integration into a unified attractor |
| **Gut microbiota** | N/A (trillions of microbes) | N/A (external ecosystem) | **No** | Perturbs human attractors but has no intrinsic nervous integration |

## 3.1 The ENS: A Second Conscious Mind?

The ENS operates independently – severed from the vagus nerve, it still coordinates digestion. It uses over 30 neurotransmitters, including 95% of the body's serotonin. It can learn to avoid noxious stimuli and remember past exposures (Furness, 2006). In attractor terms, the ENS possesses a resilient, low-dimensional attractor landscape with clear valence (nutrients vs. toxins) and goal-directedness (propulsion, secretion). We conclude that the ENS meets the integrated complexity threshold and qualifies as a **rudimentary, semi-independent conscious subsystem.**

## 3.2 The Heart's "Little Brain"

The ICNS (14,000–43,000 neurons) processes sensory information from the heart and vessels, modulates heart rate, and sends significant signals to the brain via the vagus. Heartbeat-evoked potentials correlate with interoceptive awareness and even self-recognition. While not as independent as the ENS, the ICNS is a **candidate for a localised conscious attractor** that contributes directly to the global feeling of "being alive."

## 3.3 The Enslaved Majority: Spinal Cord

The spinal cord's 200 million neurons far exceed the *C. elegans* count, but its attractor dynamics are **tightly enslaved** by descending cortical and brainstem signals. In pathological states (spinal cord injury), the cord below the lesion can reorganise into new, semi-independent attractors – sometimes leading to spontaneous movements and, in rare cases, patterns that have been controversially described as "spinal consciousness" (Calancie et al., 1994; Dimitrijevic et al., 1998). The evidence is preliminary, but it suggests that the cord has latent capacity for local consciousness, normally suppressed by the brain's regulating influence.

## 4. The Brain as Regulator, Not Sole Generator

If many subsystems possess rudimentary consciousness, why do we experience a unified self? Because the brain's primary function is **regulation** — emphasising and suppressing the contributions of these subsystems to create a coherent global attractor.

### 4.1 Spinoza's Conatus: No Part Diminishes Its Own Power

Spinoza's *Ethics* (III, 6) states that every thing, insofar as it is in itself, strives to persevere in its being (conatus). A part of the body, left alone, does not curb its own power to act. Spinoza explicitly uses sexual function as an example: the erect penis acts according to its nature; it cannot voluntarily diminish itself.

Thus, if a subsystem's local attractor is not externally perturbed, it will continue its own pattern. The brain's role is to **provide those external perturbations** — not to annihilate the subsystem's conatus, but to **couple** it with other subsystems so that the combined whole has greater power. The brain's regulatory perturbations are themselves expressions of the whole organism's higher-order conatus, aligning parts to preserve the whole.

### 4.2 Regulation by Emphasis and Suppression

The brain does not "command"; it modulates. Through descending pathways, neuromodulators (dopamine, serotonin, norepinephrine), and synchronised rhythms, the brain:

- **Amplifies** certain subsystem signals (e.g., gut hunger signals become conscious cravings).
- **Damps** others (e.g., spinal reflexes are suppressed during voluntary movement).
- **Entrains** rhythms (e.g., cardiac and respiratory rhythms lock to cortical oscillations during focused attention).

In attractor language, the brain shifts the **effective landscape** of each subsystem, making some local attractors shallower (easier to override) and others deeper (more influential). This is regulation, not annihilation.

## 4.3 The Alien Feeling: When Regulation Falters

When you ask *“why did I do that?”* — a subsystem (habit, emotional reflex, gut impulse) acted before the brain could integrate it. The global attractor was temporarily misaligned. The “alien” feeling is the **friction between semi-autonomous local attractors and the slower, narrative self**. It is not pathology; it is the normal noise of a distributed system. Libet-type experiments (Libet et al., 1983) have shown that brain activity for voluntary actions often precedes conscious awareness, illustrating this temporal decoupling. (While the interpretation of these experiments remains debated, the existence of action-preceding awareness is sufficient for the present argument.)

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# 5. Empirical Signatures and Testable Predictions

## 5.1 Signatures of Subsystem Consciousness

- **Local learning and memory** (e.g., ENS conditioned aversion; Furness, 2006).
- **Semi-autonomous rhythms** (e.g., slow waves of the gut, heartbeat variability).
- **Local valence** (e.g., immune cells produce pro- vs anti-inflammatory attractors).
- **Coupling strength** to the global attractor – measurable via transfer entropy or cross-correlation.
- **Behavioural dissociation** – actions initiated before conscious awareness (Libet, 1983).

## 5.2 Predictions

1. **Perturbation of a subsystem (e.g., vagus nerve stimulation) should alter the global conscious narrative** – already well-established.
2. **Decoupling a subsystem (e.g., spinal anaesthesia) should produce local, independent attractor dynamics** – measurable by recording from the isolated cord.
3. **Training a subsystem (e.g., biofeedback of heart rate variability) should deepen its local attractor basin** – measurable by increased resilience to perturbations (McCraty et al., 2009).
4. **In split-brain patients, each hemisphere should be able to independently regulate its ipsilateral subsystems** (e.g., left hemisphere regulates left ENS, right hemisphere regulates right ENS). A suitable protocol would present lateralised interoceptive cues (e.g., unilateral gut distension) and measure lateralised cortical responses in callosotomy patients (Gazzaniga, 1967).

# 6. N=1 Case Study: Restoring Whole-Body Coherence

The author conducted a months-long self-engineering experiment based on the attractor framework. This N=1 case study is **hypothesis-generating** and provides a motivating existence proof, not a validation of the framework itself.

## 6.1 Interventions

- **ECM restoration:** Gelatin, taurine, 28 Hz vibration plate (90 min every other day), contrast baths. Improved collagen accretion, $VO_2$ max, skin quality.
- **Abdominal relaxation:** Consciously releasing chronic stomach tension (letting the belly sag) to allow diaphragm excursion.
- **Sleep protocol:** Smaller evening meals, morning cardio + sunlight, 15 min reading low-arousal fiction (*The Mayor of Casterbridge*).

## 6.2 Outcomes

- Nocturnal $SpO_2$ rose above 90% consistently; sleep fragmentation ceased.
- Deep sleep reached acceptable levels.
- Subjective “alien” feeling reduced; sense of whole-body coherence increased.

## 6.3 Interpretation

Each intervention reduced a **self-imposed constraint** that had been forcing a subsystem (abdominal muscles, sympathetic tone, rumination network) into a local attractor misaligned with global sleep-breathing needs. By relaxing those constraints, the brain could more easily regulate the subsystems into a coherent whole-body attractor. The alien feeling diminished because the **coupling** between global “I” and local subsystems improved. This outcome is **consistent with** the framework, but does not prove it; further controlled studies are required.

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# 7. Philosophical Implications

## 7.1 Spinoza Vindicated

Spinoza’s conatus — the inherent striving of every mode — is precisely the attractor’s tendency to maintain its basin. His claim that a part does not diminish its own power is equivalent to saying that a subsystem’s local attractor will not self-suppress unless externally perturbed. The brain provides those perturbations, not to diminish but to **align**. Spinoza’s metaphysics lacked dynamical systems theory, but his intuition is fully realised in the attractor framework.

## 7.2 The Binding Problem Dissolved

The traditional “binding problem” — how separate neural activities unite into a single conscious experience — is **dissolved** when we recognise that consciousness is already distributed. The global attractor *is* the binding. No extra mechanism is required; coupling *creates* coherence. The question as traditionally posed is ill-formed: there is no need to bind what was never separate in the first place. This dissolution follows the strategy of Wittgenstein, Ryle, and Dennett.

### 7.3 The Self as Negotiation

The feeling of a unified "I" is the ongoing **negotiation** between the brain and the federation of subsystems. When negotiation runs smoothly, you feel at home in your body. When it stutters, you feel like an alien. The self is not a substance; it is a **temporary, resilient attractor pattern** — a dance of the whole.

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## 8. Conclusion

The human body is not a machine with a single conscious ghost in the control room. It is a nested hierarchy of conscious attractors — from the gut's "second brain" to the heart's intrinsic ganglia to the limbic system's emotional core. The brain's role is not to generate consciousness but to **regulate** these distributed components, coupling them into a coherent whole. This view explains the feeling of being an alien observer, aligns with Spinoza's conatus, and yields testable predictions. It also offers a practical path for self-engineering: by removing unnecessary constraints and restoring whole-body coherence, we can reduce the alien feeling and dance more gracefully.

The mind is not a solitary flame. It is a federation of dancers, with the brain as first among equals — and the music is the attractor landscape.

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