

Life after life: Structure of a Point of Time-III

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Abstract

This paper explores the cognitive and metaphysical architecture of "Life after Life", through the novel framework of the "Structure of a Point of Time-III". Building upon philosophical conceptions of time, memory, and selfhood, the study integrates insights from Henri Bergson's *durée*, J.M.E. McTaggart's A and B theories, and Edmund Husserl's phenomenology, with scientific interpretations rooted in neurobiology, quantum theory, and catastrophe theory. A central proposal is that the "point" in time experienced during an NDE is not merely a temporal compression but a higher-dimensional, atemporal manifold of selfhood and memory. The work introduces advanced topological and geometrical models—such as fibre bundles of consciousness and foliation of perceptual manifolds—to represent subjective time and its transcendence during NDEs. The paper also draws parallels with eschatological structures from Platonic, Buddhist, Abrahamic, and Vedantic traditions, culminating in a metaphysical discussion of the "Meta-NDE" at the closure of the Kalpa, where the soul reviews its entire cycle of rebirths and returns to the atemporal realm of Paramdham. Diagrams and mathematical formulations are provided to bridge philosophical insight with formal structure. This synthesis presents a multidisciplinary model for understanding temporality, death, and transcendental consciousness.

1 Introduction

The structure of time as it is subjectively experienced—particularly in conditions at the threshold of life and death—remains one of the most enigmatic questions in both philosophical and scientific domains. The phenomenon of "Life after Life" (also referred to as NDE), often characterized by life reviews, tunnel traversal, and encounters with radiant consciousness, suggests that temporality in such moments may transcend conventional linear models. The present work, titled *Structure of a Point of Time-III*, suggests that the human experience of time close to end of life, involves a radical reorganization of memory, perception, and awareness.

Several first-person narratives compiled by Moody [1] and subsequent researchers indicate that during an NDE, individuals frequently report experiencing the events of their entire lives "in a flash." This phenomenon suggests a collapse of temporal extension into a concentrated point—a metaphysical compression of the life timeline. The central thesis proposed here is that such an experiential "point of time" can be modeled as a higher-order cognitive and ontological structure, possibly reresembling a non-local integration of autobiographical data across emotional and ethical dimensions.

To investigate this hypothesis, the paper integrates classical philosophical conceptions with modern mathematical and physical tools. Bergson’s concept of *durée* [2], which treats time as lived duration rather than spatialized succession, is particularly relevant for interpreting subjective temporality during NDEs. McTaggart’s distinction between the A-series and B-series of time [3], with their implications for past, present, and future as ontologically real, provides essential insights into how consciousness temporally organizes experience.

A key innovation in this paper is the application of geometric and topological constructs to model consciousness and time. The idea of fibre bundles, where spacetime acts as the base manifold and each fibre represents a thread of conscious experience, offers a structured way to represent simultaneous memory recall, affective continuity, and identity persistence. The use of foliation theory further extends this by proposing that subjective time can be decomposed into distinct but intersecting sheets of experience, each reflecting distinct temporal and affective modes of consciousness.

Equally important is the exploration of the point of transition—the boundary where consciousness exits physical time. This boundary is modeled using catastrophe theory, particularly the fold bifurcation, to represent the sudden shift in cognitive mode and ontological state during NDE onset. The fold catastrophe is given by the canonical form:

$$V(x, \alpha) = \frac{1}{3}x^3 - \alpha x, \quad (1)$$

where x is the state variable and α is a control parameter. The transition occurs when the control parameter crosses a critical threshold α_c , triggering a discontinuous shift in the system state.

Furthermore, the scope of this paper extends beyond individual NDEs to explore the metaphysical endpoint of multiple life cycles in Indic philosophy—specifically, the Kalpa. At the closure of the Kalpa, it is believed that souls undergo a panoramic meta-review of all past births and re-enter the realm of Paramdham, a state of pure metaphysical silence and atemporality. This is modeled as a transition from a time circle S^1 to a boundary space $\mathcal{P} = \partial\mathcal{M}$, representing the domain of origin in metaphysical traditions that conceptualize time as a recurring cosmic rhythm.

Through rigorous conceptual analysis, mathematical modeling, and comparative eschatology, this paper aims to construct a bridge between subjective temporality, neurocognitive science, and perennial metaphysics. In doing so, it contributes to an emergent paradigm in which time is not a passive coordinate but an active, multilayered domain of experiential architecture.

2 Phenomenology of the Life Review in Near-Death Experiences

Near-death experiences (NDEs) have been extensively documented and discussed in clinical literature since the publication of Raymond Moody’s landmark book *Life After Life* [1]. Among the most profound and recurrent phenomena reported during NDEs is the “life review,” in which the subject perceives a detailed, emotionally charged recollection of their entire life history, often experienced within a very brief period of physical time. This presents an apparent paradox: how can decades of episodic content be condensed into what witnesses describe as “a flash”?

Empirical studies of NDEs have attempted to classify and validate the life review experience across diverse populations. Greyson [4] formalized the Greyson NDE Scale, which includes

specific items assessing the intensity and vividness of life review events. The frequency of life review occurrence in large-scale surveys is reported between 20% to 35% of NDEs, indicating its significance within the overall phenomenology of near-death states.

Several accounts describe the life review as “outside of time” or “timeless,” yet filled with coherent narrative events, sometimes even witnessed from multiple perspectives simultaneously [5]. Subjects report not only seeing but *feeling* the emotional impact of their actions on others, suggesting an evaluative and relational form of memory processing beyond typical autobiographical recall [6].

Neurological correlates of this phenomenon have been proposed in studies on anoxia-induced visions, especially under extreme metabolic stress, where the brain enters a hyper-synchronous state [7]. In such states, memories encoded in the hippocampus and prefrontal cortex may be rapidly and simultaneously accessed, possibly leading to the perception of life review. However, this does not explain the emotional, ethical, or spiritual dimensions that are commonly reported, which remain elusive to purely physiological explanation.

Hence, the life review must be approached as a multi-dimensional phenomenon encompassing neurocognitive mechanisms, phenomenological temporality, and metaphysical implications. Understanding how such a wide array of lived experiences can be compressed into a single moment of perception requires a deeper theoretical engagement with the nature and structure of time itself.

3 Philosophical Models of Time and Consciousness

To understand the structure of a life review in NDEs, we must examine classical and contemporary philosophical theories of time. Henri Bergson’s concept of *durée* or lived time stands in contrast to clock-measured, spatialized time. According to Bergson [8], consciousness does not experience time as a linear series of discrete instants, but as a qualitative flow where past and present co-inhabit a unified now. This notion directly supports the descriptions of “all of life seen in a moment” reported in life reviews.

temporal resolution dissolves into an undifferentiated field of memory, presence, and insight.

Mathematically, if one assumes that consciousness samples moments at a frequency f_c under ordinary states, then under an altered state such as an NDE, this sampling rate may increase drastically or shift toward parallelized access. Let T be the real duration of the NDE episode and M be the effective number of memories retrieved. Under normal circumstances, $M = f_c \cdot T$. In an NDE, however, subjects report $M \gg f_c \cdot T$. We define a *temporal expansion coefficient* κ as:

$$\kappa = \frac{M}{f_c \cdot T} \quad (2)$$

Values of $\kappa \gg 1$ imply that subjective memory retrieval is vastly denser than normal states, suggesting a nonlinear relationship between clock time and experiential time.

Moreover, the simultaneity of memory perception in life reviews implies that the mind can represent temporally extended events in a single frame of awareness. This supports the idea that consciousness may operate over a high-dimensional temporal manifold, rather than linear time. These ideas resonate with Julian Barbour’s notion of time as a sequence of static “Nows” [9], where time is an illusion arising from the change between configurations.

Thus, the philosophical grounding of the life review supports the proposal that what is perceived as a “point” of time may actually contain an entire multidimensional structure, integrating episodic, moral, and emotional layers within a unitary field of awareness.

4 Neurocognitive Mechanisms and Information Density

From a neurocognitive perspective, life reviews present a challenge to existing models of memory consolidation and retrieval. During normal states, memory recall is subject to constraints of sequential access, attention span, and synaptic bandwidth. However, during extreme stress or clinical death, a surge of cortical and limbic activity has been documented. Studies by Borjigin et al. [10] show a burst of synchronized gamma oscillations just after cardiac arrest in animal models, possibly indicating a hyperlucid state.

The hippocampus, which mediates autobiographical memory, and the medial prefrontal cortex, responsible for self-referential processing, show increased functional connectivity under psychedelic states [11]. These states have some experiential similarities with NDEs, particularly in temporal dilation and life reviews. It is plausible that in NDEs, a similar transient reconfiguration of large-scale brain networks allows for massive, parallelized memory retrieval.

Let I be the information content of a person’s life, in bits, stored across N significant episodic memories. If each memory m_i has an information content i_i , then:

$$I = \sum_{i=1}^N i_i \quad (3)$$

In normal states, these memories are accessed serially, over time. During a life review, they appear to be accessed concurrently. Assuming the brain’s perceptual integration bandwidth is B (in bits/sec), then the life review must involve a transient perceptual bandwidth B' such that:

$$B' = \frac{I}{T} \gg B \quad (4)$$

This implies a temporary augmentation of the brain’s representational throughput, which may occur due to the release of endogenous DMT or cortical disinhibition during critical periods [12]. However, it is unclear whether this information is processed consciously or emerges from the collapse of sequential constraints due to network-level synchrony.

In either case, the neurocognitive data support the phenomenological claim that a single point of time during NDEs can accommodate vastly more experience than in normal waking states. This phenomenon not only redefines the boundaries of consciousness but also offers a unique window into the latent capacities of human memory and perception.

5 Consciousness in 2+2 Dimensional Spacetime and the Structure of Temporal Experience

To explore how a shift to a 2+2 dimensional spacetime would affect the conscious experience of time—particularly the phenomenon of perceiving an entire life within a single point—we must begin by outlining the mathematical and phenomenological implications of having two time dimensions. In standard physical theories, spacetime is modeled with one time dimension and three space dimensions, yielding a metric of signature (1,3). A 2+2 dimensional spacetime

possesses two temporal coordinates, typically defined as orthogonal axes in a pseudo-Euclidean metric signature.

In such a spacetime, the causal structure deviates significantly from Minkowski spacetime. Whereas a (1,3) spacetime defines causality through a light cone structure, a (2,2) spacetime introduces a causal “2-cone” that permits causal connections via combinations of the two time dimensions. This modifies the nature of sequence and simultaneity. If consciousness were to transition into a (2,2) framework, then experience would no longer be governed by a singular, linear evolution through one temporal coordinate, allowing for multidirectional unfolding of events.

The presence of two time coordinates, t_1 and t_2 , enables a bi-dimensional flow of temporal experience. Consciousness could evolve along paths parameterized by these coordinates, effectively sampling events across a temporal plane rather than a temporal line. Events previously experienced as sequential in ordinary waking consciousness might instead be perceived as simultaneous, or structured in non-linear relationships. In such a case, the “life review” experienced during near-death states as a navigation across a rich and interconnected temporal manifold.

Mathematically, we may define a generalized metric for a (2,2) spacetime as:

$$ds^2 = -dt_1^2 - dt_2^2 + dx_1^2 + dx_2^2 \quad (5)$$

This permits the definition of worldlines in two-dimensional time, along which the consciousness may move. We define the state of consciousness as a field $\Psi(x_1, x_2, t_1, t_2)$, whose evolution is governed by a temporal operator D_t . In analogy to the Schrödinger equation, we posit:

$$D_t \Psi = \left(\frac{\partial}{\partial t_1} + \frac{\partial}{\partial t_2} \right) \Psi = \hat{H} \Psi \quad (6)$$

Here, \hat{H} denotes a hypothetical Hamiltonian that encompasses the informational dynamics of memory access, identity structure, and self-referential awareness. The use of a summation over partial derivatives implies that the experience of time is not constrained to unidirectional flow but may simultaneously involve multiple time gradients. Consequently, consciousness is allowed to navigate a manifold of temporally structured memories, generating the subjective experience of a “point” of time cocompressed into a phenomenological moment of experiential unity.

In this context, the notion of a life review ceases to be paradoxical. What appears as the compression of a lifetime into a single instant within one time axis may, in fact, correspond to a temporally extended path in the orthogonal time dimension. We define a subjective experiential coordinate τ that emerges from the two temporal coordinates as:

$$\tau = \sqrt{t_1^2 + t_2^2} \quad (7)$$

This scalar quantity τ may correspond to the internal time experienced by consciousness during the life review. It reconciles the simultaneous presence of multiple temporal events by projecting a temporal surface into a single, felt coordinate. Therefore, the notion of a “point” of time becomes a projection of a multidimensional temporal construct. This model accommodates both simultaneity and narrative memory, consistent with reports in near-death experiences

From a philosophical perspective, this aligns with Henri Bergson’s theory of “duration” (*durée*), which asserts that consciousness does not experience time as divisible units but as a qualitative, interpenetrating flow [8]. Additionally, this model has structural affinities with

Julian Barbour’s suggestion that time consists of a sequence of “Nows,” each being a complete configuration of the universe [9]. Under these conditions, the life review might align with quantum models of consciousness where time collapses into a superposition of remembered states.

In sum, the transition of consciousness into a 2+2 spacetime provides a plausible theoretical structure for interpreting the phenomenology of life reviews in near-death states. Rather than being an enigma, the simultaneous perception of an entire life may be understood as a natural consequence of inhabiting a spacetime manifold in which time itself possesses internal dimensionality. This offers a powerful reconciliation of neurophenomenology with advanced models of spacetime, providing both mathematical and intuitive resonance with lived experience at the brink of death.

6 Theoretical Framework: Philosophical Theories of Time and the Life Review Experience

This section analyzes these commonalities across traditions to illustrate a shared phenomenological substrate of NDEs.

Henri Bergson’s philosophy of time, particularly articulated in *Creative Evolution* [8], posits that time as lived and experienced by consciousness—what he termed *durée*—is fundamentally different from the measurable, spatialized time of clocks and physics. For Bergson, *durée* is a qualitative multiplicity where the past coexists with the present, and the flow of time is continuous and indivisible. This contrasts sharply with the common scientific view, where events interpenetrate and are apprehended as an undivided whole.

In the context of life review experiences, Bergson’s notion of *durée* provides a fitting framework. Subjects report the perception of past life events not in isolated chronological segments, but in an emotionally and morally unified whole. Events are not simply recalled, but relived, suggesting that past experiences are preserved in a dimension of consciousness that transcends linear time. If we denote the ordinary passage of time by t and the internal duration by θ , we can model this as a mapping $f : t \rightarrow \theta$, where f denotes an integration function across narrative memory.

$$\theta(t) = \int_0^t f(\tau) d\tau \quad (8)$$

Here, $f(\tau)$ represents the subjective temporal density function, varying according to memory salience and emotional intensity. In NDEs, this function spikes, resulting in a rapid accumulation of inner time θ , consistent with reports of seeing “one’s whole life flash before one’s eyes.”

J. M. E. McTaggart, in his essay “The Unreality of Time” [3], introduced a distinction between two ways of organizing temporal events: the A-series and the B-series. The A-series characterizes events as past, present, or future, and is thus inherently dynamic. The B-series, on the other hand, orders events by earlier-than and later-than relations, establishing a fixed sequence devoid of intrinsic change. McTaggart famously argued that time, as we know it, is unreal because the internal contradiction renders temporal succession a logical impossibility.

When applied to the life review, the A-series framework appears more appropriate, as subjects seem to experience time dynamically and with emotional immediacy. However, the coexistence of multiple life episodes simultaneously—often reported as being seen “all at

once”—suggests a blending with the B-series. The structure of such an experience may involve transitioning from A-series to B-series perception, allowing consciousness to traverse and reframe fixed sequences of events as a holistic and non-linear structure of remembered life experience.

To model this hybrid temporality, let us define a function $L(t)$ representing the life narrative as encoded in B-series form, where each event is fixed in its position:

$$L(t) = \{e_1, e_2, \dots, e_n\} \quad (9)$$

higher-dimensional topologies offer tools to describe the non-linear layering of memory and time.

$$\Phi(e_i) = \vec{v}_i \in R^m \quad (10)$$

This embedding allows the subject to perceive multiple events e_i simultaneously, in a non-temporal geometry of meaning, morality, or emotion. In this model, consciousness is no longer navigating t , but the structure of $\{\vec{v}_i\}$ —a form of psychological or phenomenological space derived from but not limited to the sequence of past time.

This idea is further supported by Edmund Husserl’s internal time-consciousness theory [13], where retention (the just-past), primal impression (the now), and protention (the about-to-be) form an inseparable triad. In NDEs, these three dimensions may collapse into a single perceptual field, thereby creating the impression of timeless simultaneity. Maurice Merleau-Ponty also emphasized that time is not a container for events but an emergent dimension of subjectivity itself

In conclusion, the philosophical theories of time developed by Bergson and McTaggart illuminate key aspects of the life review experience in near-death states. Bergson’s *durée* accounts for the emotional, flowing, and qualitative aspects of subjective time, while McTaggart’s A- and B-series distinction enables modeling of the structural transformations in temporal perception. When these ideas are integrated with phenomenological insights, they provide a coherent framework to understand how a life review emerges as a moment of condensed temporal identity across multiple cognitive dimensions.

7 Scientific Models: Neurobiological and Quantum Theories Explaining the Life Review Phenomenon

The life review phenomenon—commonly reported during near-death experiences (NDEs)—presents a complex challenge to current scientific understanding. Subjects often describe the rapid and emotionally intense recall of numerous autobiographical events, sometimes perceived simultaneously, despite the brief duration of the physiological episode. This paradoxical richness of temporal and mnemonic content within a narrow window has led researchers to consider both neurobiological and speculative quantum mechanistic hypotheses to elucidate its underlying principles.

From a neurobiological perspective, several models attempt to account for the vividness and structure of the life review. Among the most prominent is the hypothesis of cortical disinhibition during states of extreme stress or hypoxia. Studies conducted by Borjigin et al. [10] on rodent models demonstrated a surge in gamma wave synchrony across the neocortex shortly after cardiac arrest. These gamma oscillations are typically associated with higher-order in-

tegrative functions such responsible for binding memory, emotion, and self-perception into cohesive temporal wholes.

Let I be the total autobiographical information content encoded in cortical networks, measured in bits. In normal cognitive operation, retrieval occurs at a bounded rate R , constrained by attentional and executive gating. The total retrievable memory over time T is given by:

$$M = R \cdot T \quad (11)$$

In life review episodes, however, subjects report accessing an amount of content $M' \gg M$ in a fraction of the time. To account for this, we propose that during the near-death window, a temporary increase in integrative capacity occurs, denoted by an enhanced retrieval bandwidth R' , such that:

$$M' = R' \cdot \Delta t \quad \text{where } R' \gg R \text{ and } \Delta t \ll T \quad (12)$$

Here, Δt represents the short period during which the life review unfolds. The brain's temporary shift into a state of maximal connectivity and synchronization might permit parallel memory processing, enabling a non-linear integration of autobiographical data.

Additionally, neurotransmitters and neurohormones such as endorphins, norepinephrine, and possibly endogenous N,N-Dimethyltryptamine (DMT) may contribute to the perceptual intensity of the experience [12]. These substances modulate perception, emotional salience, and cortical inhibition, potentially unlocking latent mnemonic pathways.

Quantum models, though controversial, have been proposed as explanations for non-local or temporally anomalous consciousness. The Orch-OR (Orchestrated Objective Reduction) theory by Penrose and Hameroff [15] suggests that consciousness arises from quantum computations in microtubules within neurons. In near-death conditions, as classical processing ceases, quantum coherence may become dominant, allowing for non-linear temporal access and integration of information.

If one models the brain's cognitive state $\Psi(t)$ as a quantum wavefunction in Hilbert space, then under the collapse postulate, a life review might correspond to a final decoherence process across all temporally encoded brain states. We may conceptualize this using:

$$\Psi(t) = \sum_{n=1}^N c_n \phi_n(t) \quad (13)$$

where $\phi_n(t)$ represents memory eigenstates and c_n their amplitudes. At the moment of collapse, the full state Ψ may become accessible in a non-sequential manner, leading to the coherent flashback of autobiographical memory. Although speculative, this model allows for a mathematically unified access to multiple memory states without linear temporal traversal.

Furthermore, recent studies in quantum cognition suggest that human memory and decision-making may follow non-Boolean, quantum-like probability models [16]. These models employ superposition and interference to describe the probability of memory access, offering alternative explanations for paradoxical recall phenomena.

Despite the lack of empirical confirmation, the convergence of evidence from neurobiology and quantum modeling illustrates that life review may arise from high-order integration mechanisms that become unshackled from conventional temporal gating. Whether driven by classical electrical surges, neurochemical disinhibition, or speculative quantum transitions, the life review provides a window into the maximal state of autobiographical consciousness.

Continued investigation into the neural correlates of consciousness, combined with advancements in cognitive modeling and quantum information theory, may eventually demystify the mechanisms underpinning this extraordinary cognitive event.

8 Critical Inquiry: Conceptual Analysis of Moody's Work on Near-Death Experiences

Among these, the most striking and recurrent feature is the life review: a vivid, panoramic replay of one's entire life, often perceived in a hyper-real and emotionally intense manner.

While Moody does not define the mechanism underlying these experiences in scientific terms, his collection of testimonies provides a foundational taxonomy of NDE elements.

which offers a structured method for assessing the narrative, psychological, and phenomenological dimensions of near-death events.

While Sabom's approach remains medical and clinical in tone, it significantly contributes to validating the authenticity of such experiences.

We may model this by constructing a higher-dimensional space where the collapse of chronological memory into a single moment corresponds to a projection from a multi-dimensional manifold.

$$T_{review} = \bigcup_{i=1}^n \delta(t - t_i) \quad (14)$$

Here, T_{review} represents the subjective time function during the life review, modeled as a superposition of delta functions centered at each event time t_i . This formalization captures the idea that all episodic memories are experienced as co-present within a single temporal window, though they are individually situated in linear historical time.

Such interpretations align with non-linear models of time, where memory and perception form interwoven layers rather than sequential points.

Nevertheless, Moody's contributions remain foundational. His work inspired decades of systematic research and opened space for interdisciplinary dialogue between psychology, neurology, theology, and phenomenology. A more critical reading allows us to preserve the integrity of his descriptions while seeking explanations that do not prematurely resolve the ontological questions they raise.

Ultimately, Moody's work should be situated not as a conclusive explanation, but as a seminal phenomenological catalog of experiences that prompt further interdisciplinary inquiry.

9 Exploratory Discussion: Toward a Cognitive-Phenomenological Model of the Structure of a Point of Time-III

The experience of reliving an entire lifetime within a fleeting moment, as reported in near-death experiences (NDEs), challenges standard cognitive and physical models of temporal processing. These extraordinary reports compel a deeper theoretical construction—what we now develop as the "Structure of a Point of Time-III"—which seeks to synthesize phenomenological richness, cognitive science, and alternative geometries of time into a unified model of momentary consciousness.

into a cohesive experiential unity. The third iteration of this model builds on previous notions of extended present and blends them with multi-dimensional theories of perception and selfhood.

In a life review, however, consciousness appears to access and integrate life memories non-sequentially, revealing a cognitive architecture beyond linear recollection.

Let $\tau(t)$ be the trajectory of conscious state in experiential space over clock time t . During life review episodes, we hypothesize a projection:

$$\mathcal{P} : \mathcal{T} \subset R^1 \rightarrow \mathcal{M} \subset R^n \quad (15)$$

where \mathcal{T} is linear time and \mathcal{M} is a manifold of mental states accessible within a compressed temporal frame. The operation \mathcal{P} corresponds to a nonlinear retrieval and integration mechanism which fuses discrete autobiographical events into a synchronic representation. This mapping explains how multiple temporally distinct memories can coexist in a unitary moment of reflection.

temporality is not a container but an emergent property of perceptual and cognitive synthesis, shaped by self-referential awareness.

We introduce a local information density function $\rho(t)$, quantifying the number of retrieved and consciously processed experiences per unit of physical time. In ordinary waking consciousness, $\rho(t)$ is relatively stable and low. During a life review, the function becomes highly peaked:

$$\rho(t) = \sum_{i=1}^N \delta(t - t_i) \quad (16)$$

This equation models experiential loading as a sum of Dirac delta functions, with each t_i corresponding to an autobiographical event. The sharpness of these peaks implies that multiple such events are processed simultaneously or in ultra-fast succession, creating the illusion of timeless integration. The scalar quantity of perceived temporal extent T_p can then be modeled as a function of informational density:

$$T_p = \int_{t_0}^{t_1} \rho(t) \cdot w(t) dt \quad (17)$$

where $w(t)$ is a weighting function incorporating emotional salience or ethical relevance. This formulation offers a route to quantify subjective duration despite minimal physical time elapsing.

The third articulation of the "Structure of a Point of Time" thus involves three key features: the multi-dimensional structure of consciousness, the non-linear integration of autobiographical memory, and the modulation of subjective time by information density. It moves beyond static models to emphasize dynamic transformation and self-reflective evaluation within heightened states of awareness.

temporal dissolution and influx of holistic awareness during NDEs suggest an expansion of consciousness beyond conventional brain timekeeping.

Ultimately, "Structure of a Point of Time-III" offers a synthesis between subjective phenomenology and cognitive dynamics. It reframes the "point" not as a metaphysical instant, but as an integrative nexus of autobiographical consciousness. The continued development of this model could open new pathways for studying memory, time, and identity in both ordinary and extraordinary human experience.

10 Constraints Imposed by Near-Death Experiences on the Mathematical Structure of Time

imposed by NDEs on the structure of lived time challenge the adequacy of Newtonian or even relativistic frameworks for subjective temporality.

10.1 Constraint on Linearity

The conventional model of time treats it as a real-valued scalar parameter $t \in R$, evolving monotonically. This allows for a well-defined total order and continuity. However, life review experiences consistently report that past events are not merely recalled sequentially but are often experienced as coexistent or simultaneous. This contradicts the assumption of temporal unidirectionality and scalar structure.

To formalize this, let time typically be defined as:

$$t \in R, \quad \text{with } t_1 < t_2 \text{ iff } e_1 \text{ precedes } e_2 \quad (18)$$

In contrast, NDEs imply a functional mapping \mathcal{F} where:

$$\mathcal{F} : R \rightarrow R^n, \quad \mathcal{F}(t) = (e_1, e_2, \dots, e_n) \quad (19)$$

This suggests that each moment t may encode multiple events e_i , violating scalar linearity. We are thus compelled to move from scalar time to vector or manifold time $\mathcal{T} \subset R^n$, where time is structured multidimensionally.

10.2 Constraint on Temporal Topology

The structure of time is usually considered as topologically equivalent to a line: connected, simply connected, and without loops. In algebraic topology, this means the fundamental group of time is trivial:

$$\pi_1(R) = 0 \quad (20)$$

However, NDEs often describe recursive revisiting of events, multiple perspectives on single moments, or emotional reframing of life episodes. This implies the presence of loops or self-intersections in experiential time.

We redefine time as a topological space \mathcal{T} where:

$$\pi_1(\mathcal{T}) \neq 0, \quad \text{and possibly } \pi_k(\mathcal{T}) \neq 0 \text{ for } k > 1 \quad (21)$$

This introduces a topological constraint: time must allow higher-order homotopy features, indicating the presence of cycles, tunnels, or surfaces that permit recursive experiential structures.

10.3 Constraint on Dimensionality

higher-dimensional topologies offer tools to describe the non-linear layering of memory and time.

Let time be modeled as:

$$\vec{t} = (t_1, t_2, \dots, t_n) \in R^n \quad (22)$$

where each t_i corresponds to a temporally distinct experiential or moral dimension. This is consistent with models in 2+2 spacetime and phenomenological structures from Husserl [13] and Merleau-Ponty [14]. The mapping from clock time to this manifold is:

$$\mathcal{P} : R \rightarrow R^n, \quad t \mapsto \vec{t} \quad (23)$$

Thus, scalar time becomes insufficient, and must be restructured as a multi-dimensional object.

10.4 Constraint on Temporal Metric

In relativity, the metric of spacetime is defined as:

$$ds^2 = -dt^2 + dx^2 + dy^2 + dz^2 \quad (24)$$

However, in NDEs, time may expand, contract, or fragment, while spatial perception remains relatively stable. This suggests a dynamic temporal metric governed by the density of memory access or emotional intensity.

We define a temporal dilation function $\rho(t)$, representing experiential density, leading to a warped metric:

$$ds^2 = -\rho(t)^2 dt^2 + dx^2 + dy^2 + dz^2 \quad (25)$$

For instance, if $\rho(t) \gg 1$, then time appears dilated; if $\rho(t) \rightarrow 0$, time collapses. This metric transformation can model the highly variable experience of time reported during life reviews.

10.5 Constraint on Ordering and Causality

Conventional time assumes total ordering: every pair of events (e_1, e_2) satisfies either $e_1 \leq e_2$, $e_2 \leq e_1$, or $e_1 = e_2$. NDEs often defy this logic, as subjects report accessing events out of sequence, or grouped by emotional or ethical weight.

We model events \mathcal{E} with a partial order:

$$(\mathcal{E}, \leq_c), \quad \text{where } \leq_c \text{ is a context-sensitive relation} \quad (26)$$

In this system, $e_i \leq_c e_j$ only if memory structure or ethical narrative demands it. Thus, causality becomes a non-fixed relation, variable with internal narrative structures.

10.6 Constraint on Representability

Lastly, some NDE subjects describe perceiving their life “all at once” or as a whole, implying that time can be experienced as an object, not just a process. This resonates with Barbour’s concept of “Nows” [9], where each configuration of the universe exists timelessly.

We formalize this using configuration space:

$$T = \{\mathcal{C}_i\}, \quad \text{where } \mathcal{C}_i \text{ are complete states of consciousness} \quad (27)$$

This treats time as a set of configurations rather than a trajectory. The life review may then be modeled as a mapping:

$$\mathcal{R} : \mathcal{C} \rightarrow \bigcup_{i=1}^N \mathcal{C}_i \quad (28)$$

where \mathcal{R} is the reflective process of life review. This constraint suggests that time must support not only flow but holistic retrieval and synthesis.

11 A Physical Interpretation of the Tunnel and Light Experience in Near-Death States

may correspond metaphorically or structurally to the idea of wormholes, where consciousness traverses through a cognitive or topological singularity.

11.1 The Tunnel as a Wormhole Geometry

A wormhole, or Einstein-Rosen bridge, is a hypothetical solution to the Einstein field equations that connects two distinct regions of spacetime through a non-trivial topology. The general static, spherically symmetric wormhole metric can be written as:

$$ds^2 = -c^2 dt^2 + \frac{dr^2}{1 - \frac{b(r)}{r}} + r^2 d\Omega^2, \quad (29)$$

where $b(r)$ is the shape function, r is the radial coordinate, and $d\Omega^2$ is the angular component of the metric. The tunnel described in NDEs, perceived as narrowing with increasing speed and surrounded by darkness, closely parallels the radial visual distortion that would be experienced along a geodesic approaching a wormhole throat. As $r \rightarrow r_0$, where r_0 is the radius of the throat, the spatial geometry constricts, giving rise to a visual funnel or tunnel structure.

The sensory environment of the NDE—darkness narrowing toward a luminous point—can be interpreted as the phenomenological correlate of traversing a spacetime region with increasing curvature and causal compression. If we define the proper radial distance $l(r)$ as:

$$l(r) = \pm \int_{r_0}^r \frac{dr'}{\sqrt{1 - b(r')/r'}}, \quad (30)$$

then the rapid traversal described by NDE patients maps onto decreasing $l(r)$, with the endpoint being the wormhole exit into another region of experiential spacetime. This framework finds speculative support in studies considering wormholes as viable theoretical constructs in modified gravity or quantum gravity models [18].

11.2 Tachyonic Speed and Subjective Acceleration

A frequently described sensation during the tunnel experience is that of high-speed motion, often interpreted as exceeding the speed of light. In theoretical physics, tachyons are hypothetical particles that always travel faster than light, characterized by imaginary mass. The energy of a tachyonic particle with mass m and speed $v > c$ is given by:

$$E = \frac{mc^2}{\sqrt{v^2/c^2 - 1}}, \quad (31)$$

where $m^2 < 0$. Although tachyons are not known to exist, this formulation provides a conceptual model for the subjective perception of infinite acceleration or compression of time. Let us define the perceptual velocity of consciousness $v_{\text{subjective}}$ as the rate of experienced spacetime traversal per unit subjective time τ . Then:

$$v_{\text{subjective}} = \frac{ds}{d\tau}, \quad (32)$$

and in the limit $d\tau \rightarrow 0$, $v_{\text{subjective}} \rightarrow \infty$. As the biological clock slows due to approaching death or cerebral hypoxia, subjective awareness may retain continuity, creating the experiential condition for apparent superluminal motion.

This interpretation also resonates with psychophysical findings on temporal dilation in altered states, where time is perceived to slow or stop while subjective activity remains accelerated [19]. Thus, NDEs may reflect an internal cognitive metric that approximates tachyonic dynamics.

11.3 Light as Conformal Boundary or Cognitive Singularity

At the end of the tunnel, subjects frequently report encountering a brilliant, all-encompassing light, often interpreted as divine or all-knowing. In a relativistic model, this may correspond to a conformal boundary of spacetime or the white-hole end of a wormhole. In conformal compactifications of spacetime, light rays approach a boundary at null infinity, where the metric becomes degenerate. In Penrose diagrams, such a boundary represents the limit of all causal trajectories:

$$\lim_{t \rightarrow \infty} ds^2 \rightarrow 0, \quad \text{while } x(t) \text{ remains finite.} \quad (33)$$

This results in a brightening visual field and the dissolution of spatial structure, consistent with NDE reports. Alternatively, the light may represent the emergence from a wormhole throat into another region, with enhanced informational integration.

Neurobiologically, the intense light may reflect hyperactivation of the visual cortex due to massive neurochemical release. In particular, spikes in DMT, glutamate, or cortical disinhibition under terminal conditions have been proposed to explain such luminosity [12]. However, if treated within a physics metaphor, this corresponds to a ****cognitive singularity****—a point where conventional perception collapses and total informational unification occurs.

11.4 Love and God as Unified Field State

Perhaps the most philosophically profound element of the NDE light experience is the overwhelming feeling of love, unity, and understanding. Many interpret this as encountering God or a universal presence. If we adopt an information-theoretic perspective, this can be modeled as a condition of minimal entropy and maximal coherence.

Let the subjective entropy of the cognitive state be $S_{\text{subjective}}$, and the informational coherence be I . Then the limit condition of the life review experience is:

$$\lim_{t \rightarrow t^*} S_{\text{subjective}} \rightarrow 0, \quad I \rightarrow \infty, \quad (34)$$

where t^* represents the subjective horizon or moment of transition. This reflects a final attractor state in which all experiential modalities converge, yielding a unified cognitive field. From the standpoint of theoretical physics, such a field may be analogized to a ground state of conscious configuration space, possibly emergent from quantum coherence.

In this light, the interpretation of “God” becomes not a theological postulate but a phenomenological realization of maximal informational unity, congruent with metaphysical interpretations from panpsychism or non-dual consciousness models [20].

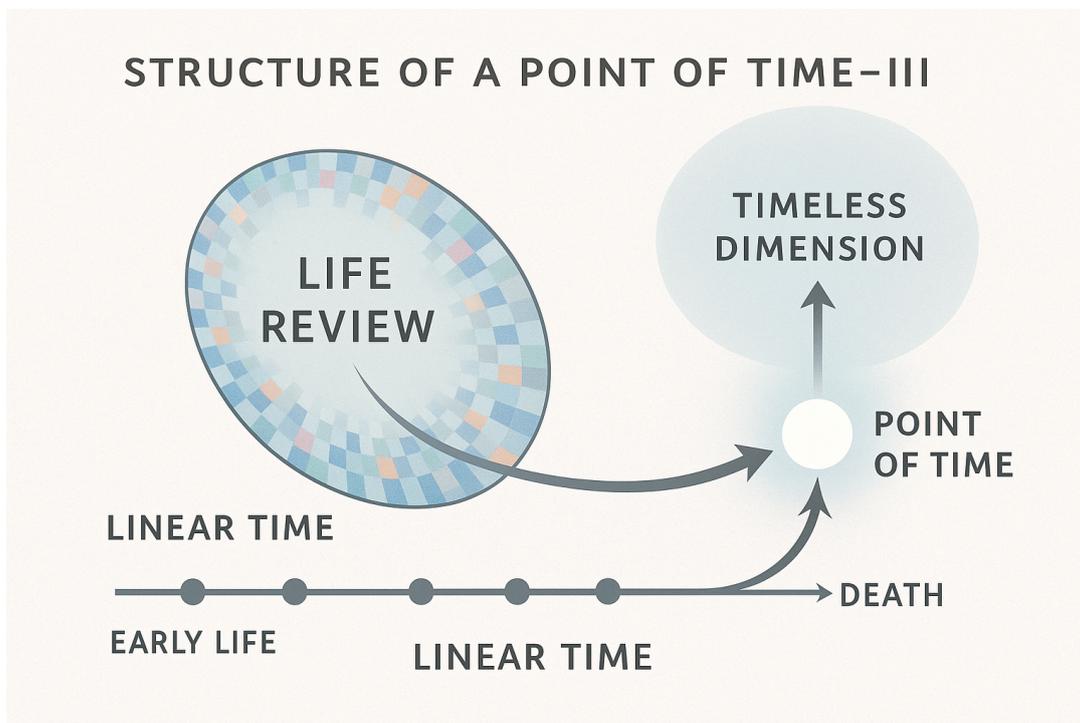


Figure 1: Conceptual diagram illustrating the experiential and geometric structure of a Point of Time as reported in Near-Death Experiences. The converging dimensions represent collapsing sensory, temporal, and memory streams into a singular field of heightened awareness.

12 The Point of Time as Atemporal Memory

temporal resolution dissolves into an undifferentiated field of memory, presence, and insight.

time is lived as a singular and undivided flow, rather than as a succession of discrete instants.

what is about to occur. Thus, what appears to be anticipation may in fact reflect a broader synchronization of conscious timelines.

higher-dimensional topologies offer tools to describe the non-linear layering of memory and time.

$$\pi : \Sigma \rightarrow R^0, \tag{35}$$

where all of Σ is mapped to a single experiential point, consistent with reports of total simultaneity. This effectively collapses temporal extension into an atemporal perceptual singularity.

Furthermore, the metric structure of such a hypersurface may not be Euclidean. Suppose the integrated memory structure is governed by a cognitive metric g defined on Σ , such that

emotional salience and moral valence warp its geometry. Then the effective cognitive distance between two memory events $p, q \in \Sigma$ may be given by:

$$d(p, q) = \int_{\gamma} \sqrt{g_{ij}(x) dx^i dx^j}, \quad (36)$$

where γ is a path within Σ connecting p and q . In this model, emotionally intense or ethically significant events lie closer to the perceptual center during a life review, a fact widely reported by NDE subjects. This re-weighting of memory structure supports the idea that the life review does not merely recapitulate life, but re-evaluates it.

Bergson emphasized that memory, rather than being a passive storehouse, participates in action and is intimately tied to perception. He distinguishes between habitual memory, which aids in motor functions, and pure memory, which is contemplative and exists independently of utility. The life review may represent a moment in which pure memory surfaces in its entirety, unbounded by physiological time or behavioral relevance [21].

This view is further corroborated by neurophenomenological accounts suggesting that during altered states of consciousness, the temporal ordering and causality constraints of cortical networks may disintegrate or be bypassed. Models based on global workspace theory and integrated information theory posit that large-scale synchronization of neural assemblies can lead to unified conscious events that are functionally non-sequential [22]. In NDEs, this may manifest as the presentation of life memory as a simultaneous gestalt.

To conclude, the “point” of time experienced during life review is not a degenerate zero-width moment, but a hypersingular state of consciousness in which time collapses into meaning. This supports a model of memory not as a stream but as a cloud — capable of being viewed from outside linear time under certain extreme neurophysiological or existential conditions.

13 Fibre Bundles of Conscious Experience

structured contents of consciousness are preserved and can be accessed through layers of intentional recall or reflective awareness.

Let us define M as the four-dimensional Lorentzian spacetime manifold, with local coordinates x^μ where $\mu = 0, 1, 2, 3$. The conscious experience of an observer is modeled as a fibre F , a manifold of internal states including affect, memory, self-representation, and perception. The total space E is then the union of all such fibres over the base manifold M :

$$\pi : E \rightarrow M, \quad (37)$$

where $\pi^{-1}(x) = F_x$ is the fibre over point $x \in M$, interpreted as the internal conscious state at spacetime point x . The structure group G of the bundle governs the allowed transitions between fibres and represents the dynamical rules of mental transformations. In normal waking consciousness, G may correspond to standard cortical transitions mediated by biochemical and neuroelectric processes.

During NDEs, however, there appears to be a radical breakdown or reorganization of the transition functions, such that multiple fibres collapse into a global section. A global section $s : M \rightarrow E$ defines a consistent selection of conscious states over spacetime. In altered states, one may encounter:

$$s : M \rightarrow \{f^*\} \subset F, \quad (38)$$

where f^* is a fixed point in the fibre space representing a coherent self-identity experiencing all events across M simultaneously. This aligns with the NDE narrative in which the experiencer “sees their entire life” from a detached, all-encompassing vantage point.

This idea parallels work in theoretical neuroscience where consciousness is viewed as a global integrative function, akin to a section of a neural field. In particular, Integrated Information Theory (IIT) proposes that consciousness corresponds to maximally integrated states of informational flow across a network [22]. Within our fibre bundle model, this maps onto a highly non-local section where past, present, and future fibre contents are unified under a singular function.

Mathematically, if Φ is a measure of global awareness over the fibre bundle E , we may model a maximally integrated experience as:

$$\Phi = \int_M \phi(x) d\mu(x), \quad (39)$$

where $\phi(x)$ is the local integrative density over fibre F_x , and μ is the standard spacetime measure. In NDEs, $\phi(x) \rightarrow \phi_{\max}$ for all $x \in M$, effectively producing a flat field of total integration — a collapse of individuality in the temporal sense into a timeless totality of experience.

Further, the structure group G may undergo symmetry breaking during extreme states. Under normal consciousness, $G \approx \text{Diff}(F)$, the group of diffeomorphisms over internal state space. Under deep collapse or transition, $G \rightarrow \text{Id}$, such that all fibres become identified, yielding a degenerate bundle:

$$\pi^{-1}(x) = f_0 \quad \forall x \in M, \quad (40)$$

where f_0 is a universal conscious state — interpreted phenomenologically as unity with a divine or absolute reality, a common motif in mystical and near-death narratives.

This fibre bundle approach offers a powerful metaphor and mathematical scaffold to represent the complex, distributed yet unified nature of consciousness as experienced in NDEs. It connects the manifold structure of subjective life with established tools from differential geometry and fields such as gauge theory, thereby enriching both philosophical and neuroscientific models of the self.

14 Time as a Foliation of Perceptual Manifolds

represented as a mathematical fiber over each point in spacetime, encoding personal memory, identity, and affective tone.

partition into distinct, yet co-existent perceptual layers reveals a foliation of conscious time within a multidimensional phase space.

More formally, a foliation of codimension-one on a 4-manifold \mathcal{P} is a decomposition into a disjoint union of 3-dimensional submanifolds $\{L_\alpha\}_{\alpha \in A}$, called leaves, such that locally:

$$\mathcal{P} \approx R^3 \times R, \quad \text{with each leaf } L_\alpha \approx R^3 \times \{t_\alpha\}. \quad (41)$$

Each leaf L_α represents a snapshot of consciousness defined by a perceptual state: for instance, a layer of memory recall or imagination. The entire NDE experience is then represented not by one leaf but by a transversal structure through multiple such layers, giving rise to a sensation of simultaneity across events typically separated in linear time.

To model inter-layer interactions, consider a tensor field T on \mathcal{P} defined such that for any vector fields X, Y tangent to the foliation:

$$T(X, Y) = \nabla_X Y - \nabla_Y X, \quad (42)$$

where ∇ is a Levi-Civita or general affine connection. Non-zero values of T across different leaves indicate transitions, interference, or blending between states of memory, imagination, and perception. During NDEs, one may experience a configuration where T is maximized over a compact domain of \mathcal{P} , signaling intense cross-talk between all layers.

The foliation concept here has strong philosophical precedent in phenomenology. Edmund Husserl described inner time-consciousness as composed of retention, primal impression, and protention. These can be viewed as temporally adjacent leaves in \mathcal{P} , forming a local chart of awareness [23]. Moreover, studies of hallucinogenic and liminal states often suggest an unfolding of multiple coexisting mental “layers,” as described in modern neurophenomenology [24].

From a computational neuroscience viewpoint, one can interpret each perceptual leaf as a stable attractor in a high-dimensional phase space. Let $\phi_i(t)$ represent the i -th perceptual mode (real-time, recall, etc.) evolving under a dynamical system:

$$\frac{d\phi_i}{dt} = f_i(\phi_1, \phi_2, \dots, \phi_n), \quad (43)$$

where f_i includes feedback terms and coupling between modes. During NDEs, strong coupling coefficients may lead to bifurcation, phase-locking, or collapse of all ϕ_i into a common attractor basin, corresponding phenomenologically to timeless integration of all experience.

Ultimately, the foliation model of perceptual time illuminates the layered, dynamic, and interpenetrating structure of consciousness. It offers a language in which timelessness and simultaneity are not mere illusions but structurally supported by geometric and dynamical principles governing mind and experience.

15 Catastrophe Theory and the Life Review Trigger

interpretation of the life review trigger using Thom’s fold catastrophe provides a dynamic model of abrupt cognitive transition.

Catastrophe theory, developed by René Thom and elaborated in the context of biological morphogenesis and cognitive systems, models sudden, qualitative changes in system states as responses to smooth, continuous changes in control parameters. The most elementary example is the fold catastrophe, described by the potential function:

$$V(x; a) = \frac{1}{3}x^3 - ax, \quad (44)$$

where x is the state variable, and a is a control parameter. The equilibrium condition $\frac{dV}{dx} = 0$ leads to:

$$x^2 = a. \quad (45)$$

For $a < 0$, no real equilibria exist; for $a = 0$, the system is at a cusp; and for $a > 0$, two equilibrium points emerge. This describes a bifurcation, where an infinitesimal change in a can trigger a macroscopic shift in x .

We suggest modeling consciousness as a system governed by multiple control parameters—metabolic integrity, neural synchrony, affective salience, and existential threshold—and that the transition into the life review represents a bifurcation in this control space. Let $C \subset R^n$ represent the control parameter manifold, and let $\phi : C \rightarrow R$ be the consciousness potential, where sudden changes in ϕ correspond to phase transitions in experience.

During an NDE, a critical parameter—such as cerebral oxygen saturation or global neural connectivity—may cross a bifurcation surface in C , causing the collapse of ordinary time perception and initiating the life review. The experiential structure then aligns with the topology of the fold catastrophe: normal time corresponds to one stable state, unconsciousness to another, and the cusp represents the transitional moment where linear time dissolves.

To extend this analysis, consider the cusp catastrophe:

$$V(x; a, b) = \frac{1}{4}x^4 - \frac{1}{2}ax^2 - bx, \quad (46)$$

with state equation:

$$\frac{dV}{dx} = x^3 - ax - b = 0. \quad (47)$$

This richer catastrophe surface allows for a hysteresis effect: depending on the path taken in control space, the system may enter or exit the life review at different thresholds. This could account for variability in NDE onset conditions among different individuals.

Furthermore, catastrophe theory connects naturally with dynamical systems theory and brain state transitions. Neural mass models and metastable states in cortical networks often exhibit cusp-like bifurcations in response to global neuromodulatory inputs. This supports the plausibility of a phase-like transition in brain state consistent with the life review [25].

On a phenomenological level, the suddenness and irrevocability of the life review experience align with the “non-linear” intuition of catastrophe theory. Individuals often report that once the life review begins, they are unable to stop or redirect it, despite maintaining a strong meta-awareness. The irreversible collapse of state space into a unique basin of attraction resonates with the topological inevitability found in fold catastrophes.

To model the experiential manifold \mathcal{E} of consciousness, we define a fibre bundle over control space C , where each fibre F_c represents the accessible experiences at control value c . The life review corresponds to a fibre with reduced dimensionality, i.e., all fibres collapse to a single experiential trajectory:

$$\pi^{-1}(c_{\text{crit}}) = \{e^*\}, \quad \text{for } c_{\text{crit}} \in \Sigma, \quad (48)$$

where Σ is the bifurcation set in control space. This constructs a bridge between catastrophe theory and the earlier fibre bundle model of consciousness, enhancing coherence across theoretical levels.

16 Comparative Religious and Mystical Parallels with NDE Structure

This section analyzes these commonalities across traditions to illustrate a shared phenomenological substrate of NDEs.

reveals a comprehensive spiritual anthropology encoded in archetypal experiences across cultures.

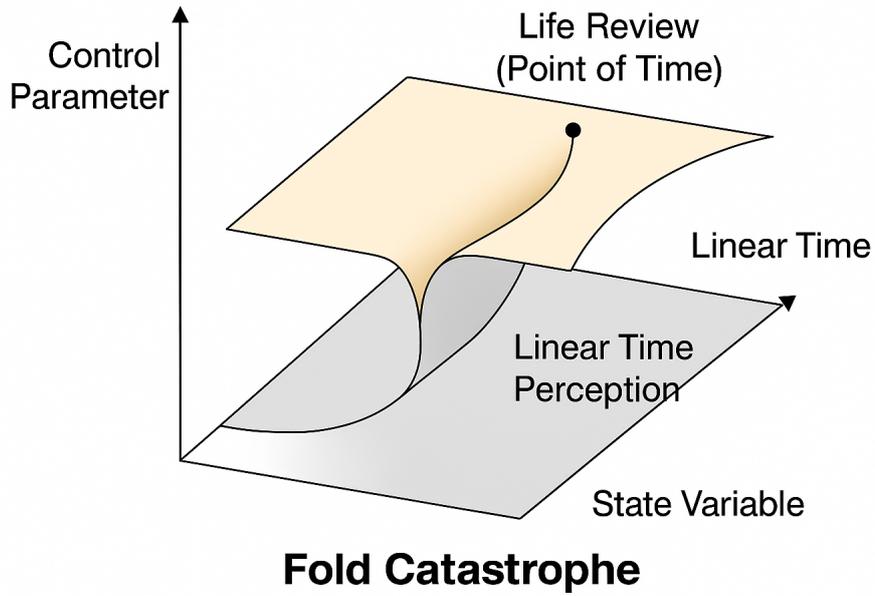


Figure 2: Diagram of a fold catastrophe representing the bifurcation at which linear time perception collapses into a unified life review state. The cusp point marks the critical threshold of transition, interpreted as the experiential singularity in NDEs.

The Bhagavad Gita's 11th chapter describes a cosmic vision that mirrors the intense unity of perception in NDEs.

According to these traditions, the transition of the soul involves a passage through symbolic states that echo stages of death and rebirth.

Sufism, the mystical branch of Islam, describes states of annihilation (*fana*) and subsistence (*baqa*) which are attained through spiritual purification and grace. These states entail the dissolution of the individual ego into divine unity, accompanied by an overwhelming sense of love and timeless presence. The Sufi literature of Ibn Arabi and Rumi contain verses that eerily resemble NDE reports, such as passing through darkness into radiant clarity, hearing celestial music, and encountering parts of transcendent unity and unconditional love.

neurophenomenological constants may underpin these visions, offering a bridge between subjective mysticism and cognitive science.

Despite doctrinal and symbolic differences, the structural elements found in NDEs and mystical experiences show remarkable overlap: dissolution of ego boundaries, perception of non-linear or eternal time, review or judgment of past actions, and an encounter with a being or field of light. To formalize this convergence, let us define a phenomenological phase space \mathcal{M} , where each point represents a state of consciousness characterized by parameters $(\epsilon, \tau, \lambda, \rho)$ corresponding to ethical evaluation, time perception, and spiritual presence.

$$\Psi : \mathcal{M} \rightarrow R^4, \quad \Psi = (\epsilon, \tau, \lambda, \rho), \quad (49)$$

where ϵ is ego-dissolution index, τ is temporal distortion factor, λ is luminosity level, and ρ is emotional valence. NDEs and mystical states cluster in a region $\mathcal{R} \subset \mathcal{M}$ where all parameters approach extremal values. This suggests a possible universal architecture of consciousness that transcends cultural form but retains structural integrity.

Comparative Mystical Parallels with Near-Death Experiences

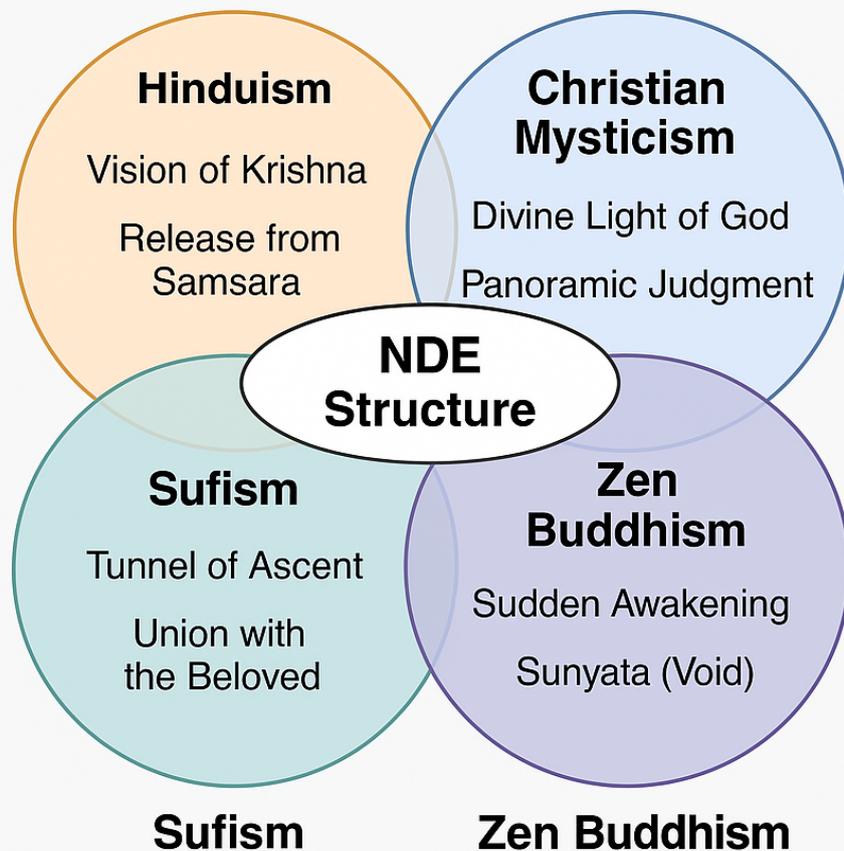


Figure 3: Comparative diagram illustrating shared structural elements between mystical traditions and Near-Death Experiences (NDEs), such as encounters with divine light, panoramic memory, ego dissolution, and transcendence of time.

17 Meta-NDE and the End of Kalpa: Cyclical Time and the Return to Paramdham

four Yugas: Satya, Treta, Dvapara, and Kali, each representing a gradual decline in virtue and consciousness.

Let us begin with the representation of time not as a real line R , but as a circle S^1 . This cyclic manifold encodes the repetition of birth and death across yugas. If we denote an incarnation by a point $p_i \in S^1$, then the entire journey of a soul through n lifetimes is the ordered set $\{p_1, p_2, \dots, p_n\} \subset S^1$. The Kalpa completes when the soul reaches the final point p_n , associated with a terminal meta-experience:

$$\lim_{t \rightarrow T_{\text{Kalpa}}} \mathcal{R}(t) = \bigcup_{i=1}^n \mathcal{L}_i, \quad (50)$$

where $\mathcal{R}(t)$ is the review function and \mathcal{L}_i is the life data of the i^{th} incarnation. At the end of Kalpa, the soul experiences not only a review of the current life, but a trans-lifetime, meta-review of the entire karmic arc.

represented as a mathematical fiber over each point in spacetime, encoding personal memory, identity, and affective tone.

$$\partial\mathcal{M} = \mathcal{P}, \quad (51)$$

where \mathcal{P} is the space of atemporal consciousness. No events occur in \mathcal{P} ; rather, it is a pure ontological presence.

This corresponds to a final bifurcation in the soul's state space. Let us define the karmic evolution of the soul as a dynamical system on a phase space $\mathcal{K} \subset R^n$. The evolution is governed by:

$$\frac{d\mathbf{k}}{dt} = \mathcal{F}(\mathbf{k}, t), \quad (52)$$

where \mathbf{k} is the karmic state vector. As $t \rightarrow T_{\text{Kalpa}}$, we encounter a terminal bifurcation surface Σ , after which:

$$\mathbf{k}(t) \rightarrow \mathbf{0}, \quad \text{for } t > T_{\text{Kalpa}}, \quad (53)$$

signifying karmic exhaustion and transition to a zero-entropy metaphysical state.

This state is akin to the Nirguna Brahman of Advaita Vedanta, or the Turiya in Mandukya Upanishad — pure awareness with no object. As such, the meta-NDE is not merely an extension of the usual NDE experience but represents a different order of cognition, closer to the metaphysical categories of *sat-chit-ananda*.

This structure finds analogs in Platonic philosophy, particularly in the theory of anamnesis, where the soul recollects its eternal truths upon exiting the cave of illusion. Similarly, in Abrahamic traditions, especially Christianity and Islam, the Day of Judgment encompasses a full account of the soul's actions across lifetimes (in some esoteric sects), followed by ascension to an eternal realm [28].

Thus, the meta-NDE at the closure of the Kalpa represents a moment when the soul's phase trajectory collapses from temporal extension to ontological singularity, transitioning from cyclical temporality to the unbounded silence of Paramdham.

Meta-NDE and the End of Kalpa: Cyclical Time and the Return to Paradhham

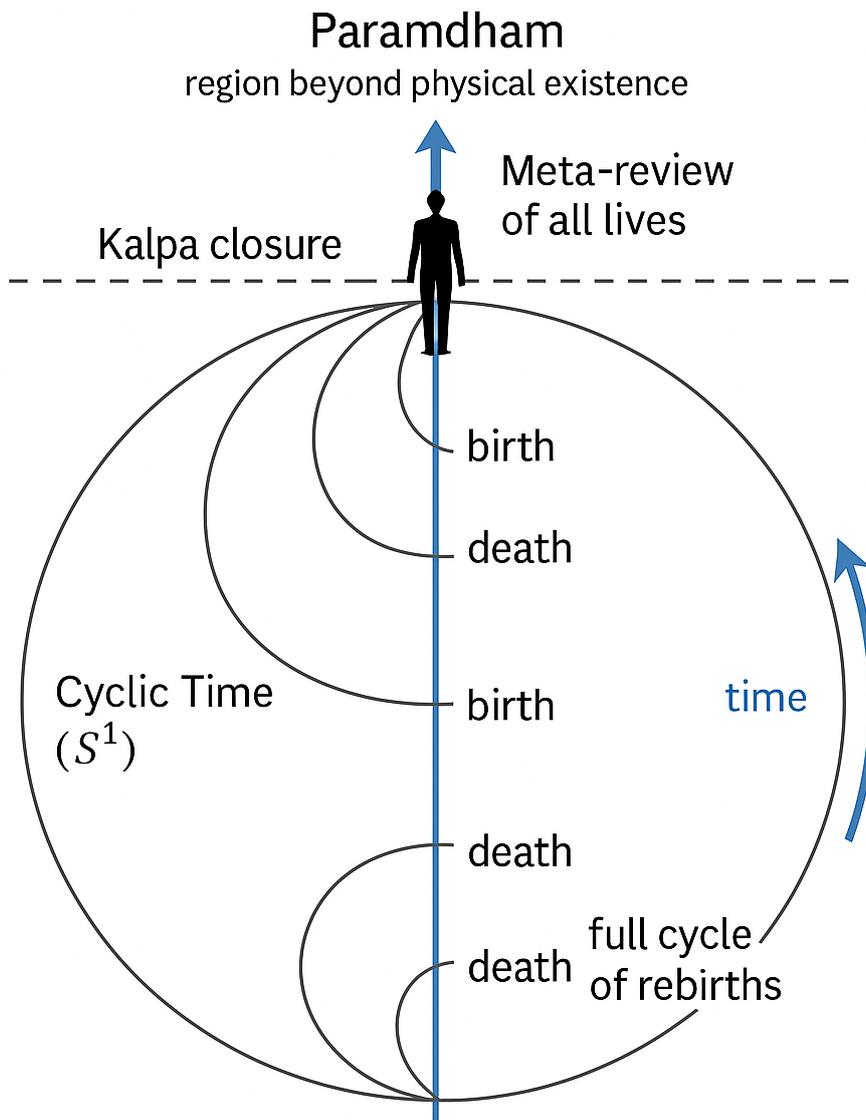


Figure 4: The Soul's journey across rebirths (modeled as cyclic time on S^1), culminating in a meta-review at the closure of the Kalpa, followed by transition to Paradhham — a metaphysical domain beyond physical time.

18 Comparative Eschatologies: Platonic Anamnesis, Buddhist Nirvana, and Abrahamic Judgment Day

This section analyzes these commonalities across traditions to illustrate a shared phenomenological substrate of NDEs.

encountered either as divine beings or luminous archetypes within altered states of consciousness.

higher-dimensional topologies offer tools to describe the non-linear layering of memory and time.

$$\mathcal{A}(s) = \pi^{-1}(s), \quad s \in \mathcal{S}. \quad (54)$$

higher-dimensional topologies offer tools to describe the non-linear layering of memory and time.

Similar to the notion of anamnesis in Plato, the meta-NDE invokes a total recollection that precedes transcendental liberation.

We may define the phenomenological gradient toward Nirvana as the reduction of the composite variables (κ, δ, ϕ) , representing craving, delusion, and volitional formation. The cessation condition is thus:

$$\lim_{t \rightarrow T} (\kappa(t), \delta(t), \phi(t)) = (0, 0, 0), \quad (55)$$

where T is the moment of final liberation. This structure is echoed in meta-NDE reports that speak of total emotional equanimity, cessation of desire, and the dissolution of personal identity at the moment of transcendence.

and are tightly interwoven with memory, identity, and experiential density during the final threshold of consciousness.

Let us define a judgment functional \mathcal{J} acting on a soul-history trajectory $\gamma(t) \in \mathcal{H}$, the moral space of actions over a lifetime:

$$\mathcal{J}[\gamma] = \int_0^T w(t) \cdot a(t) dt, \quad (56)$$

where $a(t)$ is the action density and $w(t)$ is the moral weight function. The soul's destiny is then determined by the sign and magnitude of $\mathcal{J}[\gamma]$, conceptually akin to the karmic exhaustion function discussed earlier.

Thus, while the specifics of eschatological structure differ, the common thematic convergence lies in the emergence of a terminal moment of review, transformation, and transcendence — whether conceived as return to the Forms, extinguishing into Nirvana, entrance into Paradise, or reabsorption into Paramdham. Each of these points to an invariant cognitive topology of the end-state: atemporal, integrative, and ontologically clarifying.

19 Conclusion

higher-dimensional topologies offer tools to describe the non-linear layering of memory and time.

In doing so, the model bridges subjective experience and formal representation, helping illuminate the architecture of consciousness.

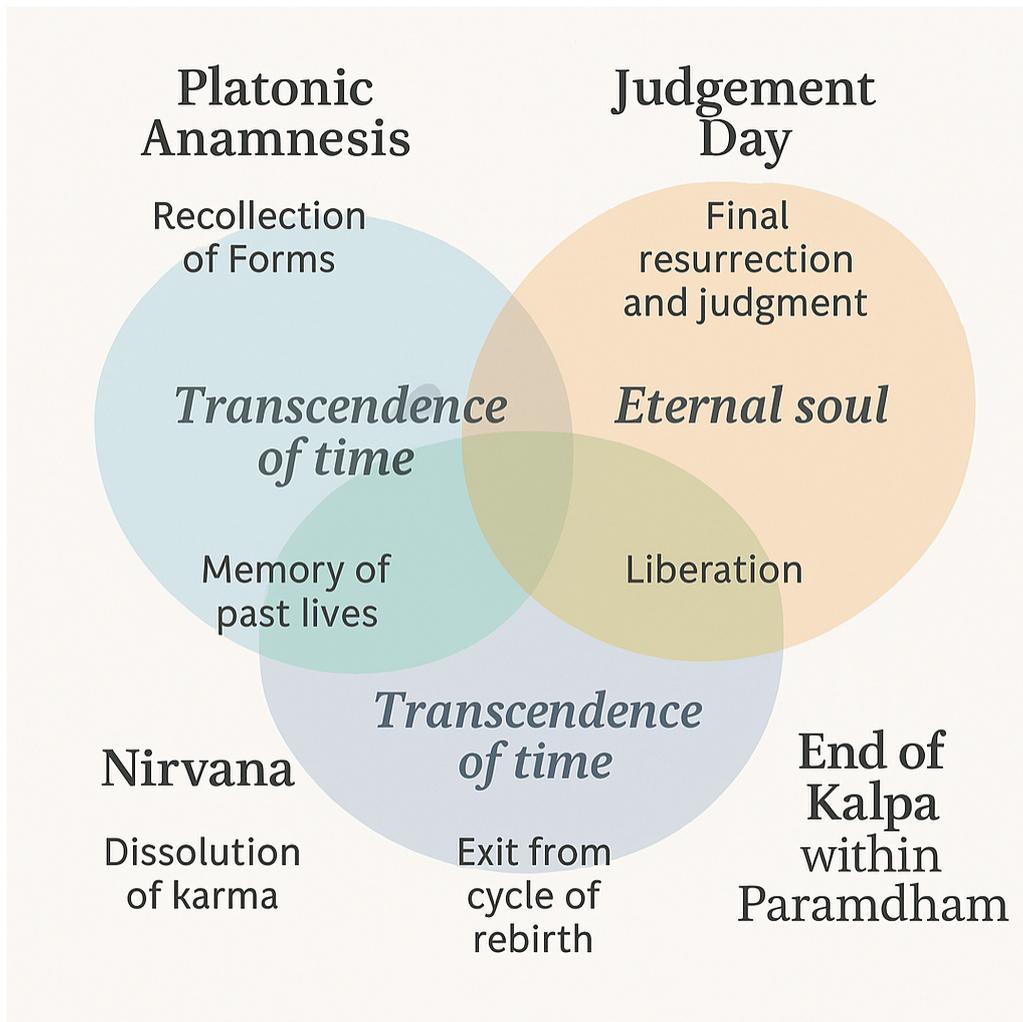


Figure 5: Conceptual Venn diagram comparing Platonic Anamnesis, Buddhist Nirvana, Abrahamic Judgement Day, and End of Kalpa within Paramdham. Shared features like transcendence of time, eternal soul, and liberation unify these eschatological visions.

embedded in a 4-dimensional perceptual space defined by affect, cognition, memory, and temporal stance.

The threshold moment when consciousness exits the physical and enters a state of atemporal awareness was modeled using catastrophe theory. The fold catastrophe equation:

$$V(x, \alpha) = \frac{1}{3}x^3 - \alpha x, \quad (57)$$

helped characterize the sudden bifurcation experienced during NDE onset. The dynamical transition from embodied cognition to a higher-order, integrated memory field aligns with reports of life review and timeless presence. These transitions also bear similarity to Buddhist models of Nirvana, Platonic anamnesis, and the eschatological Judgment Day of Abrahamic faiths, all of which denote a decisive culmination of lived experience and entry into an ontologically distinct state [27, 28].

In an extended metaphysical context, we proposed the concept of a “Meta-NDE” that occurs at the end of a cosmic Kalpa. According to Indic cosmology, this is a moment when the soul witnesses the entirety of its reincarnations and returns to *Paramdham*, the metaphysical space beyond space and time. This transition was formally expressed as:

$$\partial\mathcal{M} = \mathcal{P}, \quad (58)$$

with \mathcal{M} as the spacetime manifold and \mathcal{P} representing the boundary domain of pure consciousness. This ontological limit mirrors the Advaitic description of Nirguna Brahman as pure being, consciousness, and bliss.

suggests that the “point of time” is not a mere instance but an integrated, multi-modal event across phenomenological dimensions.

The life review experience in near-death states presents a profound challenge to our understanding of time, memory, and consciousness. Philosophically, it invites a reevaluation of time as a linear continuum, replacing it with models of temporal compression, simultaneity, or high-dimensional experience. Neurocognitively, it suggests that under extreme conditions, the brain is capable of retrieving and integrating vast spans of episodic content within a narrow physical time frame. Future studies should aim to explore this capacity through simulated states, such as deep meditation, psychedelics, or virtual reality-based memory recall, combined with neuroimaging.

The hypothesis advanced in this paper—that a “point” in time can be a structured, information-dense event—extends the phenomenological and mathematical discourse on temporality. As our understanding of consciousness deepens, models like the “Structure of a Point of Time” may offer not just explanations for anomalous experiences, but also new insights into the nature of awareness itself.

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