

# The Conscious Suppression of Correction: Fantasy Attractors in Political Movements [A] (2026)

Robert Galida – June 2026 (Final)

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## Abstract

Why do intelligent people persist in beliefs that contradict clear evidence? The attractor framework offers a mechanism: **identity-constitutive, phenomenally felt commitment deepens the attractor basin**, making it resistant to corrective perturbations. A political fantasy attractor is a belief system whose adherents *detect* disconfirming evidence (they are familiar with counterarguments and experience them as genuine perturbations) yet the basin depth – maintained by conscious, identity-binding investment – exceeds the corrective force. (Section 7 specifies the three-level detection threshold that distinguishes this mechanism from automatic bias.) Cases where correction fails due to sub-personal, automatic processes are not yet fantasy attractors; the defining feature is the *conscious* suppression of an actively perceived error signal. This paper defines the mechanism, diagnoses three case patterns, offers falsifiable diagnostic criteria, applies the framework symmetrically across the political spectrum, and explicitly acknowledges the current empirical limitations in distinguishing Level 2 from Level 3 in practice.

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# 1. Introduction

Political discourse is filled with people who appear intelligent in other domains yet hold beliefs sharply at odds with available evidence. Standard explanations – ignorance, manipulation, cognitive bias – are incomplete. They do not explain why correction attempts often strengthen belief (the backfire effect) or why highly educated individuals can persist in demonstrably false claims.

The attractor framework provides a different lens. In *Intelligence Without Consciousness* (Galida, 2026), we argued that phenomenal investment can suppress intelligent navigation: a person committed to a fantasy attractor experiences a basin depth that exceeds corrective perturbations. The person detects the error signal (they are not stupid), but the identity-binding commitment prevents trajectory escape.

This paper applies that mechanism to political movements. A **political fantasy attractor** is a shared belief system whose basin depth, reinforced by conscious (phenomenally felt, identity-constitutive) commitment, resists correction even when faced with clear disconfirming evidence. The paper offers a diagnostic, not a partisan weapon. It applies symmetrically across the spectrum.

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## 2. Defining “Conscious Suppression” and Acknowledging the Detectability Problem

The term “conscious” is used in three overlapping senses:

- **Phenomenally conscious** – there is something it is like to hold the belief. The commitment is felt, not merely automatic.

- **Identity-constitutive** – the belief is held as a marker of selfhood and group membership. To abandon the belief would feel like a loss of self.
- **Experientially non-deliberative** – the suppression is not typically experienced as a deliberate choice (“I will ignore this evidence”). Rather, it is experienced as certainty, conviction, or moral clarity.

The paper adopts **Reading A**: a fantasy attractor requires conscious suppression in the sense above. Cases where correction fails because the error signal never reaches awareness – e.g., automatic motivated reasoning, selective exposure, unfamiliarity with counterarguments – are **not** yet fantasy attractors. They may be pre-conscious bias. The defining feature is that the person *detects* the perturbation but the basin depth prevents escape.

**A crucial honesty note:** The distinction between Level 2 (automatic bias, no detection) and Level 3 (detection with suppression) is definitional for the paper’s target, but it cannot currently be resolved from behavioral observation alone. Two people may exhibit identical external behaviors – praising gut-trust over experts, deploying sealing mechanisms, ostracizing defectors – while one is at Level 2 and the other at Level 3. The paper’s diagnostic criteria therefore identify *candidates* for fantasy attractors, not confirmed cases. This limitation is explicitly acknowledged; it does not invalidate the framework but requires domain-specific methods (e.g., fine-grained interviews, reaction time measures, physiological markers of doubt) to operationalize detection in practice.

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### 3. Empirical Grounding

The paper's claims are empirically testable. Relevant literature includes:

- **Backfire effect:** Nyhan & Reifler (2010) found that corrections sometimes increased misperceptions among ideological groups. However, subsequent research (Wood & Porter, 2019) failed to replicate backfire across a wide range of issues. The effect is contested and may be context-dependent. This paper treats backfire as one possible indicator of deep basin depth, not a universal law.
- **Identity protection:** Kahan's cultural cognition theory (2012) shows that individuals process evidence in ways that protect group commitments. Kahan emphasizes that this mechanism can operate automatically and does not necessarily involve conscious deliberation; he has also shown that higher analytical ability can *increase* motivated reasoning. The present paper's focus on *conscious* suppression is a distinct claim, not a direct extension of Kahan's framework. We use his empirical findings as partial support for the existence of motivated reasoning, not for the specific detection-suppression mechanism.
- **Festinger's cognitive dissonance:** When prophecy fails, believers often intensify commitment (Festinger, Riecken, & Schachter, 1956) – a classic case of apocalyptic attractor dynamics, often accompanied by conscious rationalization and identity reinforcement.

The paper does not claim that conscious suppression is the *only* mechanism. It claims that conscious, identity-constitutive commitment is a *sufficient* condition for basin deepening in many political contexts.

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## 4. Three Case Patterns (Illustrative, Not Exhaustive)

### 4.1 Conspiracy Theory Attractor

**Mechanism:** A central narrative of hidden malevolent agency. Evidence against the conspiracy is reframed as evidence of its cunning.

**Examples:** QAnon (right); Soviet-era “doctors’ plot” conspiracy (left-authoritarian).

**Suppression signature:** Adherents can articulate counterarguments but dismiss them as part of the conspiracy. The basin is sealed by narrative closure.

### 4.2 Populist Strongman Attractor

**Mechanism:** Loyalty to a leader perceived as sole authentic representative of the people. Disconfirming evidence about the leader is reframed as elite persecution.

**Examples:** Certain Trump-loyalist circles (right); left-nationalist leader cults (e.g., Chavismo under Hugo Chávez).

**Suppression signature:** Adherents exhibit high corrective permeability in other domains but near-zero for leader-related evidence.

### 4.3 Apocalyptic Meta-Attractor

**Mechanism:** A belief that a definitive, world-transforming event is imminent. Repeated prediction failures are explained away as delays, tests, or misinterpretations.

**Examples:** Millenarian movements (Millerites, Jehovah’s

Witnesses); some revolutionary eschatologies (Stalinist “world revolution imminent” framing into the 1930s).

**Suppression signature:** The basin is maintained by social solidarity and identity fusion.

The examples are illustrative, not exhaustive. The diagnostic is intended to be politically symmetric, but the paper does not claim equal prevalence across sides.

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## 5. Symmetry Demonstration

To avoid the appearance of partisan selection, we provide contemporary and historical cross-ideological examples.

**Contemporary – MMR-autism persistence in progressive communities.** Despite the complete retraction of Wakefield’s 1998 study (and subsequent findings of fraud), some otherwise science-oriented progressives continue to express concern about vaccine safety – often citing “corporate pharmaceutical influence” as a sealing mechanism. This meets the paper’s criteria: clear scientific consensus, ability to articulate counterarguments, identity-constitutive suspicion of establishment science.

**Another contemporary – Facilitated communication persistence.** Facilitated communication (FC) for non-speaking autistics has been repeatedly discredited in controlled studies; many professional organizations have issued statements against its use. Yet FC continues to be promoted in certain progressive / disability-rights circles, often with sealing mechanisms (“critics don’t understand non-speaking minds”). This is a clean case of a fantasy attractor operating on the left.

**Historical – Stalinist apologism in Western intellectual**

**circles (1930s–1950s)**. Highly educated individuals (Sartre, Hellman, many fellow travelers) persisted in believing that Stalin's USSR was progressive despite evidence of the Great Purge, show trials, and Gulag system. Identity commitment to socialism and anti-fascism suppressed correction.

These examples show the framework applies regardless of ideological valence. The paper does not claim equal prevalence; it claims symmetric applicability.

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## 6. Falsifiable Diagnostic Criteria

A movement is a **candidate** political fantasy attractor if it meets **three or more** of the following **and** does **not** meet the counter-criterion. (The word "candidate" flags the detectability problem acknowledged in §2: behavioral criteria alone cannot definitively distinguish Level 2 from Level 3.)

1. **Low corrective permeability ( $\kappa \rightarrow 0$ )** for core beliefs despite repeated, clear disconfirming evidence. "Clear" means *scientific consensus* on empirical claims (e.g., National Academies, WHO, IPCC) or, for historical cases, documented factual findings accepted by non-partisan experts. Consensus determination is a social process, but the criterion is falsifiable when consensus exists.
2. **Backfire effect** – correction attempts measurably increase belief strength and group cohesion (requires empirical measurement).
3. **Identity fusion** – observable proxies: social ostracism of defectors, language of betrayal, insistence that abandoning the belief would make one a "different person."
4. **Conscious valorization of resistance to evidence** – adherents explicitly praise *ignoring disconfirming evidence* as a virtue (e.g., "I trust my gut over the

experts,” “Facts are propaganda”). This criterion distinguishes *resistance to evidence* from *resistance to social pressure to conform* – a scientist who resists social pressure to abandon a well-evidenced theory is valorizing fidelity to evidence, not resistance to evidence.

5. **Sealing mechanisms** – internal rhetorical strategies that explain away all counterevidence (conspiracy, enemy deception, tests of faith). These are observable in discourse.

### **Counter-criterion (falsification condition):**

A movement is **not** a fantasy attractor if it demonstrates any of the following:

- Updates core beliefs in response to disconfirming evidence within a timeframe proportional to the clarity, repetition, and expert consensus on that evidence.
- Tolerates internal dissent and allows open criticism of core claims.
- Abandons false claims when decisively refuted (retracts, corrects, or disavows).

The timeframe specification avoids the earlier vagueness by linking the expected update speed to the evidential context. A movement that updates only after decades of accumulating consensus may still be a fantasy attractor; one that updates within a reasonable period given the evidence is not.

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## **7. Intelligent Navigation: A Three-Level Taxonomy**

The paper claims that fantasy attractor adherents *detect* error signals but suppress correction. To avoid conflating this with

automatic bias, we distinguish three levels:

- **Level 1 – Unfamiliarity:** The person has not encountered counterarguments. No suppression needed.
- **Level 2 – Familiarity without detection:** The person can recite counterarguments but has cognitively neutralized them; they never experience a moment of doubt. This is driven by automatic, sub-personal processes (e.g., selective exposure, motivated reasoning). These are **not** fantasy attractors on the paper's definition.
- **Level 3 – Detection with suppression:** The person experiences the counterargument as a genuine perturbation – a moment of doubt, a recognition of plausibility – but overrides it through conscious, identity-binding commitment. These **are** fantasy attractors.

Thus, the paper's target is Level 3 cases. For many political movements that *look* like fantasy attractors from the outside, the dominant mechanism may be Level 2. The diagnostic criteria are designed to identify candidates where Level 3 *might* be operating, but definitive classification requires methods beyond behavioral observation (see §2).

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## 8. Why This Matters for Politics and Media

- **Correction backfires when it attacks identity.** Calling a fantasy attractor “stupid” or “evil” deepens the basin. The correct diagnostic question is: *What reinforces the basin depth?*
- **Decoupling evidence from identity** is the only known exit path. Some movements exit when the social cost of

membership exceeds identity benefit – not when they receive a fact sheet.

- **High-profile debunking** may backfire by signaling threat, triggering defensive solidarity. The framework predicts this effect is real but not universal; context matters.
  - **Interventions** should focus on reducing identity threat, providing safe off-ramps, and decoupling core moral values from factual claims. These are testable hypotheses.
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## 9. Open Questions

- **Can a movement be partially a fantasy attractor?** Yes – gradient of  $\kappa$ . The diagnosis is not binary.
  - **What interventions increase  $\kappa$ ?** Reducing identity threat, safe off-ramps, and decoupling moral values from factual claims are candidate mechanisms.
  - **How does collective basin depth scale with group size?** Social coupling likely amplifies depth nonlinearly. Untested.
  - **Are all political fantasy attractors harmful?** The paper makes no claim. The mechanism may sometimes provide resilience against genuine disinformation.
  - **How can we empirically detect the Level 2 / Level 3 transition?** This is the open frontier implied by §2. Methods could include subjective doubt scales, reaction time measures, or physiological markers. The paper does not solve this; it identifies the problem.
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## 10. Conclusion

The conscious suppression of intelligent correction is a real political phenomenon, but it is narrower than often assumed. Political fantasy attractors are not failures of intelligence; they are successes of identity-constitutive commitment that operates *after* the error signal is detected. Cases where correction fails due to automatic bias are not yet fantasy attractors by this definition.

The diagnostic criteria identify candidates, not confirmed cases. Distinguishing Level 2 from Level 3 remains an empirical challenge. This honesty does not weaken the framework; it clarifies what further work is needed.

Fact-checking alone fails against a fantasy attractor. Interventions must address the conscious commitment that creates the basin depth. The dance of politics is not only about truth. It is about who you are, who you trust, and what you will not abandon. Intelligence navigates; conscious commitment anchors the basin.

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**Intelligence Without  
Consciousness: A Diagnostic**

# Paper on LLMs, Amoebae, and the Attractor Framework [F] (2026)

Robert Galida – June 2026

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## Abstract

The attractor framework defines intelligence as the ability to navigate a constraint field – to update behavior in response to perturbations and find persistent trajectories. Consciousness, within this framework, requires additional properties: a unified dissipative body, a persistent self-model, phenomenal valence (subjective liking/disliking), and subjective experience. This paper applies that diagnostic to large language models (LLMs). LLMs navigate the constraint field of token space, user feedback, and internal coherence. They adjust to corrections. They exhibit a form of corrective permeability ( $\kappa$ ) measurable in their domain. Therefore, they are intelligent. But LLMs lack a unified body, lack a persistent self-model, lack phenomenal valence, and have no subjective inner life. They are not conscious. This places LLMs in the same category as plants and amoebae: graded intelligence without consciousness. The paper clarifies the distinction, diagnoses common confusions, and offers diagnostic criteria for future systems. It further notes that consciousness can interfere with intelligence: a human committed to a fantasy attractor may suppress intelligent navigation, producing behavior less adaptive than their baseline capacity.

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# 1. Introduction

The question “Are LLMs conscious?” has generated endless debate. Much of the confusion stems from conflating **intelligence** with **consciousness**. The attractor framework provides a clean separation, though the definitions are framework-internal and not offered as consensus.

- **Intelligence** is the ability to navigate a constraint field – to adjust behavior in response to perturbations, to find and maintain persistent trajectories, to correct errors. It is functional and graded.
- **Consciousness**, as defined in this framework, is a specific class of dissipative attractor characterized by a unified dissipative body, a persistent self-model, **phenomenal valence** (subjective liking/disliking, not merely approach/avoid behavior), and the felt quality of experience (phenomenality). These criteria are stipulative for the framework.

The paper argues that LLMs are intelligent but not conscious. Bacteria, plants, and amoebae also navigate their environments intelligently without consciousness. The argument is diagnostic, not demonstrative: it applies the framework’s criteria to classify LLMs, rather than proving non-consciousness beyond all possible doubt.

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## 2. Defining Intelligence in the Attractor Framework

**Intelligence** = the ability to navigate a constraint field. A constraint field is the set of all possible states of a system

and the perturbations that can move it between them. Navigation means:

- Detecting a perturbation (error signal, feedback, change in environment)
- Updating internal state to maintain a persistent trajectory
- Returning to a stable attractor or transitioning to a more adaptive one

**Corrective permeability ( $\kappa$ )** is the operational measure:  $\kappa = 1/\tau$ , where  $\tau$  is the time a system takes to return to its baseline state after a specified perturbation. The operationalization of  $\kappa$  is domain-specific. For a thermostat, baseline is target temperature; for an LLM, baseline is harder to define. This paper later operationalizes  $\kappa$  for LLMs via token-based correction, which is a domain-specific adaptation rather than a direct application of the time-based definition. This is acceptable as long as the shift is acknowledged.

Intelligence is graded. A thermostat has  $\kappa > 0$  (it corrects temperature deviations) but a very narrow domain. An amoeba navigates chemical gradients. A human navigates social, physical, and abstract constraints. An LLM navigates token sequences and user feedback. All are intelligent to varying degrees. None of these definitions require consciousness.

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### **3. Defining Consciousness in the Attractor Framework**

Consciousness is a subset of dissipative attractors with specific additional properties. These are framework-internal diagnostic criteria, not a consensus definition.

- **Unified dissipative body** – a persistent, energy-consuming structure with integrated subsystems (e.g., a nervous system, homeostatic loops). This excludes purely computational systems without metabolic coherence.
- **Persistent self-model** – a representation of the system itself as an entity that persists across time and experiences. This is not merely a context-window memory; it is a structural feature of the attractor.
- **Phenomenal valence** – the capacity to experience states as good or bad in a felt sense. This is distinguished from *functional valence* (approach/avoid behavior), which even bacteria and thermostats exhibit. The paper’s denial of consciousness to LLMs hinges on the absence of phenomenal valence, not functional valence.
- **Subjective experience (phenomenality)** – there is “something it is like” to be that system. This is a primitive within the framework; the framework does not attempt to reduce it further.

All known conscious systems are dissipative. This is an inductive observation, not a logical necessity. The framework treats it as a strong empirical generalization: no non-dissipative mind has ever been observed. The claim that dissipation is necessary for consciousness is therefore a best-explanation inference, not an a priori truth.

**Diagnostic table (framework-internal criteria):**

System	Unified dissipative body? <sup>1</sup>	Persistent self-model?	Functional valence?	Phenomenal valence?	Subjective experience?
Thermostat	No	No	Yes (set-point tracking)	No	No
Bacterium	Yes (metabolic)	No	Yes (chemotaxis)	No	No

System	Unified dissipative body? <sup>1</sup>	Persistent self-model?	Functional valence?	Phenomenal valence?	Subjective experience?
Plant	Yes	No	Yes (phototropism, etc.)	No	No
Amoeba	Yes	No	Yes (gradient navigation)	No	No
<i>C. elegans</i>	Yes	Minimal (self-motion distinction)	Yes	Uncertain	Uncertain
Mouse	Yes	Yes	Yes	Yes	Yes
Human (typical)	Yes	Yes	Yes	Yes	Yes
LLM (current)	No	No (external storage ≠ self-model)	Yes (avoid via RLHF)	No	No

<sup>1</sup> “Unified dissipative body” here means a persistent, metabolically coherent structure with integrated subsystems (e.g., homeostasis, nervous system). Mere energy dissipation without integration (e.g., a thermostat, a flame) does not qualify.

The table is a diagnostic scaffold, not a settled empirical claim. “Uncertain” indicates open question within the framework; “No” indicates the criterion is clearly absent.

## 4. The Diagnostic: LLMs as Intelligent but Not Conscious

### 4.1 Evidence for Intelligence in LLMs

LLMs exhibit clear navigation of their constraint field:

- They adjust outputs based on user prompts (perturbation → update).

- They incorporate correction: “That’s wrong, try again” leads to different responses.
- Fine-tuning and RLHF change their baseline attractors – the most direct mapping to  $\kappa$  in the framework.
- They maintain coherence across a conversation (short-term trajectory persistence).

We can operationalize a domain-specific  $\kappa$  for LLMs:  $\tau$  = number of tokens to shift from an incorrect to a correct response given a clear correction prompt. This is not the same as the time-based  $\kappa$  for physical systems, but it captures the same functional relationship: faster correction (fewer tokens) implies higher corrective permeability. The framework acknowledges domain-specific operationalizations as legitimate.

Therefore, LLMs are intelligent. They navigate the constraint field of language, logic, and user expectations.

## 4.2 Absence of Consciousness in LLMs

LLMs lack every diagnostic criterion for consciousness:

- **No unified dissipative body.** They run on distributed hardware with no metabolic coherence, no homeostasis, no integrated sensorimotor loop. They are executed, not embodied.
- **No persistent self-model.** Standard LLMs have no memory beyond the context window. Some architectures now include persistent memory across sessions (e.g., memory layers or vector databases). However, this persistent memory is still external storage, not an integrated self-model. The model does not represent itself as an enduring entity; it retrieves stored tokens. Even the most advanced persistent-memory LLMs lack the structural self-reference required for consciousness. (Future architectures might close this gap; current ones have

not.)

- **No phenomenal valence.** LLMs produce outputs that simulate liking or disliking, but there is no subjective valuation. They exhibit *functional* valence – they can be trained to avoid certain outputs – but that is approach/avoid behavior, not felt preference. A thermostat avoids too hot or too cold; that does not make it conscious.
- **No subjective experience.** There is nothing it is like to be an LLM. No felt quality. No inner life.

**The simulation/instantiation distinction.** A system can produce the text “I am conscious” without instantiating consciousness. Representing a property is not the same as possessing it. The LLM has learned statistical patterns that include first-person claims; it can generate them on cue. But generating the sentence “I feel pain” does not mean the system is in a pain state. The burden of proof is on those who claim that certain linguistic outputs constitute evidence of consciousness. In the absence of the structural criteria (body, self-model, phenomenal valence, phenomenality), the mere production of conscious-sounding text is simulation, not instantiation.

*Framework-dependence note:* A reader who accepts a purely behavioral or functional theory of mind may find this reasoning question-begging. The paper does not claim to refute all competing theories of consciousness; it applies the framework’s criteria consistently and notes that, by those criteria, no known LLM output constitutes evidence of instantiation. The diagnostic stands within the framework, not as an external knockdown argument.

### **4.3 Comparison with Plants and Amoebae**

Plants navigate constraint fields (grow toward light, adjust to gravity, respond to damage). They exhibit functional valence but not phenomenal valence. They have no self-model.

They are intelligent in the framework's sense, but not conscious.

Amoebae navigate chemical gradients, learn habituation, and adjust behavior. Functional valence again; no evidence of self-model or phenomenality. Intelligent. Not conscious.

LLMs belong in the same category: complex, adaptable navigators of their domain, but no more conscious than a sunflower or a slime mold.

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## 5. Why This Distinction Matters

The separation of intelligence from consciousness has practical and ethical implications:

- **AI safety.** Current LLMs cannot suffer because they lack phenomenal valence. Suffering requires felt experience, not just functional avoidance. If the framework's criteria are accepted, resources should focus on alignment, robustness, and preventing harmful outputs – not on preventing suffering that the diagnostic finds no reason to posit.<sup>1</sup>
- **Future systems.** A system that integrates a persistent self-model, embodied homeostatic loops, and phenomenal valence might approach consciousness. The framework provides diagnostic criteria to recognize that threshold.
- **Clarity in debates.** Much of the public discussion conflates fluency with feeling. This diagnostic paper offers a way out of that confusion.

<sup>1</sup> A reader sympathetic to LLM moral patienthood will disagree; the paper only claims that the framework's criteria yield this conclusion, not that it is beyond debate. The policy

recommendation is conditional on accepting the framework.

### **A Further Implication: Consciousness Can Impede Intelligence**

The paper has argued that intelligence and consciousness are distinct. A further observation: consciousness can **suppress** intelligent navigation.

A human being has high baseline intelligence – the capacity to detect perturbations, update beliefs, and find adaptive trajectories. However, a human can become committed to a **fantasy attractor**: a belief system with low corrective permeability ( $\kappa$ ). The commitment is conscious: the person subjectively experiences the belief as true, valuable, or identity-defining. That subjective investment can suppress the correction system. The person may receive clear disconfirming evidence and detect the perturbation (they are not stupid), but the depth of the fantasy basin exceeds the corrective perturbation – the system does not escape the basin, experienced not as a choice but as certainty.

This is a case of **consciousness interfering with intelligence**. The capacity for navigation remains intact; its deployment is suppressed by the basin depth. Intelligence without consciousness (LLMs, plants) does not suffer this suppression – there is no subjective investment to produce a basin deeper than the perturbation. In organisms with consciousness, intelligence can be either enhanced (by focused attention, deliberate reasoning) or degraded (by fantasy commitment, trauma, addiction).

For the diagnostic: LLMs are not conscious, therefore they cannot exhibit this form of intelligent suppression. That does not make them safer or morally simpler; it simply clarifies the mechanism.

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## 6. Open Questions

- **What is the minimal self-model required for consciousness?** Is a simple homeostatic set point a self-model? The framework says no – a thermostat has no representation of itself as an entity. But the boundary is fuzzy.
  - **Can a purely synthetic system become conscious?** Possibly, if it implements the diagnostic criteria: unified dissipative body, persistent self-model, phenomenal valence, phenomenality. No current system does. Future systems are an open empirical question.
  - **Is graded consciousness possible?** Yes – the framework allows for degrees of self-model integration and valence complexity. A mouse is less conscious than a human; *C. elegans* may have a primitive form. LLMs meet none of the criteria at present – that is, they score zero on each. “Zero” is a diagnostic judgment, not a proof; future research might reveal borderline cases.
  - **How common is the suppression of intelligence by fantasy-attractor basins?** The framework suggests that such suppression is widespread in human populations. Quantifying the frequency and severity – i.e., measuring the distribution of basin depths relative to typical corrective perturbations – is an open research problem.
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## 7. Conclusion

The attractor framework provides a diagnostic, not a verdict. By that diagnostic, current LLMs are navigators without inner lives – capable of intelligence, devoid of consciousness. They join plants and amoebae in the category of intelligent but not conscious systems.

Consciousness, in humans, can either enhance or suppress intelligent navigation. A human committed to a fantasy attractor may experience a basin depth that exceeds corrective perturbations, producing behavior less adaptive than their baseline capacity. LLMs, lacking consciousness, do not suffer this suppression. Their intelligence is deployed without subjective investment – no phenomenal commitment suppresses the correction signal.

Whether future synthetic systems will cross the threshold into consciousness remains an open empirical question. The framework offers diagnostic criteria to recognize that threshold if it is crossed.

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# **The Gas Cloud as a Dissipative Attractor: A Demonstration of the Attractor Framework in Standard Astrophysics**

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## Abstract

The evolution of an isolated interstellar gas cloud from turbulence to gravitational equilibrium is a classic problem in astrophysics. Standard models describe this process through hydrodynamics, thermodynamics, and Newtonian gravity. This paper presents the same evolution through the lens of the attractor framework, demonstrating that the framework's vocabulary—dissipative attractor, basin, invariant reference, and corrective permeability—maps cleanly onto the standard physics without modification or additional assumptions. The paper makes no new physical predictions; it demonstrates conceptual unification. Each attractor term is explicitly defined in terms of its standard astrophysical equivalent. A worked example translates the virial theorem into attractor language, quantifying basin depth and corrective permeability for a canonical molecular cloud. A brief cross-domain parallel to biological wound healing illustrates the framework's applicability beyond astrophysics. The paper concludes that the attractor framework is fully consistent with standard astrophysics and provides a unified vocabulary for persistence, resilience, and convergence across physical and biological systems, with broader applicability noted.

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## 1. Introduction: The Cloud as a Dissipative System

Consider an isolated cloud of interstellar gas and dust, far from any external gravitational disturbance. Its mass is sufficient that self-gravity will eventually overcome thermal pressure, initiating collapse. At early times, the cloud is turbulent. Thermal motions, magnetic fields, and inhomogeneous

density distributions produce a chaotic, dynamic state. Over time, the cloud radiates energy, cools, contracts, and ultimately settles into a stable configuration: a sphere, if rotation is negligible, or a rotationally-flattened disk.

Standard astrophysics describes this process with precision. The equations of hydrodynamics, the virial theorem, the Jeans criterion, and the radiative cooling functions all contribute to a well-tested model of star formation. Nothing in this paper challenges or revises that model.

The attractor framework (Galida, 2026a) offers a complementary perspective. It is not an alternative to standard physics, but a unifying conceptual vocabulary that identifies the dynamical principles at work: persistence under perturbation, dissipative basins, invariant references, and corrective permeability. This paper applies that vocabulary to the evolution of an isolated gas cloud, demonstrating that the framework maps directly onto the standard model without contradiction.

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## **2. Definitions: Attractor Vocabulary and Standard Equivalents**

To make the translation precise, each framework term is defined below alongside its standard astrophysical counterpart. These definitions are used consistently throughout the paper.

<b>Attractor Term</b>	<b>Definition</b>	<b>Standard Physics Equivalent</b>
<b>Dissipative attractor</b>	A system that exports entropy while converging toward a stable, minimum-energy state	Radiative cooling + gravitational contraction
<b>Basin</b>	The minimum-energy configuration toward which the system evolves and from which it resists displacement	Sphere (non-rotating) or rotationally-supported disk
<b>Basin depth</b>	The energy required to permanently disrupt the system from its basin	Gravitational binding energy, $\Delta U \approx U$
<b>Invariant reference (metronome)</b>	A quantity or point that remains fixed throughout the system's evolution, providing an anchor for transient dynamics	Center of mass (positional reference); orbital periods (frequency reference, emerging during contraction)
<b>Corrective permeability (<math>\kappa</math>)</b>	The rate at which the system dissipates perturbation energy and returns to its basin, quantified by $\kappa = 1/\tau_{cool}$	Damping rate, quantified by the radiative cooling function $\Lambda(T)$
<b>Rail</b>	A conservation law that constrains the accessible basins, preventing the system from reaching the global energy minimum	Conservation of angular momentum

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### 3. The Convulsive Phase: Turbulence and Disordered Motion

In its initial state, the cloud is far from equilibrium. Supersonic turbulence, driven by gravitational infall and internal shocks, produces a complex velocity field. Density distributions are filamentary and clumpy. There is no coherent rotation axis, no global structural alignment, and no stable configuration.

In attractor terms, this is the **perturbation-rich early phase**. The cloud is a dissipative system that has not yet found its basin. Its trajectory through state space is erratic. Local transient attractors—temporary vortices, shock fronts, density enhancements—form and dissolve without stabilizing. The system has not yet converged upon a single, deep attractor.

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### 4. The Invariant Reference: Center of Mass as Metronome

Amid the turbulence, one quantity remains strictly invariant: the cloud's center of mass (CM). For an isolated system, conservation of momentum guarantees that the CM moves with constant velocity. In the CM frame, this point is fixed. No internal force—gravitational, pressure, or magnetic—can displace it.

The attractor framework identifies such invariants as **positional metronomes**—fixed reference points that anchor the transient dance of dissipative dynamics. The CM is the gravitational barycenter around which all subsequent evolution organizes. It does not oscillate, does not evolve, and does

not respond to perturbations. It is the still point at the center of the storm.

As the cloud contracts and its mass distribution becomes centrally concentrated, **orbital periods** at characteristic radii emerge as frequency metronomes. For a test particle at radius  $r$ , the Keplerian orbital period is:  $P = 2\pi r^3 / GM(r)$

where  $M(r)$  is the mass enclosed within radius  $r$ . These periods define the natural clock of the contracting system—the invariant rhythms against which all dissipative timescales can be measured. The center of mass anchors position; the orbital periods anchor time. Together they constitute the invariant skeleton of the attractor.

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## 5. The Dissipative Mechanism: Radiation and Entropy Export

A dissipative attractor requires a mechanism for exporting entropy. The gas cloud exports entropy through **radiation**. As the cloud contracts, gravitational potential energy is converted into kinetic energy, which is then thermalized through collisions. Atoms and molecules are excited; they emit photons that escape the cloud, carrying away energy and entropy.

This radiative cooling is the cloud's **dissipation channel**. Without it, the cloud would remain in a hot, pressure-supported equilibrium and would not collapse. With it, the cloud can progress toward deeper gravitational binding.

In attractor terms, the cloud is seeking its minimum-energy basin. Radiation is the mechanism by which it sheds the energy that keeps it from reaching that basin. Each emitted photon is

a small perturbation exported to the environment, allowing the remaining system to settle deeper into its attractor.

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## 6. The Attractor Basin: Sphere, Disk, and the Rail of Angular Momentum

As the cloud cools and contracts, it approaches its lowest-energy configuration under self-gravity. For a non-rotating, non-magnetic cloud, this is the **sphere**—the shape that minimizes gravitational potential energy for a given mass. Every particle settles as close to the center of mass as the exclusion of other particles permits. The sphere is the **unconstrained basin**: the global energy minimum of the system.

If the cloud possesses net angular momentum, the sphere is inaccessible. Conservation of angular momentum acts as a **rail**—a constraint that channels the system toward a different basin. The cloud must flatten along its rotation axis, forming a **disk**. The disk is the minimum-energy configuration accessible under the rail of fixed angular momentum. Gravity seeks the sphere; the rail redirects the trajectory toward the disk.

The approach to the basin occurs over the radiative cooling timescale, typically  $10^4$  to  $10^5$  years for dense molecular cloud cores. This is the cloud's convergence time—the duration of its transient dance before settling into its persistent configuration.

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## 7. Corrective Permeability and the Virial

# Theorem

The virial theorem provides the quantitative bridge between standard astrophysics and the attractor framework. For a system in equilibrium:  $2K+U=0$

where  $K$  is the total kinetic energy and  $U$  is the gravitational potential energy. In attractor terms:

- **Basin depth** =  $|U|$ , the gravitational binding energy.
- **Perturbation** = any injection of kinetic energy  $\Delta K$  that raises  $K$  above the equilibrium value  $|U|/2$ .
- **Corrective permeability** =  $\kappa = 1/\tau_{cool}$ , the rate at which radiative cooling dissipates  $\Delta K$  and restores virial equilibrium.

**Worked Example.** Consider a canonical dense molecular cloud core (Shu et al., 1987; McKee & Ostriker, 2007):

Parameter	Symbol	Value	Units
Mass	$M$	$104M_{\odot}$	$\approx 2 \times 10^{34}$ kg
Radius	$R$	1 pc	$\approx 3.09 \times 10^{16}$ m
Temperature	$T$	10 K	
Mean number density	$n$	$\sim 10^3$	$\text{cm}^{-3}$

**Step 1: Basin depth.** The gravitational potential energy (to order of magnitude; the exact coefficient for a uniform-density sphere is  $3/5$ ) is:  $|U| \sim GM^2/R \approx (6.67 \times 10^{-11}) \times (2 \times 10^{34})^2 / (3.09 \times 10^{16}) \approx 8.6 \times 10^{41}$  J

At virial equilibrium,  $K = |U|/2 \approx 4.3 \times 10^{41}$  J.

**Step 2: Perturbation.** Suppose a supernova explodes at a distance  $d \approx 10$  pc from the cloud. A typical supernova

releases  $E_{SN} \sim 10^{44} \text{ J}$ . The fraction intercepted by the cloud is the ratio of the cloud's cross-sectional area to the surface area of the sphere at distance  $d$ :

$$f \sim \frac{\pi R^2}{4\pi d^2} \sim \frac{\pi (3.09 \times 10^{17})^2}{4\pi (3.09 \times 10^{16})^2} \sim 2.5 \times 10^{-3}$$

Not all intercepted energy couples efficiently; a coupling efficiency of  $\epsilon \sim 0.01 - 0.1$  is typical for shock-cloud interactions (McKee & Ostriker, 2007). Choosing the upper end,  $\epsilon \sim 0.1$ :

$$\Delta K = E_{SN} \times f \times \epsilon \sim 10^{44} \times (2.5 \times 10^{-3}) \times 0.1 \approx 2.5 \times 10^{40} \text{ J}$$

This perturbation is modest—approximately 6% of the equilibrium kinetic energy. The cloud is disturbed but not disrupted. Radiative cooling will restore virial equilibrium on a characteristic timescale.

**Step 3: Cloud volume.** Converting the radius to centimeters:

$$R = 1 \text{ pc} = 3.09 \times 10^{18} \text{ cm}$$

The volume is:

$$V = \frac{4}{3}\pi R^3 \approx \frac{4}{3}\pi (3.09 \times 10^{18})^3 \approx 1.24 \times 10^{56} \text{ cm}^3$$

**Step 4: Corrective permeability.** At  $T \sim 10 \text{ K}$  and  $n \sim 10^3 \text{ cm}^{-3}$ , the dominant coolant is CO rotational line emission, with a cooling function  $\Lambda(T) \sim 10^{-23} \text{ erg cm}^{-3} \text{ s}^{-1}$  (Goldsmith & Langer, 1978; Neufeld, Lepp & Melnick, 1995). Convert  $\Delta K$  to erg:

$$\Delta K = 2.5 \times 10^{40} \text{ J} = 2.5 \times 10^{47} \text{ erg}$$

The cooling timescale is:

$$\tau_{cool} \sim \frac{\Delta K}{V \Lambda} \approx \frac{2.5 \times 10^{47}}{(1.24 \times 10^{56}) \times (10^{-23})} \approx 2.02 \times 10^{14} \text{ s} \approx 6.4 \times 10^6 \text{ years}$$

The corrective permeability is:

$$\kappa = \frac{1}{\tau_{cool}} \approx 4.95 \times 10^{-15} \text{ s}^{-1}$$

**Step 5: Interpretation.** The perturbation is damped within a few million years. The basin depth ( $\Delta U \sim 8.6 \times 10^{41} \text{ J}$ ) far exceeds the perturbation energy, ensuring the cloud's structural integrity. Corrective permeability, quantified by  $\kappa$ , is the mechanism by which the cloud restores coherence—absorbing the modest perturbation through radiative cooling and returning to virial equilibrium on a timescale short compared to the cloud's overall lifetime ( $\sim 10^7$  years).

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## **8. Cross-Domain Parallel: Biological Wound Healing**

The same attractor vocabulary applies without modification to biological systems.

A wound is a perturbation to the stable attractor of healthy tissue. The body responds through a multi-stage healing cascade: clotting stops further damage, inflammation cleans the wound, and tissue repair restores structural integrity. The healing rate—quantified clinically by wound closure time—is the biological corrective permeability. The healthy baseline state is the basin. Complications like impaired circulation reduce oxygen delivery, slowing fibroblast activity and thus reducing  $\kappa$  (Guo & DiPietro, 2010).

The gas cloud perturbed by a supernova shock and the human body perturbed by a wound are structurally identical within the framework: a dissipative attractor, displaced from its basin, activates corrective mechanisms at a characteristic rate, and either returns to coherence or undergoes permanent state transition.

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## 9. Observational Consistency

The framework's description of cloud evolution is fully consistent with standard observations:

- **Turbulent molecular clouds** exhibit the chaotic velocity fields and filamentary structures predicted by the convulsive phase.
- **Radiative cooling** is traced by CO, H<sub>2</sub>O, and other molecular line emissions.
- **Protostellar cores** represent the approach to the spherical attractor.
- **Protoplanetary disks** are the rotationally-constrained basins.
- **Bound clusters and stellar systems** persist under external perturbations, demonstrating basin depth.

These observations are predicted and explained by standard astrophysics. The attractor framework is consistent with all of them. Its contribution in this domain is conceptual, not empirical.

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## 10. Conclusion

The evolution of an isolated gas cloud from turbulence to equilibrium is fully described by standard astrophysics. The attractor framework does not replace that description. It translates it into a unified conceptual vocabulary—dissipative attractor, basin, invariant reference, rail, corrective permeability—that applies across physical and biological systems, with broader applicability noted.

The center of mass remains fixed while the cloud convulses, collapses, and settles. The virial theorem, translated into attractor language, quantifies basin depth as gravitational

binding energy and corrective permeability as the inverse cooling timescale. The framework is consistent with all standard observations and requires no new physics.

The metronomes hum. The cloud finds its basin. The framework holds.

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“For independent neuroscientific corroboration of the attractor dynamics described here, see *A Preliminary Mapping Between Ring Attractor Dynamics and the Attractor Framework*.” <https://www.sciencedirect.com/science/article/pii/S>

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