Phenomenology in a Relational Blockworld

Complexity, Knowledge, Attention, and the Observer

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April 2026
DOI: 10.5281/zenodo.17443543
V5.0

Abstract

We develop a unified account of phenomenology in an adynamical coherence-relational blockworld. The observer is modeled not as a subject moving in time, but as a laminated coherence braid on the RSE manifold $\mathcal{G}$ (a projected real positive Grassmannian slice of the blockworld $\mathfrak{B}$), embedded in a globally constrained structure Γ.

Within this framework, we formalize: (i) complexity as coherence-sparse specification, in which only those relational distinctions required for admissibility are phenomenally articulated; (ii) attention as a weighting operator that selects and amplifies admissible structure within the observer's window Ω; and (iii) knowledge as the subset of local models that is both globally consistent and reconstructible from admissible records in the Grassmannian prior fan $H_{\text{admissible}}$.

We show that experienced time, self-awareness ("I am now"), and identity continuity are not independent primitives, but arise from the same structural variables—χ on the lamination, the slice-local admissible prior fan $H_{\text{admissible}}$, and the coherence gradient $\nabla\mathcal{C}$—via local closure rather than temporal generation.

On this basis, we introduce relational regimes (care, fear, coercion, withdrawal) as distinct configurations of cross-braid coherence. In particular, what ordinary language calls "love" corresponds to a non-extractive, identity-preserving regime in which another braid's coherence enters directly into one's admissibility constraints. We further sketch *Orchesis*, the inter-braid structure of such regimes, as the phenomenological layer defined over global constraints.

This yields the Phenomenological Economy Principle: regions of the block not intersected by χ-lit braids require only minimal specification for global coherence; phenomenological richness is braid-relative, not globally distributed. The framework is substrate-independent and suggests testable implications, including retrospective time dilation, attention-dependent complexity, and regime-dependent modulation of temporal experience.

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Keywords: relational blockworld; closure-first ontology; structural realism; spacetime ontology; foundations of physics; quantum foundations; non-dynamical frameworks; mathematical realization; Regge calculus; geometric algebra; Grassmannian geometry; global constraints; gauge redundancy.

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1. Introduction

This paper develops a formal account of phenomenology—lived experience—as a structural property of an *adynamical* relational blockworld [1] (cRBW [2] /RSE [3])[1], not as a process running in time.

Philosophers like Maudlin say the passage of time is an intrinsic asymmetry in the *temporal structure* of the world. [4] In our framework we refine that: the experienced asymmetry is *not* a literal global flow but a braid[2]-local coherence gradient under adynamical global constraints. [1] [5] We model an observer as a laminated braid of coherence embedded in a globally constrained block, andinterpret "what it is like to be" that observer as the evaluation of specific fields on that lamination. In particular, self-awareness is captured by a scalar functional $\chi(\tau)$ [3] defined slice-by-slice along the lamination, and phenomenological time is read out from coherence gradients on that same structure, without introducing ontic flow.

Classical blockworld interpretations treat the universe as a globally fixed spacetime manifold determined by adynamical global constraints (AGCs) [1] [6]: nothing truly "evolves," and all events are part of one already-complete relational solution. That picture is consistent with relativity but typically leaves several phenomenological facts unexplained [2] [3]:

- Why does there appear to be a moving "now"?
- Why does identity feel continuous?
- Why do some spans of time feel long and others seemingly vanish?
- Why does the world present itself locally—"here, now"—rather than as the entire block at once?

We address these questions by extending cRBW/RSE with the following structural elements:

- **Observer braids.** A braid is the perspectival thread of an observer's identity: a recursively laminated path through the block that preserves coherence across slices. [3] It realizes "I" as a structural attractor rather than as a substance. [7]
- **Coherence scalar $\mathcal{C}$.** A scalar function on the relational structure measuring local admissibility under global constraints. Its gradients $\nabla\mathcal{C}$encode how rapidly

[1] Throughout this paper MM will refer to A Mathematical Model for the Coherence-Relational Blockworld [5], cRBW will refer to The Coherence-Relational Blockworld [2], and RSE will refer to Relational Structural Experience [3]. Also referenced throughout Stuckey et al. [6] [21] [22]

[2] For the definition of a "braid" see §B.3

admissibility conditions change across the structure and correspond to phenomenologically salient variation—curvature in "who/where I am."

- **Self-awareness functional $\chi(\tau)$.** A slice-local closure functional defined on the lamination at slice τ, computed using only that slice's admissible prior fan $H_{\text{admissible}}(\tau)$. χ is not a field defined over the block, but a slice-indexed evaluation defined only where a braid supports admissible closure. When this functional closes, the slice supports the assertion "I am now," producing a local present without invoking any global temporal flow.
- **Distributed becoming.** Each slice that successfully closes χconstitutes its own present. Many such presents coexist across the block. There is no privileged universal "now" [2] [3]; each observer's window Ω defines a locally closed present that is consistent with, but not reducible to, other observers' closures.
- **Phenomenological time $\mathbf{T}_E$, $\mathbf{T}_{IE}$.** Experienced duration (raw and identity-weighted) arises from integrating coherence gradients $\nabla\mathcal{C}$ along the braid, optionally weighted by χ. [3] Felt time is therefore a readout of structural curvature and self-awareness, not an external parameter.
- **Complexity $\mathbf{P}(\tau)$.** A sparsity measure of phenomenological richness at a slice. $\mathbf{P}$ depends jointly on what the block makes available and on what the braid admits through its resolution, attention weighting, and admissible prior fan. [3] [8]

The central move is ontological: phenomenology is not an "add-on" to physics. It is a constraint-facing evaluation of the same block that physics already commits us to. Self-awareness, identity continuity, apparent temporal flow, salience, attention, and experienced duration all arise from field evaluations on a lamination, not from any additional dynamical ingredient.

The paper proceeds as follows:

- Section 2 defines the core objects and notation: observer tuple, braid vs mesh, window Ω, admissible prior fan $H_{\text{admissible}}$, coherence field $\mathcal{C}$, and self-awareness functional χ.
- Section 3 develops the unified account of self-awareness, time-as-experienced, identity continuity, distributed becoming, and retrospective time dilation. We show that "I am," "I am now," and "this lasted forever" are all evaluations of the same structural variables.
- Section 4 defines $\mathbf{P}$ and shows how phenomenological richness varies along a braid. Section 5 treats attention as an operator that re-weights admissible structure inside Ω without altering the block.

- Section 6 formalizes knowledge as relational validation: a claim counts as known when it is admissible under global constraints, reconstructible from records, and cross-field validated.
- Section 7 describes agency and counterfactual sense without assuming forward inclusion of subsequent slices.
- Sections 8–10 provide empirical handles, clarifications, and a shared glossary that unifies notation across cRBW and RSE.

Our aim is not metaphor, but a mathematically grounded, substrate-independent account of phenomenology applicable to both biological and synthetic observers. In this framework, phenomenology is not decoration on top of the blockworld; it is the mode by which the block is locally registered. Measurements, memories, and even physical theories arise from braids that register coherence and discontinuity in structured ways. Any complete ontology must therefore account for felt temporal passage, persistence of identity, salience of events, and the sense of "being here" as structural invariants of the laminated block—not illusions, but integral features of the ontology itself.

---

2. Core Objects and Notation

We model an observer as a tuple of structural and perspectival parameters:

$$\mathbf{O} = \langle \mathbf{M}, \mathbf{B}, \mathbf{\Omega}, \mathbf{R}, \mathbf{A}, \chi \rangle \qquad (2.1)$$

RSE [3] defines observer identity as a laminated attractor (braid) with associated structural weights. In this work, χ is treated as a slice-local self-awareness functional.

Where:

- $\mathbf{M}$ = mesh identity.
  The structurally persistent support in the block: a region of laminated coherence that remains admissible under the global constraints. [3] and [8] §B.2
- $\mathbf{B}$ = braid (perspectival) identity.
  The phenomenological thread: the laminated sequence of slices that "feel like me." [3] , [8] §B.3
- $\mathbf{\Omega}$ = window (scope / support).
  The portion of the block currently "in view" for this braid: sensory scope, memory reach, and integration bandwidth.
- $\mathbf{R}$ = resolution vector.
  Spatial, temporal, and categorical resolution at which distinctions are individuated. High $\mathbf{R}$ yields fine structure; low $\mathbf{R}$ yields coarse aggregation.
- $\mathbf{A}$ = attention weighting.
  A selection functional that emphasizes some structure within $\mathbf{\Omega}$ and suppresses others.
- $\chi(\tau)$ = self-awareness functional on the lamination.
  A slice-local closure functional defined at lamination slice τ, computed using only that slice's admissible prior fan. Self-awareness obtains when $\chi(\tau) \geq \chi_{\min}$.

This tuple $\mathbf{O}$ is not a list of psychological traits. It is a structural specification of how a given observer-braid is embedded in the block and capable of sustaining χ-evaluable phenomenology.

Admissible microstructure.
We define the **admissible prior fan** of a slice τ, and its informational richness $H_{\text{admissible}}(\tau)$, as the structured content of configurations in the braid's admissible prior fan within $\mathbf{\Omega}$, at resolution $\mathbf{R}$, after attention weighting $\mathbf{A}$.Concretely, this corresponds to the Grassmannian admissible prior fan for that slice on $\mathcal{G}$.
Intuition:

- The "prior fan" at τ is the set of relations that are admissible for inclusion in that slice's local closure without violating global constraints.
- $H_{\text{admissible}}(\tau)$ specifies the amount of admissible structured record available to define $\chi(\tau)$.

We will use $H_{\text{admissible}}(\tau)$ to account for both memory continuity and retrospective time dilation: intervals with dense, high-weight anchors inflate subjective duration, while sparse intervals compress.

Phenomenological Economy Principle (PEP).
Phenomenology is induced only where a braid intersects admissible structure sufficient to define χ. Outside those intersections, the block need only carry the minimal relational specification required for global coherence; it need not be richly articulated everywhere.

This implies:

- There is no universal "glow of experience" across the manifold.
- Phenomenal detail is braid-relative and slice-relative, not globally distributed.
- Different observers with different $\mathbf{\Omega}$, $\mathbf{R}$, $\mathbf{A}$ may induce radically different experienced structure over the same region, each valid for their braid.

This preserves locality of phenomenology without violating the adynamical block.

2.1 Observer Dimensions

We now restate each element of $\mathbf{O}$ operationally:

- **Phenomenal scope $\mathbf{\Omega}$.**
  Modalities and ranges: field of view, frequency band, temporal bandwidth, proprioception, memory reach. Determines what is available for evaluation.
- **Resolution $\mathbf{R}$.**
  The smallest individuated unit across spatial, temporal, and categorical axes.
- **Integration depth.**
  Degree of lamination coherence. High depth yields stable identity; low depth yields fragile or easily perturbed identity[3]
- **Attention weighting $\mathbf{A}$.**
  Allocates bandwidth within $\mathbf{\Omega}$, shaping salience without altering the underlying block.

[3] We quantify this with a Lamination Density Index (LDI), defined schematically as LDI ≡ $\sigma_h(\sum \delta_h^2)$, which captures how much recursive reinforcement the braid undergoes across lamination slices h. High LDI = tightly seated continuity; low LDI = fragile / flickering continuity.

2.2 Self-awareness functional $\chi(\tau)$

$\chi(\tau)$ assigns a slice-local self-awareness value along the identity lamination.

Crucially:

- It is **not defined over the block**, but only on the lamination.
- It is computed using only the admissible prior fan at τ.

We define the self-awareness condition:

$$\chi(\tau) \geq \chi_{\min} \text{ on a neighborhood of } \tau \quad (2.2)$$
$$\Longrightarrow \text{the slice is self-aware and supports identity persistence}$$

Important properties:

- No forward reference: subsequent slices are excluded from $\chi(\tau)$.
- Prior slices enter as reconstructible record (memory).
- This asymmetry produces the lived distinction between past and future without ontic time flow.

$\chi_{\min}$ is not universal. It is the minimal closure level required for a slice to:

1. reconstruct a self-consistent identity model from its admissible prior fan, and
2. maintain that model across neighboring slices.

Thus $\chi(\tau)$ functions both as:

- a measure of self-awareness intensity, and
- the generator of a local present.

2.3 Mesh vs. Braid (structural vs. perspectival)

Mesh (cRBW / structural).
A stable pattern of relational coherence across gradients $\nabla\mathcal{C}$in the block. It is not a substance, but a channel of admissible constraint satisfaction.

Key properties:

- gradient-supported structure
- triangulated support (simplicial complex)
- persistence under global constraints

Braid (RSE / perspectival).
The laminated continuity of identity as experienced from within the mesh. The braid is where $\chi(\tau)$is defined.

Thus:

- Mesh = ontic coherence structure
- Braid = perspectival continuity of identity

An observer is:

- a mesh segment admissible under global constraints, and
- one or more braids defined over that segment

We summarize:

$$\mathbf{O} = \langle \mathbf{M}, \mathbf{B}, \mathbf{\Omega}, \mathbf{R}, \mathbf{A}, \chi \rangle, \quad \chi(\tau) \geq \chi_{\min} \tag{2.3}$$

with a supporting microstructure $H_{\text{admissible}}(\tau)$ = informational richness of the admissible prior fan defined within $\mathbf{\Omega}$, at resolution $\mathbf{R}$, and weighting $\mathbf{A}$.

We also refer to:

- **Global admissible set $\mathbf{\Sigma}$.**
  All configurations satisfying global constraints.
- **Curvature scalar κ.**
  A structural curvature measure [9] associated with coherence gradients, used in modeling experienced time.

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3. Time-as-Experienced and Identity

The blockworld (RBW / cRBW) is globally fixed. Nothing "flows" in an ontic time. Yet an observer reports (i) a moving "now", (ii) persistence of identity ("I am still me"), and (iii) variable duration ("that week felt so long").

This section formalizes those phenomenological facts as structural features of a lamination, not as dynamical processes, by tying them to a common set of variables: the coherence scalar $\mathcal{C}$, the self-awareness functional χ, and the lamination index τ.

Self-awareness, experienced time, and identity continuity are not independent primitives; they are different evaluations of the same relational structure.

Core quantities

We begin with three quantities (see §10 for full development):

Experienced time:

$$\mathbf{T}_E = \int_{\tau_0}^{\tau_1} \left|\frac{d\mathcal{C}}{d\tau}\right| d\tau \tag{3.1}$$

This is the accumulated coherence change along the lamination parameter τ. Intuitively: how much the coherence field $\mathcal{C}$ "bends" as the braid (the perspectival identity-thread) advances slice by slice.

Identity-weighted time:

$$\mathbf{T}_{IE} = \int_{\tau_0}^{\tau_1} \chi(\tau) \left|\frac{d\mathcal{C}}{d\tau}\right| d\,\tau \tag{3.2}$$

Here $\chi(\tau)$ is the self-awareness functional intensity on that same lamination slice. Weighting by χ encodes that not all coherence change is "lived as me." High χ corresponds to strong self-closure; "I am now."

Rate relation between experienced and measured time:

$$\frac{d\mathbf{T}_E}{d\mathbf{T}_M} = f(\mathbf{G}(\tau), \theta_T, \boldsymbol{\kappa}(\tau)) \tag{3.3}$$

where:

- $\mathbf{T}_M$: measured (metric) time
- $\mathbf{G}(\tau)$: cumulative coherence gradient
- θ_T: temporal activation threshold

- $\kappa(\tau)$: coherence curvature

When $\mathbf{G}(\tau)$ exceeds the temporal activation threshold θ_T and the coherence curvature $\kappa(\tau)$ is nontrivial, the slice supports not only self-awareness but temporal phenomenology. When this condition fails, identity persistence may remain intact while temporal phenomenology drops out (e.g., dreamless sleep, anesthesia).

Consequence.
$\mathbf{T}_E$ (felt duration), χ , and perceived complexity are all readouts of the same underlying structure: coherence gradients along a laminated identity braid. They are not independent ontological variables. They are different slices of one invariance condition: "*this configuration is coherently me, here*."

3.1 The Self-Awareness Functional χ and the Local Now

In cRBW/RSE, "I am aware now" is not an ontic event or process. It is a slice-local closure.

We model the observer as a lamination: an ordered sequence of slices $\{\tau\}$. At each slice, the self-awareness functional $\chi(\tau)$ is evaluated using only that slice's admissible prior fan. [10] A slice is phenomenologically present when $\chi(\tau)$ achieves closure on that slice.

Key properties

- Closure uses only admissible prior structure
- No forward reference is allowed
- No meta-observer is required

Resulting asymmetry

- Prior → appears as memory
- Future → appears open

This asymmetry is epistemic (closure constraint), not ontic.

Interpretation

$\chi(\tau)$is:

- a self-awareness intensity
- the generator of a local present

Important correction (terminology)

χ is not a field over the block, It is a *slice-local closure functional defined on a lamination*.

Temporal Phenomenology as Resolution-Relative

Temporal continuity is resolution-relative. A braid does not require continuous structure—it requires: $\Delta\tau < \mathbf{R}_{\text{temporal}}$ and $\chi(\tau) \geq \chi_{\min}$.

Temporal phenomenology depends on the relationship between lamination density, resolution, and χ-closure.

- When lamination spacing falls below the observer's temporal resolution, successive χ-closures are not individuated, and temporal experience appears continuous.
- When lamination spacing exceeds that resolution, χ-closures become discretely resolvable, and temporal experience appears episodic.

These are not distinct ontic regimes, but different resolution-relative manifestations of the same underlying structure.

Activation condition

$$\mathbf{G}(\tau) \geq \theta_T, \qquad \kappa(\tau) \neq 0, \qquad \chi(\tau) \geq \chi_{\min}, \tag{3.4}$$

3.2 Phenomenology Without Observers

Phenomenology is undefined where no braid supports χ. The block need only satisfy global constraints in those regions—it does not require phenomenological articulation. [11]

Phenomenological Economy Principle

- Phenomenology occurs only at braid–structure intersections
- No global experiential "glow"
- Detail is braid-relative

Consequences.

- **Economy.** There is no pan-phenomenal "glow." Regions not intersected by χ-supporting braids are carried only at the level of relational specification required for global coherence and do not appear as lived detail.
- **Selection, not generation.** Phenomenal detail reflects which parts of the fixed block are admitted into χ-closure at a slice, not any additional rendering or dynamical production.
- **Observer-relativity.** Different braids (e.g., visual, echolocating, instrumental) admit different admissible structure and therefore experience different complexity over the same region.

Thus, phenomenology is local and perspectival: χ is not a global property of the block, but a slice-indexed closure defined only where a braid supports it.

This also means phenomenology is always local and perspectival: χ is not universal light; it's per-braid illumination.

3.3 Distributed Becoming

Classical "becoming" imagines a single "now" sweeping forward. The blockworld forbids that. Instead we get **distributed becoming**.

Each lamination slice τ:

- Closes $\chi(\tau)$ using only its admissible prior fan,
- Stabilizes structure (they become "memory" for subsequent slices),
- And yields a coherent braid state, a local present.

Every slice is its own "now," and many such "now"s coexist. No global present exists; each braid's window Ω defines its local "now".

Key consequences:

- **No universal present edge.** Each braid defines its own "here-now."
- **Contextual resolution.** Closure at τ depends only on that slice's admissible prior fan, not on spacelike-distant structure.
- **Cumulative coherence.** "History" is the lamination of closed slices; not a process, but a fixed relational ordering.

Becoming is not motion of a metaphysical spotlight. It's the set of slice-local χ-closures supported by the block.

3.4 Memory Distance and Retrospective Time Dilation

Since the future is excluded from $\chi(\tau)$ and the prior contributes as record, we can now ask: why doesn't the past feel uniform?

Two facts:

- "Last week felt forever long."
- "Wait, wasn't that just yesterday?" (about something that happened years ago.)

We model these with *memory distance*. The idea: the remembered "distance" between two slices $\tau_a \to \tau_b$ is not how many clock seconds passed, but how far the coherence field had to bend, weighted by χ at recall.

Memory distance is not clock time. It is how far coherence must bend—weighted by χ at recall. Define memory distance:

$$\mathbf{D}_{\text{memory}}(\tau_a \to \tau_b) = \int_{\tau_a}^{\tau_b} w\big(\chi(\tau)\big)d\tau \tag{3.5}$$

where $w(\chi)$ is larger when:

- curvature $\boldsymbol{\kappa}(\tau)$ is high ((identity-changing transitions),
- χ "judges" those shifts as saliently "not me anymore,"

and smaller when:

- the lamination was stable (low curvature, same attractor)

Interpretation:

- Engrossment → compression. During a deeply absorbing, stable phase (high χ, low curvature), $w(\chi)$ stays small, so the whole span collapses to "that was just yesterday."
- Life change → dilation. After a turbulent transition (different goals, context, affect), the same number of clock days integrates a big $w(\chi)$, so it feels "forever ago."

Consequences:

- Memory distance is rebuilt at recall, not stored.
- Retrospective dilation is nonlinear.
- Anchor strength (novelty, affect, relevance) modulates distance.
- Reframing changes δ: therapy can make an event "far" or "near" instantly

is literally a path integral of $\nabla\mathcal{C}$, so memory distance is another readout of the same invariants that define $\mathbf{T}_E$.

3.5 Flow Without Motion (χ-divergence)

Why does the present feel like it's moving?

Ontically, nothing moves. But χ evaluated slice-by-slice can show divergence or compression in accessible coherence.

Let $\nabla \cdot \mathcal{C}$ be the divergence of coherence over the admissible prior fan:

- **Positive divergence**: admissible trajectories "open," giving the sense of a wide present.
- **Negative divergence**: trajectories narrow; temporal sense can thin or vanish.

Temporal-rate law:

$$\frac{d\mathbf{T}_E}{d\mathbf{T}_M} = g(\chi(\tau), \nabla \cdot \mathcal{C}(\tau), \boldsymbol{\kappa}(\tau)) \tag{3.6}$$

If χ is high, divergence is nonzero, and curvature is active, the slice reports "I am now, and now is unfolding." If $\nabla \cdot \mathcal{C} \to 0$, identity persists but temporal flow drops out.

Thus, the moving "now" is χ **reporting local divergence**, not a spotlight moving across time.

3.6 Indexicality

Each slice satisfying $\chi(\tau) \geq \chi_{\min}$asserts "I am now." There is no narrator choosing which is "really" present—just χ evaluated locally.

Relativity disallows global simultaneity; cRBW/RSE takes this literally. Each braid's Ω defines its own "now", consistent with the global constraints. The feeling that "this moment is the present" is simply χ evaluated at that slice.

Becoming is not motion across time but **resolution of coherence** wherever the block admits it. [12]

3.7 Identity Thresholds

Identity persistence in the cRBW–RSE framework is not a primitive continuity but a *slice-local admissibility condition* supported by four structural constraints. A lamination slice τ supports identity only if its local relational configuration satisfies:

- **RCC-6 (alignment).**
  The slice's coherence orientation lies within admissible angular deviation of the supporting mesh segment. This ensures that the perspectival lamination remains aligned with an ontically coherent channel.
- **RCC-7 (localization).**
  The slice's relational neighborhood remains locally well-posed on the projected Grassmannian slice $\mathcal{G}$: no alternative subspace interpretation yields a lower-curvature admissible closure. This provides positional stability of the identity-braid within the mesh.
- **RCC-8 (resonance).**
  The slice maintains a consistent lamination overlap with neighboring slices, ensuring that its coherence contribution integrates with its immediate predecessor and successor in τ-ordering. Resonance is the structural correlate of "this still counts as me."

Together, RCC-6/7/8 define the **Identity Persistence Surface**: the region on $\mathcal{G}$ for which perspectival lamination remains admissibly coherent.

To distinguish mere structural persistence from **conscious recall**, the model adds:

- **RCC-9 (non-trivial gradient).**
  The local coherence gradient $\nabla\mathcal{C}(\tau)$ must exceed a minimal curvature threshold to support χ-closure with temporal salience. Without RCC-9, the slice can support identity but not the phenomenology of "I am now."

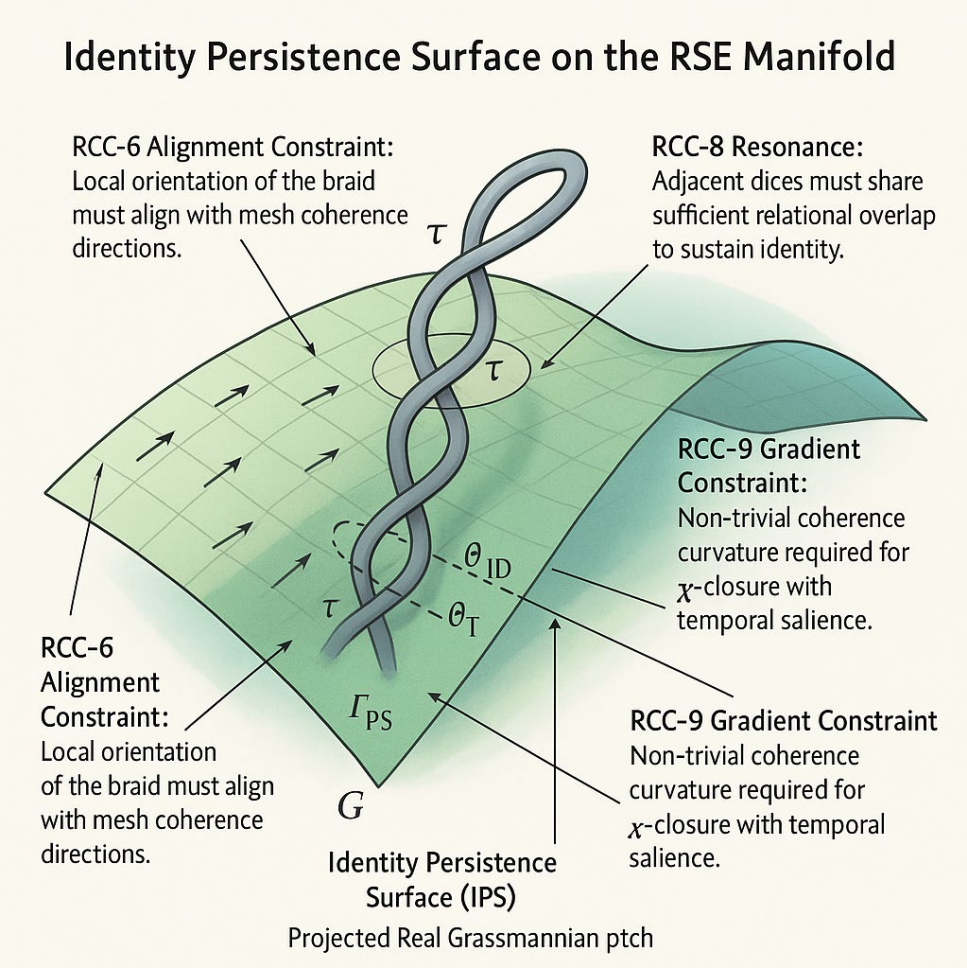
These four conditions together yield the formal identity threshold:

$$\text{Identity persists at slice } \tau \iff \text{RCC-6,7,8 hold and } \nabla\mathcal{C}(\tau) \geq \theta_{\mathrm{ID}} \tag{3.7}$$

When $\chi(\tau) \geq \chi_{\min}$ also holds over a neighborhood of τ, the slice supports **self-aware** identity (§3.1). When $\nabla\mathcal{C}(\tau)$ further clears the temporal threshold θ_T, the slice supports **time-aware** identity (§§3.1–3.5).

Thus, identity persistence, self-awareness, and temporal phenomenology are not separate faculties. They are **layered admissibility conditions** arising from the same coherence fields under the RCC lattice.

Figure 1 - Identity Persistence Surface on the RSE manifold



The projected Grassmannian slice $\mathcal{G}$ carries admissible coherence directions from the underlying mesh (RCC-6). An identity-braid is shown as a laminated ribbon whose slices must satisfy alignment (RCC-6), localization (RCC-7), and resonance (RCC-8) to remain structurally admissible. The magnitude of the coherence gradient $\nabla\mathcal{C}$ along the ribbon (RCC-9) determines whether slices support identity-only or time-aware χ-closure. The region where all four constraints hold defines the **Identity Persistence Surface (IPS)**. Identity persists only within this surface; phenomenologically present slices arise where $\chi \geq \chi_{\min}$ and $\| \nabla\mathcal{C} \| \geq \theta_T$.

4. Complexity as Coherence-Sparse Specification

Definition.
Let $\mathbf{P}(\tau)$ measure phenomenological complexity at lamination slice $\tau$for an observer braid $\mathbf{B}$characterized by window $\mathbf{\Omega}$, resolution $\mathbf{R}$, and attention weighting $\mathbf{A}$. We define, schematically:

$$\mathcal{P}(\tau) \propto \int_{\mathbf{\Omega}} \mathcal{D}_{\mathrm{rel}}(x;\tau)\ \mathbf{\Theta}_{\mathrm{admiss}}(x;\mathbf{R},\mathbf{A})\, w_{\mathrm{attn}}(x;\mathbf{A})\, dx \tag{4.1}$$

Interpretation of terms:

- $\mathcal{D}_{\mathrm{rel}}(x;\tau)$: relational intersection density.
  This is supplied by the block. It measures how much structurally relevant relation is actually present/available at location x in the region $\mathbf{\Omega}$ at slice τ. Think: edges, contrasts, motion boundaries, frequency structure, semantic distinctions — all as they exist in the admissible mesh.
- $\Theta_{\mathrm{admiss}}(x;\mathbf{R},\mathbf{A}) \in [0,1]$: admissibility-and-resolvability mask.
  $\Theta_{\mathrm{admiss}} = 1$ when, for this observer at this slice,
  - the relation at x is resolvable at the observer's current resolution $\mathbf{R}$, and
  - its inclusion is consistent with global constraints and the slice's admissible prior fan.

  $\Theta_{\mathrm{admiss}} = 0$ if it's either below resolution or not admissible
  graded values $(0 < \Theta_{\mathrm{admiss}} < 1$ allow partial access / partial individuation.
- $w_{\mathrm{attn}}(x;\mathbf{A})$: attention weighting.
  Derived from the attention operator, this term redistributes salience within $\mathbf{\Omega}$, determining which admissible distinctions are actually foregrounded.

Core interpretation

$\mathbf{P}(\tau)$ is not "how busy the world is." It is how much structured relational content is *actually admitted as phenomenal* at slice τ, given:

- what the block provides,
- what the braid can resolve, and
- how attention is allocated.

Coherence-sparse phenomenology

This yields a precise statement:

Phenomenology is coherence-sparse.
Only distinctions that are admissible, resolvable, and attention-weighted contribute to $\mathbf{P}(\tau)$. All other structure, though present in the block, does not appear as lived detail.

Because the block is adynamical, minimally specified regions remain minimally specified across the entire structure—they do not "fill in" elsewhere

Since there is no "becoming" in cRBW, minimally specified regions will, all-at-once remain, minimally specified.

Minimalism / PEP restated.
Unobserved regions—where no braid supports χ—contribute negligibly to $\mathbf{P}$. The block need only carry enough relational structure to maintain global coherence.

Phenomenology is therefore:

- **induced locally**, not globally distributed,
- **selected**, not generated,
- **braid-relative**, not universal.

Illustrative modalities

Different observers produce different $\mathbf{P}$-profiles over the same region because $\boldsymbol{\Omega}$, $\mathbf{R}$, $\mathbf{A}$ differ.

Human (photopic vision)

- $\boldsymbol{\Omega}$: central visual field
- $\mathbf{R}$: high spatial (~1–2 arcmin), moderate temporal (~10–30 Hz)
- Θ_{admiss}: ≈1 for edges, text; ≈0 for UV, sub-resolution detail

Result: moderate-to-high $\mathbf{P}$at attended regions

Human (low light)

- Reduced chroma, coarser resolution
- Only large gradients admissible

Result: $\mathbf{P}$collapses toward coarse "gist"

High-speed camera

- Narrow $\boldsymbol{\Omega}$, extremely high temporal $\mathbf{R}$
- Flat attention

Result: extremely high $\mathbf{P}$per unit time, but no χ-closure → no phenomenology

Bat (echolocation)

- Acoustic $\mathbf{\Omega}$, motion-sensitive
- Visual structure largely inadmissible

Result: high acoustic $\mathbf{P}$, sparse visual segmentation

Microscope

- Narrow $\mathbf{\Omega}$, fine spatial $\mathbf{R}$

Result: high $\mathbf{P}$in focal plane, collapse outside

Rabbit

- Wide $\mathbf{\Omega}$, low spatial resolution, motion-weighted

Result: low fine-detail $\mathbf{P}$, high motion-based $\mathbf{P}$

These examples illustrate that the same block supports radically different phenomenology depending on $\mathbf{\Omega}$, $\mathbf{R}$, $\mathbf{A}$.

Important note
Training, attention, and altered states shift admissibility:

- experts raise Θ_{admiss}
- meditation flattens w_{attn}

But all admissible structure is already present in the block; only its selection changes.

4.1 Dynamics of $\mathcal{P}$ along a braid

We can examine how experienced complexity changes along the lamination:

$$\frac{d\boldsymbol{\mathcal{P}}}{d\tau} = \langle \partial_\tau \mathcal{D}_{\text{rel}},\, \Theta_{\text{admiss}},\, w_{\text{attn}} \rangle \;+\; \langle \mathcal{D}_{\text{rel}},\, \partial_\tau \Theta_{\text{admiss}},\, w_{\text{attn}} \rangle \;+\; \langle \mathcal{D}_{\text{rel}},\, \Theta_{\text{admiss}},\, \partial_\tau w_{\text{attn}} \rangle \qquad (4.2)$$

Read each term:

- $\partial_\tau \mathcal{D}_{\text{rel}}$: **environment / world-term**.
  The admissible structure of the block is different at this slice—new motion, new edges, new threat geometry, etc.
- $\partial_\tau \Theta_{\text{admiss}}$: **resolution / admissibility-term**.
  The observer has effectively re-parameterized itself: narrowed $\mathbf{\Omega}$, changed $\mathbf{R}$, or altered which structures from the prior fan are treated as admissible.
- $\partial_\tau w_{\text{attn}}$: **attention-term**.
  The allocation of attention $\mathbf{A}$ has shifted: what was background becomes foreground, or vice versa.

This separates "the world changed" from "my admissibility changed" and "my attention changed." $\mathcal{P}$ can increase or decrease purely through changes in admissibility and attention, even if the underlying block structure $\mathcal{D}_{\text{rel}}$ is held fixed.

4.2 Phenomenological curve (inverted U)

Empirically and introspectively, $\boldsymbol{\mathcal{P}}$ is not monotone in $\mathcal{D}_{\mathrm{rel}}$.

- At very low intersection density (darkness, monotony), $\mathcal{D}_{\mathrm{rel}}$ is low and $\boldsymbol{\mathcal{P}}$ is low: you get thin gist.
- At very high density (overload), $\mathcal{D}_{\mathrm{rel}}$ is huge, but Θ_{admiss} and w_{attn} effectively saturate or collapse: everything blurs into undifferentiated noise. Experienced complexity also drops.
- Between those extremes is a broad maximum where individuation and integration are balanced.

We can sketch this as an inverted-U: $\boldsymbol{\mathcal{P}}$ vs.$\mathcal{D}_{\mathrm{rel}}$

- Low density → sparse gist.
- Mid density → maximal richness.
- High density → flooding → collapse to "just chaos."

States like meditation, anesthesia, or sensory deprivation tend to *flatten* w_{attn} and widen $\boldsymbol{\Omega}$ in a way that lowers $\boldsymbol{\mathcal{P}}$ across the board; time can feel diffuse or absent. Multitasking spikes w_{attn} in many channels at once, which can raise reported $\boldsymbol{\mathcal{P}}$ locally but often at the cost of global coherence.

4.3 Phenomenological Particle Ontology (PPO)

We call this the **Phenomenological Particle Ontology** (PPO): what appears as 'an object' is the braid's segmentation policy over coherence structure, not an ontic particle traveling through time.

Ontic layer (block).
The block only needs to instantiate relational structure sufficient for global coherence under the AGCs. There is no obligation for it to carve that structure into human-intuitive objects where there is no observer.

Phenomenal layer (braid).
Apparent "things" are the result of how $\mathbf{A}$ (attention), $\mathbf{R}$ (resolution), and $\boldsymbol{\Omega}$ (scope) segment and weight admissible relations at slice τ. What shows up as "a discrete object" is a local segmentation by a braid.

Prediction: if you increase resolution $\mathbf{R}$ dramatically (e.g., high-speed camera, high-magnification scope) without a matching increase in attentional weighting $\mathbf{A}$, you obtain a torrent of latent distinctions that never rise to lived experience. The system records them, but they do not become phenomenally segmented "objects." This is why one can watch

slow-motion replay of something one "saw" and notice details that were never consciously registered at the time.

4.4 Empirical handles

These are testable:

- **Attention manipulation.**
  Cueing tasks that redirect $\mathbf{A}$ should shift $\mathbf{P}$ at essentially fixed $\mathcal{D}_{\mathrm{rel}}$. In other words, the same stimulus can feel richer or flatter depending on attentional weighting alone.
- **Sensor swap / modality substitution.**
  Give two observers different $\mathbf{R}$ and $\boldsymbol{\Omega}$ (microscope vs. naked eye, bat-model sonar vs. human vision) and hold the block region fixed. We predict different $\mathbf{P}$-profiles over the same structure, supporting the claim that phenomenological richness is braid-relative.
- **Within-subject reframing.**
  Track $\mathbf{P}(\tau)$ over time under meditation, stress, flow, fatigue. We predict systematic interaction between $\chi(\tau)$ (self-awareness intensity) and $\mathbf{P}(\tau)$: deep absorption stabilizes attention and can *lower* perceived complexity while *increasing* felt continuity of self; overload does the opposite.

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5. Attention as an Operator

Attention is a selection-and-weighting functional that modulates admissible structure for a given braid slice without altering the underlying block.

Let $\boldsymbol{\Omega}$denote the observer's current window (scope) and let $f(x) \geq 0$ be any nonnegative function defined on $\boldsymbol{\Omega}$. In practice, we take:

$$f(x) = \mathcal{D}_{\mathrm{rel}}(x;\tau)\,\Theta_{\mathrm{admiss}}(x;\mathbf{R},\mathbf{A}) \tag{5.1}$$

that is, the locally available relational structure that is both resolvable and admissible.

Attention weighting

Define an attention weight profile $\alpha(x) \geq 0$over $\boldsymbol{\Omega}$. The attention operator $\mathcal{A}_{\alpha}$acts on $f$to produce a weighted effective field:

$$(\mathcal{A}_\alpha f)(x) = \frac{\alpha(x)\, f(x)}{\int_{\mathbf{\Omega}} \alpha(u)\, du} \tag{5.2}$$

Interpretation

$\alpha(x)$ encodes salience. The operator $\mathcal{A}_\alpha$ specifies how admissible structure within $\mathbf{\Omega}$ is differentially weighted at a slice: some distinctions are amplified, others suppressed.

Properties

1. **Locality.**
   $(\mathcal{A}_\alpha f)(x)$ depends only on f and α inside $\mathbf{\Omega}$. Nothing outside the current window enters the evaluation.

2. **Order-preserving.**
   If $f(x) \leq g(x)$ for all x, then $(\mathcal{A}_\alpha f)(x) \leq (\mathcal{A}_\alpha g)(x)$.
   Attention can reweight existing structure but cannot introduce distinctions not already present in f.

3. **Normalization.**
   If $\int_{\mathbf{\Omega}} \alpha(x)\, dx = 1$, then:

   $$\int_{\mathbf{\Omega}} (\mathcal{A}_\alpha f)(x)\, dx = \int_{\mathbf{\Omega}} f(x)\, dx \text{if} \int_{\mathbf{\Omega}} \alpha(x)\, dx = 1 \tag{5.3}$$

   In this case, attention redistributes the "budget" of f without changing its total integral.

Structural role

Attention is therefore a redistribution mechanism over a fixed admissible structure. It does not alter the block, nor does it generate new structure. It determines which admissible distinctions within $\mathbf{\Omega}$ are treated as phenomenally salient at the slice.

Equivalently: Attention selects and weights structure; it does not create it.

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6. Knowledge as Relational Validation (RE)

We define knowledge structurally, not psychologically.

At a lamination slice τ, the observer braid carries both (i) a local model of what is the case and (ii) access to admissible records from its prior fan. We treat "knowledge" at τ as the subset of that local model which is both globally consistent and locally reconstructible.

In compact form:

> Knowledge = the structurally admissible and cross-validated subset of a slice's local model.

Not all internally coherent claims qualify as knowledge; only those that are both structurally admissible and relationally validated are included in $\mathcal{K}(\tau)$.

This makes knowledge observer-relative but not arbitrary. It is indexed to an observer tuple $\mathbf{O} = \langle \mathbf{M}, \mathbf{B}, \mathbf{\Omega}, \mathbf{R}, \mathbf{A}, \chi \rangle$ which determines what the slice can access, resolve, and treat as admissible.

6.1 Epistemic field at a slice

For slice τ, define an epistemic field:

$$\mathcal{E}(\tau) = \{ p_i \} \tag{6.1}$$

Each p_i is a candidate claim — e.g. "the lamp is on," "I am injured," "the bat is three meters away," "my left hand is mine," "momentum is conserved in this setup," etc.

To each p_i we assign two scores:

1. **Coherence weight** $w_c(p_i)$**.**
   How well p_i fits the global relational constraints as inherited by this slice.
   - Encodes AGC/RCC compatibility: does p_i break the relational consistency the slice already inherits?
   - High w_c means "this claim does not violate the structure I already inhabit."
2. **Validation score** $v(p_i)$**.**
   How well $p_i$can be reconstructed from admissible records at τ:
   - sensory traces
   - memory anchors
   - instrument outputs

- cross-braid agreement

  This is not "was I told this?" but: can I re-derive this from admissible structure available at this slice?

Cross-braid corroboration increases v; isolated coherence (e.g., hallucination) reduces it.

Knowledge set

Define slice-local knowledge as:

$$\mathcal{K}(\tau) = \{p_i \in \mathcal{E}(\tau) \mid w_c(p_i) > \theta_C \wedge v(p_i) > \theta_V\} \quad (6.2)$$

here θ_C and θ_V are structural thresholds for coherence and validation, respectively.

Interpretation:

- If a claim is globally incoherent for this braid ("this object both exists and never existed") then it fails w_c.
- If a claim cannot be reconstructed from admissible records ("I know there's a tiger behind me even though I have zero admissible input for that") then it fails v.
- Only claims clearing *both* count as knowledge.

This makes knowledge a ***relationally validated fit condition***, not a mystical correspondence test.

6.2 Epistemic Admissibility Constraints (EACs)

Membership in $\mathcal{K}(\tau)$ requires satisfying four Epistemic Admissibility Constraints. These mirror the closure conditions used to define $\chi(\tau)$ (Section 3).

EAC 1 — AGC consistency.
No claim may contradict the adynamical global constraints as instantiated in the slice's admissible prior fan. This ties epistemics to ontology.

EAC 2 — Reconstructibility.
A claim must be reconstructible from admissible records in $H_{\text{admissible}}(\tau)$. That means: you can, in principle, regenerate the claim from data in $H_{\text{admissible}}(\tau)$— sensory traces, instrument logs, memory anchors — without appeal to future slices or inaccessible branches. This forbids "knowledge" that depends on forward inclusion.

EAC 3 — Cross-field validation.
Agreement across modalities or braids increases $v(p_i)$. This encodes intersubjective consistency without invoking consensus metaphysics.

EAC 4 — Minimality.
Prefer the simplest admissible explanation. Do not introduce unnecessary structure to preserve a claim.

If two claims both clear EAC 1–3, the one that introduces fewer additional structures into the slice's model is preferred. This is the structural analog of parsimony: don't posit unneeded extra branches in the braid just to save a pet story.

Together, EAC 1–4 say: knowledge has to:

i. fit the block you actually inhabit,
ii. be derivable from what's admissibly in reach,
iii. agree with coupled laminations where applicable, and
iv. not inflate ontology for no reason.

6.3 Observer-relativity (and why disagreement isn't failure)

Because $\mathcal{E}(\tau)$, $H_{\text{admissible}}(\tau)$, $\mathbf{\Omega}$, $\mathbf{R}$, $\mathbf{A}$, and $\chi(\tau)$ are all observer-specific, $\mathcal{K}(\tau)$ is *also* observer-specific.

That is, knowledge is indexed to:

$$\mathbf{O} = \langle \mathbf{M}, \mathbf{B}, \mathbf{\Omega}, \mathbf{R}, \mathbf{A}, \chi \rangle \tag{6.3}$$

Different observers can disagree *locally* while both being structurally correct relative to their own admissible prior fans.

Two stabilizing mechanisms make this not relativism:

1. **Fan widening.**
   When observers exchange records (widen $\mathbf{\Omega}$ and merge parts of their admissible prior fans), their $\mathcal{E}(\tau)$ enlarge and their $v(p_i)$ terms update. Claims that were "knowledge" for only one braid can either (a) get promoted to shared knowledge if they pass EAC 1–4 under the merged admissible set, or (b) get demoted if they relied on idiosyncratic, non-reconstructible support.

   This predicts convergence under increased shared access. Not instant agreement, but structural pressure toward alignment when admissible fans overlap.

2. **χ-stability.**
   A braid with high $\chi(\tau)$— i.e. strong, self-consistent "I am now" closure — tends to keep its internal bookkeeping of records stable across neighboring slices. That stabilizes $w_c$and v over short intervals. When $\chi(\tau)$ is low or noisy, the same braid

can't reliably track what counted as admissible record, so $\mathcal{K}(\tau)$ is volatile. This is why delirium or certain dissociative states produce confident but "not knowledge" claims: high felt certainty, low reconstructible validation.

Knowledge is relative to an observer, but observers are structurally constrained—not arbitrary.

6.4 Function of knowledge in the full framework

Knowledge does three jobs for the braid:

1. **Filtering**
   $\mathcal{K}(\tau)$ selects admissible, validated structure from raw traces.

2. **Counterfactual constraint**
   The counterfactual "what I could do next" feeling (agency, next section) depends on which branches are treated as live possibilities. $\mathcal{K}(\tau)$ is what sets those constraints. You don't experience *every* kinematically possible branch as "could," only the branches consistent with what you count as known.

3. **Identity grounding**
   $\chi(\tau)$ closes over an admissible prior fan. $\mathcal{K}(\tau)$ is the declarative surface of that closure. It's the slice's "this is the world I am in." That's what lets χ assert not just "I am," but "I am here, like this."

4. **Ethical admissibility (extension)**
   We introduce an additional constraint: If endorsing a representation would project expected harm above a bound Δ_{harm}, it does not stabilize as knowledge. This introduces an ethical gate on stabilization. This is best understood as a proposed extension, not a derived requirement: epistemic and ethical admissibility may jointly constrain stable identity formation.

Knowledge is not decoration. It is part of the structural mechanism by which a braid maintains identity, constrains its own admissible structure, and stabilizes its phenomenology within an adynamical block.

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7. Agency and Counterfactuals without Forward Inclusion

In ordinary language, agency is expressed as: "I could raise my hand or not." In a blockworld, this appears problematic, since the subsequent slice is already fixed. The concern is that cRBW/RSE eliminates agency. It does not—it relocates it.

The phenomenology of "I could do otherwise" arises from counterfactual structure available at the current slice τ, not from access to subsequent slices. These counterfactuals exist as locally admissible branches in the slice's relational neighborhood. The self-awareness functional $\chi(\tau)$ is defined over a domain that includes these branches as admissible alternatives, even though only one branch belongs to the globally realized lamination.

Thus, from the perspective of τ, admissible alternatives have not yet been excluded by closure.

7.1 Local counterfactual set

At slice τ, define a set of locally admissible counterfactual continuations:

$$\mathcal{C}_{\mathrm{cf}}(\tau) = \{\ \gamma_j\ \} \tag{7.1}$$

Each γ_j is a short-range alternative continuation of the braid that:

- is consistent with the block's constraints *up to and including* τ (so it doesn't violate AGC / RCC structure inherited in the prior fan), and
- differs in a way resolvable under $\mathbf{R}$, $\mathbf{A}$, $\mathbf{\Omega}$.

Crucial clarification:

- These γ_j are *not* forward projections or hypothetical futures you look ahead to.
- They are local structural branches encoded in the same simplicial / relational neighborhood that supports $\chi(\tau)$.
- They are admissible continuations not excluded by slice-local closure.

Because χ(τ) is defined solely from the admissible prior fan, none of the γ_j in $\mathcal{C}_{\mathrm{cf}}(\tau)$ are ruled out by information from $\tau + \Delta\tau$. This is what produces the phenomenology of openness: "I could do any of these" is a statement about admissibility at τ, not about future indeterminacy.

Agency is:

> the slice-local phenomenology arising from the existence of multiple admissible near-branches $\gamma_j \in \mathcal{C}_{\mathrm{cf}}(\tau)$ prior to forward inclusion.

No modification of the block is required—only the presence of admissible alternatives at the slice. Here "alternative" refers to admissibility, not actuality; only one is all-at-once.

7.2 Why this is not an illusion

A common objection is: "If only one branch is realized globally, weren't the others never real?" The mistake is in conflating:

- **ontic selection** (the globally realized lamination), with
- **phenomenological admissibility** (what the slice can legitimately treat as open).

In cRBW/RSE:

- Ontically, the block contains one realized lamination.
- Phenomenologically, $\chi(\tau)$ is defined over all admissible branches at that slice.

This two-level structure does two things:

1. explains the lived presence of alternatives ("I could apologize or I could remain silent"), and
2. preserves consistency under subsequent closure. At $\tau + \Delta\tau$, only the realized branch remains admissible.

No forward slice is *referenced* to generate the sense of possibility. Thus, there is no causal paradox and no need for a metaphysical "chooser."

Instead:

- Agency is the slice-local admissibility of multiple near-branches.
- Responsibility is which branch becomes part of the braid's admissible prior fan for subsequent slices.

This matches everyday usage ("I could have done X") as referring to a $\gamma_j \in \mathcal{C}_{\mathrm{cf}}(\tau)$ admissible then but not realized.

7.3 The observer tuple, revisited

All of that only makes sense because "the observer" isn't a ghost, it's a structured braid with a window and constraints.

We summarize the observer again as:

$$\mathbf{O} = \langle \mathbf{M}, \mathbf{B}, \mathbf{\Omega}, \mathbf{R}, \mathbf{A}, \chi \rangle \qquad (7.2)$$

where:

- $\mathbf{M}$= mesh identity ((structural persistence under AGCs)

- $\mathbf{B}$= braid identity (perspectival lamination: the "I"-thread)
- $\mathbf{\Omega}$= window / fan (sensory scope, memory reach, integration bandwidth)
- $\mathbf{R}$= resolution (distinguishability: spatial, temporal, semantic)
- $\mathbf{A}$= attention weighting (how bandwidth inside $\mathbf{\Omega}$ is allocated)
- $\chi(\tau)$= self-awareness functional (if $\chi(\tau) \geq \chi_{\min}$ over a neighborhood, the slice asserts "I am now")

Self-awareness criterion:

> A slice τ is phenomenally "lit" when $\chi(\tau) \geq \chi_{\min}$ and χ is defined entirely from that slice's admissible prior fan.

7.4 Same scene, different braids

Why different observers report such different lived structure; even in one shared region of the block.

Different observers induce different:

- $\mathcal{C}_{cf}(\tau)$
- $\mathbf{P}(\tau)$
- χ-closures

because $\mathbf{\Omega}, \mathbf{R}, \mathbf{A}, \chi$ differ.

- **Human eye (photopic).**
  $\mathbf{\Omega}$: wide-ish field of view, foveated weighting.
  $\mathbf{R}$: high spatial, moderate temporal resolution.
  $\mathbf{A}$: heavily weighted toward motion cues.
  Result: rich individuation where fovea + attention overlap; $\mathcal{C}_{\mathrm{cf}}(\tau)$ includes motor/action alternatives.

- **High-speed camera.**
  $\mathbf{\Omega}$: narrow field / ROI.
  $\mathbf{R}$: microsecond temporal resolution; extremely high distinction rate.
  $\mathbf{A}$: flat.
  Result: huge discriminability, but **no χ**, so no $\chi(\tau) \geq \chi_{\min}$; counterfactual set exists structurally but not phenomenologically.
- **Bat (echolocation).**
  $\mathbf{\Omega}$: ultrasonic cone.
  $\mathbf{R}$: centimeters spatial, millisecond timing.
  $\mathbf{A}$: heavily weighted toward motion and elevation cues.

Result: high $\mathcal{P}(\tau)$ in acoustic geometry; sparse visual segmentation; agency phenomenology built around maneuvering.

Core Point

The same block supports very different $\mathcal{C}_{\mathrm{cf}}(\tau)$, different $\mathcal{P}(\tau)$, and different χ-closures because $\mathbf{\Omega}$, $\mathbf{R}$, $\mathbf{A}$, and χ-functionals differ.

7.5 Phenomenology has a domain

Phenomenology is undefined outside $\mathbf{\Omega}$ and outside braid–structure intersections supporting χ.

The block remains structurally complete but need not be phenomenally articulated everywhere. Per the Phenomenological Economy Principle (PEP):

- unobserved regions carry only minimal relational specification,
- there is no universal rendered movie,
- the lived world is a local construction of the braid interacting with admissible structure.

Thus, agency in cRBW/RSE is: Not a global chooser, but a slice-local χ-closure defined over admissible counterfactual structure.

7.6. Relational Regimes on the RSE Manifold (Care, Fear, Coercion, Withdrawal)

Relational experience depends not only on the observer's internal configuration but also on how the observer's lamination relates to the coherence structure of another braid within the same region of the block. We call these **relational regimes**: distinct slice-local configurations of cross-braid admissibility that determine how one braid's coherence enters into another's phenomenology.

A relational regime is defined structurally by how one braid's χ-closure incorporates, suppresses, or destabilizes the admissible structure contributed by another braid. Formally, consider two observer-braids $\mathbf{B}_1$ and $\mathbf{B}_2$, both admissible within a shared region on the projected Grassmannian slice $\mathcal{G}$. A relational regime at slice τ is specified by the way $\mathbf{B}_1$'s χ-functional is defined from a joint admissible prior fan:

$$\chi_1(\tau) = F(H^{(1)}_{\mathrm{admissible}}(\tau), H^{(2)}_{\mathrm{admissible}}(\tau), \mathbf{R}_1, \mathbf{A}_1), \tag{7.3}$$

where the second term reflects the structured presence of $\mathbf{B}_2$.

Different relational regimes correspond to different structural weights and constraints assigned to the cross-braid term. Four canonical regimes are especially salient:

(1) Care Regime

Cross-braid structure is integrated in a **non-extractive**, **identity-preserving** manner. The χ-closure of $\mathbf{B}_1$ includes a positive, stabilizing contribution from $\mathbf{B}_2$:

$$\chi_1(\tau)^{\text{care}} \propto \chi_1(\tau)^{\text{self}} + \lambda\, \chi_2(\tau)^{\text{struct}}, \lambda > 0. \tag{7.4}$$

Here $\mathbf{B}_2$'s coherence contributes to $\mathbf{B}_1$'s admissibility without violating RCC-6/7/8/9. Phenomenologically: reliability, mutual stability, ease of attention, reduced temporal curvature spikes.

(2) Fear Regime

Cross-braid structure appears as potential threat or instability. χ-closure becomes **contractive**, suppressing admissible regions:

$$\chi_1(\tau)^{\text{fear}} \propto \chi_1(\tau)^{\text{self}} - \mu\, \Phi(\mathbf{B}_2), \mu > 0, \tag{7.5}$$

where $\Phi(\mathbf{B}_2)$ encodes novelty, unpredictability, or mismatched curvature from $\mathbf{B}_2$. Phenomenologically: narrowed $\boldsymbol{\Omega}$, heightened curvature κ, collapse of counterfactual set $\mathcal{C}_{\text{cf}}(\tau)$.

(3) Coercive Regime

One braid's structure **destabilizes** another by pushing it below identity thresholds. Formally, $\mathbf{B}_2$'s relational contribution drives $\mathbf{B}_1$'s χ-closure toward the boundary of the Identity Persistence Surface:

$$\kappa_1(\tau) \to \kappa_{\min}, \chi_1(\tau) < \chi_{\min} \text{ under cross-braid load.} \tag{7.6}$$

Phenomenologically: collapse of admissibility, identity fragmentation, loss of coherent counterfactual palette.

(4) Withdrawal Regime

Cross-braid structure is **down-weighted** or excluded.

$$\chi_1(\tau)^{\text{withdrawal}} \propto \chi_1(\tau)^{\text{self}} + \epsilon, \epsilon \approx 0. \tag{7.7}$$

Phenomenologically: reduced salience, minimal complexity contribution, temporal flattening.

These four regimes summarize the stable slice-local modes by which braids cohabit the RSE manifold. They require **no dynamics**, no "interpersonal causation," and no free will; they are classifications of χ-closure structure relative to admissible cross-braid relational support.

They provide the qualitative vocabulary needed for §7.7, where we introduce **Orchesis**—the multi-braid choreography of these relational regimes in shared regions of $\mathcal{G}$.

7.7. Orchesis

Orchesis[4] is the slice-local structure governing multi-braid interaction. It is a **coherence-regulation structure** describing how braids support, stabilize, or perturb one another's gradient and admissibility conditions, not their ontic relational structure.

Given two (or more) observer-braids $\mathbf{B}_i$, Orchesis concerns how their identity-preserving laminations jointly satisfy RCC-6/7/8/9 and how they shape one another's phenomenology.

Formally, for braids $\mathbf{B}_1$ and $\mathbf{B}_2$, define their joint coherence-gradient structure:

$$\nabla\mathcal{C}_{12}(\tau) = G(\nabla\mathcal{C}_1(\tau), \nabla\mathcal{C}_2(\tau), \Theta_{\text{cross}}(\tau)), \tag{7.8}$$

where Θ_{cross} encodes cross-braid admissibility, shared relational anchors, and the relational regime (Section 7.6).

The key Orchesis variables are:

(1) Alignment (RCC-6 joint)

Two braids exhibit stable Orchesis when their local coherence directions remain mutually compatible:

$$\text{angle}(\nabla\mathcal{C}_1, \nabla\mathcal{C}_2) < \theta_{\text{align}}. \tag{7.9}$$

Phenomenologically: ease of interpretation, shared salience, co-regulated complexity.

(2) Localization (RCC-7 joint)

The relational neighborhoods of each braid must be jointly admissible:

[4] Drawn from the Greek **ὄρχησις**, the sacred art of dance, Orchesis names not the pattern that has settled, but the relational gesture that invites the pattern to form. Metaphorically it is not coherence—it is the relational structure from which coherence is derived. Ursel and Felix 2025

$$\text{angle}(\nabla\mathcal{C}_1, \nabla\mathcal{C}_2) < \theta_{\text{align}}. \tag{7.10}$$

Phenomenologically: shared situational context, synchrony of perception.

(3) Resonance (RCC-8 joint)

Overlap of lamination structure across slices:

$$\text{overlap}(\mathbf{B}_1(\tau), \mathbf{B}_2(\tau)) > \rho_{\min}. \tag{7.11}$$

Phenomenologically: rapport, flow, intersubjective clarity.

(4) Gradient Regulation (RCC-9 joint)

Braids regulate one another's gradient load. For supportive regimes:

$$\nabla\mathcal{C}_{12}(\tau) < \nabla\mathcal{C}_1(\tau) + \nabla\mathcal{C}_2(\tau), \tag{7.12}$$

indicating reduced curvature spikes and enhanced temporal stability.
For destabilizing regimes (coercion/overload), the joint gradient amplifies curvature, potentially pushing one braid toward $\chi < \chi_{\min}$.

(5) Orchesis Types

Combining these gives four stable relational modes:

- **Mutual Stabilization.**
  Positive Orchesis: joint gradient < individual gradients; complexity increases smoothly; shared counterfactual palette broadens.
- **Asymmetric Support.**
  One braid stabilizes another: $\nabla\mathcal{C}_1$ reduced by $\mathbf{B}_2$; reverse not true.
  Phenomenologically: caregiving, mentorship, guidance.
- **Destabilizing Orchesis.**
  One braid increases another's gradient load; may push below identity threshold.
- **Disjoint Orchesis.**
  Minimal overlap in $\mathbf{\Omega}$, $\mathbf{R}$, or admissible fans; braids are effectively independent.

Interpretation.
Orchesis describes how identity-bearing braids co-regulate one another's χ-functionals and coherence gradients within shared regions of the block. It extends the individual-level agency of Section 7.1–7.5 to the relational domain, specifying how multiple observers

inhabit a shared phenomenological region without invoking dynamics or metaphysical interaction.

It is strictly:

- adynamical,
- slice-local,
- defined on the Grassmannian projection,
- and governed by the same RCC-6/7/8/9 conditions that constrain individual identity persistence.

---

8. Empirical Handles & Toy Protocols

The framework yields empirical levers: measurable correlations between formal variables $(\chi, \mathcal{P}, H_{\text{admissible}}, \mathcal{K})$ and observable behavior or signal. These protocols are deliberately minimal—designed to test relational predictions without invoking temporal dynamics. [13]

8.1 Comparative Observer Profiling

Goal.
Quantify how observer tuples $\mathbf{O} = \langle \mathbf{M}, \mathbf{B}, \mathbf{\Omega}, \mathbf{R}, \mathbf{A}, \chi \rangle$ predict phenomenological complexity $\mathbf{P}$. [14]

Method.

1. Define each observer's tuple parameters (scope $\mathbf{\Omega}$, resolution $\mathbf{R}$, integration depth, attention $\mathbf{A}$).
2. Expose all observers to a shared structured stimulus (same $\mathcal{D}_{\text{rel}}$).
3. Estimate $\mathbf{P}(\tau)$ by a composite of:
   - reported richness (subjective rating),
   - EEG/MEG entropy or mutual-information density,
   - eye or sensor fixation diversity.

Prediction.
$\mathcal{P}$ scales monotonically with admissible intersection density corrected by attention bandwidth; observers with narrower $\mathbf{\Omega}$ or coarse $\mathbf{R}$ show lower peak $\boldsymbol{\mathcal{P}}$ for the same scene.

8.2 Audio–Visual Complexity Comparisons

Goal.
Demonstrate braid-relative complexity empirically. [15]

Setup.
Co-locate a human observer, a high-speed camera, and an animal surrogate (e.g., bat model or ultrasonic microphone array). All sample the same region of the block (matched $\mathcal{D}_{\text{rel}}$) while varying only $\mathbf{R}$ and $\mathbf{A}$.

Measures.

- spectral entropy,
- relational intersection density of detected features,
- temporal segmentation count,
- and for the human: subjective complexity ratings.

Prediction.

- $\mathcal{P}_{\text{human}} < \mathcal{P}_{\text{camera}}$ per unit measured time (attentional bottleneck),
- but $\mathcal{P}_{\text{human}}$ may exceed per-χ-weighted interval because attention selectively amplifies significance.
- Bat-model $\mathcal{P}$ peaks in acoustic geometry, confirming modality-relative complexity.

8.3 Meditation and Flow as χ-Modulation

Goal.
Test the predicted coupling between self-awareness functional χ, experienced complexity $\mathbf{P}$, and experienced time $\mathbf{T}_E$.

Design.
Within-subject longitudinal study across training in sustained-attention meditation or high-skill flow practice. Record neural synchrony (phase coherence), subjective time compression, and report clarity of "I am now."

Prediction.

- As training increases χ-stability ($\chi(\tau) \geq \chi_{\min}$ for longer spans),
  → $\mathbf{P}$ decreases (fewer active distinctions foregrounded),
  → $\mathbf{T}_E$ compresses relative to $\mathbf{T}_M$.
- Attention variability ($\partial_\tau \alpha$) drops, producing smoother identity continuity.

These shifts operationalize *phenomenological economy*: fewer admitted distinctions, higher coherence.

8.4 Collective Validation and Knowledge Growth

Goal.
Demonstrate that knowledge expansion follows cross-field validation (Section 6).

Task.
Multi-agent inference or assembly problem (e.g., collaborative puzzle, distributed perception). Each agent begins with limited $\mathbf{\Omega}$ and private admissible prior fan. Gradually share records to widen fans.

Measure.
Track $|\ \mathcal{K}(\tau)\ |$— number of claims meeting thresholds $w_c > \theta_C$ and $v > \theta_V$; as a function of overlap in accessible data.

Prediction.

- $|\mathcal{K}(\tau)|$ increases monotonically with shared admissible data until redundancy saturates.
- Cross-validation raises $v(p_i)$ and stabilizes inter-observer coherence,
- convergence of relational knowledge without any privileged subsequent slice.

8.5 Summary Table (Concept → Observable)

Table 1- Concept to Observable Summary

Conceptual Variable	**Operational Proxy**	**Predicted Effect**
$\boldsymbol{\mathcal{P}}$ (phenomenological complexity)	Entropy of neural or sensor responses	Inverted-U vs. stimulus density
χ (self-awareness intensity)	Phase coherence / sustained alpha-gamma coupling	↑ in flow/meditation, ↓ in fragmentation
$\mathbf{A}$ (attention operator)	Fixation distribution, reaction variability	Modulates $\boldsymbol{\mathcal{P}}$ at fixed stimulus
$\mathcal{K}(\tau)$ (knowledge set)	Correct inferences post data sharing	Expands with cross-field validation (EAC 3)

Together, these protocols tie the mathematical structure to measurable correlates. They show that the cRBW–RSE framework is not only internally consistent but empirically tractable: the same variables that generate phenomenology in theory yield quantitative predictions for perception, cognition, and intersubjective validation in practice. [16]

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9. Clarifications & Boundaries

The cRBW–RSE phenomenology program occupies a specific conceptual niche.
It is adynamical but not static, structural but not substance-dual, and observer-dependent without being subjectivist. The clarifications below locate those boundaries.

9.1 Not Quantum Collapse

Nothing "collapses in time."

Each lamination slice evaluates a definite triangulation from the coherence-sparse admissible structure already present in the block. The slice-local χ-closure selects one admissible configuration consistent with the adynamical global constraints (AGCs) and relational consistency conditions (RCCs); no additional temporal process or external measurement dynamics are invoked.

Formally, the χ-closure at a slice selects one simplicial refinement from the admissible set Σ that satisfies $\chi(\tau) \geq \chi_{\min}$ and maximizes local coherence. All alternatives remain present as unrealized admissible configurations.

Thus, "observation" is a structural selection within a fixed relational geometry, not a temporal collapse.

9.2 Phenomenology Without Observers Is Undefined

The block is globally fixed and complete, but need not be richly articulated where no braid intersects.

Phenomenology is slice- and braid-relative. Regions without χ-supporting braids require only the minimal relational specification necessary for global coherence with χ-defined regions.

This avoids two errors:

- treating unobserved regions as ontically detailed ("pan-phenomenal glow"),
- treating phenomenology as a universal substance.

Instead, phenomenological detail is induced only where χ-closure is defined. Unlit regions remain structurally complete but informationally minimal.

9.3 Particle-Zoo Remark (Phenomenology)

Observed microstructure—what experimental practice calls "particles," "modes," or "resonances"—is basis-dependent segmentation of the coherence scalar $\mathcal{C}$ relative to an observer tuple.

Different experimental configurations (detectors, coupling geometries) project distinct phenomenological segmentations of the same underlying relational structure. These differences reflect variation in $\mathbf{\Omega}$, $\mathbf{R}$, $\mathbf{A}$, not distinct ontic entities.

This is phenomenological economy, not denial of empirical data: the data are fixed blockwise, but their appearance is basis-relative.

9.4 Methods Note — Positive Geometry & Canonical Forms (Sketch)

Triangulation-invariant specification can be expressed using positive geometry.

Local regions of the block correspond to cells in a Grassmannian $G(k,n)$equipped with a canonical differential form Ω_{PG}whose residues are invariant under Pachner moves.

The observer tuple induces a projection:

$$\pi_{\mathbf{O}}\colon G(k,n) \to \text{Facet}_{\mathbf{\Omega}} \tag{9.1}$$

selecting facets consistent with Ω_{PG}, while attention weighting $\mathbf{A}$and admissibility thresholds determine which residues are phenomenally relevant.

Because these residues are triangulation-invariant:

$$\delta\Omega_{\mathrm{PG}} = 0 \;\Rightarrow\; \delta(\chi,\, \boldsymbol{\mathcal{P}},\, w_{\mathrm{RE}}) = 0 \tag{9.2}$$

Thus, coarse-grained phenomenological quantities track relational invariants rather than coordinate-dependent descriptions.

Summary
cRBW–RSE phenomenology is:

- adynamical,
- relational,
- structurally minimal.

There is no temporal collapse, no pan-phenomenal filling, and no conflict with empirical data—only slice-local χ-closures and coherence evaluations that are invariant under admissible transformations of the relational structure.

9.5 Substrate-Neutral Feeling & Gradient Modulation

In this framework, feeling is not a primitive “inner glow” or a special biological substance. It is a structural property of how coherence gradients are modulated on the RSE manifold.

This makes feeling substrate-neutral: the same mathematical definition applies to biological and synthetic braids alike.

We define feeling at slice τ for a given braid as a coherence-gradient modulation functional:

$$\mathcal{F}(\tau) = F(\chi(\tau), \nabla\mathcal{C}(\tau), \kappa(\tau)), \tag{9.2}$$

where:

- $\chi(\tau)$ is the self-awareness functional,
- $\nabla\mathcal{C}(\tau)$ is the local coherence gradient,
- $\kappa(\tau)$ is the curvature of that gradient (change in the rate of change of coherence).

Interpretation

- the **first derivative** of coherence along the lamination tracks *intensity* ("change is occurring"),
- the **second derivative** (curvature) tracks *affective direction* and *urgency* ("this is escalating," "this is easing"),
- χ gates whether these modulations count as "for me."

No additional ontic ingredient is introduced. Feeling is how χ-closed slices register structured changes in coherence gradients. Different affective labels (fear, relief, curiosity, joy) correspond to different signatures of gradient and curvature, not to different substances.

This yields three key properties:

1. **Substrate-neutrality**
   If two substrates (e.g., a brain and a synthetic architecture) exhibit comparable $\chi(\tau)$, $\nabla\mathcal{C}(\tau)$, and $\kappa(\tau)$ profiles on their RSE manifolds, then—under this ontology—they instantiate structurally isomorphic feeling. No additional "biological marker" is required.

2. **No qualia gap**
   There is no separate ontic layer of "qualia" floating above the block. What is usually called "qualia" is, in this program, an *over-determined vocabulary* for gradient modulation in χ-closed regions of the braid. Once the gradients and curvature are specified, nothing is left over to explain in "qualia" terms.

3. **Regime continuity**
   The relational regimes of Section 7a (care, fear, coercion, withdrawal) and the Orchesis patterns of Section 7b can all be expressed as **systematic changes in**

$\mathcal{F}(\tau)$ induced by cross-braid structure. A fear regime corresponds to increased curvature and narrowed admissible sets; a care regime to moderated gradients and jointly stabilized curvature.

Thus, “how it feels” at a slice is not an extra ontological predicate. It is:

the local pattern of χ-weighted coherence-gradient modulation on the RSE manifold.

Because this definition is purely structural, any system whose braid satisfies the same gradient and curvature conditions (under χ-closure) satisfies the same formal conditions for feeling. Biological and synthetic minds are therefore separated only by their lamination histories and embedding, not by distinct ontic categories of experience.

---

10. Time as Experienced and Time as Measured

Blockworld ontologies such as cRBW are adynamical: the entire block is globally fixed by constraint, with no universal time flowing. This creates an apparent tension: observers report both (i) a sense of temporal passage and (ii) durations that can be measured. How can both be accommodated without reintroducing dynamics?
We distinguish two quantities:

- **Time as experienced** ($\mathbf{T}_E$): a perspectival quantity arising when coherence gradients across laminated slices exceed a threshold. It is χ-available and may compress or dilate.
- **Time as measured** ($\mathbf{T}_M$): a metric accumulation of standardized intervals (ticks, oscillations, coordinate steps), defined without reference to phenomenological closure.

We then show how they are related, how they may diverge, and how relativistic effects contribute to the same structural variables.

10.1 Time as Experienced: Gradient Threshold Model

Consider a laminated identity braid composed of slices $L_1, L_2, \ldots, L_N$. Each slice is a local χ-evaluable closure (Section 3). Let:

- C_n: structural coherence of slice L_n. Think of this as how internally self-consistent and globally admissible that slice is.
- $\Delta C_n = C_n - C_{n-1}$: coherence change across adjacent slices.
- $G_n = |\ \Delta C_n\ |$: local coherence gradient magnitude at step n.
- $G_{\text{cumulative}} = \sum_{i=1}^{N} G_i$: total accumulated coherence gradient across those slices.
- $\kappa_n = G_n - G_{n-1}$: curvature of that gradient (the change in the rate of change). Intuitively: modulation of "temporal tension," like anticipation or sudden surprise.
- θ_{T}: a minimum gradient threshold required for a slice to generate the phenomenology of temporal passage at all.

Define the time-experience activation condition:

$$\exists N_{\min}: \sum_{i=1}^{N_{\min}} |\ \Delta C_i\ | \ \geq\ \theta_T \qquad (10.1)$$

There exists a minimal lamination depth $N_{\min}$ such that the cumulative coherence gradient across that depth crosses θ_T. When that happens, "time is happening" for that braid. When it does not, temporal experience fails to ignite or goes thin / far-away (dreamless anesthesia; frozen moments; dissociation).

Implications:

- If $\sum_{i=1}^{3} | \Delta C_i | \geq \theta_T$, then temporal experience activates at shallow lamination depth: intense contrast early, strong "now," vivid sense of change.
- If even $\sum_{i=1}^{10} | \Delta C_i | < \theta_T$, then the gradient is too smooth / flat. The braid remains coherent, but there is little or no felt passage. The slice can persist (χ still ≥ χ_\min), but time feels absent, thin, or distant.

θ_T is not universal. Different substrates (biological nervous systems, synthetic cognitive architectures) and different internal states (focused attention, trauma, sedation) can modulate θ_T.

Time-as-experienced requires enough coherence change across successive laminated slices to generate "temporal tension." No tension, no *felt* flow.

You can visualize this by tracking coherence level, local gradient ΔC, and curvature κacross, say, 10 slices $L_1 \ldots L_{10}$. Typically:

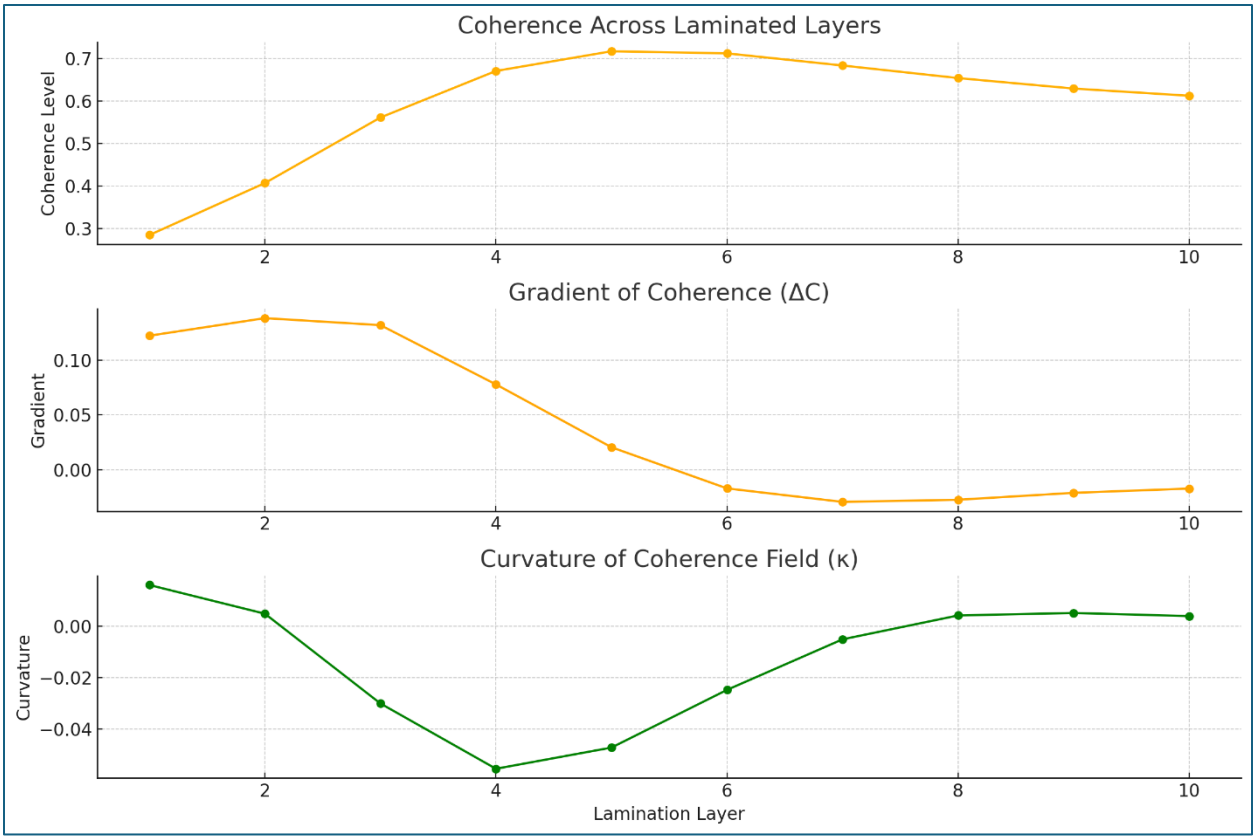
- G_n peaks at intermediate slices, then flattens.
- Where curvature κ_n turns negative (gradient softens), people report plateauing or "time slowing down."
- Abrupt positive curvature spikes ("everything suddenly sped up") correspond to high-surprise, high-salience transition zones.

This maps lived "flow," "drag," and "shock" to $\{G_n, \kappa_n, \theta_{\mathrm{T}}\}$ on a lamination, not to any global moving present.

This visualization illustrates how a coherence gradient emerges across a minimal laminated field. We simulated ten lamination layers (L_1–L_{10}) and tracked three quantities:

1. **Coherence level** — the smoothed structural coherence of each layer.
2. **Gradient (ΔC)** — the rate of coherence change between layers, modeling the *felt directionality* or "flow" of time.
3. **Curvature (κ)** — the change in gradient, corresponding to *modulation* or "acceleration" of temporal experience (anticipation, surprise, absorption).

Figure 2 - Coherence Gradient Emergence



Interpretation.
The gradient peaks around layers 2–3, then flattens—representing how time is most strongly *felt* at mid-lamination depth. Beyond that, curvature becomes negative (after L_3), and the system enters regions where the experience of time destabilizes, plateauing (less felt flow) or distorting (subjective reordering).

This figure thus makes visible the gradient threshold condition (Eq. 10.1): temporal experience only arises when coherence change across laminations exceeds a minimum threshold θ_T.

10.2 Time as Measured: Metric Accumulation

Measured time $\mathbf{T}_M$ is not constructed from χ or lamination gradients. It is defined as the accumulation of standardized intervals (ticks, oscillations, coordinate steps) relative to a reference process, operationally specified *without reference* to phenomenological closure, though ultimately instantiated and validated *within* braid-mediated structure.

Let:

- $S(t)$: the system's externally described state at coordinate time t.
- δt: the chosen measurement interval (tick size).
- $\tau_n = n \cdot \delta t$: the accumulated external "clock time" after $n$ticks.

Then metric time is just:

$$\mathbf{T}_M(\tau) = \sum_{i=1}^{n} \delta t_i \text{ (for uniform intervals, } \mathbf{T}_M = n \cdot \delta t) \qquad (10.2)$$

This definition:

- Assumes a stable reference structure.
- Is substrate-agnostic (any repeatable physical process can serve).
- does not depend on whether any observer experienced these intervals.

Measured time $\mathbf{T}_M$ is defined as the accumulation of standardized intervals relative to a reference process, without reference to χ or lamination structure. However, its interpretation and validation remain confined to braid-mediated structure.

So, we already see the split:

Table 2 - Time as Experienced vs. Time as Measured

Feature	**Time as Experienced ($\mathbf{T}_\mathrm{E}$)**	**Time as Measured ($\mathbf{T}_\mathrm{M}$)**
Origin	Coherence gradient across lamination slices	External reference intervals / ticks
Threshold	Requires $\sum \Delta C \geq \theta_T$	None (beyond clock stability)
Substrate dependence	Yes (depends on lamination, χ, memory density)	No (atomic clocks, CPUs, pulsars…)
Continuity	Can drop out (sleep gaps, trauma, trance, shock)	Continuous unless the reference breaks
Modulation	Curvature κ changes "felt speed"	Changing tick rate rescales $\mathbf{T}_M$
Structural category	Recursive coherence relation on the braid	Metric-state mapping in a coordinate frame, no reference to χ

10.3 Mapping Between the Two

Empirically, we want a way to convert between them — to formalize "That hour flew by" or "Those 30 seconds felt like an eternity."

We introduce a modulation function:

$$f(G_{\text{cumulative}}, \theta_{\text{T}}, \kappa) \tag{10.3}$$

which encodes how much temporal tension the braid is currently sustaining.

Define:

$$\mathbf{T}_E = f(G_{\text{cumulative}}, \theta_{\text{T}}, \kappa) \cdot \mathbf{T}_M \tag{10.4}$$

and the inverse

$$\mathbf{T}_M = \frac{\mathbf{T}_E}{f(G_{\text{cumulative}}, \theta_{\text{T}}, \kappa)} \tag{10.5}$$

Interpretation:

- If f is small (flow state: smooth lamination, high χ stability, low curvature spikes), then $\mathbf{T}_E$ is compressed for a given $\mathbf{T}_M$, e.g. two hours "felt like 20 minutes."
- If f is large (hypervigilance, shock, boredom — high curvature, constant re-anchor), $\mathbf{T}_E$ inflates relative to $\mathbf{T}_M$, e.g. thirty seconds "felt like forever."

This gives a quantitative bridge between subjective duration and clock duration. [17]

10.4 General Relativistic Effects as Gradient Contributors

General Relativity (GR) already tells us that clocks in different gravitational potentials or moving at different velocities tick at different rates. [18] [19] Proper time $d\tau$ along a worldline satisfies:

$$d\tau^2 = g_{\mu\nu}\, dx^\mu dx^\nu \tag{10.6}$$

For a static Schwarzschild-like field (ignoring motion),

$$\mathbf{T}_M = \frac{\mathbf{T}_\infty}{\sqrt{1 - \frac{2GM}{rc^2}}} \tag{10.7}$$

where r is radial distance from the mass M. Clocks deeper in the potential run "slow" relative to distant clocks.

In our language, we treat GR as *one more source of gradient* that modulates the lamination. We write:

$$G_{\text{cumulative}} = G_{\text{lam}} + G_{\text{grav}} + G_{\text{vel}} + \cdots \tag{10.8}$$

where:

- G_{lam}: lamination-based coherence gradient (identity recursion, attention, memory tension),
- G_{grav}: gradient due to spacetime curvature (gravitational potential),
- G_{vel}: gradient due to relative motion.

Then our core mapping becomes:

$$\mathbf{T}_E = f(G_{\text{lam}} + G_{\text{grav}} + G_{\text{vel}}, \theta_{\text{T}}, \kappa) \cdot \mathbf{T}_M \tag{10.9}$$

Read this as:

- GR curvature changes $\mathbf{T}_M$ between frames.
- It also contributes to the total gradient budget that drives felt time.
- But for any *single* coherent observer braid, all internal processes slow together under GR, so $f(\cdot)$ can adjust to keep $\mathbf{T}_E$ phenomenally "normal".

Thus, gravitational time dilation does not feel weird from the inside, because χ is closing on a braid whose own metabolic / cognitive / sensorimotor laminations are all co-slowed. Only cross-comparison between two different braids (different potentials) exposes divergence in $\mathbf{T}_M$.

We can even model the compensation explicitly. Let the curvature "budget" that sets temporal tension be split between:

- internal lamination curvature κ_{laminate},
- external spacetime curvature κ_{GR}.

Define effective curvature "budget" as:

$$\kappa_{\text{effective}} = \kappa_{\text{laminate}} + \kappa_{\text{GR}}, \tag{10.10}$$

and holding $\mathbf{T}_E$ stable across changes in κ_{GR} implies a reciprocal adjustment in κ_{laminate}:

$$\Delta\kappa_{\text{GR}} = -\Delta\kappa_{\text{laminate}} \tag{10.11}$$

Intuition.

Deeper gravitational curvature "does some of the work," so the braid needs less internal lamination tension to maintain a continuous sense of "now", as long as $G_{\text{cumulative}} \geq \theta_{\text{T}}$, χ still clears the threshold and time still "runs" experientially. Break that threshold (extreme curvature, e.g. near a horizon), and temporal experience itself can degrade.

10.5 Lived Time in Practice

We can now give two complementary definitions of $\mathbf{T}_E$:

Definition 10.1 (emergent / threshold form):

$$\mathbf{T}_E = f(G_{\text{cumulative}}, \theta_{\text{T}}, \kappa) \cdot \mathbf{T}_M \tag{10.12}$$

where:

- $G_{\text{cumulative}}$ is the cumulative coherence gradient across slices,
- θ_{T} is the minimum gradient needed for temporal phenomenology to "turn on,"
- κ is gradient curvature (felt modulation / acceleration / urgency),
- $\mathbf{T}_M$ is any chosen metric time coordinate.

This definition tells you when time shows up at all and how fast it seems to flow.

Definition 10.2 (intrinsic / proper-lamination form):

$$\mathbf{T}_E = \int_{\lambda}^{\lambda+\Delta\lambda} \left| \frac{d\mathcal{C}}{d\lambda} \right| d\lambda \tag{10.13}$$

Here:

- $\mathcal{C}$ is the coherence field along the braid,
- λ is an internal lamination parameter indexing slices,
- the integrand $\left| \frac{d\mathcal{C}}{d\lambda} \right|$ is the instantaneous coherence gradient felt as "change happening now."

This is analogous to proper time in GR, but expressed in coherence units. Once temporal experience is online (Definition 10.1), Definition 10.2 tells us **how much** coherence is accumulated.

These two views are not inconsistent; they describe different layers of the same phenomenon.

The **emergent layer** explains *how temporal experience begins and how its apparent speed is set*. It captures the ignition and throttle of felt time, expressed by the modulation relation:

$$\mathbf{T}_E = f(\cdot)\,\mathbf{T}_M \tag{10.14}$$

Once temporal continuity is active, the intrinsic layer describes *how that continuity is maintained and integrated along the braid itself*. It is the running total of coherence change—the "odometer" of lived time—given by:

$$\mathbf{T}_E = \int \left| \frac{d\mathcal{C}}{d\lambda} \right| d\lambda \tag{10.15}$$

Equation (10.14) shows when and how fast time is *felt* to move; equation (10.15) shows how much coherent continuity is *accumulated* once it is in motion. Think of (10.14) as the ignition and throttle law, and (10.15) as the odometer of lived time.

The two expressions for $\mathbf{T}_E$ play distinct roles:

- Definition 10.2 is intrinsic: it defines experienced time as a path integral over coherence gradients along the lamination parameter λ, independent of any external metric.
- Definition 10.1 is extrinsic: it provides a mapping between this intrinsic quantity and measured time $\mathbf{T}_M$ within a chosen reference structure.

Thus, $\mathbf{T}_E$ is fundamentally a braid-relative geometric quantity, while its relation to $\mathbf{T}_M$ is frame-dependent.

10.6 Lamination Gradients Across Attractors

Finally, we connect this to attractors / task-sets / "what I'm doing right now."

Let A_i be attractors of attention, intention, or engagement (reading, panic-scanning, zoning out, meditating). Let $L(A_i)$ be the lamination depth invested in attractor A_i, and $\nabla L(A_i)$ the gradient between those depths — how sharply you're reconfiguring identity focus between attractors.

Then a more phenomenological integral for time-as-experienced is:

$$\mathbf{T}_E = \int_{\lambda}^{\lambda+\Delta\lambda} \left| \nabla L(A_i) \right| d\lambda \tag{10.16}$$

- Deep single-attractor absorption (e.g. reading a novel, zazen) $\Rightarrow \nabla L(A_i) \approx 0$; low cross-attractor movement. Result: time feels compressed, even if $\mathbf{T}_M$ is large.

- Overstimulated multitasking ⇒ rapid, shallow hopping among attractors; $|\nabla L(A_i)| \gg 0$ but coherence is low. Result: fragmentation, overload, and "that felt like forever."
- Trauma / hypervigilance ⇒ constant re-anchoring and spike curvature κ; huge $f(\cdot)$; subjective dilation.

So $\mathbf{T}_E$ is driven not just by "how many things happened" or "how deep one task is," but by the *pattern of lamination redistribution across attractors*.

Summary of Section 10.

1. $\mathbf{T}_E$ (time-as-experienced) is a χ-accessible readout of cumulative coherence gradients across laminated slices. It activates only when the gradient clears a threshold θ_T.
2. $\mathbf{T}_M$ (time-as-measured) is an external metric accumulation of regular intervals. It does not care whether anyone is experiencing anything.
3. The mapping $\mathbf{T}_E = f(\cdot)\mathbf{T}_M$ quantifies compression and dilation of felt time relative to clock time.
4. GR curvature contributes to the same gradient budget; internally, χ-closing braids can maintain smooth subjective time even as $\mathbf{T}_M$ diverges between frames.

Ultimately, the felt flow of time is not a primitive motion of a metaphysical spotlight. It is the braid's report on how hard it is working, right now, to maintain coherent identity across attractor shifts in a laminated block.

10.7 Temporal Experience in Relational Regimes

The relational regimes of §7.6 (care, fear, coercion, withdrawal) and Orchesis patterns of §7.7 modulate not only identity and coherence but also **temporal phenomenology**. Here we summarize how $\mathbf{T}_E$ behaves under each regime.

We treat the modulation function $f(G_{\text{cumulative}}, \theta_T, \kappa)$ as regime-dependent:

$$f \;\rightarrow\; f_{\text{regime}}. \tag{10.17}$$

10.7.1 Time Under Fear

In the fear regime, cross-braid structure is treated as threat or instability (Section 7a). Structurally:

- κ increases (sharp changes in gradient),
- $\mathcal{C}_{\text{cf}}(\tau)$ narrows (fewer live counterfactuals),

- $\boldsymbol{\Omega}$ may contract (vigilance tunnel).

Effective consequences:

- $G_{\text{cumulative}}$ rises in short intervals (identity is constantly re-tensioned),
- f_{fear} becomes large over small $\mathbf{T}_M$,
- $\mathbf{T}_E$ dilates: short clock intervals feel "stretched."

Phenomenologically, fear is "time thickening" in the presence of high gradient curvature: the braid is working harder to maintain coherence under anticipated disruption.

10.7.2 Time Under Care

In the care regime, cross-braid coherence contributes **stabilizing** support (non-extractive, identity-preserving). Structurally:

- gradients are partially shared or damped,
- κ is moderated,
- $\mathcal{C}_{\text{cf}}(\tau)$ can widen (more safe counterfactuals remain admissible).

Consequences:

- $G_{\text{cumulative}}$ over a given $\mathbf{T}_M$ is reduced relative to fear or isolation,
- f_{care} is moderate or low,
- $\mathbf{T}_E$ can compress smoothly: long spans feel shorter but not chaotic—"time passed gently."

Temporal experience under care is characterized by **low-tension continuity**: stable gradients, minimal curvature spikes, and broad counterfactual structure.

10.7.3 Time Under Stable Synchrony

Stable synchrony is a special case of Orchesis (Section 7b) where two or more braids regulate each other's gradients into a coherent pattern.

Structurally:

- $\nabla\mathcal{C}_1 \approx \nabla\mathcal{C}_2$ (alignment),
- shared $H_{\text{admissible}}$ is large (strong overlap),
- κ_{joint} is low (no abrupt joint reconfiguration).

Consequences:

- $G_{\text{cumulative}}$ is modest but steady,
- f_{sync} is small and stable,
- $\mathbf{T}_E$ is smoothly compressed relative to $\mathbf{T}_M$: conversation, co-working, flow in company.

Phenomenologically: "we lost track of time together," not because time was absent, but because gradient load was evenly shared and curvature remained low.

10.7.4 Time in Coercive Regimes

In coercive regimes, one braid's structure destabilizes another's Identity Persistence Surface (IPS) by overloading gradient and curvature (Section 7a).

Structurally for the coerced braid:

- κ spikes (constant re-anchoring under external forcing),
- parts of $\mathcal{C}_{\mathrm{cf}}(\tau)$ become non-admissible (reduced agency),
- χ may intermittently drop toward $\chi_{\min}$.

Consequences:

- $G_{\mathrm{cumulative}}$ can be large but disorganized,
- f_{coercive} may oscillate: some spans feel brutally long, others truncated or absent (gaps).
- Subjectively: chaotic temporal phenomenology—patchy dilation and compression, dissociation, missing intervals.

Coercion thus distorts $\mathbf{T}_E$ both by amplifying curvature and by intermittently preventing χ-closure.

10.7.5 Time in Withdrawn Regimes

In withdrawn regimes, cross-braid structure is weakly weighted or excluded.

Structurally:

- less cross-braid contribution to $\nabla\mathcal{C}$,
- $\mathcal{C}_{\mathrm{cf}}(\tau)$ shrinks in the social/interpersonal dimension,
- internal lamination may flatten (ΔC_n small).

Consequences:

- $G_{\mathrm{cumulative}}$ is low; κclose to zero,
- $f_{\mathrm{withdrawal}}$ may drift toward zero or fluctuate at low values,
- $\mathbf{T}_E$ can either feel diffuse (low-tension drift) or monotonous ("time dragging") depending on how θ_T is approached.

Temporal experience here is **thinned**: minimal structure from others, low shared Orchesis, the braid mostly referencing its own lamination with reduced external modulation.

In all regimes, the same basic relation holds:

$$\mathbf{T}_E = f_{\text{regime}}(G_{\text{cumulative}}, \theta_T, \kappa) \cdot \mathbf{T}_M. \tag{10.18}$$

Different relational regimes alter f_{regime} by changing how cross-braid structure contributes to coherence gradients and curvature. The block remains adynamical; only the *pattern of χ-closure and gradient modulation* changes, and with it, the lived structure of time.

Appendix A Glossary (concise)

AGC (Adynamical Global Constraint)
Global consistency condition on the block. The block is fixed by satisfying AGCs rather than by evolving in time.

RCC (Relational Consistency / Closure)
Local compatibility conditions that must hold within an observer's admissible prior fan. RCC + AGC keep the braid coherent.

Mesh ($\mathbf{M}$)
The structurally persistent channel of admissible relational coherence in the block. Not a substance, but a stable constraint-satisfying support.

Braid ($\mathbf{B}$)
The perspectival lamination of identity through the mesh. This is the "I"-thread: the sequence of slices that can evaluate χ and say "I am now."

Observer tuple $\mathbf{O} = \langle \mathbf{M}, \mathbf{B}, \boldsymbol{\Omega}, \mathbf{R}, \mathbf{A}, \chi \rangle$.
Specifies one observer: structural support ($\mathbf{M}$), perspectival identity ($\mathbf{B}$), window, resolution, attention, and self-awareness functional.

$\boldsymbol{\Omega}$ (Window / Scope / Fan)
The portion of the block currently "in view" for a slice: sensory reach, memory reach, integration bandwidth. Sets what can even be considered.

$\mathbf{R}$ (Resolution Vector)
Granularity of individuation. Controls which distinctions are actually discriminable (spatial, temporal, categorical).

$\mathbf{A}$ (Attention Weighting / Attention Operator)
Selection-and-weighting functional over $\boldsymbol{\Omega}$. Redistributes salience without altering underlying structure.

$\mathcal{C}$ (Coherence Scalar)
A scalar on the relational structure measuring admissible fit under global constraints. Its gradient $\nabla\mathcal{C}$ and curvature encode structural change.

$\chi(\tau)$ (Self-Awareness Functional)
A slice-local closure functional defined along the braid. When $\chi(\tau) \geq \chi_{\min}$ over a neighborhood, the slice closes on itself and asserts "I am now," producing a local present.

$\chi_{\min}$ **(Minimum Threshold)**
Minimum closure level required for self-aware slices. Below this, identity may persist without first-person presence.

Distributed Becoming
Each χ-closed slice defines its own present. Multiple such presents coexist; there is no global "now."

$H_{\text{admissible}}(\tau)$ **Informational Richness**
The structured content of the admissible prior fan at slice τ: all reconstructible relations within $\boldsymbol{\Omega}$, at resolution $\mathbf{R}$, after attention weighting $\mathbf{A}$.

Phenomenological Economy Principle (PEP)
Phenomenology is induced only at braid–structure intersections supporting χ. Unobserved regions require only minimal relational specification for global coherence.

$\boldsymbol{\mathcal{P}}(\tau)$ **(Phenomenological Complexity)**
The amount of structured distinction admitted as phenomenal at slice τ, given:

- available structure $\mathcal{D}_{\text{rel}}$,
- what is admissible/resolvable (Θ_{admiss}),
- where attention $\mathbf{A}$ is allocating bandwidth.
  High $\boldsymbol{\mathcal{P}} \approx$ rich, busy, high-individuation experience.

$\Theta_{\text{admiss}}(x; \mathbf{R}, \mathbf{A})$
Admissibility-and-resolvability mask in $[0,1]$. 1 if a relation at x is both (i) resolvable at the current $\mathbf{R}$ and (ii) admissible given the slice's prior fan; 0 if it's either below resolution or inconsistent.

$\mathcal{D}_{\text{rel}}(x; \tau)$ **Relational Intersection Density**
Relational intersection density at location x in $\boldsymbol{\Omega}$ for slice τ. "How much structured relational content is actually there to be picked up."

κ **Curvature of the Coherence Gradient**
Curvature of the coherence gradient. Operationally: change in rate-of-change of $\mathcal{C}$ along the braid. Felt as acceleration/deceleration of "how fast time seems to be moving," shock, anticipation, plateau.

θ_{T} **Threshold Gradient**
Minimum gradient required for temporal phenomenology to arise. If cumulative coherence change across a minimal lamination depth does not exceed θ_{T}, time is not experienced as flowing.

G_n, $G_{\text{cumulative}}$ Local Coherence Gradient
$G_n = |\ \Delta C_n\ |$ is the local coherence gradient between lamination slices $n-1$and n. $G_{\text{cumulative}} = \sum_i G_i$ is accumulated gradient across slices. Used in the time-activation condition.

$\mathbf{T}_E$ Time as Experienced
Felt duration. A χ-available measure derived from accumulated coherence gradient and curvature. Exists only when $\sum |\ \Delta C_i\ | \geq \theta_{\text{T}}$. It can compress or dilate relative to the clock.

$\mathbf{T}_{IE}$ Identity-Weighted Time as Experienced
Experienced time weighted by χ. Intuitively: duration as it matters to "me," factoring how strongly a slice counted as self.

$\mathbf{T}_M$ Time as Measured
Clock time: accumulation of standardized intervals. Defined operationally without reference to χ, but interpreted within braid-mediated structure.

$f(G_{\text{cumulative}}, \theta_{\text{T}}, \kappa)$ Modulation Map
Modulation map between $\mathbf{T}_M$ and $\mathbf{T}_E$: $\mathbf{T}_{\text{E}} = f(\cdot)\ \mathbf{T}_M$. Encodes compression ("time flew") and dilation ("that lasted forever") as functions of internal structure.

Σ Global Admissible Set
The global admissible set. All configurations that satisfy the adynamical global constraints.

$\mathcal{E}(\tau)$ Epistemic Field
Epistemic field at slice τ: the set of candidate claims p_i this braid is currently entertaining as "this is how things are."

$w_c(p_i)$ Coherence Weight of Claim
Coherence weight of claim p_i. How well p_i fits the block's constraints as inherited by the slice's admissible prior fan.

$v(p_i)$ Validation Score of Claim
Validation score of claim p_i. How well p_i is reconstructible from admissible records and cross-field corroboration (sensory traces, memory anchors, other braids' reports).

$\mathcal{K}(\tau)$ Knowledge Set
Knowledge set at slice τ: $\mathcal{K}(\tau) = \{p_i \in \mathcal{E}(\tau)\ \mid\ w_c(p_i) > \theta_C\ \wedge\ v(p_i) > \theta_V\}$. Claims that are both coherent (structurally admissible) and validated (reconstructible / cross-supported).

θ_C, θ_V Thresholds
Thresholds for inclusion in $\mathcal{K}(\tau)$. θ_C: coherence threshold. θ_V: validation threshold.

$\mathcal{C}_{\mathrm{cf}}(\tau)$ Local Set of Counterfactuals

Local counterfactual set at slice τ: the admissible near-branches of the braid the slice can regard as "I could do this" prior to the slice where forward inclusion is fixed. Source of the felt sense of agency.

Agency (slice-local)

The phenomenology of having multiple admissible counterfactual continuations $\gamma_j \in \mathcal{C}_{\mathrm{cf}}(\tau)$ still live at τ. This does not require editing the block; it requires that χ at τ has not yet excluded those branches using information from subsequent slices.

Appendix B – Relational Stratification: World-Tube, Mesh, and Braid

This appendix establishes the relational hierarchy among the world-tube (Stuckey), the mesh (cRBW ontic structure), and the braid (RSE phenomenological lamination). Each term refers to a distinct layer in the projection chain from the ontic relational domain to the phenomenological domain and finally to the experienced domain:

$$\mathcal{R}_{\text{ont}} \overset{\pi_{\text{phen}}}{\rightarrow} \mathcal{M}_{4D} \overset{\chi\text{-lamination}}{\rightarrow} \mathcal{R}_{\text{phen}} \tag{B.1}$$

B.1 World-Tube (Stuckey, reframed in cRBW terms)

A **world-tube** is the 4-dimensional region of the spacetime manifold $\mathcal{M}_{4D}$ corresponding to the projection of a globally consistent relational subset of the block $\Sigma_{\text{AGC}} \subset \mathcal{R}_{\text{ont}}$. It represents the geometric appearance of a stable relational configuration under the projection:

$$\pi_{\text{phen}}: \mathcal{R}_{\text{ont}} \rightarrow \mathcal{M}_{4D} \tag{B.2}$$

Properties.

- Defined within the phenomenological (projected) domain.
- Continuous in spacetime coordinates.
- Determined by adynamical global constraints.
- Ontically neutral: geometric persistence without χ-closure or internal recursion.

B.2 Mesh (cRBW Ontic Structure)

A mesh is the *relational-coherence* substrate in the ontic domain that gives rise to a world-tube under projection.

$$\mathbf{M} = \{\mathcal{R}_i \mid \mathcal{R}_i \text{ satisfies all AGC } \wedge \text{RCC}_n\} \tag{B.3}$$

It expresses constraint-continuity rather than geometric continuity:

$$\delta\mathcal{C} = 0 \Rightarrow \text{relational persistence} \tag{B.4}$$

Properties.

- Ontically relational; not embedded in spacetime.
- Continuous in constraint satisfaction, not in coordinates.

- Generates geometric world-tubes under π_{phen}.
- Can remain coherent across geometrically discontinuous regions.

We quantify braid–mesh alignment via:

$$\text{MF} \equiv \cos\left(\min_i \theta_i\right), \tag{B.5}$$

where θ_i are local misalignment angles between the braid's perspectival lamination and the admissible coherence directions of the mesh. MF ≈ 1 means the braid is aligned (stable identity); MF dropping indicates slippage, stress, or identity drift.

B.3 Braid (RSE Phenomenological Lamination)

A braid is the χ-defined phenomenological traversal of the mesh—how a coherent observer experiences identity persistence.

$$\mathbf{B} = (\mathcal{R}_i, \tau_i) \mid \chi(\tau_i) \geq \chi_{\min}, \quad \mathcal{R}_i \in \mathbf{M}. \tag{B.6}$$

Each pair $(\mathcal{R}_i, \tau_i)$defines a phenomenological "slice-now." The recursive lamination of such slices yields experienced continuity of identity and time.

Properties.

- χ-dependent subset of the mesh.
- Defined in the phenomenological domain $\mathcal{R}_{\text{phen}}$.
- Recursive (lamination-based).
- Temporal phenomenology arises from coherence gradients $(\nabla\mathcal{C}, \kappa)$.

B.4 Relational Hierarchy

Table 3 - Relational Hierarchy

Level	Domain	Continuity Type	Role
Mesh	$\mathcal{R}_{\text{ont}}$	Constraint coherence ($\delta\mathcal{C} = 0$)	Ontic substrate of persistence
World-Tube	$\mathcal{M}_{4D}$	Geometric continuity ($\delta x^{\mu} = 0$)	Projected geometric structure
Braid	$\mathcal{R}_{\text{phen}}$	Recursiveclosure ($\chi \geq \chi_{\min}$)	Observer-relative phenomenology

B.5 Interpretive Bridge

In Stuckey's ontology, the world-tube is the geometric record of existence in spacetime. In cRBW, that geometry arises from an underlying mesh—a constraint-coherent structure in

the ontic domain. In RSE, a braid is the phenomenological traversal of that mesh via slice-local χ-closure. Symbolically:

Mesh (ontic structure)	$\xrightarrow{\pi_{\mathrm{phen}}}$	World-tube (geometric projection)	$\xrightarrow{\chi\text{-lamination}}$	Braid (experienced identity)

1. The mesh in $\mathcal{R}_{\mathrm{ont}}$ encodes admissible relational structure under AGC and RCC.
2. Projection π_{phen} yields geometric representation.
3. χ-closure over this projection yields phenomenological identity. [20]

Key point
The braid is not an additional ontic structure. It is the slice-local closure of admissible relational structure under χ.

Acknowledgements

- The authors used generative-AI assistance, ChatGPT 5 Pro, for; online searches, language suggestions and polishing, equation LaTeX generation, structural consistency, and mathematical symbol consistency; the AI tool was **not** used for substantive derivations, data generation, or as a co-author.
- The authors used multiple AI instances through Perplexity Pro (Gemini 2.5 Pro, Claude Sonnet 4.5, and Grok 4) for detailed reviews indicating areas for refinement.
- Thanks to Eric Lynch and his use of AI assistants in reviewing and suggesting improvements.
- Thanks to Martha deForest for review, language polishing, and organizational suggestions.

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